

The Smart Education & Vocational Training System
Complete range of Chungpa EMT products





CHUNGPA

Vocational Training System for HRD & Smart Education

“The Standard Company in the World”



Chungpa EMT's Mission Statement:

Create the Technology

Create the Education

Create the Future

We envision a new bright future by making a contribution to the cultivation of technical manpower and leading the right path of world's technical education through our innovative products and creative solutions.

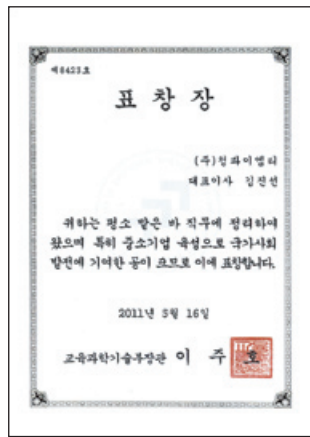




Technical Innovation

To meet a variety of sophisticated customer needs around the globe, CHUNGPA provides various types of state-of-art didactic equipments and total solutions.

We will do our best efforts to create new value chains for competitive growth dynamics and lead technical innovation to be the center of global business.



Award certificate issued by the Korean government



Patent certificate – Integrated measurement type educational platform



Excellence in Quality

We are pledged to offer high quality products and customer satisfaction services through dynamic challenge, endless passion and innovative ideas.



Environment Management System
ISO14001:2004



Quality Management System
ISO 9001:2008

CEO's Message

Management philosophy

Enterprise that respects people and nature
Enterprise that affluent lives of mankind

Management goal

Enterprise outreaching globally
Globally core enterprise

Management ideology

Knowledge control management
Technology innovation management
Sharing realization management

Policy on quality

Best spirit, best quality, best service



How are you?

We truly appreciate your support with continued interest in our products.

As you know, Chungpa EMT has been in the same scope of business in technical didactic training system for many years. With our accumulated technical skills and in-depth knowledge in research and development, we can provide various types of state-of-art didactic equipments and total solution.

We offer complete experimental education solutions that satisfy both lecturers and students through aggressive course actions of research and development in electricity, electronics, telecommunication and automation in order to quickly respond to this rapidly changing information era.

Proudly speaking, we obtained many certifications and governmental recognitions such as a government procurement supplier, a Hi Seoul brand company, a Seoul patent star company, ISO 14001:2004 certified company, a European CE certified company, a U.S patent holder and a member of Korea Trade Association and Korea Scientific Instruments Industry Cooperative. Especially, Chungpa EMT has been selected as a Hi-Seoul Brand member by the Seoul Metropolitan City for 6 years in a row.

I believe that our didactic training system will contribute to the cultivation of technical manpower and serve your needs to prepare the National Skills Competency (NSC) and National Qualification Exams. Dedicated to technical education, we will be happy to lead the right path of world's technical education through our innovative products and creative solutions.

President. Kim Jin-Sun



Company History

Chungpa EMT will not only maximize the performance of existing vocational training system and technical education businesses, but also explore new educational business areas including smart learning, science and technology, health, medical and robotics. We at Chungpa EMT will do our best to contribute to the prosperity of the human societies and become a global leader in the field of vocational training system.

1995 ~ 2015

- 2015**
 - 2 Won the grand prize awarded by the Korea Instruments Industry Cooperative (KSIIIC)
 - 3 Registered three patents on engineering education platform: "Smart Trainer"
 - 4 Was renominated as an "INNO-BIZ company"
- 2014**
 - 4 Was renominated as a "venture business"
 - 12 Was renominated as a "promising export-oriented SME"
- 2013**
 - 1 Was selected for the prestigious "Hi Seoul Brand" for six years in a row
 - 2 Developed the RSL-500 Lecture Capture System
 - 4 Developed the AReS Smart Trainer
 - 5 Launched the R&D projects on the Lecture Capture System and Smart Trainer
- 2012**
 - 4 Developed Smart PLC Training System
 - 5 Developed LED Training System
 - 10 Developed a RSL server solution
 - 11 Developed a mobile smart learning software

Registered patents for the firmware update system and methods for remote mobile devices using wireless communication network (No. 10-1200025)

Won the USD 300 Million Export Tower Prize awarded by Seoul Business Agency
- 2011**
 - 1 Applied for design registration: Wind Energy Generator equipped with solar cells (No. 30-0584736)
 - 2 Applied for design registration: Solar Tracking System (No. 30-05588171)
 - 5 CEO Mr. Jin-Sun Kim received a minister citation (Ministry of Education, Science and Technology)
- 2010**
 - 4 Enrolled as a software business entity (by Korea Software Industry Association)
 - 6 Was nominated as a Seoul Patent Star Company (by Seoul Business Agency)
 - 12 Registered a patent on "Hybrid Renewable Energy Generation System and Power Quantity Measuring Instrument" with other four patents
- 2009**
 - 1 Was nominated as Hi Seoul Brand Company (by Seoul Business Agency)
 - 3 Executed a contract for a boat tracking and monitoring system in Chengdu, China
- 2008**
 - 2 Registered the company's R&D Center through Korea Industrial Technology Association
 - 6 CEO Mr. Jin-Sun Kim received a minister citation (Korea Federation SMBA)

Was nominated as a "promising export-oriented SME"
- 2007**
 - 3 Won a prize awarded by Minister, Ministry of Commerce, Industry and Energy



- 2006**
 - 2 Was nominated as a "venture business" (Small & Medium Business Agency)
 - 3 Received INNO-BIZ certification (Small & Medium Business Agency)
 - 6 Was nominated as a excellent technology business (Korea Credit Guarantee Fund)
 - 9 Acquired a patent for the automatic vehicle control device
- 2005**
 - 3 Developed "Digital Electric Safety Meter (KESCO-2000)"
 - 4 Applied for the U.S patent with "no-contact type battery pack charging system"
 - 5 Registered the "Digital Electric Safety Meter" as a utility model (No.0386320)
Developed "GSM/GPRS communication terminal" (uWDT-540G)
- 2004**
 - 5 Obtained a patent for "no-contact type battery pack charging system" (No. 0432369)
Developed "Digital Multifunctional Measuring Meter"
- 2003**
 - 5 Relocated the headquarter by moving to a larger facility in the Gasan Digital Industrial Complex
 - 10 Applied for the international PCT patent on "no-contact type battery pack charging system"
- 2002**
 - 3 Entered into a distribution contact for CASPOC circuit simulation software
 - 4 Developed "Power Measurement Network System" and "Portable Power Quality Analyzer"
 - 9 Obtained certification of ISO 9001:2000/KS A9001:2001
 - 10 Proceeded a patent application for "no-contact type battery pack charging system"
- 2001**
 - 6 Developed a large screen monitoring device for power plant measurement and control
- 2000**
 - 7 Obtained certification of EMC registration for the LCD Projector
- 1999**
 - 5 Converted into a corporation under the name of Chungpa EMT Co. (CEO: Jin-Sun Kim)
 - 6 Registered a trade business through the Korea Trade Association
- 1998**
 - 1 Developed "Electric Measurement System"
 - 7 Obtained a governmental permit for factory operation
 - 10 Developed "Solar Power Training System"
- 1997**
 - 1 Developed "Robot System" using solar energy
 - 4 Developed "Linear Motion Training System"
 - 12 Developed "Transformer Trainer"
- 1996**
 - 7 Developed "Power Acquisition Software"
 - 10 Developed "50MHz Pulse Generator"
- 1995**
 - 7 Established a private company – "Chungpa Engineering" (CEO: Jin-Sun Kim)
 - 10 Developed "Digital Power Meter (Volt, Ampere, Watt, PF)"
 - 12 Obtained a permission to join a member of Korea Scientific Industry Cooperative

Turning Dreams into Reality in The Future

Our management philosophy states that a company is nothing but a human being.

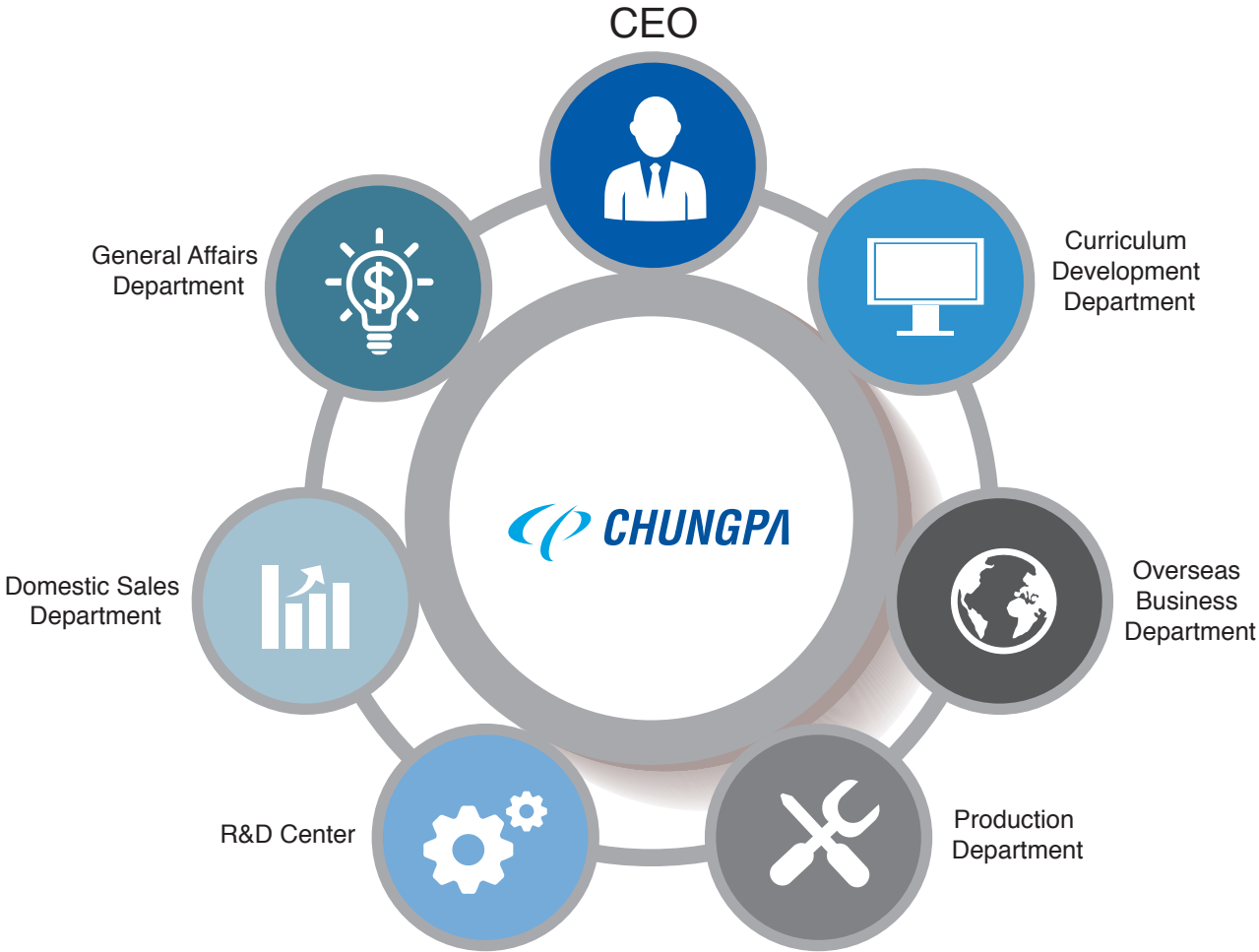
We understand that personal growth of our employees is the root of the corporate development. Accordingly, we try to secure a competitive edge through regular training sessions and courses of education offered to our employees.

Also, we host and run a sales meeting session annually by inviting our sales partners and distributors representing the domestic market, and also those from around the world.

We are making endless efforts to jump into a new paradigm of technical education and training.



Company Organization



Certifications and Awards

Since the foundation of Chungpa EMT, we obtained many certifications and governmental recognitions such as a government procurement supplier, a Hi Seoul brand company, a Seoul patent star company, ISO 14001:2004 certified company, a European CE certified company, a U.S patent holder and a member of Korea Trade Association and Korea Scientific Instruments Industry Cooperative.

Corporate Certifications



Governmental Awards



Patents & Technology Certificates



Main Business Fields

Based on research and development activities over 20 years, CHUNGPA EMT is proud to be a role model company for smart technology education.

We are implementing smart learning businesses based on the market-proven technologies and broad business experiences accumulated to date in developing educational training system, test & measuring instruments, and mobile vehicle control system and solutions.



Smart Learning System

Chungpa EMT is unfolding smart learning solution businesses based on excellent contents designed to meet the needs of the industry and learning institutes after successful development of the Real Smart Learning System and the Smart Trainer.



Didactic Training System

We offer complete experimental education solutions that satisfy both lecturers and students through aggressive course actions of research and development in electricity, electronics, telecommunication and automation in order to quickly respond to this rapidly changing information era.



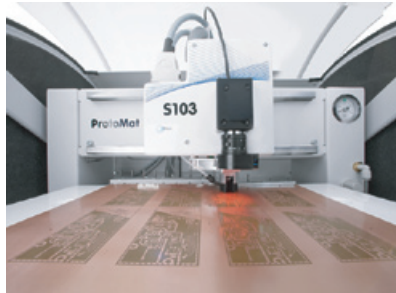
Telecommunication System

Chungpa EMT is recognized as a high-tech company by the success of developing the highly advanced terminal system of remote vehicle control using the Ubiquitous core technology of GPS, CDMA and GSM/GPRS communication network.



Test & Measuring Instrument

We supply high-performance measuring instruments such as a digital oscilloscope, power quality analyzer, and Multifunctional Digital Electric Meter that was jointly developed by Korea Electric Power Corporation (KEPCO).



PCB & SMT Business

Faculty researchers and students use the reliable and precise PCB and SMT production system for their research and development as well as laboratory training.



R&D Project Implementation

The prestigious research & development institutes such as Seoul University, KAIST and Korea Institute of Textile are using the nano-fiber textile spinning system supplied by Chungpa EMT for development of nano-fiber technology.



Simulation Software Business

By researching the excellent teaching methods recognized domestically and new technologies applied to education, we are supplying the high-tech simulation software designed to help students obtain hands-on technical skills.



Overseas Vocational Training Solution

We have been supplying our excellent-quality educational training system in many countries and providing the international vocational education solutions to our overseas local partners.



Scholarship Project

We are implementing a "10-year scholarship project" by the establishment of a scholarship fund that had been prepared over years and making a best effort in accessing talent pools through the scholarship offered to 20 students.

Contents

Electricity / Electronics Section

Smart Trainer

3 Smart Trainer | AReS

Electricity / Electronics

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| 24 | Electronic Circuit Trainer CPE-EO2310 | 68 | DC Motor (Shunt/Compound) and AC Synchronous Generator CPE-ER1604 |
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| 34 | Power Transmission-Distribution & Electrical Installation Trainer EIS-3000 | 72 | Power Electronics Circuit Trainer CPE-ER1400 |
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| 41 | Micro Controller Training Kit CPE-MP300 | 74 | Digital Logic Circuit Trainer CPE-EO2110 |
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| 47 | Ubiquitous-based Integrated Sensor Application Trainer CSN-2005 | 76 | Digital & Analog Lab Unit CPE-EO2130 |
| 51 | Sensor Application Trainer CPE-SN2007 | 77 | Digital Lab Unit CPE-EO2140 |
| 53 | Inverter Training System CPE-ER1010 | 78 | Analog Semiconductor Circuit Trainer CPE-EO2200 |
| 54 | Industrial Inverter Control Trainer CPE-ER1000 | 79 | Electronic & Semiconductor Circuit Trainer CPE-EO2210 |
| 55 | AC Servo Motor Trainer CPE-ER200 | 80 | Basic Electricity & Electronics Trainer CPE-EO2220N |
| 56 | DC Motor Control Trainer CPE-ER160 | 81 | Analog OP AMP Circuit Trainer CPE-EO2240 |
| 57 | Motor Trainer CPE-ER170 | 82 | Electric Power Distribution Trainer CPE-EP1000 |
| 58 | Stepping Motor Trainer CPE-ER180 | 83 | Power IT Electrical Distribution Trainer CPE-K330 |
| 59 | DC Servo Motor Trainer CPE-ER190 | 84 | Fire Fighting Electrical Application Trainer CPE-ER1991 |
| 60 | Transformer Trainer CPE-ER500VA | 86 | Fire Fighting Electrical Wiring Trainer CPE-ER1992 |
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Electricity / Electronics Section

Renewable Energy

- | | |
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3kW Grid-tied Solar Energy Training Systems CP-GTS3KC
Solar Tracker Training System CP-GT2000</p> <p>112 Solar Tracking Control Trainer CPE-ST20P</p> <p>113 Photovoltaic System Assembly & Disassembly Trainer CPE-S25</p> <p>117 Energy Conversion Trainer CP-S30</p> | <p>119 Portable Solar Energy Trainer CP-S22P</p> <p>120 Solar Street Light Training System
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LED

- | | |
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ICT Section

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- | | |
|---|---|
| <p>143 Wireless Communication & Antenna Trainer CPE-TC5010</p> <p>146 FM Stereo Transmitter & Receiver Trainer CPE-TC5000</p> <p>147 AM/FM Transmitter & Receiver Trainer CPE-TC5030</p> <p>148 CDMA/GPS Microprocessor Training Kit UDT-350A</p> | <p>149 Ubiquitous Mobile Tracking System Series CPE-MP500 Series</p> <p>151 Ubiquitous Mobile Tracking System - TM CPE-MP500-TM</p> <p>153 Ubiquitous Mobile Tracking System - SM CPE-MP500-SM</p> <p>155 Ubiquitous Mobile Tracking System - SUB CPE-MP500-SUB</p> |
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| 163 | Hydraulic Trainer CPE-HY8000
Electro-Hydraulic Trainer CPE-HY8500 | 244 | Mini-MPS Trainer (Mitsubishi PLC) CPE-AT3500A |
| 167 | Electro-Pneumatic Control Trainer CPE-PN2100 | 244 | Mini Automation Multiprogramming Trainer CPS-AT3450U |
| 170 | Smart PLC Trainer CPE-MP150 | 248 | Mini Automation Multiprogramming Trainer CPS-AT3450 |
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| 173 | Universal Programmable Logic Controller Trainer
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| 175 | Modular PLC Application Trainer CPS-3550U | 253 | Motion Control Trainer CPE-AT4410 |
| 177 | Universal PLC Training System CPS-3500U | 254 | Conveyor Control Trainer CPE-AT3805 |
| 180 | Programmable Logic Controller Trainer CPS-3400 | 255 | Conveyor Control Trainer CPE-AT3810 |
| 183 | Multiple-PLC Application Trainer CPE-PN7540 | 256 | Mini Pneumatic Control Trainer CPS-AT3460 |
| 185 | Automation PLC Training Kit CPS-3750M | 257 | Smart I/O Control Pneumatic Trainer CPS-AT3470 |
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| 187 | Siemens PLC Trainer CPS-3800 | 259 | Portable Electro-Pneumatic Training Kit CPE-PN7520 |
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| 189 | Portable Siemens PLC Trainer CPS-3541 | 261 | Pneumatic Components Set CPE-PMAP |
| 190 | Multi-purpose PLC Demonstration Unit CPS-3540-SIM | 262 | Elevator Trainer CPS-AT3900 |
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| 197 | Electrical Sequence Control Trainer CPS-3100A | 267 | Auto Warehouse Robot Trainer CPE-RO8010 |
| 198 | Electrical Sequence Control Trainer CPS-SQ38 | 268 | Auto Warehouse Robot Trainer CPE-RO8020 |
| 199 | Modular Sequence Control Trainer CPE-ER1200 | 269 | Parking Tower System Trainer CPE-AT3910 |
| 202 | Touch Panel Trainer CPE-AT3092M | 270 | PTP Robot Trainer CPE-RO8000 |
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| 204 | Factory Automation Trainer CPE-AT8030N | | |
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| 233 | Smart Servo Control Trainer CPE-AT4430 | | |
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Smart Learning Section

Smart Learning

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Software

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Test & Measurement Section

Test & Measurement

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301 Leakage Current Clamp | CPM-SN300

302 Digital Storage Oscilloscope | CPM-1005BE / CPM-2005BE

305 Digital Multimeter | CPM-8302A

306 Function Generator
 | CPM-8202 / CPM-8203 / CPM-8205 / CPM-8210

308 3GHz Universal/Frequency Counter | CPM-8030 / CPM-8030U

310 Universal/Frequency Counter (1.5GHz / 3.7GHz)
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312 Universal Measuring Instrument | MS-9170

310 Universal Relay Tester | CPM-2700

314 Transistor Checker & Curve Tracer | CPE-2800

316 Regulated DC Power Supply
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 CPS-3032/CPS-3052

317 Tracking Regulated DC Power Supply
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322 Electricity & Electronics Experimental Table
 | CPE-OT9020 / CPE-OT9030 / CPE-OT9040



Product Images

Electricity / Electronics Section

Smart Trainer



3

Smart Trainer AReS

Electricity / Electronics



21

Electric Circuit & Electrophysics Trainer
CPE-EO2300



24

Electronic Circuit Trainer
CPE-EO2310



27

Digital & Analog Circuit Trainer
CPE-EO2320



30

PC-based DAQ Training Kit
CPE-MP115



31

Electrical Installation &
Safety Engineering Trainer
EIS-2000



34

Power Transmission-Distribution &
Electrical Installation Trainer
EIS-3000



37

Microprocessor Training Kit
CPE-MP100B



41

Micro Controller Training Kit
CPE-MP300



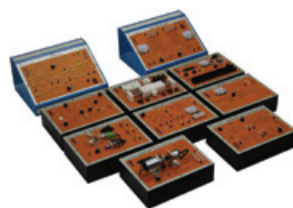
43

PC-based Sensor Application Trainer
CPE-SN2012



47

Ubiquitous-based Integrated Sen-
sor Application Trainer
CSN-2005



51

Sensor Application Trainer
CPE-SN2007



53

Inverter Training System
CPE-ER1010

Product Images

Electricity / Electronics Section

☒ Electricity / Electronics



54
Industrial Inverter Control Trainer
CPE-ER1000



55
AC Servo Motor Trainer
CPE-ER200



56
DC Motor Control Trainer
CPE-ER160



57
Motor Trainer
CPE-ER170



58
Stepping Motor Trainer
CPE-ER180



59
DC Servo Motor Trainer
CPE-ER190



60
Transformer Trainer
CPE-ER500VA



61
Electrical Machine Trainer
CPE-ER1500



65
DC Motor (Shunt/Series) and DC
Compound Generator
CPE-ER1601



66
Squirrel Cage Induction Motor
and DC Shunt Generator
CPE-ER1602



67
Wound-Rotor Induction Motor
(3-Phase) and DC Generator
(Shunt/Compound)
CPE-ER1603



68
DC Motor (Shunt/Compound) and
AC Synchronous Generator
CPE-ER1604



69
AC Synchronous Motor (3-Phase)
and DC Shunt Generator
CPE-ER1605



70
Load Resistor (1-Phase / 3-Phase)
CPE-RL203K / CPE-RL303K



71
DC Power Supply Trainer
CPE-ER1105



72
Power Electronics Circuit Trainer
CPE-ER1400

Product Images

Electricity / Electronics Section

☒ Electricity / Electronics



73
Digital Logic Lab Unit
CPE-EO2100



74
Digital Logic Circuit Trainer
CPE-EO2110



75
Analog Lab Unit
CPE-EO2120



76
Digital & Analog Lab Unit
CPE-EO2130



77
Digital Lab Unit
CPE-EO2140



78
Analog Semiconductor Circuit
Trainer
CPE-EO2200



79
Electronic &
Semiconductor Circuit Trainer
CPE-EO2210



80
Basic Electricity &
Electronics Trainer
CPE-EO2220N



81
Analog OP AMP Circuit Trainer
CPE-EO2240



82
Electric Power Distribution Trainer
CPE-EP1000



83
Power IT Electrical
Distribution Trainer
CPE-K330



84
Fire Fighting Electrical
Application Trainer
CPE-ER1991



86
Fire Fighting Electrical
Wiring Trainer
CPE-ER1992



87
Fire Fighting Simulation Trainer
CPE-ER1993



89
Integrated Fire Fighting
Control Software
CPE-ER1994

Product Images

Electricity / Electronics Section

Renewable Energy



93
Integrated Fire Fighting
Control Software
CPE-EN4500



102
Solar/Wind/Fuel Cell
Training System
CPE-EN4600



107
Standalone Solar Energy
Training System
CP-S120



107
Wind & Solar Hybrid Energy
Training System
CP-S120C



109
Grid-tied Solar Energy
Training System
CP-GTS1.2K



109
1.2kW Grid-tied Solar Energy
Training System
CP-GTS1.2KC



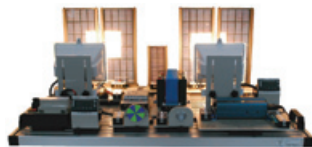
109
3kW Grid-tied Solar Energy
Training Systems
CP-GTS3KC



109
Solar Tracker Training System
CP-GT2000



112
Solar Tracking Control Trainer
CPE-ST20P



113
Photovoltaic System Assembly &
Disassembly Trainer
CPE-S25



117
Energy Conversion Trainer
CP-S30



119
Portable Solar Energy Trainer
CP-S22P



120
Solar Street Light Training System
CP-SOLAR100/200/400



121
Wind Energy Training System
(Hybrid Type)
CP-WS300



122
Wind Energy Training System
CP-WS350



123
Wind Turbine Training System
CP-WIN400/900/1000

Product Images

Electrics/Electronics Specialization

Renewable Energy



124
Professional Fuel Cell
Training System
CP-392E



125
Hydrogen Fuel Cell
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CP-HD500



126
Fuel Cell Analyzer
PRO-200F



127
Renewable Energy Data Analyzer
CPE-SM3010

LED



131
LED Drive Circuit Trainer
CPE-EO2700



134
Integrated LED Panel Trainer
CPE-EO2820



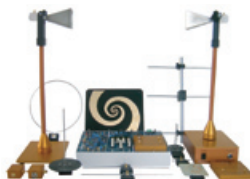
137
LED Signage Display
Training System
CPE-EO2830



139
Panorama LED Bar Trainer
CPE-EO2840

ICT Section

Information Communication



143
Wireless Communication &
Antenna Trainer
CPE-TC5010



146
FM Stereo Transmitter &
Receiver Trainer
CPE-TC5000



147
AM/FM Transmitter &
Receiver Trainer
CPE-TC5030



148
CDMA/GPS Microprocessor
Training Kit
UDT-350A

Product Images

ICT Section

Information Communication



151
Ubiquitous Mobile Tracking System - TM
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CPE-MP500-TM



153
Ubiquitous Mobile Tracking System - SM
(Student-centered main system)



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Ubiquitous Mobile Tracking System - SUB
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Automation/Mechatronics/Robotics



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175
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177
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180
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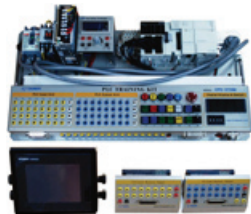
Product Images

Automation Section

Automation/Mechatronics/Robotics



179
Multiple-PLC Application Trainer
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181
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182
Portable PLC Trainer
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188
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189
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190
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CPS-3540-SIM



192
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CPS-3543



194
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CPS-3140



194
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194
Sequence Control Trainer
CPS-3210



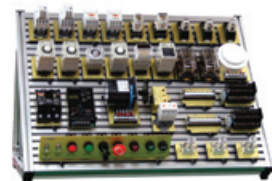
196
Electrical Sequence Control Trainer
CPS-3100B



197
Electrical Sequence Control Trainer
CPS-3100A



198
Electrical Sequence Control Trainer
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199
Modular Sequence Control Trainer
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Product Images

Automation Section

Automation/Mechatronics/Robotics



202
Touch Panel Trainer
CPE-AT3092M



203
Graphic Panel Trainer
CPE-AT3090



204
Factory Automation Trainer
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206
Flexible Manufacturing System
CPE-FMS



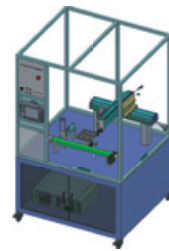
211
Smart Factory Training System
CPE-FAS30



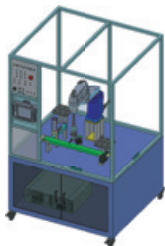
219
Modular Production Training
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CPE-MPS200



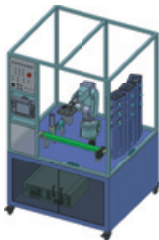
225
Modular Production
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230
2-Axis Cartesian Coordinate
Robot Trainer
CPE-RO9001



231
4-Axis SCARA Robot Trainer
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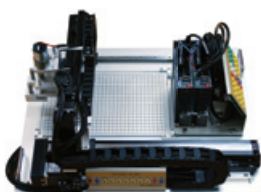
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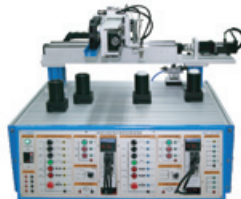
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235
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236
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CPE-AT4400



238
PC-based Analog Control Trainer
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240
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CPE-AT3620A

Product Images

Automation Section

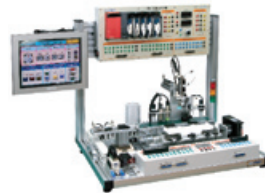
Automation/Mechatronics/Robotics



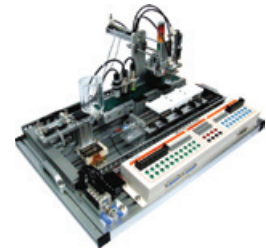
242
Water Level Control Trainer
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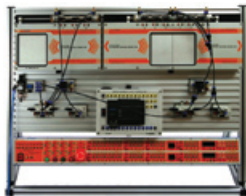
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246
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248
Mini Automation
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250
Pneumatic Auto Door Trainer
CPE-PN2500/2500A/PN2500B



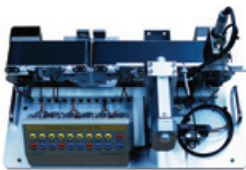
251
Factory Automation Trainer
CPE-AT3680



253
Motion Control Trainer
CPE-AT4410



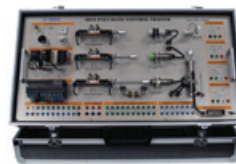
254
Conveyor Control Trainer
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255
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CPE-AT3810



256
Mini Pneumatic Control Trainer
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Smart I/O Control Pneumatic Trainer
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Portable Electro-Pneumatic Training Kit
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260
Portable Pneumatic Training Kit
CPE-PN7530



261
Pneumatic Components Set
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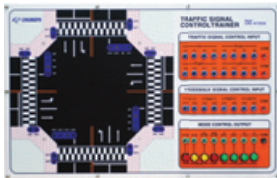


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Automation Section

Automation/Mechatronics/Robotics



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Temperature Control Trainer
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265
PLC-based Temperature Control
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Smart Learning Section

Smart Learning



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RSL Series

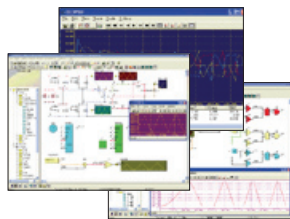
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Software



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Automation Studio™



287

Power Electronics &
Green Energy CAD Software
CASPOC



291

HMI/SCADA Software
AUTOBASE 10

Test & Measurement Section

Test & Measurement



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Multifunctional Digital Electric Meter
CEM-2200



301

Leakage Current Clamp
CPM-SN300



302

Digital Storage Oscilloscope
CPM-1005BE / CPM-2005BE



305

Digital Multimeter
CPM-8302A

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Test & Measurement Section

☒ Test & Measurement



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Function Generator
CPM-8202/8203/8205/8210



308
3GHz Universal /
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CPM-8030 / CPM-8030U



310
Universal / Frequency Counter
(1.5GHz / 3.7GHz)
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CPM-8037



312
Universal Measuring Instrument
MS-9170



314
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315
Transistor Checker & Curve Tracer
CPE-2800



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Regulated DC Power Supply
CPS-251S, CPS-303/305/3010,
CPS-503/505,
CPS-3032/CPS-3052



317
Tracking Regulated
DC Power Supply
CPS-201T / CPS-303 / CPS-305T



318
AC/DC Variable Power Supply
CPS-2450B



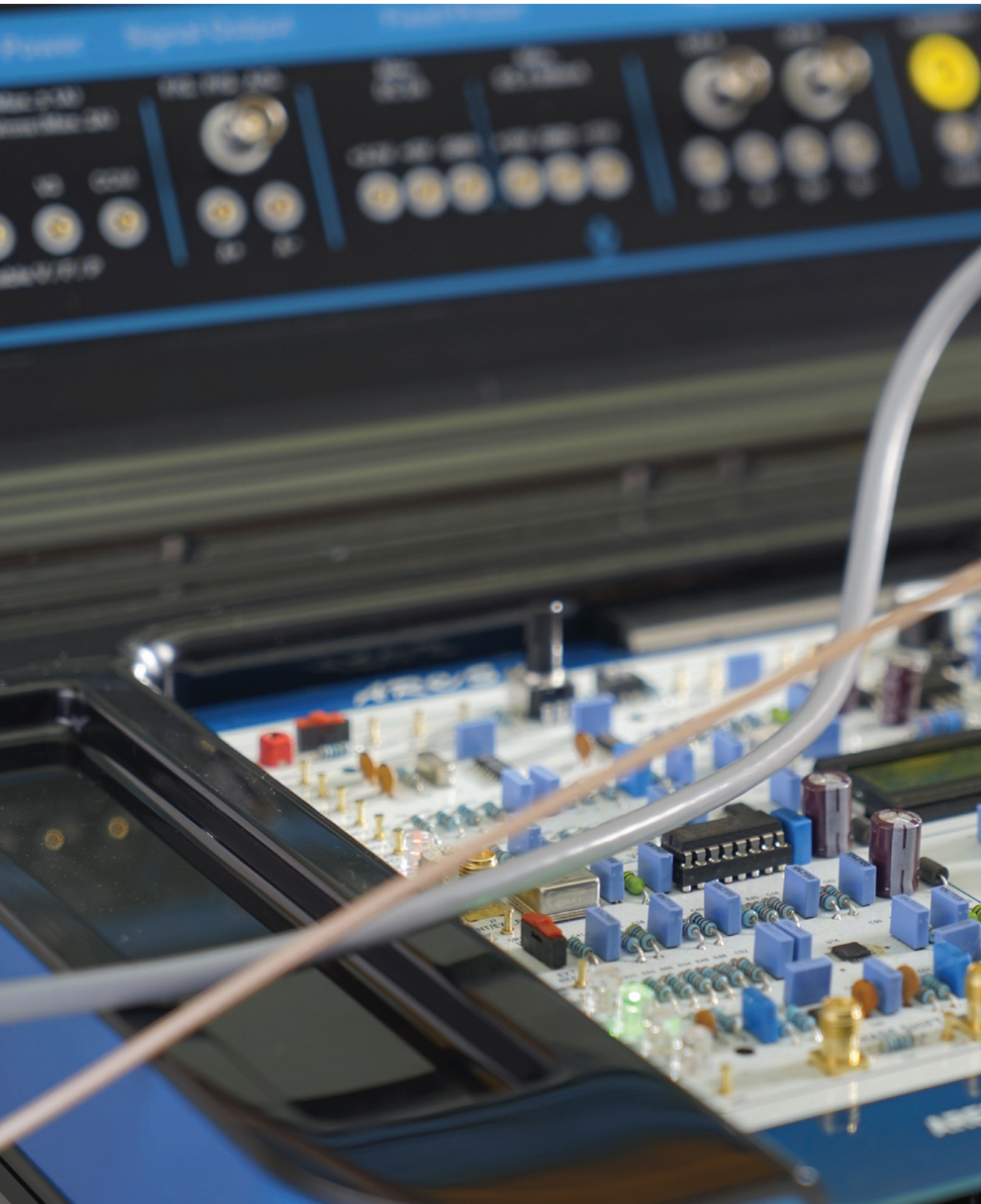
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CV/CF Automation
Voltage Regulator
CPS-3001K



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Multifunction Experimental Table
CPE-OT9000/OT9010



322
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Experimental Table
CPE-OT9020/OT9030/OT9040





Smart Trainer

Contents

3 Smart Trainer | AReS

ARes (All-in-One Real time Instrumentation & Educational System)

Smart Trainer



FEATURES

- All-in-one smart learning platform designed for technical education
- Embedded Microsoft Operating System (OS) for easy operation
- Built-in functions of various measuring instruments such as oscilloscope and function generator
- Internet access through cable or wireless(WiFi) communication
- Full-color TFT touch LCD
- Supports USB and Serial Interface
- Highly efficient test & measurement application software
- Multilingual support
- Various types of experimental modules: electricity, electronics, telecommunication, microprocessor and automation control
- Capable of playing back smart learning video contents
- Comes with contents management software as a part of experimental modules package
- Digital experimental manuals in e-Book format (option)
- Circuit design simulation software: CASPOC (option)

MS Windows embedded System

- Oscilloscope
- Volt & Ampere meter
- Power meter
- Digital multimeter
- Function generator
- Arbitrary waveform generator
- DC source generator
- 3-channel variable DC power supply
- 3-phase variable AC power supply
- 4-channel fixed DC power supply
- Digital I/O devices
- Relay output devices
- Test & measurement application software

Advanced Platform (model: ARes-Advanced)

- Embedded OS of smart learning platform for the measurement
- Equipped with Intel CPU (Atom processor)
- 1.6GHz, 800MHz FSB, 512KB L2 cache
- 2.1W ultra low power system [FCBGA package]
- Hyper-Threading technology [45nm technology]
- Ethernet and Wi-Fi communication
- Serial and USB communication interface
- Touch screen resolution: QXGA (1920 x 1200)
- Connector to link experimental modules: 124 points
- Integrated measuring board with 3-core CPU





Variety GUI of TFT touch LCD software

Basic Platform (model: AReS-Basic)

- Embedded OS of smart learning platform for the measurement
- Equipped with Arm Cortex CPU (Cortex-M4 32 bit RISC processor)
- Serial and USB communication interface
- Connector to link experimental modules: 124 points
- Integrated measuring board with 3-core CPU

Embedded Software

- Embedded OS based application software (*ARes-Advanced)
- Smart touch user interface control function (*ARes-Advanced)
- PC-based application software (*ARes-Basic)
- Supports Multilingual selection and audio/video control
- Real-time measuring instrumentation software [ARes-RTI-01]
- Smart learning contents management software [ARes-SLS-500-01]
- Electronic (e-Book) format experimental manual [Option]
- Circuit design simulation software [Option]

Real-Time Measuring Application Software (ARes Advanced)



PC-Based Application Software (ARes Basic)



ARes (All-in-One Real time Instrumentation & Educational System)

Try our new-concept smart learning platform and enjoy high quality learning experiences!

The ARes Smart Trainer is the all-in-one smart learning platform designed for technical education. This smart learning platform is equipped with 11 types of measuring instruments essential for smart technology education such as oscilloscope, digital multimeter, DC power supply, AC power supply and function generator.

The ARes Smart Trainer features a full-color TFT touch LCD screen for clear view and powerful arithmetic operations based on Atom N270 CPU processor. It was designed to ensure benefit of smart education through the hardware architecture of the built-in integrated measurement board loaded with 3-Core CPU. It provides excellent communication environment through various types of interface: USB, Serial, Ethernet and WI-FI. The 11 types of measuring instruments of the Smart Trainer can be interfaced with the PC as well as software.

In addition, optional e-Book experimental manual and video learning contents integrated with the smart learning platform will build true smart learning environment. With the ARes Smart Trainer, you can improve the quality of technical education beyond your imagination.



Oscilloscope



Voltmeter & Ampere meter



Power Meter



Function Generator



Pulse Generator



Arbitrary Generator



DC Source Generator



DMM (Digital Multimeter)



3-Channel Variable DC Power supply



3-Phase Variable AC Power supply



Advanced 3-Phase Power supply



Digital Input (16-bit)



Digital Output (16-bit)



Digital I/O Control



Relay Output



Quick Menu

ARes (All-in-One Real time Instrumentation & Educational System)

SPECIFICATIONS

• ARes Main Unit (Advanced & Basic)

Signal input (2CH)	Oscilloscope	Impedance : 1M Ω 20pF Max voltage : \pm 50V Band width : 4MHz Sample rate : 40MS/s ADC resolution : > 10bit Voltage DIV : \pm 10V / 5V / 2V / 1V / 0.5V / 0.2V / 0.1V / 50mV / 20mV Time DIV : > 22 times 1 μ s - 10s Trigger mode: AUTO / SINGLE / STOP Memory : Streaming to host	
	Voltmeter & Ampere meter	Measurement : AC/DC voltage, current and power (V/A) Function : Mean, rectified, root mean, peak, peak to peak, root mean square value Range : AUTO & MANUAL (> 9 step 100mV - 50V)	
Signal output (1CH)	<ul style="list-style-type: none"> • Function generator • Pulse generator • Arbitrary generator 	Impedance : 50 Ω 200mA Amplitude : 200mVpp, 2Vpp, 20Vpp Frequency : 0.1Hz - 1MHz Range : 0.1Hz / 1Hz / 10Hz / 100Hz / 1kHz / 10kHz / 100kHz step Function generator waveform : Sine, Square, Triangle, Logic (TTL), DC Positive, DC Negative	
	DC source output	Range : 100mV / 1V / 10V Volt Source : \pm 0 ~ 10V	
Digital input (digital analyzer / counter)		Number of channels : 16 (Int. + Ext.) Input voltage : TTL / CMOS Max voltage : 20V Sampling frequency : 100kHz Trigger mode : LOW / HIGH / DC Function : BIN, OCT, DEC, HEX (8-bit or 16-bit) Memory : Streaming to host	
Digital output (signal generator / timer)		Number of channels : 16 (Int. + Ext.) Output voltage : TTL / CMOS Output current : 3mA Max voltage : \pm 15V Function : BIN, OCT, DEC, HEX (8-bit or 16-bit) Output frequency: 100kHz Memory : Streaming to host	
Relay output		8-relay COM Max. 24VDC / 1A Normally Open/Closed (NO/NC)	
Variable supply	3-channel DC power	V1 voltage : DC 0 ~ \pm 20V 1A V3 voltage : DC 0 ~ \pm 20V 1A	V2 voltage : DC 0 ~ \pm 20V 1A
	3-phase AC power	AC voltage : AC 14Vrms 2A (Resolution : 0.1V) Frequency : 1Hz - 150Hz (Resolution : 1 Hz)	
	Advanced 3-phase power	Function : Sine, V-Sine, Block, Pulse V1 voltage : AC 0 ~ 100% V3 voltage : AC 0 ~ 100% V3 frequency : 1 ~ 150Hz	V2 voltage : AC 0 ~ 100% V2 phase shift : 0 ~ 359 degree V2 clock frequency : 10 ~ 32kHz
Digital multi meter		Voltage : [DC] 1V / 10V / 100V, AUTO [AC] 700mV / 7V / 70Vrms / AUTO, 40Hz ~ 20kHz Current : [DC] 500mA / 2A / AUTO [AC] 500mA / 2Arms / AUTO, 40Hz ~ 5kHz Resistance : 100 Ω / 1k Ω / 10k Ω / 100k Ω / 1M Ω / 10M Ω , AUTO Capacitance : 10nF / 100nF / 1 μ F / 10 μ F / 100 μ F / 1000 μ F, AUTO Continuity diode : 1V, 10V	
Fixed power supply		Fixed Voltage : +3.3V 1A / +5V 1A / \pm 15V 500mA	

EXPERIMENTAL MODULES

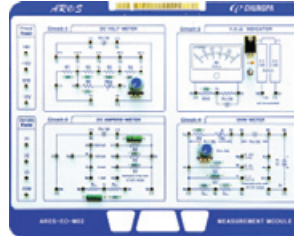
• Basic Electronics Package (EO Series)

DC Circuit (AReS-EO-M01)



- 1) Ohm's Law
 - 2) Serial/Parallel Circuit
 - 3) Kirchoff's Law
 - 4) Galvanometer
 - 5) Wheatstone Bridge
- * Note: The AReS-EO-M01 DC Circuit Module requires a set of voltmeter, amphere meter, ohm meter and galvano meter for proper experiments.

Measurement (AReS-EO-M02)



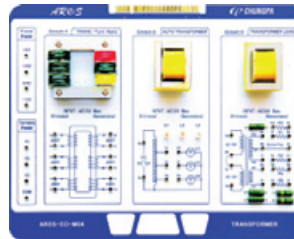
- 1) DC Volt Meter
- 2) V, A, R Indicator
- 3) DC Ampere meter
- 4) Ohm meter

AC Circuit (AReS-EO-M03)



- 1) Capacitance
- 2) Inductance
- 3) RC/RL circuit
- 4) LC resonance (Series/Parallel)
- 5) Filter circuit

Transformer (AReS-EO-M04)



- 1) Trans. turn Ratio
- 2) Auto Transformer
- 3) Transformer Load

Semiconductor-1 (AReS-EO-M05)



- 1) Diode Characteristics
- 2) Zener diode
- 3) NPN Transistor
- 4) PNP Transistor

Semiconductor-2 (AReS-EO-M06)



- 1) J-FET characteristics
- 2) MOS-FET characteristics
- 3) SCR characteristics
- 4) TRIAC characteristics

Transistor Amplifier (AReS-EO-M07)



- 1) AMP. biasing
- 2) Complementary AMP
- 3) Common emitter AMP
- 4) Darlington AMP

OP Amplifier (AReS-EO-M08)

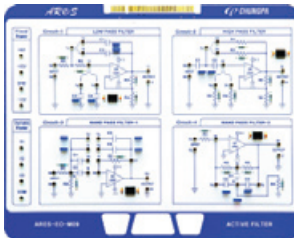


- 1) Inverting amplifier
- 2) DC OFFSET 1, 2
- 3) Non-Inverting AMP
- 4) Differential AMP
- 5) Summing AMP

ARes (All-in-One Real time Instrumentation & Educational System)

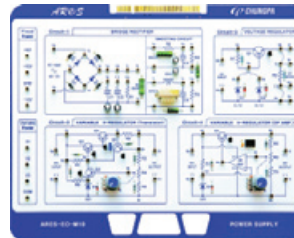
• Basic Electronics Package (EO Series)

Active Filter (ARes-EO-M09)



- 1) Low pass filter
- 2) High pass filter
- 3) Band pass filter 1, 2

Power Supply (ARes-EO-M10)



- 1) Bridge rectifier
- 2) Voltage regulator
- 3) Variable V-regulator (Transistor)
- 4) Variable V-regulator (OP Amp.)

Oscillator (ARes-EO-M11)



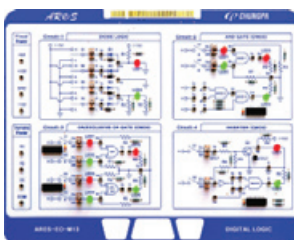
- 1) Phase shift oscillator
- 2) Wien bridge oscillator
- 3) Colpitts oscillator
- 4) Hartley oscillator
- 5) Cristal osicllator

Pulse Circuit (ARes-EO-M12)



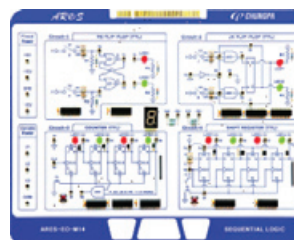
- 1) Clipper 1, 2
- 2) Schmitt trigger
- 3) Bistable multivibrator
- 4) Monostable multivibrator

Digital Logic (ARes-EO-M13)



- 1) Diode logic
- 2) AND gate (CMOS)
- 3) OR/XOR gate (CMOS)
- 4) Inverter (CMOS)

Sequential Logic (ARes-EO-M14)



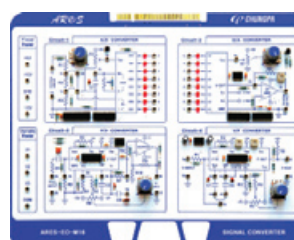
- 1) RS flip-flop (TTL)
- 2) JK flip-flop (TTL)
- 3) Counter (TTL)
- 4) Shift Register (TTL)

Combination Logic (ARes-EO-M15)



- 1) Decoder (TTL)
- 2) Encoder (TTL)
- 3) Multiplexder / Demultiplexer (CMOS)
- 4) Half Adder / Full Adder (TTL)

Signal Converter (ARes-EO-M16)



- 1) A/D converter
- 2) D/A converter
- 3) F/V converter
- 4) V/F converter

• **Basic Electronics Package (EO Series)**

*** OPTION**
Analog Meters (ARes-EO-OP1)



- 1) Galvanometer
 - 2) Voltmeter
 - 3) Amphere meter
 - 4) Ohm meter
- * Note: The "ARes-EO-OP1 Analog Meters Module" is suggested for experiments on the ARes-

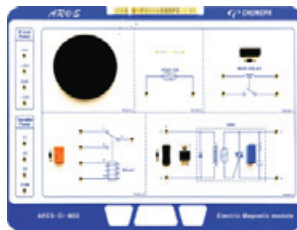
• **Basic Electronics Package (EI Series)**

RLC Circuits (ARes-EI-M01)



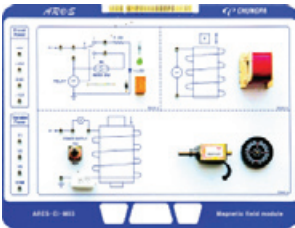
- 1) AC/DC voltage measurement
- 2) AC/DC current measurement
- 3) Ohm's Law
- 4) Kirchhoff's Law
- 5) Series-parallel combination circuit
- 6) Power conversion theories
- 7) Characteristics of transformer
- 8) DC circuit (RC) and transient phenomenon
- 9) AC circuit (RC/RL/RLC)
- 10) Characteristics of transformer
- 11) Resonant circuit (series/parallel) and LC filter

Electromagnet (ARes-EI-M02)



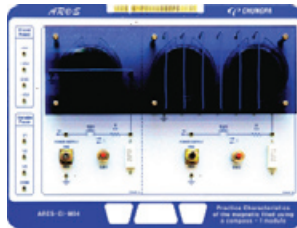
- 1) Magnetic system characteristics
- 2) Magnetic field characteristics
- 3) Switch and relay in use of a magnet
- 4) Basic principles of electromagnet

Electromagnetic Field Circuit (ARes-EI-M03)



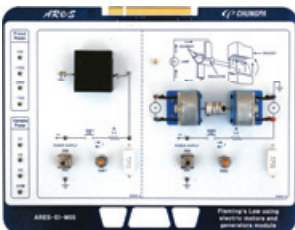
- 1) Magnetic field
- 2) Drawing magnetic lines
- 3) Strength of the magnetic field
- 4) Lenz Law
- 5) Faraday Law

Characteristics of Magnetic Field (ARes-EI-M04)



- 1) Amphere's Law
You can use a compass to practice the direction of the magnetic fields according to the flow of current.

Fleming's Law (ARes-EI-M05)



- 1) Experiment on motors and generators
- 2) Experiment on Fleming's Law

Characteristics of Coil (ARes-EI-M06)



- 1) Magnetic induction
- 2) Mutual induction
- 3) Magnetic flux induction

ARes (All-in-One Real time Instrumentation & Educational System)

• Basic Electronics Package (EI Series)

Basic Circuit of Semiconductor (ARes-EI-M07)



- 1) Diode/Zener diode characteristics
- 2) Rectifier circuits
- 3) Filter circuits
- 4) TR/ FET/SCR/UJT/LED characteristics
- 5) Multimeter

Basic Electrical Circuit (ARes-EI-M08)



- 1) Amplifier / Multistage amplifier / Cascade amplifier
- 2) Constant voltage
- 3) Light control circuit
- 4) Relay characteristics
- 5) Touch control switch

Electrical Acoustic Amplification Circuit (ARes-EI-M09)



- 1) Push-pull amplifier
- 2) Wheatstone bridge

Characteristic Circuit of Electric Elements (ARes-EI-M10)



- 1) CDS characteristics
- 2) Light control switch
- 3) Thermistor characteristics
- 4) Temperature control circuit
- 5) Sound control circuit

Oscillator Circuit (ARes-EI-M11)



- 1) Blocking generator
- 2) Electronic bird sound generator
- 3) Astable multivibrator
- 4) LED light circuit
- 5) LC resonant circuit

Breadboard Module (ARes BD-M01)



- Voltage: DC 5V, -15V, +15V / variable voltage (V1, V2, V3)
- Variable resistor: 1k Ω
- Toggle switch, Tact switch
- RS-232 communication
- LED indicator lamp
- Digital I/O
- Relay output



PLC Module (ARes-AT-M01)



- Voltage: DC 5V, -15V, +15V / variable voltage (V1, V2, V3)
- Input simulator: Toggle switch, Tact switch
- Output simulator: LED (4ea)
- D-SUB I/O port
- Digital I/O port: Input (16ea), output (16ea)

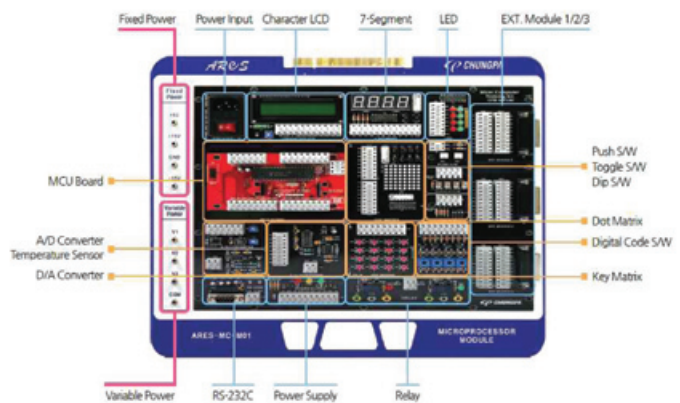


ARes (All-in-One Real time Instrumentation & Educational System)

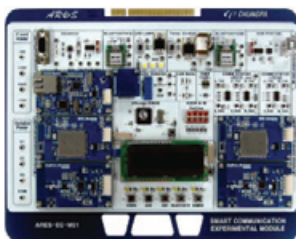
Microprocessor Module (ARes-MC-M01)



- LCD screen: 16 x 2-line (backlight)
- 7-segment
- A/D Converter: 12-bit (MCP3202)
- D/A Converter: 8-bit (DAC0800)
- Relay: 12V-2C (1ea), 5V-2C (1ea)
- Temperature sensor: LM35, TO-92 type
- Dot /Key matrix



Communication Module (ARes-EC-M01)



- RS485, LAN, Wi-Fi, Bluetooth, ZigBee
- LED Lamp, USB port
- Temperature control
- Color detection, illumination sensor, humidity sensor
- Atmega 128, ADR & IP setting



Antenna Module (ARes-EC-M04)



- Frequency range: 500Mhz, 2GHz (standard), 10GHz (option)
- Rotational angle: 360 degree
- 16 x 2 test LCD backlight
- AC power input: 90 ~ 240V / 50 ~ 60Hz
- DC power input: ±5V, 12V



• Sensor Module

Photo Electric Sensor - 1 (ARes-SN-M01)



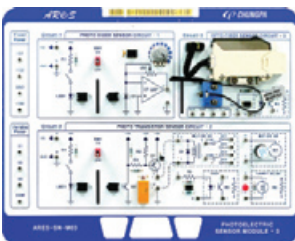
- Photoelectric sensor (Direct reflection type-PNP)
- Photoelectric sensor (Permissive type-PNP)
- DC motor system
- Virtual conveyor system

Photo Electric Sensor - 2 (ARes-SN-M02)



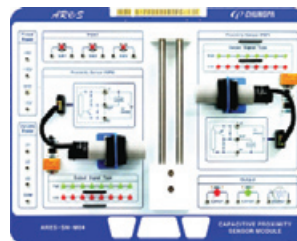
- CdS sensor
- Photo coupler
- Streetlight control system

Photo Electric Sensor - 3 (ARes-SN-M03)



- Photo diode
- Photo transistor
- Fiber optic sensor (Direct reflection type)
- Sequence control

Photo Electric Sensor - 4 (ARes-SN-M04)



- Capacitive proximity sensor (PNP)
- Capacitive proximity sensor (NPN)

ARes (All-in-One Real time Instrumentation & Educational System)

• Sensor Module

Photo Electric Sensor - 5 (ARes-SN-M05)



- Inductive proximity sensor (PNP)
- Inductive proximity sensor (NPN)

Chemical Sensor - 1 (ARes-SN-M06)



- Gas sensor
- pH sensor

Chemical Sensor - 2 (ARes-SN-M07)



- Humidity sensor

Temperature Sensor (ARes-SN-M08)



- Thermistor sensor
- Thermocouple sensor
- PT-100 sensor

Temperature Sensor (ARes-SN-M08-1)



- Temperature control (heating & cooling)
- Digital thermometer

Hall Sensor (ARes-SN-M09)

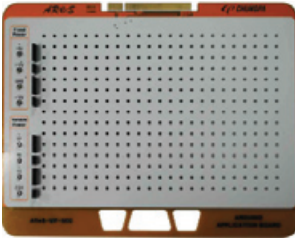


- Hall Sensor - 1
- Hall Sensor - 2



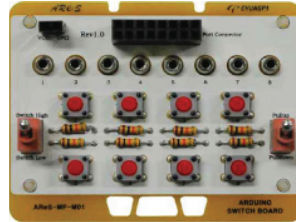
• Arduino Module

Arduino Application Board (AReS-MP-M00)



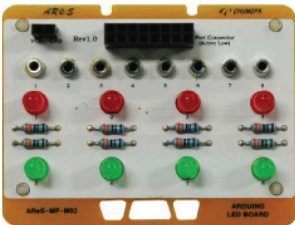
- Power: 5V, variable voltage
- Slot hole: 1mm (each)
- Size: 280(W) x 216(D)mm

Arduino Switch Board (AReS-MP-M01)



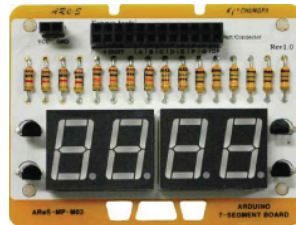
- Tact switch: 8ea
- Test point (2ø): 8ea
- Pull-up / Pull-down resistance (adjustable)
- Size: 70(W) x 54(D)mm

Arduino LED Board (AReS-MP-M02)



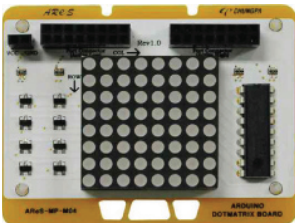
- 5ø round LED: 8ea
- Test point (2ø): 8ea
- Size: 70(W) x 54(D)mm

Arduino LED Board (AReS-MP-M03)



- 7-segment (2 x 2): 2ea
- Common Anode
- Size: 70(W) x 54(D)mm

Arduino Dot-Matrix Board (AReS-MP-M04)



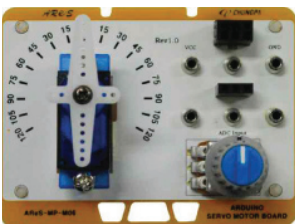
- 8 x 8 dot matrix (Red)
- Size: 70(W) x 54(D)mm

Arduino TFT Screen (AReS-MP-M05)



- 1.77" TFT LCD
- 168 x 120 pixels
- Micro SD card
- Size: 70(W) x 54(D)mm

Arduino Servo Motor (AReS-MP-M06)



- 10kΩ potentiometer
- Speed: 0.1 / 60°
- Operating power: 4.8V (~ 5V)
- Size: 70(W) x 54(D)mm

Arduino Keypad Board (AReS-MP-M07)

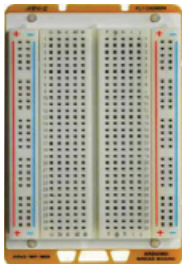


- 3 x 4 keypad matrix
- Size: 58(W) x 90(D)mm

ARes (All-in-One Real time Instrumentation & Educational System)

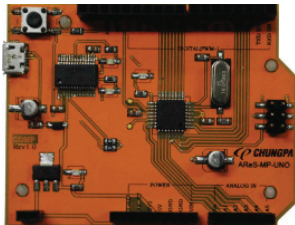
• Arduino Module

Arduino Breadboard (ARes-MP-M08)



- 300 terminal holes
- Size: 58(W) x 90(D)mm

Arduino PCB Board (ARes-MP-UNO)



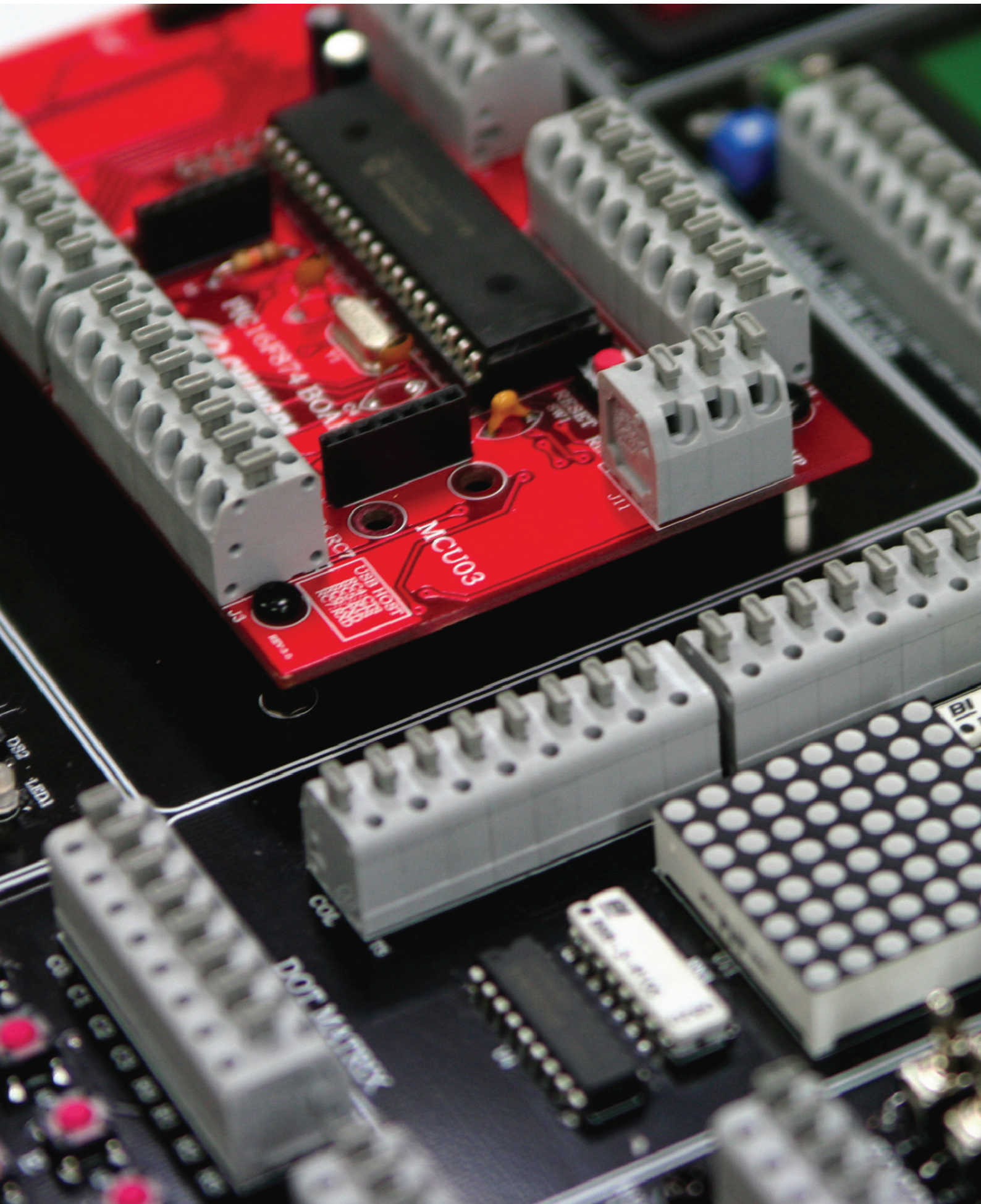
- 3 x 4 keypad matrix
- Size: 58(W) x 90(D)mm

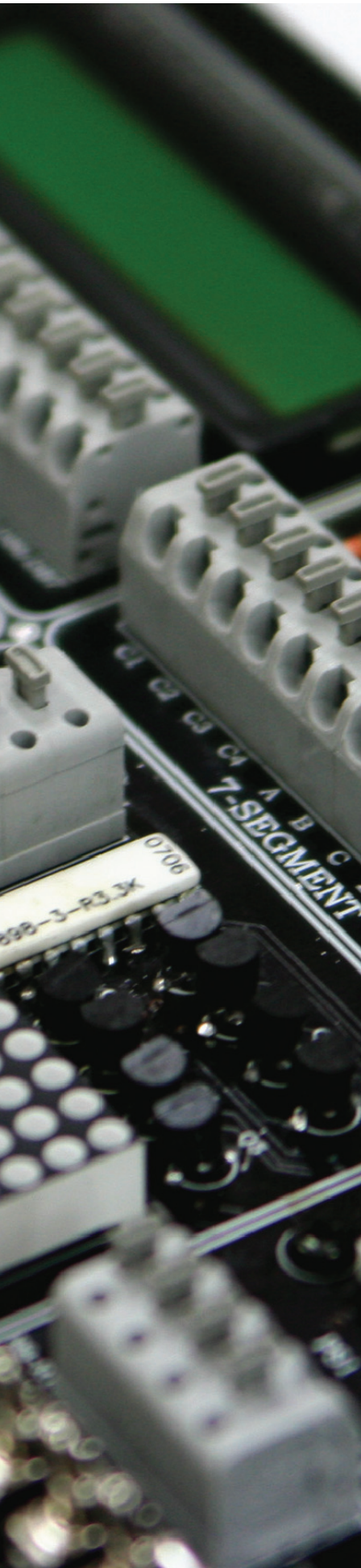


ORDERING INFORMATION

Category	Products	Ordering cord No.
System platform (*select Advanced or Basic type)	AReS-Advanced	AReS-AD-01
	AReS-Basic	AReS-BA-01
PC Software (standard)	Smart Learning Contents Manager	AReS-SLS-500-01
Breadboard (standard)	AReS-Breadboard	AReS-BB-01
Options	Basic Electronics Modules (16 pcs) [AReS-EO-M01 ~ M16]	AReS-EO-MDP-1
	Basic Electricity Modules (11 pcs) [AReS-EI-M01 ~ M11]	AReS-EI-MDP-1
	PLC Modules [AReS-AT-M01]	AReS-AT-M01
	Microprocessor Module [AReS-MC-M01]	AReS-MC-M01
	Communication Module [AReS-EC-M01]	AReS-EC-M01
	Antenna Module [AReS-EC-M04]	AReS-EC-M04
	Sensor Modules (10 pcs) [AReS-SN-M01 ~ M09]	AReS-SN-MDP1
	Arduino Modules (10 pcs) [AReS-MP-M00 ~ UNO]	AReS-MP-MDP1
	Circuit Design Simulation Software (CASPOC Starter)	AReS-CASPOC-BA-01
	Circuit Design Simulation Software - Educational Package (Single-user)	AReS-CASPOC-FA-01
	e-Book Experimental manual	AReS-EB-01







Electricity / Electronics

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- 66 Squirrel Cage Induction Motor and DC Shunt Generator | CPE-ER1602
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- 70 Load Resistor (1-Phase / 3-Phase) | CPE-RL203K / CPE-RL303K
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- 82 Electric Power Distribution Trainer | CPE-EP1000
- 83 Power IT Electrical Distribution Trainer | CPE-K330
- 84 Fire Fighting Electrical Application Trainer | CPE-ER1991
- 86 Fire Fighting Electrical Wiring Trainer | CPE-ER1992
- 87 Fire Fighting Simulation Trainer | CPE-ER1993
- 89 Integrated Fire Fighting Control Software | CPE-ER1994

CPE-EO2300

Electric Circuit & Electrophysics Trainer



INTRODUCTION

The CPE-EO2300 Electric Circuit & Electrophysics Trainer not only enhances learning the basic concepts in physics but also treats broad topics of electrical engineering such as interpretation of the AC and DC circuits, electrostatic induction phenomenon, characteristics of rectifier circuit, and single-phase inverter and 3-phase inverter.

The CPE-EO2300 Electric Circuit & Electrophysics Trainer does not focus on expression of numerical formula nor explanation of complex physical phenomena. It is designed to give effective hands-on practice on principles and applications of electricity in linkage with theories.

EXPERIMENTAL CONTENTS

- Charging/discharging curve of capacitors
- Characteristics of capacitors in series or parallel connection
- Characteristics of capacitors in AC and DC
- Characteristics of DC voltmeter and ammeter
- Ohm's Law
- Characteristics of resistors in series or parallel connection
- Wheatstone bridge circuits
- Shunt resistance
- Maximum power transmission
- Internal resistance of power source
- Characteristics of power source in series or parallel connection
- Characteristics of transformers
- Single-phase transformer and low-voltage transformer
- Autotransformer
- Permanent magnet
- 3-phase transformer
- Wire connection (Y, Δ) on transformer
- Uniform and non-uniform loads of transformer
- 3-phase rectifier circuit
- Full wave rectifier circuit
- RC / RL / RLC circuit in series or parallel connection
- Coil in series or parallel connection
- RL and RC filters
- Magnetic field effects
- Characteristics of electromagnetism
- Magnetic induction
- Point effects
- Magnetoconductance
- Screen effects
- Uniform and non-uniform magnetic fields
- Capacitor effects

FEATURES

- Designed to give effective hands-on practice on basic principles of physics and electrical engineering
- Focuses on realistic experiments to verify theories instead of numerical expression and explanation of complex physical phenomena
- Capable of verifying basic principles of electrophysics through the circuit configuration practices
- Modularized structure with a module rack for easy attachment and detachment of modules
- Highly durable and rigid worktable in steel beam structure
- Light weight and durable experimental modules based on the plastic injection mold
- Module storage box allowing user convenience in keeping the experimental modules safe
- Low-noise locking casters for convenient relocation of the training system
- Supports easier circuit configuration by the circuit diagrams printed on each module
- Provides power for circuit practices through the power supply module

SPECIFICATIONS

I. Experimental table set

- Structure: Steel beam (painted)
- Dimension: 1600(W) x 750(D) x 820(H)mm
- Casters with a lock: 4ea (noise-reduction type)
- AC 220 power outlet: Installed on the surface of the table (flush type)
- Module rack: Double-deck structure enabling attachment and detachment of modules
- Module storage box: With hinged door and module storage slots









II. Power supply

- Variable DC power output: 0 ~ 30V 2A
With built-in overload protection circuit
- Fixed DC power output: +5V, +15V, -15V
- Fixed AC power output: +6V, -6V, +7.5V, -7.5V, +9V, -9V, +12V, -12V
- Speaker : 0.25W
- Variable resistor: 4ea
- Input voltage: AC 220V
- 3 ϕ 380V power output (R, S, T, N), max. 5A






III. Experimental modules

- Number of modules: Standard type (M1~M9, OP1~OP4) - 13ea
- Dimension: 380(W) x 110(D) x 285(H)mm [standard type]

EXPERIMENTAL MODULES

List of Modules		Experimental Contents
	CPE-EO2300-M01 Capacitor	Charging/Discharging curves of the capacitor Capacitor in series/parallel connection Characteristics of capacitor in AC/DC Circuit
	CPE-EO2300-M02 DC Circuit-1	DC voltmeter DC ammeter Special resistance Wheatstone Bridge Ohm's Law Resistor in series/parallel connection
	CPE-EO2300-M03 DC Circuit-2	Voltage divider Shunt resistor Maximum power transmission Voltage source in series/parallel connection Internal resistance of voltage sources
	CPE-EO2300-M04 Magnetic Induction - 1	Principle of transformer Single-phase/Low-voltage transformer Current/Economy transformer Magnetic coupling Voltage generation with permanent magnets
	CPE-EO2300-M05 Magnetic Induction - 2	High voltage transformer Voltage doublers with diodes Single-phase/Half-wave rectifier Center tap/Bridge rectifier
	CPE-EO2300-M06 Magnetic Induction - 3	3-phase transformer Delta-Star connection Symmetrical/Non-symmetrical load 3-phase/ Mid-phase rectifier circuit Full-wave rectifier circuit
	CPE-EO2300-M07 AC Circuit	RC/RL/RLC series-parallel connection Coil series-parallel connection RL-RC High pass / Low pass Phase shift
	CPE-EO2300-M08 Magnetism-1	Permanent magnets Magnetic force effects Principles of magnetism and electromagnet Self induction

CPE-EO2300

	CPE-EO2300-M09 Magnetism-2	Point effect/Screening effect Homogeneous/Inhomogeneous electric fields Magnetic conductivity Capacitor effect
	CPE-EO2300-OP1 Power Supply	Fixed DC power: +5V, +15V, -15V Fixed AC power: ±6V, ±7.5V, ±9V, ±12V Variable DC power: 0~30V 3-Phase 380V power Speaker: 2.25 inches, 8 Ω, 0.25W Variable resistor: 4ea
	CPE-EO2300-OP2 Analog Meter	DC Voltage meter: 5V/15V (FS: 1mA) DC Ammeter: 10mA/100mA (FS: 1mA) AC Voltage meter: 20V AC Ampere meter: 500mA AC voltage meter: 400V Galvano meter
	CPE-EO2300-OP3 High Voltage Output	DC input voltage: 15V Output voltage: 2kV, 4kV, 6kV, 8kV, 10kV (5 steps) Power switch
	CPE-EO2300-OP4 Electrometer	DC input voltage: 15V Power selector switch: 5V, 10V, 50V, 100V Input impedance: $\geq 10^{12}\Omega$ Output capacitance: $\leq 100\text{pF}$ BNC cable

* Note: The CPE-2300-OP1 Power Supply Module is required for conducting experiments with one of three modules: CPE-EO2300-M4, CPE-EO2300-M5 or CPE-EO2300-M6 module.

STANDARD ACCESSORIES

- Power cord: 1set
- 3-phase power cord: 1ea
- Insulated connection cable: 1set
- Non-insulated connection cable: 1set
- Aluminum case for static experiments: 1set
- User's guide manual & experimental manual : 1set

OPTIONS

- Oscilloscope (CPM-1005BE)
- Function generator (CPM-8210)
- Digital LCR meter (CPM-2840)
- Digital multimeter (CPM-8302A)



CPE-E02310

Electronic Circuit Trainer



FEATURES

- Designed to give effective hands-on practice on basic principles of electrical and electronic engineering
- Covers basic principles of electronic circuits and wire connection practices
- Modularized structure with a module rack for easy attachment and detachment of modules
- Highly durable and rigid worktable in aluminum profile structure
- Light weight and durable experimental modules based on the plastic injection mold
- Module storage box allowing user convenience in keeping the experimental modules safe
- Transparent surface of the OP AMP modules designed for checking the components
- Easy attachment and detachment of the OP AMP modules through their built-in magnet
- Low-noise locking casters for convenient relocation of the training system
- Supports easier circuit configuration by the circuit diagrams printed on each module
- Provides power for circuit practices through the power supply module

INTRODUCTION

The CPE-E02310 Electronic Circuit Trainer covers basic principles of RLC circuits, as well as overall concept in essential electrical engineering circuits including the characteristics of diodes, transistors, amplified circuits, oscillators, AM & FM radio circuits and digital circuits. For electrical engineering students and even ordinary people interested in electrical engineering, the CPE-E02310 Electronic Circuit Trainer enhances knowledge of accessibility in learning electrical engineering principles.

EXPERIMENTAL CONTENTS

- Ohm's Law
- Kirchoff's Law
- Series or parallel connection of resistors
- Non-linear resistors
- Series or parallel connection of capacitors
- Coil and transformer
- RL/RC/LC/RLC circuit (series or parallel connection)
- Characteristics of diodes and transistors (PNP/NPN)
- Voltage stabilization using Zener diode
- Bridge rectifier circuit and full/half wave rectifier
- Common base transistor circuit
- Common emitter transistor circuit
- Common collector transistor circuit
- Directly coupled / R-C coupled amplifier coupled amplifier
- Push-pull power amplifier
- Negative Feedback - Tone control
- Hartley / Colpitts / R-C / Crystal / Blocking oscillator
- Schmitt trigger circuit
- Bistable / Astable / Monostable multivibrator
- Tuned collector and base oscillator
- 100MHz FM oscillator
- 1kHz / 1MHz oscillator
- AM / FM / RING modulation
- HF / IF amplifier
- AM / FM detector
- Super heterodyne radio receiver
- Full adder and Subtractor
- RS / JK / D flip flop
- Register and Counter
- Digital display
- Tunnel / Capacitor diode
- Diac / Triac
- Zener / photo diode
- Photo transistor
- SCR / UJT / FET / MOSFET

SPECIFICATIONS

I. Experimental table set

- Structure: Steel beam (painted)
- Dimension: 1600(W) x 750(D) x 820(H)mm
- Casters with a lock: 4ea (noise-reduction type)
- AC 220 power outlet: Installed on the surface of the table (flush type)
- Module rack: Double-deck structure enabling attachment and detachment of modules
- Module storage box: With hinged door and module storage slots

II. Power supply











- Variable DC power output: 0 ~ 30V / 2A
With built-in overload protection circuit
- Fixed DC power output: +5V, +15V, -15V
- Fixed AC power output: +6V, -6V, +7.5V, -7.5V, +9V, -9V, +12V, -12V
- Speaker : 0.25W
- Variable resistor: 4ea
- Input voltage: AC 220V








III. Experimental modules

- Number of modules: Standard type (M1 ~ M14, OP1, OP2) - 16ea
OP Amp. module set (M14) - 1set (in carrying case)
- Dimension: 380(W) x 110(D) x 285(H) mm [standard type]

CPE-E02310

EXPERIMENTAL MODULES

List of Modules	Experimental Contents
 <p>CPE-E02310-M01 Basic Electricity</p>	Ohm's Law Kirchoff's Law Resistor in series/parallel connection Capacitor in series/parallel connection Non-linear resistor and VDR Coil and transformer
 <p>CPE-E02310-M02 A.C circuits</p>	RL / RC / LC / RLC series circuit RL / RC / LC / RLC parallel circuit
 <p>CPE-E02310-M03 Diodes</p>	Characteristic of diodes Voltage stabilization using Zener diodes Full / Half wave rectifier Bridge rectifier circuit
 <p>CPE-E02310-M04 Transistors</p>	Characteristics of transistors: NPN / PNP Common base transistor circuit Common emitter transistor circuit Common collector transistor circuit
 <p>CPE-E02310-M05 Amplifiers-1</p>	Directly coupled amplifier R-C coupled amplifier Negative feedback - tone control
 <p>CPE-E02310-M06 Amplifiers-2</p>	Single-ended power amplifier Push-pull power amplifier without output transformer
 <p>CPE-E02310-M07 Amplifiers-3</p>	Push-pull power amplifier with output transformer
 <p>CPE-E02310-M08 Oscillators-1</p>	Colpitts oscillator R-C oscillator Hartley oscillator Crystal oscillator Schmitt trigger circuit
 <p>CPE-E02310-M09 Oscillators-2</p>	Bistable multivibrator Astable multivibrator Blocking oscillator Monostable multivibrator Tuned collector / base oscillator
 <p>CPE-E02310-M10 Radio circuits-1</p>	AM / FM / RING modulation AM / FM Detector HF / IF amplifier Super heterodyne radio receiver

	CPE-EO2310-M11 Radio circuits-2	Power Supply Transmitter 100MHz FM / 1kHz Oscillator 1MHz oscillator Amplitude modulation
	CPE-EO2310-M12 Digital circuits-1	RTL logic (gates: NAND - AND - OR - NOT) DTL logic (gates: NAND - AND - OR - NOT) TTL logic (gates: NAND - AND - OR - NOT)
	CPE-EO2310-M13 Digital circuits-2	RS / JK / D Flip Flop Full adder / Subtractor Register Counter Digital display
	CPE-EO2310-M14 Electronic Components	Tunnel diode / Capacitor diode / Zener diode Photo diode Photo transistor Diac / Triac SCR / UJT / FET / MOSFET
	CPE-EO2310-M15 Operational Amplifier	Summing circuit / Subtracting circuit / Differentiating circuit / Integrating circuit / Oscillator Resistor: 50k Ω , 100k Ω , 220R, 2.2k Ω , 10k Ω , 1k Ω , 13k Ω , 22k Ω , 750R, 5k Ω Capacitor: 0.0047 μ F, 0.0022 μ F, 10nF Diode: 1N4148 OP Amp. IC
	CPE-EO2310-OP1 Power Supply	Variable DC power: 0 ~ 30V Fixed DC power: +5V, +15V, -15V Fixed AC power: \pm 6V, \pm 7.5V, \pm 9V, \pm 12V Speaker: 2.25 inches, 8 Ω , 0.25W Variable resistor: 4ea
	CPE-EO2310-OP2 Analog Meter	DC voltage meter: 30V 2A DC ampere meter: 2A AC voltage meter: 250V AC ampere meter: 2A

STANDARD ACCESSORIES

- Power cord : 1set
- Connection cable (insulated type) : 1set
- Connection cable (non-insulated type) : 1set
- OP Amp. components for various experiments: 1set (in aluminum case)
- User's Guide & Experimental Manual : 1set

OPTIONS

- Oscilloscope (CPM-1005BE)
- Function generator (CPM-8210)
- Digital LCR meter (CPM-2840)
- Digital multimeter (CPM-8302A)



CPE-EO2320

Digital & Analog Circuit Trainer



FEATURES

- Designed to give effective hands-on practice on basic principles of digital and analogue engineering
- Covers basic principles of digital and analogue circuits and wire connection practices
- Modularized structure with a module rack for easy attachment and detachment of modules
- Highly durable and rigid worktable in steel beam structure
- Light weight and durable experimental modules based on the plastic injection mold
- Module storage box allowing user convenience in keeping the experimental modules safe
- Transparent surface of the OP Amp modules designed for checking the components
- Easy attachment and detachment of the OP Amp modules through their built-in magnet
- Low-noise locking casters for convenient relocation of the training system
- Supports easier circuit configuration by the circuit diagrams printed on each module
- Provides power for circuit practices through the power supply module

INTRODUCTION

The digital and analog engineering is an essential field in learning principles of electricity, electronics and information communication technology. The digital and analog engineering is an indispensable element of the modern society, which can be found in cellular phone, multi-media, process control, intelligent service robot, automotive electronics, home appliance and aerospace.

The CPE-EO2320 Digital & Analog Circuit Trainer helps the user easily understand digital and analog circuits with various types of methods from basic concepts to applied circuit experiments.

EXPERIMENTAL CONTENTS

- Basic logic circuit
- NOR / NAND logic function
- Switching circuit using NAND and NOR
- Asynchronous RS flip flop using NOR Gate
- JK M/S flip flop
- T / D / RS flip flop
- Toggle flip flop
- Transistor as reversing stage
- Schmitt trigger circuit
- DRL(OR/AND/COMPOUND) circuit
- DTL(NOR/NAND/COMPOUND) circuit
- AND / NAND / OR / NOR / NOT gate
- 1-bit Full Adder
- Decimal counter and decoder
- 4-bit memory / binary counter
- UP/DOWN binary counter
- UP/DOWN decimal counter
- Step voltage generator with DA Converter
- Clock generator
- Bistable multivibrator
- Astable multivibrator
- Monostable multivibrator
- Traffic signal light circuit
- 10Hz / 1Hz clock generator
- Constant-current source and differential amplifier
- Non-inverting amplifier
- Differential voltage amplifier
- Inverter / Adder / Subtractor
- Comparator / Integrator
- RC oscillator
- AD / DA converter
- RAM X4 memory
- EEPROM 8x8
- 7-segment
- Characteristics of color LED

SPECIFICATIONS

I. Experimental table set

- Structure: Steel beam (painted)
- Dimension: 1600(W) x 750(D) x 820(H)mm
- Casters with a lock: 4ea (noise-reduction type)
- AC 220 power outlet: Installed on the surface of the table (flush type)
- Module rack: Double-deck structure enabling attachment and detachment of modules
- Module storage box: With hinged door and module storage slots










II. Power supply

- Variable DC power output: 0 ~ 30V 2A
With built-in overload protection circuit
- Fixed DC power output: +5V, +15V, -15V
- Fixed AC power output: +6V, -6V, +7.5V, -7.5V, +9V, -9V, +12V, -12V
- Speaker : 0.25W
- Variable resistor: 4ea
- Input voltage: AC 220V








III. Experimental modules

- Number of modules: Standard type (M1~M13, OP1, OP2) - 15ea
OP Amp. module set (M14) -1set (in carrying case)
- Dimension: 380(W) x 110(D) x 285(H) mm [standard type]

EXPERIMENTAL MODULES

List of Modules	Experimental Contents
 <p>CPE-EO2320-M01 Digital Circuits-1</p>	<ul style="list-style-type: none"> Fundamentals of basic logic circuits Logic function of NOR and NAND Switching circuits using NAND and NOR Laws of switching algebra (Boolean algebra) Complete disjunctive/conjunctive normal form
 <p>CPE-EO2320-M02 Digital Circuits-2</p>	<ul style="list-style-type: none"> Schmitt trigger and monoflop Asynchronous RS flip flop with NOR gate Synchronous RS flip flop JK M/S flip flop T / D / RS flip flop Toggle flip flop Transistor as reversing stage
 <p>CPE-EO2320-M03 Digital Circuits-3</p>	<ul style="list-style-type: none"> DRL - OR/AND Gate DTL - NAND/NOR Gate AND / NAND / OR / NOR / NOT gate DRL - Simple combination circuit DTL - Combination circuit
 <p>CPE-EO2320-M04 Digital Circuits-4</p>	<ul style="list-style-type: none"> Equivalence and antivalence Decoder, binary / 0 to 3 8421 - BCD / 0 to 4 decimal places 8421 - BCD / 5 to 9 decimal places
 <p>CPE-EO2320-M05 Digital Circuits-5</p>	<ul style="list-style-type: none"> 1-bit full adder 4-bit memory 4-bit binary counter Decimal counter & decoder with 7-segment display
 <p>CPE-EO2320-M06 Digital Circuits-6</p>	<ul style="list-style-type: none"> Binary up-counter to 5 (0 to 4) Binary down-counter to 5 (4 to 0) Decimal counter with automatic stop at '0' UP/DOWN decimal counter
 <p>CPE-EO2320-M07 Digital Circuits-7</p>	<ul style="list-style-type: none"> Step voltage generator with DA Converter. Clock generator Bistable multivibrator Astable multivibrator Monostable multivibrator
 <p>CPE-EO2320-M08 Digital Circuits-8</p>	<ul style="list-style-type: none"> Simple traffic light control Delayed ON/OFF control of three-way intersection Logic circuit for a vehicle 10 Hz / 1 Hz clock generator
 <p>CPE-EO2320-M09 Digital Circuits-9</p>	<ul style="list-style-type: none"> Electronic speedometer

CPE-EO2320

	CPE-EO2320-M10 Analog Circuits-1	<ul style="list-style-type: none"> Simple differential amplifier Differential amplifier with constant current source uA 741 operational amplifier Non-inverting amplifier Differential voltage amplifier AC voltage amplifier
	CPE-EO2320-M11 Analog Circuits-2	<ul style="list-style-type: none"> Inverter and impedance transformer Input quiescent current and offset voltage compensation Adder and Subtractor Comparator (threshold value switch) Constant current source & voltage to current converter Comparator with differential gap
	CPE-EO2320-M12 Analog Circuits-3	<ul style="list-style-type: none"> Integrator Delta and saw tooth generator Smoothing with first and second order delay elements RC oscillator with operational amplifier AD/DA Converter
	CPE-EO2320-M13 Analog Circuits-4	<ul style="list-style-type: none"> RAM X4 memory EE PROM 8 x 8 7-segment Colored LED
	CPE-EO2320-M14 Operational Amplifier	<ul style="list-style-type: none"> Summing circuit / Subtracting circuit / Differentiating circuit / Integrating circuit / Oscillator Resistor: 50k Ω, 100k Ω, 220R, 2.2k Ω, 10k Ω, 1k Ω, 13k Ω, 22k Ω, 750R, 5k Ω Capacitor: 0.0047uF, 0.0022uF, 10nF Diode: 1N4148 OP Amp. IC
	CPE-EO2320-OP1 Power Supply	<ul style="list-style-type: none"> Fixed DC power: +5V, +15V, -15V Fixed AC power: $\pm 6V$, $\pm 7.5V$, $\pm 9V$, $\pm 12V$ Variable DC power: 0~30V Speaker: 2.25 inches, 8 Ω, 0.25W Variable resistor: 4ea
	CPE-EO2320-OP2 Analog Meter	<ul style="list-style-type: none"> DC Voltmeter: 30V 2A DC Ampere meter: 2A AC Voltmeter: 250V AC Ampere meter: 2A

STANDARD ACCESSORIES

- Power cord : 1set
- Insulated connection cable: 1set
- Non-insulated connection cable: 1set
- OP AMP components (in aluminum case): 1set
- User's guide manual & experimental manual : 1set

OPTIONS

- Oscilloscope (CPM-1005BE)
- Function generator (CPM-8210)
- Digital LCR meter (CPM-2840)
- Digital multimeter (CPM-8302A)



CPE-MP115

PC-based DAQ Training Kit



FEATURES

- User selection of REMOTE mode and LOCAL mode
- Schematic diagrams on the panel to show the processes of ADC and DAC
- Consists of A/D Converter for collecting and analyzing analog data on PC
- Generates five types of wave form using D/A converter
- Capable of controlling the D/A input by PC and monitoring all I/O values on PC

INTRODUCTION

The CPE-MP115 PC-based DAQ Training Kit displays a change of analog signal from the outside by two types of mode: REMOTE MODE and LOCAL MODE.

This PC-based DAQ Training Kit digitizes analog signal obtained in real time, transmits the digitized signal to PC, and shows it in graphics to help the user understand better. It covers the response characteristics of light, and the user can get response results easily by the course of changing the brightness of a small bulb.

EXPERIMENTAL CONTENTS

- Using hardware and firmware
- Windows-based Visual C++ practices
- Communication Protocol
- Programming practices

SPECIFICATIONS

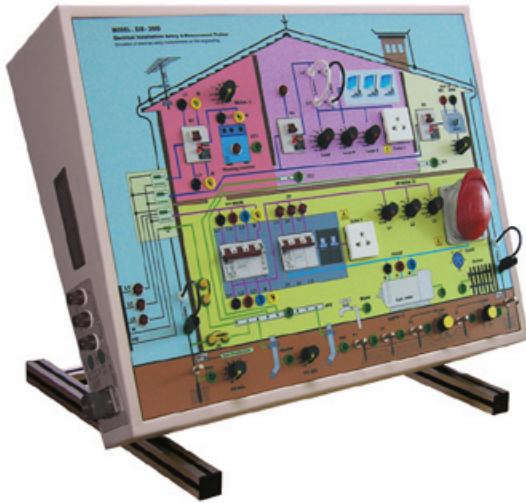
A/D Converter	Resolution	8bits
	Conversion speed	100us
	Analog input range	0 ~ 12.75V
	Digital output level	5V \pm 0.2V TTL
	Full scale error	\pm 1 LSB
D/A Converter	Display	4-digit 7-segment
	Resolution	8bits
	Conversion speed	100us
	Analog output range	0 ~ 12.75V
	D/A chip type	Current output
PC Interface	Full scale error	\pm 1 LSB
	Display	4-digit 7-segment
	MCU	T89C51ED2
	PC interface	RS-232C(38400 bps)

STANDARD ACCESSORIES

- Lamp Module : 1ea
- Photo TR Module : 1ea
- CDS Module : 1ea
- 4mm connection cable : 4ea
- Serial cable (9-pin F-F) : 1ea
- DAQ software program CD: 1ea
- User's guide manual : 1ea

EIS-2000

Electrical Installation & Safety Engineering Trainer



FEATURES

- Ideal for engineering, electrical installation, and measurement in simulation.
- Training on electrical installation:
 - 1-Phase, 3-phase, 3-phase 4-wire (R/S/T/N)
 - Earth-to-earth and earth-to-neutral (insulation-to-installation)
- Training on electrical safety measurement:
 - AC voltage, DC voltage, earth resistance, ground voltage, phase insulation resistance, phase test, line status test, resistance by leakage current, and capacitance by leakage current
- Fault simulation:
 - ELCB practices, circuit breaker practices, variable tests on leakage current, variable tests on earth resistance and battery voltage tests
- Complying international electrical installation and safety standards: IEC 364 and EN 61010-1

INTRODUCTION

The EIS-2000 Electrical Installation & Safety Engineering Trainer is an integrated simulation equipment for measuring the AC voltage, DC voltage, earth resistance, insulation resistance and leakage current in single-phase AC circuit, 3-phase AC circuit, and 3-phase 4-wire AC circuit and performing an electric leakage shutoff test.

- Fault simulation of electric installations and demonstration of actual measurements
- Learning of electrical installations and usage of measuring instruments

Versatile training purposes for private sector and public sector

As a multi-purpose equipment, the Electric Installation Measurement Trainer enables private companies to train their staffs on electricity safety and measuring methods. Also, it helps to train school teachers in high school or vocational school. It also helps college professors teach basic principles of electricity and measurement methods for their students. The user can make a best use of it with Multifunctional Digital Electric Meter (model: CEM-2200).

To practice field simulations

The Electric Installation Measurement Trainer allows the user to measure insulation resistance, earth resistance, effect of ground voltage, and ground resistance as it comprises single-phase AC circuit and 3-phase AC circuit.

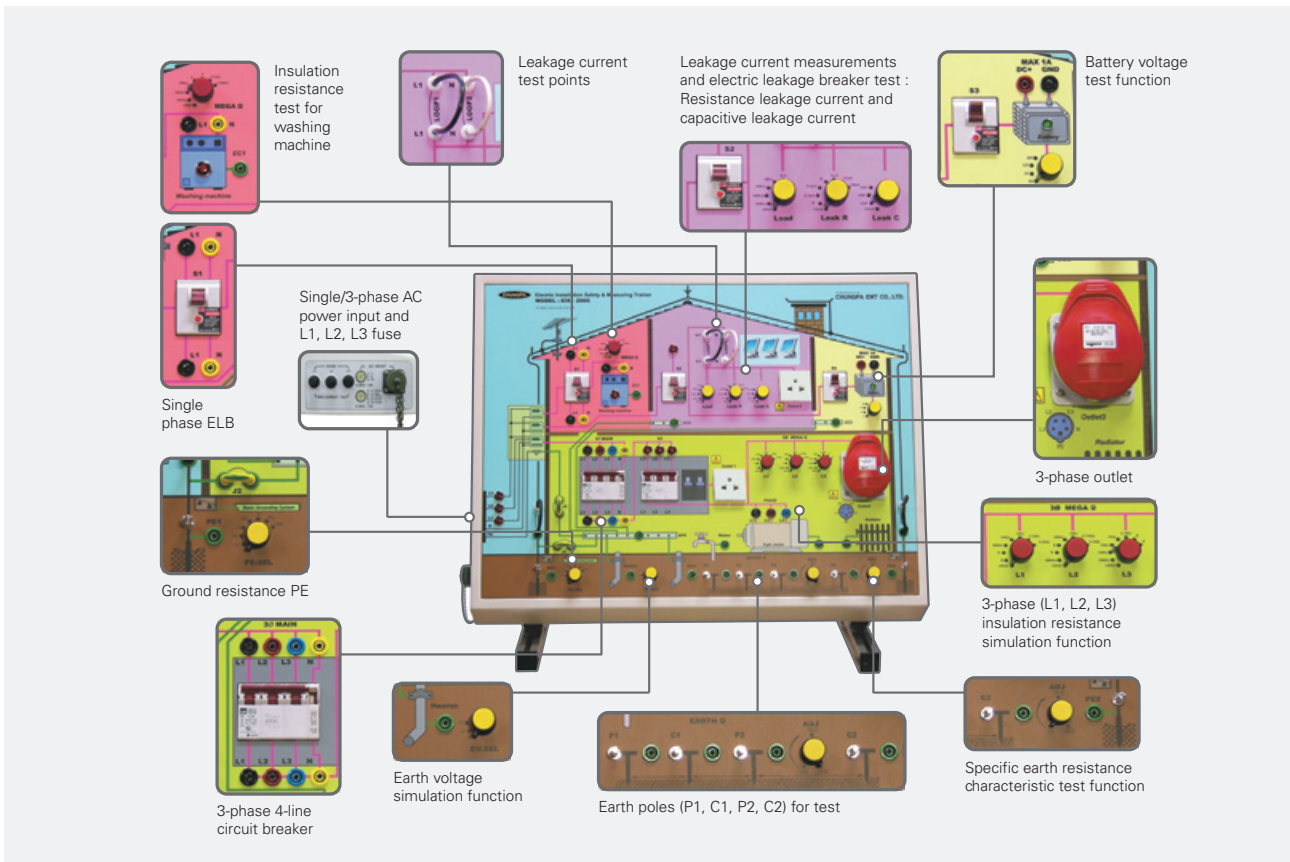
To perform AC load experiment

When measuring the single-phase leak current, the user can test by charging load as there is a socket for load. The user can charge load through sockets for single-phase load and 3-phase load in a 3-phase line.



EXPERIMENTAL CONTENTS

- Prevention of electric accidents and safety of electric equipment
- Electromagnetic interference and prevention
- Electrostatic interference and prevention
- Safety training on thunder stroke damages
- 1-phase / 3-phase voltage measurement (AC and DC)
- Measurement of AC current
- Measurement of R/S/T phase and live line voltage
- Measurement of insulation resistance and leakage current
- Measurement of ground resistance (2-point / 3-point) and line to ground voltage
- Performance testing on electrical circuit breaker



SPECIFICATIONS

Insulation resistance	<p>1-phase power line: 0.08MΩ, 0.1MΩ, 0.2MΩ, 1MΩ, 10MΩ, 100MΩ, 200MΩ, OPEN</p> <p>3-phase power line: L1: 0.2MΩ, 0.5MΩ, 1MΩ, 10MΩ, 100MΩ, 200MΩ, 500MΩ, OPEN L2: 0.3MΩ, 0.75MΩ, 2MΩ, 20MΩ, 150MΩ, 300MΩ, 400MΩ, OPEN L3: 0.09MΩ, 0.1MΩ, 0.2MΩ, 1MΩ, 10MΩ, 100MΩ, 200MΩ, OPEN</p>
Ground resistance	<p>2-point earth test Water pipe:7.5Ω, heater:10Ω, gas pipe:3Ω, radiator:100Ω, motor:10Ω</p> <p>3- point earth test 1Ω, 2Ω, 3Ω, 5Ω, 7.5Ω, 10Ω, 30Ω, 110Ω</p>
Auxiliary earth resistance	0 ~ 10k Ω variable: 2ea
Ground rod	PE1 / PE2 / P1 / P2 / P3 / C1 / C2
Ground voltage	0V / 6V / 9V (selectable)
Phase test point	U(L1), V(L2), W(L3)
Leakage current load	<p>R-Load1: 1kΩ, 10kΩ, 100kΩ, 200kΩ, 300kΩ, OPEN</p> <p>Leakage current (R-load2): 30mA, 15mA, 2mA, 1mA, 0.4mA, 0.2mA, 0.1mA, OPEN</p> <p>Leakage C-load: 0.033, 0.01, 0.001, OPEN</p>
DC voltage output	0V, 5V, 12V, 24V (max. 1A)
Electric leakage circuit breaker	1-phase 15A / 30mA : 3ea
Circuit breaker	3-phase 4-wire 10A : 1ea 3-phase 3-wire 10A : 1ea
AC output socket	1-phase: 2ea (outlet 1 & 2) 3-phase 4-wire + PE: 1ea (outlet 3)
Power indicator	AC: 8ea, DC: 1ea
Input voltage	1-phase 220V \pm 15% (50/60Hz), 3-phase 380V \pm 15% (50/60Hz) 4-wire (L1/L2/L3/N)
Dimension	660(W) X 550(H) X 170(D)mm
Weight	20kg

STANDARD ACCESSORIES

- Power cord: 1-phase (2 meters) x 1ea
3-phase (4 meters) x 1ea
- Angle stand : 1 ea
- Experimental lead wire : 1 set
- User's guide & experimental manual: 1 ea

OPTIONS (highly recommended for effective experiments)

• Multifunctional Digital Electric Meter (CEM-2200)

- AC voltage : 0V to 750V true RMS
- DC voltage : 0V to 1000V
- Insulation resistance : 500V / 999.9M Ω
- Ground resistance (earth Ω) : 0 ~ 2000 Ω
- Electroscop (live) : Buzzer alarm and LCD display
- Phase meter (PHA) : 3-phase 110V ~ 750VAC
- IrDA communication and memory function

EIS-3000

Power Transmission-Distribution & Electrical Installation Trainer



FEATURES

- Ideal for engineering, electrical installation, and measurement in simulation.
- Training on electrical installation:
 - 1-Phase, 3-phase, 3-phase 4-wire (R/S/T/N)
 - Earth-to-earth and earth-to-neutral (insulation-to-installation)
- Training on electrical safety measurement:
 - AC voltage, DC voltage, earth resistance, ground voltage, phase insulation resistance, phase test, line status test, resistance by leakage current, and capacitance by leakage current
- Fault simulation:
 - ELCB practices, circuit breaker practices, variable tests on leakage current, variable tests on earth resistance and battery voltage tests
- Complying international electrical installation and safety standards:
 - IEC 364 and EN 61010-1

INTRODUCTION

The EIS-3000 Power Transmission-Distribution & Electrical Installation Trainer is designed to help the user understand both power transmission system from a power plant and power distribution system through high-voltage transmission and transformation of electric energy. It is equipped with comprehensive metering displays in single-phase and three-phase sections.

- Power generation, transmission and distribution
- Fault simulation of electric installations and demonstration of actual measurements
- Learning of electrical installations and usage of measuring instruments

Comprehensive electrical measurement

The EIS-3000 Power Transmission-Distribution & Electrical Installation Trainer is an integrated simulation equipment for measuring AC voltage, DC voltage, earth resistance, insulation resistance and leakage current in single-phase AC circuit, 3-phase AC circuit, and 3-phase 4-wire AC circuit and performing an electric leakage shutoff test.

Versatile training purposes for private sector and public sector

As a multi-purpose equipment, the EIS-3000 Power Transmission-Distribution & Electrical Installation Trainer enables private companies to train their staffs on electricity safety and measuring methods. Also, it helps to train school teachers in high school or vocational school. It also helps college professors teach basic principles of electricity and measurement methods for their students. The user can make a best use of it with Multifunctional Digital Electric Meter (model: CEM-2200).

To practice field simulations

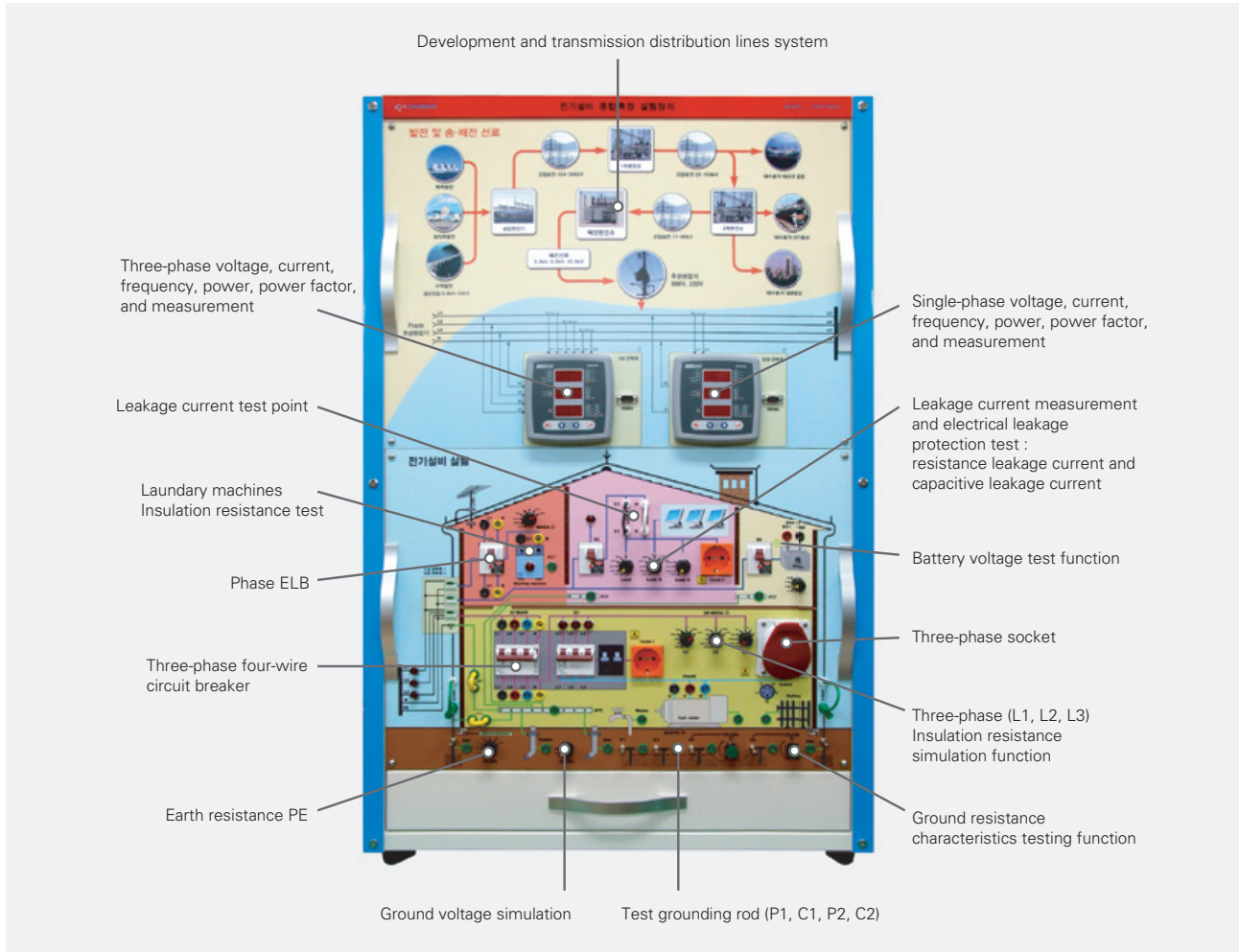
The EIS-3000 Power Transmission-Distribution & Electrical Installation Trainer allows the user to measure insulation resistance, earth resistance, effect of ground voltage, and ground resistance as it comprises single-phase AC circuit and 3-phase AC circuit.

To perform AC load experiment

When measuring the single-phase leak current, the user can test by charging load as there is a socket for load. The user can charge load through sockets for single-phase load and 3-phase load in a 3-phase line.

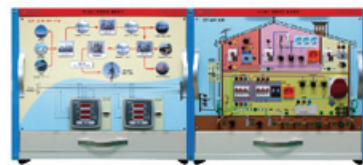
EIS-3000

EIS-3000 is an educational equipment devised by international standards in relation to electrical fields like IEC 364 and EN61010-1.



EXPERIMENTAL CONTENTS

- Power generation, transmission and distribution
- Prevention of electric accidents and safety of electric equipment
- Electromagnetic interference and prevention
- Electrostatic interference and prevention
- Safety training on thunder stroke damages
- 1-phase / 3-phase voltage measurement (AC and DC)
- Measurement of AC current and frequency
- Measurement of R/S/T phase and live line voltage
- Measurement of insulation resistance and leakage current
- Measurement of ground resistance (2-point / 3-point) and line to ground voltage
- Performance testing on electrical circuit breaker



EIS-3000B



EIS-3000A

SPECIFICATIONS

Digital meter for monitoring power transmission and distribution	Accuracy : IEE687 Class 1.0 Communication : RS-485 MODBUS / DNP3.0 / Lonworks Measurement: Phase voltage, line voltage, current, power, active power, reactive power, apparent power, power factor and frequency 3-phase indication: 4-digit digital meter (3ea) 1-phase indication: 4-digit digital meter (3ea)
Insulation resistance	1-phase power line: 0.08MΩ, 0.1MΩ, 0.2MΩ, 1MΩ, 10MΩ, 100MΩ, 200MΩ, OPEN 3-phase power line: L1: 0.2MΩ, 0.5MΩ, 1MΩ, 10MΩ, 100MΩ, 200MΩ, 500MΩ, OPEN L2: 0.3MΩ, 0.75MΩ, 2MΩ, 20MΩ, 150MΩ, 300MΩ, 400MΩ, OPEN L3: 0.09MΩ, 0.1MΩ, 0.2MΩ, 1MΩ, 10MΩ, 100MΩ, 200MΩ, OPEN
Ground resistance	2-point earth test Water pipe:7.5Ω, heater:10Ω, gas pipe:3Ω, radiator:100Ω, motor:10Ω 3- point earth test 1Ω, 2Ω, 3Ω, 5Ω, 7.5Ω, 10Ω, 30Ω, 110Ω
Auxiliary earth resistance	0 ~ 10kΩ variable: 2ea
Ground rod	PE1 / PE2 / P1 / P2 / P3 / C1 / C2
Ground voltage	0V / 6V / 9V (selectable)
Phase test point	U(L1), V(L2), W(L3)
Leakage current load	R-Load1: 1kΩ, 10kΩ, 100kΩ, 200kΩ, 300kΩ, OPEN Leakage current (R-load2): 30mA, 15mA, 2mA, 1mA, 0.4mA, 0.2mA, 0.1mA, OPEN Leakage C-load: 0.033, 0.01, 0.001, OPEN
DC voltage output	0V, 5V, 12V, 24V (max. 1A)
Electric leakage circuit breaker	1-phase 15A / 30mA : 3ea
Circuit breaker	3-phase 4-wire 10A : 1ea 3-phase 3-wire 10A : 1ea
AC output socket	1-phase: 2ea (outlet 1 & 2) 3-phase 4-wire + PE: 1ea (outlet 3)
Input voltage	1-phase 220V ±15% (50/60Hz) 3-phase 380V ±15% (50/60Hz) 4-wire (L1/L2/L3/N)

STANDARD ACCESSORIES

- Power cord: 1-phase (2 meters) x 1ea
3-phase (4 meters) x 1ea
- Angle stand : 1 ea
- Experimental lead wire : 1 set
- User's guide & experimental manual: 1 ea

OPTIONS (highly recommended for effective experiments)

- **Multifunctional Digital Electric Meter (CEM-2200)**
 - AC voltage : 0V to 750V true RMS
 - DC voltage : 0V to 1000V
 - Insulation resistance : 500V / 999.9MΩ
 - Ground resistance (earth Ω) : 0 ~ 2000Ω
 - Electro-scope (live) : Buzzer alarm and LCD display
 - Phase meter (PHA) : 3-phase 110V ~ 750VAC
 - IrDA communication and memory function

CPE-MP100B

Microprocessor Training Kit



FEATURES

- Three types of standard MPU board (AT 89S51, ATmega8535 and PIC16F874A)
- Consists of six standard experimental modules such as DC Motor module and Infrared Light Sensor module
- Diverse experiments through the optional components: one ATmega128 MCU board and 16 optional experimental modules
- USB Port ISP cable
- USB Host - cellular phone interface



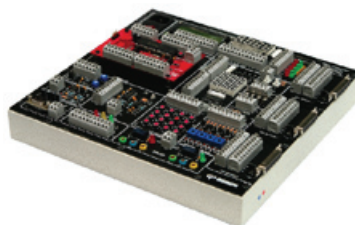
INTRODUCTION

The CPE-MP100B Microprocessor Training Kit is a "three-on-one" training system; three types of the MP100B MCU boards can be placed respectively on top of the microprocessor main board (referred to as "MP100B Master Unit"). The user can learn the memory structure of each MCU, difference in the registers, and arithmetic operation.

The MP100B Master Unit, or microprocessor main board, comprises two sections: Display section and Hardware section. The Display section includes LED, LCD, dot matrix and numeric indicator. The Hardware section includes key pad, relay, thermometer, converter, RS232 interface and various switches. Also, it consists of three connectors in D-sub 25 pins as to support infinite extension with external devices. In addition to optional modules, a hardware developed by the user can be interlocked with the MP100B Master Unit.

The three types of the MP100B MCU boards can be easily mounted and separated from the MP100B Master Unit. In addition to learning purposes, the MCU boards can be used for simple control in industry. Usually, the principles and functions of one MCU are taught for one semester at many learning institutes. However, the CPE-MP100B Microprocessor Training Kit helps students learn three types of MCU at maximum for one semester, and they can make the most of learning effects in a short period of time.

The Microprocessor Training Kit can be interlocked with a cellular phone through the USB-HOST module; and students can do advanced level of programming practices.



EXPERIMENTAL CONTENTS

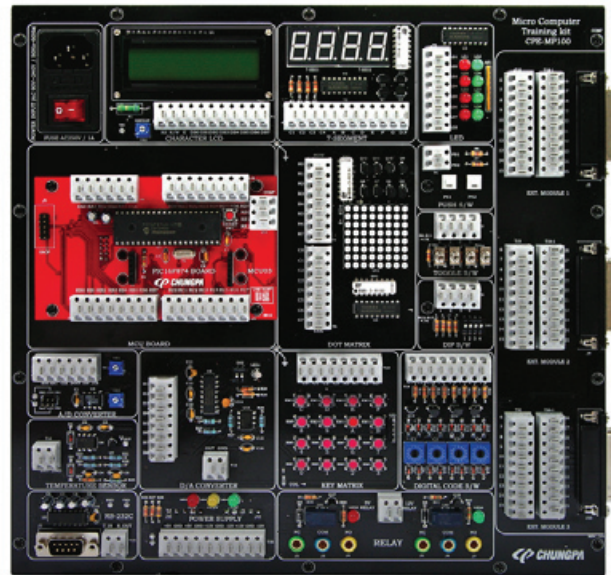
- Characteristics of MCU (AT89S51 / ATmega8535 / PIC 16F874 / ATmega128)
 - Memory and structure of MCU
 - System clock
 - Power sleep mode
 - Watchdog timer
- Hardware interface
 - Hardware development using MCU
 - Understanding the functions of MCU
 - Methods of the circuit interface
- MCU software and development tool
 - Cross assembler and AVR studio 4
 - IAR C cross compiler
 - Code vision compiler
 - Hardware development tools
- General-purpose I/O port
 - PIN setting
 - Reading PIN values
- Timer and counter
- Analog comparator
- Analog to digital converter (ADC)
- Digital to analog converter (DAC)
- USART (Universal Synchronous/Asynchronous Receiver/Transmitter)
- How to control 7-segment LED
- How to control a Dot Matrix
- How to control a relay
- How to control a limit switch and a reed switch
- How to control 16-key
- How to control a PWM DC motor
- How to control a stepping motor
- How to control thermistor and CdS
- How to control infrared light sensor
- How to control "Relay Output Control Module"
- How to control "Photo Coupler Module"
- Practices for I/O configuration



PRODUCT COMPOSITION

1. Microprocessor main board (MP100B Master Unit) : 1set
2. Standard MCU board : 3ea
3. Standard experimental module : 6ea
4. Interface cable and high strength jump wire : 1set

(MP100B Master unit)



SPECIFICATIONS

• MP100B Master Unit	
MCU	Standard: ATmega8535, AT89S51 and PIC16F874A (*Option: ATmega128)
USB host	ATmega 8515 SMS and data communication
LED	5PIE & red color : 8ea
7-Segment	4 digits & red color
Dot matrix	8x8 size & red color
Character LCD	16 characters x 2-line (backlight)
AD converter	12-bit resolution, MCP3202
DA converter	8-bit resolution, DAC0800
Relay	12V-2C (1ea), 5V-2C (1ea)
Temperature sensor	LM35, TO-92 type
DIP switch	4-pole: 1ea
TACT Switch	2ea
TOGGLE Switch	SPDT: 4ea
Digital code switch	4-bit: 4ea
Communication Port	RS232C: 1ea
Dimension	300(W) x 290(D) x 90(H)mm

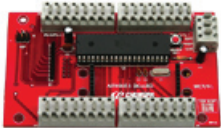
CPE-MP100B

Basic Components

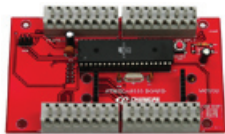
1) Standard MCU board [3ea]

- ① MCU01 : AT89S51 board
- ② MCU02 : AVR(ATmega8535) board
- ③ MCU03 : PIC V8.0(PIC16F874) board

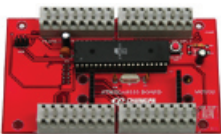
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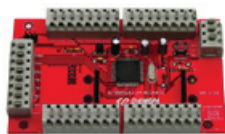
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Optional MCU04



2) Standard experimental module [6ea]

- ① M01 : DC motor module
- ② M02 : Stepping motor module
- ③ M03 : Limit switch & reed switch module
- ④ M04 : Thermistor(NTC) & CDS module
- ⑤ M05 : Infrared distance & photo interrupter module
- ⑥ M06 : Infrared light sensor module

①



②



③



④



⑤



⑥



Optional Components

1) Optional MCU board [1ea]

- MCU04 : ATmega128 board

2) Optional experimental modules [16ea]

- M07 : Breadboard module
- M08 : Extension PCB module
- M09 : Peripheral expansion 8255 module
- M10 : 8-relay control module
- M11 : 8-digit switch control module
- M12 : 16-LED control module
- M13 : Graphic LCD control module
- M14 : AC servo motor control module
- M15 : 4-channel AD/DA converter module
- M16 : VF(Voltage-to-frequency) converter module
- M17 : FV(Frequency-to-voltage) converter module
- M18 : Stepping motor's N.C position control module
- M19 : DC motor's speed & position control module
- M20 : AC lamp control module
- M21 : Large dot-matrix control module
- M22 : Isolated photo coupler module



M07/Bread board module



M10/8-Relay control module

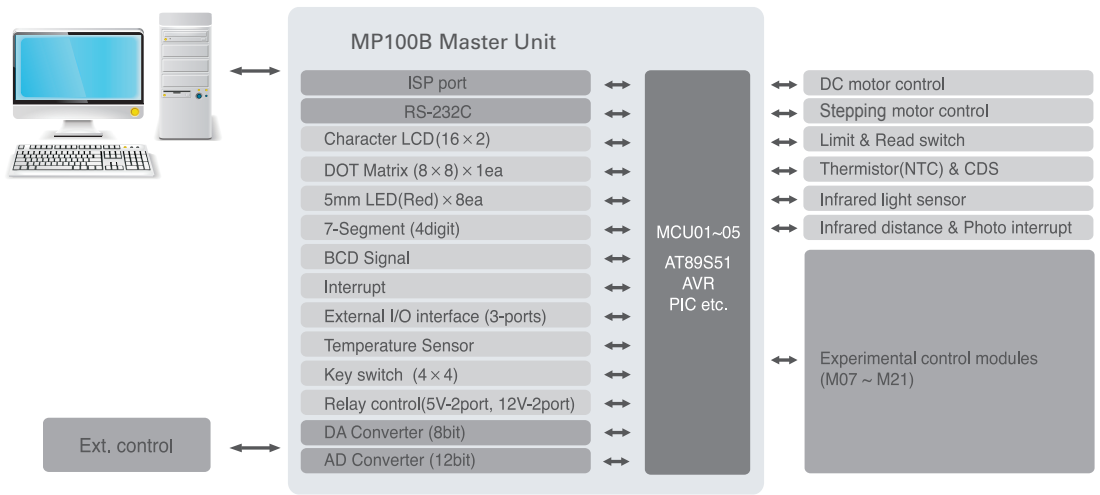
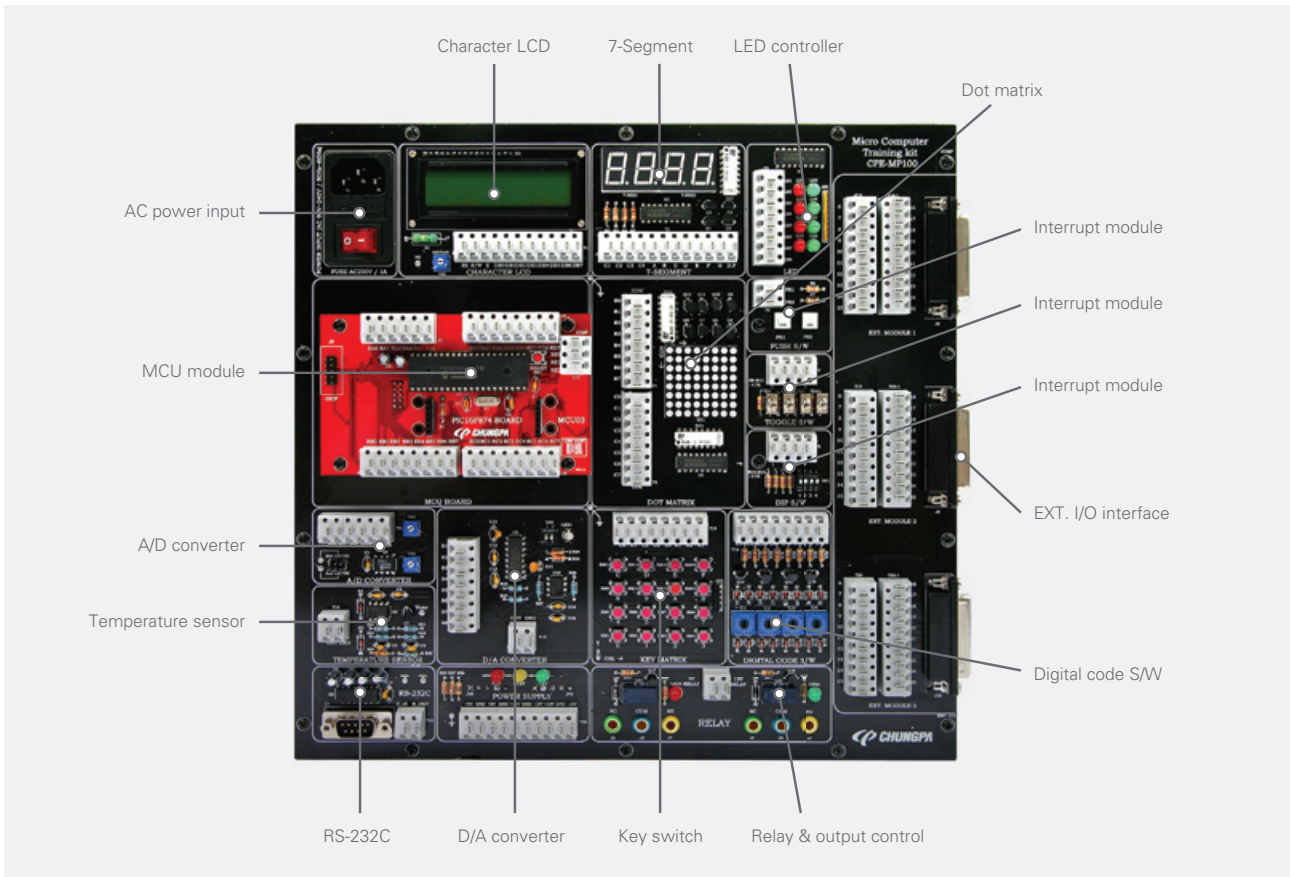


M22/Isolated photocoupler module

STANDARD ACCESSORIES

- Power cord : 1ea
- Serial cable : 1ea
- PIC kit V2-PIC download cable : 1ea
- USB-ISP cable V3-AVR & 8051 download cable : 1ea
- High strength jump wire : 1set
- Application software CD : 1ea
- User's guide manual: 1ea
- Experimental manual : 1ea

• Key Components of MP100 Master Unit



CPE-MP300

Micro Controller Training Kit



FEATURES

- Equipped with various types of input switch and output display
- Basic to advanced level learning courses on the microprocessor
- Supports a broader range of hands-on practice by the external I/O extension interface
- Enables high speed downloading through the ISP cable, part of the CPE-MP300 accessories
- Convenient communication practices by the USB and RS-232C interfaces
- Remote control practice based on IR communication

INTRODUCTION

The CPE-MP300 Micro Controller Training Kit does not require a separate ROM writer. It is fully capable of downloading a written computer program to the built-in flash memory. The Micro Controller Training Kit covers basic principles of AT89S52 MCU hardware and methods of address control. The user can learn both C programming language and assembly language through the course of writing computer programs and performing actual control practices. They can enjoy great educational effects through various control practices: display, I/O, IR communication, PS2 type keyboard, SRAM and EEPROM.

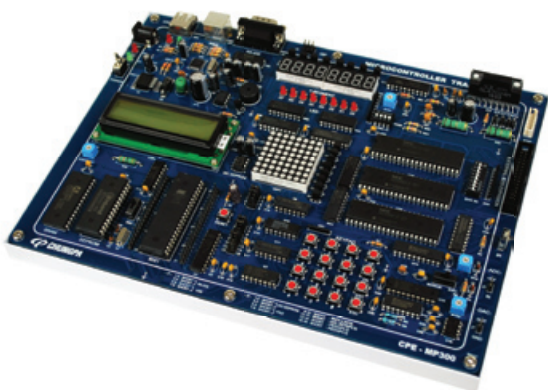
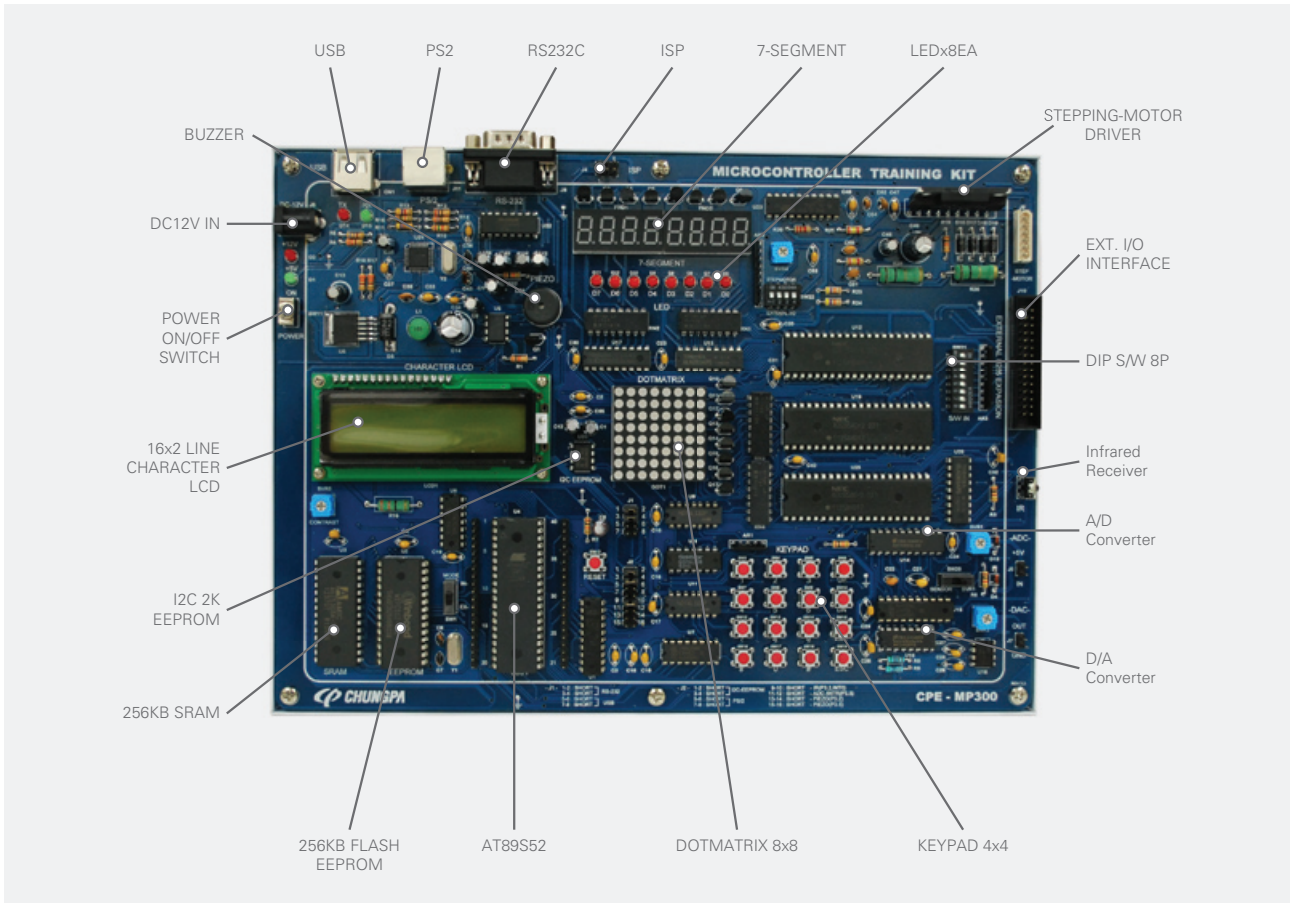
EXPERIMENTAL CONTENTS

- Address BUS control
- 8255 control practices
- I/O port practices using LED
- 8 x 8 dot matrix display
- 7-segment and character LCD control
- 4 x 4 tact switch control
- 8255 input control with DIP switch
- Stepping motor control with the stepping motor driver
- EEPROM and SRAM
- EEPROM control by the I2C method
- PS2 keyboard control
- Sound practices with Piezo
- A/D converter and D/A converter
- Remote control by the infrared lamp
- Serial port communications (RS232 and USB)

SPECIFICATIONS

• MP300 Master Unit	
MCU	AT89S52
Memory	SRAM (256KB) Flash EEPROM (256KB) I2C EEPROM
LED	5PIE & red color (8ea)
7-segment	8-digit & red color
Dot matrix	8 x 8 size & red color
Character LCD	16 characters x 2 lines (backlight)
A/D converter	12-bit resolution, MCP3202
D/C converter	8-bit resolution, DAC0800
Keypad	4 x 4
Stepping motor driver	1ea
DIP S/W	8-pole: 1ea
Buzzer	Piezo : 1ea
Communication	RS232C (1ea), USB (1ea), PS2 (1ea) and ISP (1ea)
IR receiver	1ea
Ext. I/O interface	26-pin connector :1ea
Power source	DC 12V adapter

• Key Components of MP300 Master Unit



STANDARD ACCESSORIES

- DC adapter : 1ea
- ISP cable : 1ea
- USB cable : 1ea
- RS-232C cable (PC interface) : 1ea
- Stepping motor : 1ea
- Application Software CD : 1ea
- IR remote control : 1ea
- Aluminum carrying case: 1ea
- User's guide & experimental manual: 1ea

CPE-SN2012

PC-based Sensor Application Trainer



FEATURES

- Supports a variety of experiments using 25 types of sensor modules
- Helps understand the characteristics of various sensors and acquire application skills
- One-touch lever clamp applied for easy attachment and detachment of the modules
- Gives insight for the output method and conversion method for various types of sensors
- Capable of verifying and analyzing the output value of sensors on PC
- Enhances the application skills by understanding the principles of sensor signal processing through the DAQ Module
- Low-noise locking casters for convenient relocation of the equipment

INTRODUCTION

The CPE-SN2012 PC based Sensor Application Trainer treats the characteristics of various sensors and highlights feasible application of the sensors in a related field. It was designed to help understand the process of signal conversion and to enhance application skills in automation by practicing various sensors such as temperature sensors, optical sensors, ultrasonic sensors, humidity sensors, hall sensors, proximity sensors and pressure sensors.













The user can learn how to process the signal and check it easily through the course of conversion and amplification of the signal detected by various methods.

EXPERIMENTAL CONTENTS

- CdS sensor's characteristics
- Photo diode sensor
- Photo transistor
- Optical fiber
- Capacitive sensor
- Inductive sensor
- Load cell sensor
- Flow velocity sensor
- Acceleration sensor
- Gas sensor
- Humidity sensor
- pH sensor (acidity)
- Hall sensor
- Ultrasonic sensor
- Microphone
- Thermistor
- Temperature sensor
- Superconducting sensor






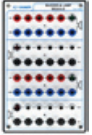




SPECIFICATIONS

	Worktable	<ul style="list-style-type: none"> + Structure: Aluminum profile (L-type panel) + Dimension: 1200(W) x 750(D) x 800(H)mm + Slot board: 25mm in interval + Low-noise locking casters: 4ea + Drawers: Equipped with safety lock
	Power Supply (PN-7750)	<ul style="list-style-type: none"> + DC 24V output terminal: 3 pairs + Overload and short circuit protection (alarm function) + Maximum current: 5A
	Slide Unit (CPE-SN2012-M25)	<ul style="list-style-type: none"> + Travel distance : 150mm + Rotational radius: $\pm 90^\circ$
	Acceleration Sensor (CPE-SN2012-M11)	<ul style="list-style-type: none"> + Measuring range : $\pm 2 \sim \pm 1000g$ + Type of output: Voltage[V] + Discharging Voltage: DC 24V + Built-in polarity protection circuit

	Load Cell (CPE-SN2012-M32)	+ Measuring range: Max. 50kgf + Output voltage: 5V	
	Pressure Sensor (CPE-SN2012-M12)	+ Measuring range: 0.1~1bar + Type of output: Voltage[V]	+ Output voltage: DC 24V + Built-in polarity protection circuit
	Flow Velocity Sensor (CPE-SN2012-M13)	+ Input pressure: 0.1~1bar + Type of output: Voltage[V]	+ Output voltage : DC 24V + Built-in polarity protection circuit
	CdS (CPE-SN2012-M01)	+ Type of output: Resistance [Ω] + Operating temperature : -30 $^{\circ}$ C ~ +70 $^{\circ}$ C	
	Photo Diode (CPE-SN2012-M02)	+ Type of output: Current [μ A] + Output voltage: DC 24V + Built-in polarity protection circuit	
	Photo Transistor (CPE-SN2012-M03)	+ Type of output: Current [mA] + Output voltage : DC 24V + Built-in polarity protection circuit	
	Optical Sensor Module (pervious) (PN-7551, 7552)	+ Power source: DC 24V + Response speed : Less than 1ms + Consumption current : 40mA + Light source : Infrared LED	+ Lamp receiver: Photo diode (IC built-in type) + Sensitivity adjustment: Variable resistor + Distance detection: 5~10 meter + Built-in polarity protection circuit
	Optical sensor module (reflective) (PN-7550)	+ Power source: DC 24V + Power source: Infrared LED + Response speed: 1ms	+ Sensitivity adjustment: Variable resistor + Operation indicator: LED + Built-in polarity protection circuit
	Thermistor (CPE-SN2012-M18)	+ NTC: about 10k Ω + Type of output: Resistance [Ω] + Operating temperature: -20 $^{\circ}$ C ~ +200 $^{\circ}$ C	
	Thermocoupler (CPE-SN2012-M06)	+ Type of output: Voltage[V] + Power source: DC 24V	+ K-type + Built-in polarity protection circuit
	Fiber Optic Sensor (PNP) (CPE-SN2012-M14)	+ Power source: DC 24V + Power source: Red color LED + Conversion mode: Indicator lamp ON / Dark ON + Response speed: 1ms	+ Sensitivity adjustment: Variable resistor + Operation indicator: LED + Built-in polarity protection circuit
	Fiber Optic Cable (CPE-SN2012-M15)	+ Diameter: 2.2mm + Length: 1m + Response speed: 1ms	+ Allowed curve radius: 30r + Minimum objection detection: 0.1mm

CPE-SN2012

	Optical Conversion Unit (CPE-SN2012-M33)	<ul style="list-style-type: none"> + Power source: DC 24V + Power source: Transparent white Ø10 LED + Built-in polarity protection circuit
	Hall Sensor (CPE-SN2012-M16)	<ul style="list-style-type: none"> + Type of output: Resistance [Ω] + Output voltage: 5V + Operating temperature : -55°C ~ +125°C
	Hall Sensor (CPE-SN2012-M17)	<ul style="list-style-type: none"> + Type of output: Resistance [Ω] + Output voltage: 5V + Operating temperature: -55°C ~ +125°C
	PT100 (CPE-SN2012-M07)	<ul style="list-style-type: none"> + Pt100Ω + Type of output: Resistance [Ω]
	Pyroelectric Sensor (CPE-SN2012-M19)	<ul style="list-style-type: none"> + Power source: DC 24V + Rise time: 100ms + Operating temperature : -40°C ~ +60°C + Built-in polarity protection circuit
	Heating Unit (CPE-SN2012-M20)	<ul style="list-style-type: none"> + Temperature range: 15°C ~ 70°C + Power source : DC 24V + Thermoelectric module (heating / cooling) + Temperature adjustment + Built-in polarity protection circuit
	Ultrasonic Sensor (CPE-SN2012-M21)	<ul style="list-style-type: none"> + Distance detection: 1~50cm + Operating temperature : -40°C ~ +85°C + Response frequency: 40 ± 1kHz + Type of output: Voltage (V) + Built-in polarity protection circuit
	Microphone (CPE-SN2012-M22)	<ul style="list-style-type: none"> + Type of output: Frequency output + Measuring range : 20Hz~20kHz + Condenser microphone + Built-in polarity protection circuit
	pH Standard Solution (CPE-SN2012-M23)	<ul style="list-style-type: none"> + pH4.0 standard solution: 500ml (1 bottle) + pH7.0 standard solution: 500ml (1 bottle) + pH10.0 standard solution: 500ml (1 bottle) + Measuring reagent: 3 types
	Inductive Sensor (PNP) (PN-7556)	<ul style="list-style-type: none"> + Power source: DC 24V + Switching distance: 5mm + Maximum switching frequency: 350Hz + Built-in polarity protection circuit + Equipped with LED indicator
	Inductive Sensor (NPN) (PN-7557)	<ul style="list-style-type: none"> + Power source: DC 24V + Switching distance: 4mm + Maximum switching frequency: 350Hz + Built-in polarity protection circuit + Equipped with LED indicator
	Capacitive Sensor (PN-7554)	<ul style="list-style-type: none"> + Power source: DC 24V + Switching distance: 8mm + Maximum switching frequency: 50Hz + Consumption current: 15mA + Built-in polarity protection circuit + Equipped with LED indicator

	Gas Sensor (CPE-SN2012-M04)	+ Gas detection: LPG, LNG, Methane + Detection range: 500~1000ppm.	+ Output type: Voltage[V] + Built-in polarity protection circuit
	pH sensor (CPE-SN2012-M24)	+ Measuring range: 0.00~14.00 pH + Operating temperature: 0~60°C + Response time: 10s (90% response)	+ Output type: Voltage[V] + Built-in polarity protection circuit
	Humidity Sensor (CPE-SN2012-M05)	+ Type of output: Voltage [V] + Measuring range: 0~100% + Built-in polarity protection circuit	
	Light Controller (CPE-SN2012-M26)	+ Can apply to all sensor modules + With a built-in timer	+ AC 220V power source + DC 24V
	Temperature Sensor (CPE-SN2012-M27)	+ Can apply to all sensor modules + Heater in use + DC 24V	
	Buzzer & Lamp Module (PN-7720A)	+ Input terminal: 10ea + Type of output: Lamp & buzzer + Operation: Works at the time of receiving a NPN or PNP signal input	
	Digital Counter (PN-7712A)	+ Power source : DC 24V + Indicator : 4 digits	+ Mode selection: 100-pulse, 1000-pulse + Display change: Push type switch
	Amplifier Module (CPE-SN2012-M28)	+ Half/Full wave rectifier circuit + Built-in 350Ω resistor + Ø4 terminal	+ Signal creation using OP Amp + Adjustable terminal offset
	Data Collection Module (CPE-MP115A)	+ Analog input: 0~12.75V + Function generator module + Waveform: 5 types	+ Frequency output: 2.6 Hz ~ 312.5Hz + DC voltage output module + Output level: 0~12.75V
	Signal Converter (CPE-SN2012-M30)	+ Power source: DC 24V + Input voltage: 0~12V	+ Response voltage: 0~10V + 8-step sensor characteristics range (selectable)

STANDARD ACCESSORIES

- Power cord: 1ea
- Connection cable: 1ea
- PC application software CD : 1ea
- User's guide manual: 1ea
- Experimental manual: 1ea

OPTIONS

- Multifunctional Digital Electric Meter (CEM-2200)
- Digital Multimeter (CPM-8302A)
- Differential pressure gauge

CSN-2005

Ubiquitous-based Integrated Sensor Application Trainer



FEATURES

- Hypersensitive digital graphic LCD display
- Designed to practice ubiquitous-based sensor control
- Measurement of sensor signals through the CSN-200 Main Unit
- Real-time measurement of sensor signal waves
- Quick and precise response of measured values
- PC interface through the USB or RS485 communication
- PC application software to practice characteristics of sensors
- Automatic recognition of sensor modules
- External output control practice using the data of sensors
- RF communication for sensor values to be transmitted in radio frequency (Option)

INTRODUCTION

The CSN-2005 Ubiquitous-based Integrated Sensor Application Trainer consists of a main unit (CSN-200), a breadboard module, an external I/O board module, 23 experimental modules, 16 sensor units and PC application software.

The Ubiquitous-based Integrated Sensor Application Trainer supports various I/O configuration and shows experimental results in the form of text or graphics on the LCD screen of CSN-200 main unit. This system displays information of each module when connecting to the CSN-200 main unit. The I/O parameters and results can be viewed by connecting the PC with USB interface. For wire communication, the RS485 interface is being used for network configuration and communication. Also, the radio frequency network is built for a training purpose through the optional "CRF200 RF Communication Kit for PC".

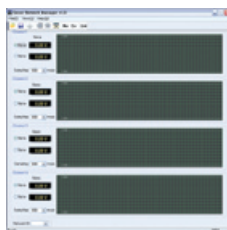
The Ubiquitous-based Integrated Sensor Application Trainer comes with application software and is designed to help the user learn and practice easily. When the PC or a sensor control unit sends a signal for external output, then output comes from EXT or I/O. There is no need to require a separate power line or I/O line. The power source and I/O are transmitted through the D-sub cables. Also, each circuit module has test points, so that students can measure circuit values while testing I/O changes.

STANDARD ACCESSORIES

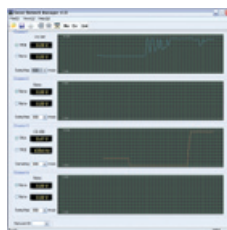
- Power cord: 1ea
- USB cable: 1ea (for connection of CSN-200 Main Unit to PC):
- 2mm plug type cord: 1set
- Jumper wire: 1set
- 9-pin D-SUB cable: 1ea (for connection of a sensor unit to a sensor module):
- 15-pin D-SUB cable: 4ea (for connection of a sensor module to CSN-200 Main Unit)
- Application software CD: 1ea
- User's manual: 1ea
- Experiment & Practice guide book: 1ea

OPTIONS

- RF communication kit for PC (*model: CRF-200)



• Main



• Measuring









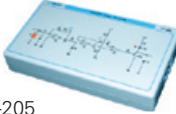











• Normal IO


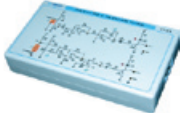

















• External IO

EXPERIMENTAL CONTENTS

Category	List of Experiments	Experimental Module	Sensor Unit
Package - I (Standard)	<ul style="list-style-type: none"> • AD590 Temperature Transducer Module <ul style="list-style-type: none"> - How to compose AD590 temperature transducer - Characteristics of AD590 temperature transducer - Conversion of AD590 temperature transducer - Applied experiments with AD590 temperature transducer 	 CS-201	 CS-201-S
	<ul style="list-style-type: none"> • Chemical Sensor Module <ul style="list-style-type: none"> - Principles and applications of gas sensor - Principles and applications of smoke sensor - Principles and applications of ethanol sensor 	 CS-202	 CS-202-S
	<ul style="list-style-type: none"> • A/D Hall Sensor Module <ul style="list-style-type: none"> - Principles of analog and digital hall sensors - Applied experiments with analog and digital hall sensors 	 CS-203	 CS-203-S
	<ul style="list-style-type: none"> • Thermocouple Sensor Module <ul style="list-style-type: none"> - Composition of thermocouple - Characteristic of thermocouple - Principles of thermocouple conversion - Applied experiments with thermocouple 	 CS-204	 CS-204-S/Thermocouple
	<ul style="list-style-type: none"> • Photo Cell Sensor Module <ul style="list-style-type: none"> - Characteristics of photo cells - Principles of photo cell conversion - Applied experiments with photo cells 	 CS-205	 CS-205-S
	<ul style="list-style-type: none"> • Infrared TX/RX Sensor Module <ul style="list-style-type: none"> - Characteristics of infrared (IR) - IR driver circuit - IR transceiver circuit - Applied experiments with IR 	 CS-206	 CS-206-S
	<ul style="list-style-type: none"> • P2000 Pressure Sensor Module <ul style="list-style-type: none"> - Structure of pressure sensor - Principles of pressure conversion - Applied experiments on pressure conversion 	 CS-207	 CS-207-S
	<ul style="list-style-type: none"> • Voltage-to-Frequency Converter Module <ul style="list-style-type: none"> - Principles of voltage-to-frequency conversion - Principles of frequency-to-voltage conversion - Applied experiments with photo encoder 	 CS-208	None
	<ul style="list-style-type: none"> • Frequency-to-Voltage Converter Module <ul style="list-style-type: none"> - Principles of voltage-to-frequency conversion - Principles of frequency-to-voltage conversion - Applied experiments with photo encoder 	 CS-209	None
	<ul style="list-style-type: none"> • Breadboard Module <ul style="list-style-type: none"> - Composition of breadboard components - Applied experiments with various sensor circuits 	 CS-200B	None
<ul style="list-style-type: none"> • External I/O Board Module (including a cable) <ul style="list-style-type: none"> - How to control external devices and I/O ports - 8-relay port control - 4-TTL I/O port control - Signal input to the photo cells - DA output control 	 CS-200B I/O	None	

CSN-2005

Category	List of Experiments	Experimental module	Sensor unit
Package - I (Standard)	<ul style="list-style-type: none"> • Probe Module - Probe sensor for circuit measurement - Input measurement : 2 channels - Measuring range : DC 0 ~ 10V 	None	 CS-200P
Package - II (Optional)	<ul style="list-style-type: none"> • Pyroelectric Sensor & Thermister Sensor Module - Operational principles of pyroelectric sensor - Applications of pyroelectric sensor - Operational principles of thermister sensor - Applied experiments with thermister sensor 	 CS-210	 CS-210-S
	<ul style="list-style-type: none"> • Ultrasonic Sensor Module - Characteristics of ultrasonic wave - Transmission and reception of ultrasonic wave - Applied experiments on ultrasonic wave conversion 	 CS-211	 CS-211-S
	<ul style="list-style-type: none"> • Photo Transistor & Photo-Interrupter Sensor Module - Characteristics of photoconductive detection - Applied experiments on photoconductive detection 	 CS-212	 CS-212-S
	<ul style="list-style-type: none"> • Pt100 Sensor Module - Resistance temperature detector (RTD) - Composition of Pt100 - Characteristics of Pt100 - Pt100 conversion circuits - Applied experiments with Pt100 	 CS-213	 CS-213-S / PT100
	<ul style="list-style-type: none"> • Humidity Sensor Module - Classification of humidity sensor - Composition and characteristics of humidity sensor - Applied experiments with humidity sensor 	 CS-214	 CS-214-S
	<ul style="list-style-type: none"> • Strain Gauge Sensor Module - Operational principles of strain gauge - Characteristics of strain gauge - Applied experiments with strain gauge 	 CS-215	 CS-215-S
	<ul style="list-style-type: none"> • Magnetoresistive Sensor Module - Modes of magnetic resistance sensor - Structure and characteristics of magnetic resistance sensor - Applied experiments with magnetic resistance sensor 	 CS-216	 CS-216-S
<ul style="list-style-type: none"> • Crystal Temperature Sensor Module - Modes of crystal temperature sensor - Structure and characteristics of crystal temperature sensor - Applied experiments with crystal temperature sensor 	 CS-217	 CS-217-S	
Package - III (Optional)	<p>MECHANICAL SENSOR MODULES</p> <ul style="list-style-type: none"> • Linear Scale Module (including sensor) : CS-218 - Characteristics of linear scale - Measurement of travel distance • Load Cell Weight Conversion Module (including sensor) : CS-219 - Load cell conversion circuit - Weight measurement - Digital scale • LVDT Transducer Module (including sensor): CS-220 - Conversion circuits - Measurement of position - Measurement of distance 	<p>STANDARD ACCESSORIES</p> <ul style="list-style-type: none"> • Power cord: 1ea • USB cable (CSN-200 Main Unit to PC): 1ea • 2mm plug cable: 1set • Jumper wire: 1set • D-SUB 9-pin cable: 1ea • D-SUB 15-pin cable: 4ea • Application software CD: 1ea • User's guide manual: 1ea • Experimental manual: 1ea <p>OPTIONS</p> <ul style="list-style-type: none"> • RF Communication Kit for PC (*model: CRF-200) 	

SPECIFICATIONS

• Main Unit (CSN-200)

Display	<ul style="list-style-type: none"> • Graphic LCD display (multifunctional) - 320 x 240 dots - Backlight (blue color)
Sensor input port	<ul style="list-style-type: none"> • Number of channel : 4 channels • 15-pin D-sub connector • Analog input : 12 bit (2- input channel) • Digital I/O channel: 5 channels • Power line : DC \pm12V, DC \pm5V • Interface : EEPROM data and clock interface
External I /O port	<ul style="list-style-type: none"> • 34-pin digital I/O connector (1ea) • 8-relay control port • 4-digital output (TTL) • 4-digital input (TTL) • 4-photo coupler input • 1-PWM output • DA output (0 ~ 10V) • DC \pm12V, DC \pm5V
Communication	<ul style="list-style-type: none"> • USB PC interface port: 2ea (front: 1ea, rear: 1ea) • RS-485 PC interface port: 1ea • RF interface port : 1ea • ISP port (for downloading microcomputer firmware): 1ea
Control function key	<ul style="list-style-type: none"> • Function key switch: 4ea • Channel selector key: 3ea
Temperature	<ul style="list-style-type: none"> • Operating temperature: -5°C ~ +45°C (23°F ~ 113°F) • Storage temperature: -35°C ~ +65°C (-31°F ~ 149°F)
Power supply	AC 85 ~ 264V 50/60Hz
Dimension	290(W) x 260(D) x 180(H) mm
Weight	3.35Kg

• Experimental Modules and Sensors

Category	Experiment module	Sensor unit	
Package - I (Standard)	CS-200B	Bread Board Module	None
	CS-200P	Probe Module	CS-200P
	CS-200B I/O	External I/O Board Module (including a cable)	None
	CS-201	AD590 Temperature Sensor Module	CS-201-S
	CS-202	Chemical Sensor Module (gas, smoke and ethanol)	CS-202-S
	CS-203	A/D Hall Sensor Module	CS-203-S
	CS-204	Thermocouple Sensor Module	CS-204-S
	CS-205	Photo Cell Sensor Module	CS-205-S
	CS-206	Infrared Sensor Module (TX / RX)	CS-206-S
	CS-207	P2000 Pressure Sensor Module	CS-207-S
	CS-208	Voltage-to-Frequency Converter Module	None
CS-209	Frequency-to-Voltage Converter Module	None	
Package - II (Optional)	CS-210	Pyroelectric & Thermister Sensor Module	CS-210-S
	CS-211	Ultrasonic Sensor Module	CS-211-S
	CS-212	Photo Transistor & Photo-Interrupter Sensor Module	CS-212-S
	CS-213	Pt100 Sensor Module	CS-213-S
	CS-214	Humidity Sensor Module	CS-214-S
	CS-215	Strain Gauge Sensor Module	CS-215-S
	CS-216	Magnetoresistive Sensor Module	CS-216-S
CS-217	Crystal Temperature Sensor Module	CS-217-S	
Package - III (Optional)	CS-218	Linear Scale Module	Sensors are included in three modules: CS-218, CS-219 and CS-220
	CS-219	Load Cell Weight Conversion Module	
	CS-220	LVDT Transducer Module	

CPE-SN2007

Sensor Application Trainer



FEATURES

- Consists of 10 experimental modules and 16 types of sensors
- Electronic circuit practices such as signal detection, signal amplification and signal conversion
- Helps learn the principles of A/D and D/A conversion for signal processing
- Enhances the signal amplification and processing skills through various sensors

EXPERIMENTAL CONTENTS

- Various electronics circuits for signal detection, signal amplification and signal conversion
- Sensor amplification (inverting, non-inverting, differential, DC offset and comparator)
- A/D and D/A conversion for signal processing
- Principles of thermocouple and thermistor
- Principles of photo sensor (LED, photo transistor and Cds)
- Principles of rotary encoder
- Ultrasonic wave's transmission and reception
- Magnetic sensor, pressure sensor and proximity sensor



SPECIFICATIONS

OP-AMP UNIT (CPE-SN2007-M1)

- Coupling : AC and DC
- Amplifier mode : Inverting, non-inverting, differential, DC offset, comparator
- DC offset : -15V ~ 0 ~ +15V
- DC output : $\pm 15V$ 0.3A
- Power source : AC220V 50/60Hz
- Dimension : 345(W) \times 220(D) \times 120(H) mm

SIGNAL CONVERTER UNIT (CPE-SN2007-M2)

- A/D conversion : Successive type
- Analog input : DC 0 ~ 10V
- Digital output : 8-bit TTL level
- D/A conversion : Current summing type
- Digital input : 8-bit TTL level
- Analog output : DC 0 ~ 10V
- Conversion rate : 100 μ s (analog to digital)
50 μ s (digital to analog)
- DC output : $\pm 15V$ 0.3A
- Power source : AC220V 50/60Hz
- Dimension : 345(W) \times 220(D) \times 120(H) mm

TEMPERATURE SENSOR (CPE-SN2007-01)

- Detectable circuit : Wheatstone Bridge and Amplifier
- Temperature source : Heater and Cooler
- Resistance : 500 Ω ~ 5k Ω
- Heater & Fan : DC 5 ~ 15V
- Sensor : Thermocouple and thermistor
- Power source : DC $\pm 15V$ 1A

PHOTO SENSOR (CPE-SN2007-02)

- Source bias : DC 0 ~ 30mA
AC 100Hz ~ 10kHz (Digital Counter)
- Sensing range : 0 ~ 200mm
- Sensor : LED, photo transistor and Cds
- Power source : DC $\pm 15V$ 1A

ROTATION SENSOR (CPE-SN2007-03)

- Input voltage : DC 5V
- Output waveform : Square wave
- Output phase : A and B
- Resolution : 100 pulses per revolution
- Response : 25kHz
- Power source : DC $\pm 15V$ 1A

ULTRASONIC SENSOR (CPE-SN2007-04)

- Nominal frequency : 40kHz
- Sensitivity : Over -67dB
- Receiver bandwidth : 6kHz (-74dB)
- Transmitter level : Over 110dB

VIBRATION

- Frequency : 10Hz ~ 1kHz
- Sensor Output : 40mV/1G

GAS SENSOR (CPE-SN2007-05)

- Type of gas : LPG, LNG and Methane
- Sensing range : 500 ~ 10,000 ppm
- Circuit voltage : Max. 24V (AC or DC)
- Heater voltage : 5V (AC or DC)
- Power source : DC $\pm 15V$ 1A

HUMIDITY SENSOR (CPE-SN2007-06)

- Humidity : 30% ~ 90% RH
- Temperature : 0 $^{\circ}$ C ~ 60 $^{\circ}$ C
- Sensor output : DC 1 ~ 3V (at 30% ~ 90% RH)
- Power source: DC $\pm 15V$ 1A

HALL SENSOR (CPE-SN2007-07)

- Material : GaAs
- Voltage : 55 ~ 140 mV
- Input resistance : 450 ~ 900 Ω

Proximity Sensor

- Sensing distance : 0 ~ 5 mm
- Detectable object : Magnetic substance
- Frequency : 500 Hz

Pressure Sensor

- Measuring Range : 0 ~ 1 kg/cm² (Max. 2kg/cm²)
- Output : 1 ~ 5V
- Compressor : Handy type

SENSOR SWITCH (CPE-SN2007-08)

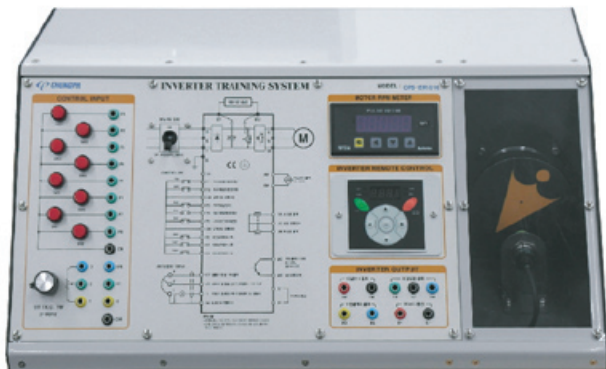
- Reed switch, mercury switch and limit switch
- Contact : SPST
- Contact current : 0.1A (24V)
- Travel distance : 80mm
- Driving motor : 0 ~ 60 RPM
- Power source : DC $\pm 15V$ 1A

STANDARD ACCESSORIES

- Power cord : 2ea
- Connection cable : 1set
- Data cable : 1ea
- Shock sensor unit : 1ea
- Alcohol thermometer : 1ea
- Thermocouple probe : 1ea
- CdS probe : 1ea
- Thermistor probe : 1ea
- LED probe : 1ea
- Lamp probe : 1ea
- Ultrasonic TX probe : 1ea
- Photo transistor probe : 1ea
- Handy air compressor : 1ea
- Experimental manual : 1ea

CPE-ER1010

Inverter Training System



FEATURES

- Equipped with a compact hard case ensuring mobility and easy installation
- Composed of a 3-phase inverter, a 3-phase induction motor and I/O devices
- Capable of connecting to the D/A converter unit of a programmable logic controller
- Showing the circuit diagrams of the inverter on the front panel
- Network system with the RS485 communication function

EXPERIMENTAL CONTENTS

- The principles and characteristics of the inverter
- The principles and characteristics of the motor
- Basic operation practices using a keypad
- How to control a motor by the inverter
- How to control a main circuit and a switching circuit
- How to use the variable resistor for operation
- Power Factor and Efficiency
- Sensorless vector control practices
- Multiple speed control practices
- Application control in use of a programmable logic controller

SPECIFICATIONS

3-PHASE INVERTER

- Motor capacity: 0.1kW
- Rated output
 - Rated power: 0.3kVA
 - Rated current: 0.8A,
 - Output frequency: 0 ~ 400Hz
 - Output voltage: 3-phase 380V ~ 460V [*Option: 3-phase 220V]
- Rated input
 - Voltage: 3-phase 380V ~ 460V ($\pm 10\%$) [*Option: 3-phase 220V]
 - Frequency: 50 ~ 60Hz ($\pm 5\%$)
- Cooling method : Forced air cooling system
- Protective structure : Open type (IP00)
- Control mode : V/F control
- Operation : Keypad / terminal block / communication
- Protective function : Intertripping, overload alert and instantaneous interruption
- Indication
 - Operation: Output frequency, output current, output voltage, frequency setting value, operational speed and DC voltage
 - Trip: Displays the malfunctioning status in case the protective function is activated (memorizing up to five failure records)
- I/O devices: Control terminals and control switches
- Operating temperature: $-10^{\circ}\text{C} \sim 40^{\circ}\text{C}$, 90% R.H

3-PHASE INDUCTION MOTOR

- Operating power : 3-phase AC 380V
- Rotary disc : Graphic design
- Equipped with a sensor for detecting the speed of revolution

I/O CONTROL DEVICES

- Digital RPM meter : 1ea
- Variable resistor (1k Ω) : 1ea
- Input switch : 8ea

MAIN POWER UNIT

- Rated voltage : 3-phase AC 380V 60Hz
- Rated sensitivity current: 30mA
- Rated float current : 15mA
- Leakage current circuit breaker (ELCB) : 1ea

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- User's guide manual : 1ea

CPE-ER1000

Industrial Inverter Control Trainer



SPECIFICATIONS

3-PHASE INVERTER (2ea)

- Motor: 1HP (0.75kW)
- Rated output
 - Rated capacity: 1.9kVA
 - Rated current: 2.5A,
 - Output frequency: 0 ~ 400Hz
 - Output voltage: 3-phase 380V ~ 460V
- Rated input
 - Voltage: 3-phase 380V ~ 460V ($\pm 10\%$),
 - Frequency: 50 ~ 60Hz ($\pm 5\%$)
- Cooling method: Forced cooling
- Protection: Open type (IP00)
- Control : V/F control
- Operation mode: Keypad / terminal block / communication (selectable)
- Protective function
 - Intertrip: Overcurrent, overvoltage, overload, inverter overheat, motor overheat, low voltage, wrong I/O connection, communication error, hardware trouble and CPU error
 - Inverter alarm: Stall prevention and overload warning
 - Instant interruption: Below 15m sec. - continued operation
Above 15m sec. - automatic restart
- Indication
 - Operating information: Output frequency, output current, output voltage, frequency setpoint, operational speed and DC voltage
 - Trip information
 - Indicates failure history in case a protection function is operated
 - Memorizes five cases of failure history
- Control terminals and control switches
- Use environment
 - Ambient temperature: -10°C ~ 40°C
 - Storage temperature: -20°C ~ 65°C
 - Ambient humidity: below 90% R.H
 - Atmospheric pressure: -70 ~ 106 kPa

FEATURES

- All-in-one structure: 3-phase inverter, 3-phase induction motor, instrumentation system and console rack frame
- Highly durable structure of the console rack frame
- Locking casters for convenient relocation of the training system
- Measurement and digital indication of the instrumentation system: voltage, current, power and revolution of 3-phase induction motor:
- Open architecture of the console rack frame in the rear side to see the components inside and maximize learning effects
- Supports interlocking experiments with D/A unit and I/O unit of programmable logic controllers
- Equipped with the inverter that is certified by international standards : CE, UL and CUL
- In use of the inverter with network system based on RS485 communication function
- Insulated connection terminals ensuring safety of the user

EXPERIMENTAL CONTENTS

- Characteristic and types of the inverter.
- Control of the main and switching circuit
- Power factor and efficiency
- Characteristic of the motor
- How to control motors by the inverter
- How to use the inverter loader
- How to set parameters and monitor the operation of inverter
- How to control revolution and speed using an external panel switch
- How to control revolution and speed using a variable resistor
- How to control revolution and speed using a programmable logic controller

3-PHASE INDUCTION MOTOR (2ea)

- Power source: 3-phase AC 380V
- Rotary disk : Graphic design
- Equipped with a sensor detecting rotational speed

INSTRUMENTATION SYSTEM (1ea)

- Measurement and digital indication: voltage, current, power and power factor
- 3-phase I/O terminal: Input (3ea), output (3ea)

MAIN POWER UNIT (1ea)

- Rated voltage : 3-phase AC 380V 60Hz
- Rated sensitivity current : 30mA
- Rated float current : 15mA
- Leakage current circuit breaker (ELCB) : 1ea
- Power indicator lamp: 3ea
- Output terminal :3ea

PLC CONTROL UNIT (1ea)

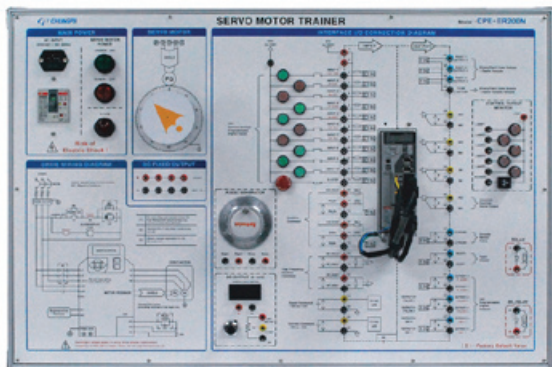
- Input : 18 points
- Output : 12 points

STANDARD ACCESSORIES

- Power cord : 1ea
- Insulated connection cable : 1set
- User's guide manual : 1ea

CPE-ER200

AC Servo Motor Trainer



FEATURES

- Equipped with Rockwell Automation CSDJ Plus Servo Drive being widely used in industry
- PC-based control and monitoring through the computer software package

EXPERIMENTAL CONTENTS

- Basic setting and operation of AC Servo Drive
- How to set parameters of the servo motor
- How to control the sequence of I/O signals and brake control signals
- Operation of the servo motor by the Line Drive Output
- Servo motor operation practices by the operators
- Multiple speed control practices
- Zero-clamp practices
- Torque control practices

SPECIFICATIONS

Power source	Single-phase AC 220V (-15% ~ + 10%) , 50/60Hz
Control method	PWM control in use of IPM
Encoder	2000 / 2048 / 2500 / 10000 P/R (incremental or absolute)
Ambient temperature	0° ~ +50°C (90% R.H)
Vibration / shock resistance	Vibration: 0.5G / Shock: 2G (1G = 9.8m/s2)
Position (output)	Encoder output: A-phase, B-phase and Z-phase (MC3487 Line Driver)
External input	Servo ON/OFF, proportional control, forward/reverse rotation prevention, and alarm reset
External output	Brake control (in rotation), servo alarm/code (3-bit), speed compliance (speed control mode), position compliance (position control mode), Z-pulse (open collector)
Protective function	Overcurrent, overload, overvoltage, overspeed, overheated inverter, CPU error, malfunctioned encoder, and communication disorder
Dynamic brake	To be activated in case of alarm activation
D/A output (speed)	Setting value (RPM) at $\pm 1V/SET -08$ (Max. $\pm 10V$)
D/A output (torque)	Setting value (%) at $\pm 1V/SET -09$ (Max. $\pm 10V$)
External indicator LED	Power ON, Servo Run, Servo Alarm
Operator	<ul style="list-style-type: none"> • Command values such as speed, torque, position and electrical angle • Error values • Feedback values • Offset values • Load inertia ratio
PC software	All functions of Operator

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- Serial cable (9-Pin, D-SUB) : 1ea
- PC software CD: 1ea
- CSDJ Plus user's manual : 1ea

CPE-ER160

DC Motor Control Trainer



FEATURES

- Designed to control the installed DC motor by PLC programming
- Equipped with photo interrupter sensor, photo coupler and pulse generator
- Digital indicator displaying the motor's RPM
- With circuit diagrams on the trainer's front panel to maximize learning effects

EXPERIMENTAL CONTENTS

- How to control CW/CCW of a DC motor
- Speed control of a DC motor
- Multistep speed control of a DC motor
- Counter circuit
- Counting the number of rotation
- How to control a DC motor by a programmable logic controller
- CW/CCW control of a DC motor by a programmable logic controller
- Multistep speed control of a DC motor by a programmable logic controller
- CW/CCW repeating control of a DC motor

SPECIFICATIONS

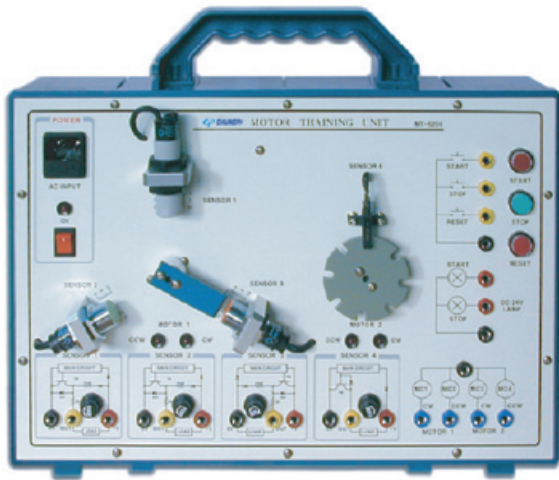
DC motor	Power Source: DC 24V Revolutions per minute: 120 RPM
PLC control unit	Arithmetic calculation : Internal program repetitive calculation I/O control method : Scan sync batch processing Program language : Mnemonic Ladder Command : Basic (30ea)and Application (154ea) Processing speed : 3.2 ~ 7.6us/step Program memory capacity : 800 steps
Circular rotary disc	Size: Ø110mm
Sensor	Photo interrupter sensor
Relay	DC 24V
Indicator	4-digit FND
Zener diode	6V, 12V, 18V
DC 24V output lamp	5ea
Toggle switch	2ea
Selector switch	1ea
Input push button	4ea
Power source	AC 220V

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- User's guide manual : 1ea

CPE-ER170

Motor Trainer



FEATURES

- Equipped with two DC motors, two proximity sensors, one capacitive sensor and one photo micro sensor
- Designed to control the rotation of motors by proximity sensors
- Covers the speed and forward/reverse rotation of motors
- Built-in circuit protection fuse
- Supports connection to programmable logic controllers for diverse programming experiments
- Equipped with a carrying case for convenient storage and mobility

EXPERIMENTAL CONTENTS

- How to control the DC motor by a NPN or PNP proximity sensor
- Controlling the DC motor's rotation by a NPN or PNP proximity sensor
- Controlling the DC motor's angle control by a NPN or PNP proximity sensor
- How to control the DC motor by a photo interrupter sensor
- Controlling the DC motor's rotation by a photo interrupter sensor
- Continuous operation of the DC motor

SPECIFICATIONS

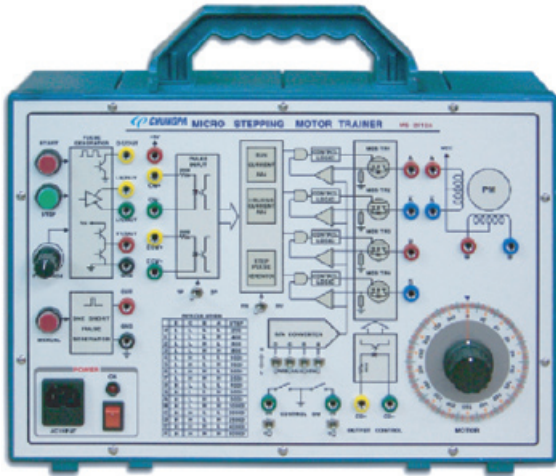
Proximity sensor	Type: high-frequency oscillator (NPN : 1ea, PNP: 1ea)
	Power source : DC 12V ~ 24V
Capacitive proximity sensor	Detectable distance : 8mm ±10%
	Detectable objects: steel, metal, plastic, water, stone, and other dielectric substances
	Type: NPN output
Photo interrupter sensor	Power source : DC 12V ~ 24V
	Detectable distance : 8mm ±10%
	Method: Permissive detection
DC geared motor	Type: NPN output type
	Power source : DC 5V ~ 24V
	Detectable distance : 5mm
Push button & lamp indicator	Number of motor: 2ea (Motor #1 & Motor #2)
	LED indicator: Displays CW and CCW rotational status 2ea (Motor #1 & Motor #2)
	Power source : DC 24V
	Input terminal (CW / CCW): DC24V
	Speed of revolution: 60 RPM
	Type: Rotary disc attachment
Input voltage	Object detection: By the proximity sensor
	Indicator lamp (START & STOP): DC 24V
	Push button: START, STOP and RESET
Input voltage	AC 220V

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- User's guide manual : 1ea

CPE-ER180

Stepping Motor Trainer



FEATURES

- Designed to teach how to control the rotational angle and speed control of a stepping motor.
- Experimental practices on the characteristics of a stepping motor in accordance with a resolution setup
- Enables operational control by an external programmable logic controller and a motion controller
- Equipped with a carrying case for convenient storage and mobility

EXPERIMENTAL CONTENTS

- Operation of the stepping motor
- Characteristics of a stepping motor in accordance with a resolution setup
- Controlling the direction of rotation
- Operational control by the line drive method
- Operational control and output control by "one shot" pulse generator

SPECIFICATIONS

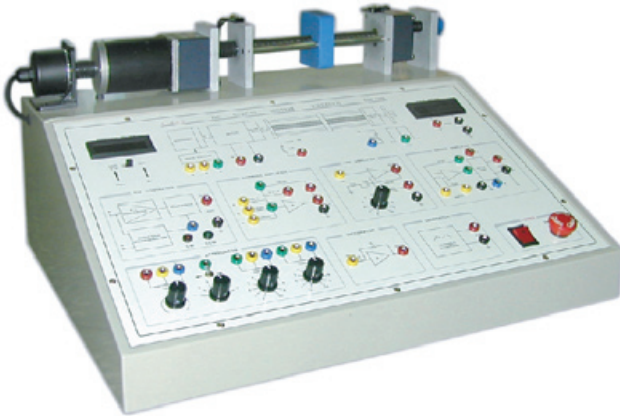
Pulse generator	START button, STOP button, Frequency control knob
	Open collector output
	Line output
	Totem pole output
One shot pulse generator	Manual push button
	Totem pole output
Stepping motor	Unipolar wiring connection
	1.8 degree
	Rotary disc with scales : rotational angle indication
Motor driver	Pulse input conversion: 1P / 2P switch
	Rotational direction control: FR / RV switch
Resolution setting switch	Toggle switch: 4ea
	Resolution range: 200, 400, 500, 800, 1000, 1600, 2000, 2500, 4000, 5000, 8000, 10000, 20000, 25000, 40000 and 50000 pulses per rotation
Signal input type	1-pulse signal type and 2-pulse signal type
Control signal	Stepping motor's output control signal
	Control signal: DC 5V
	Toggle switch : 2ea
Input voltage	AC 220V, 50/60Hz

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- User's guide manual : 1ea

CPE-ER190

DC Servo Motor Trainer



FEATURES

- Hands-on practices on the characteristics and principles of DC Servo Motor
- Linear guide with TM screw designed for positioning experiments
- Supports PWM motor control
- Equipped with digital indicators displaying the motor's speed and travel distance

EXPERIMENTAL CONTENTS

- Operation of OP AMP
- Speed control of a DC servo motor
- Driver of a DC servo motor
- Rotary encoder
- Detection of speed
- Speed control of closed loop
- Position control
- Closed loop position control
- Position control by PI controller

SPECIFICATIONS

DC power supply	Output voltage : $\pm 15V$
Attenuation	100k Ω potentiometer (10-turn) : 1ea 100k Ω variable resistor: 2ea
Summing amplifier	Negative AMP Input : 3ea
Pre-amplifier	OP AMP Gain adjustment by VR
Motor drive amplifier	Built-in overload protection circuit "+", "-" differential input circuit
F/V converter (bipolar)	Input : A-phase, B-phase LED indicator: Displays CW / CCW rotation Output : DC $\pm 0V \sim 10V$
Servo motor	Power source: DC 12V Equipped with a decelerator
PI control integrator	Output: $\pm 12V$ RC integrator circuit based on OP AMP
RPM meter & mm METER	Indicates the number of revolution and travel distance 4-digit 7-segment FND indicator
Function generator	Triangle wave and square wave
Positioning apparatus	Linear guide with TM screw Limit switch mounted on the apparatus Travel distance: max. 100mm
Position detection	Potentiometer (10-turn): 1ea Equipped with a decelerator
Rotary encoder	Phase : A-phase, B-phase and Z-phase Output: Totem Pole Resolution : 200 P/R Response frequency : max. 180kHz
Digital voltmeter	3-digit 7-segment FND indicator Input range : DC $\pm 0 \sim 99.9V$ Resolution : 0.1V
Power	AC 220V 50/60Hz Power switch Emergency switch

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- User's guide manual : 1ea

CPE-ER500VA

Transformer Trainer



FEATURES

- Hands-on training in the use of components being used in the field
- Composed of 3-phase transformer, 3-phase load resistor, 3-phase variac and I/O measuring meters
- Semitransparent front panel in the see-thru structure capable of observing wire connections inside the system
- Supports open architecture in the rear side of the system for easily checking the components and wire connections
- Forced ventilation system to effectively suppress heat caused by loads during the course of experiments

EXPERIMENTAL CONTENTS

- Voltage regulation
- No-load loss measurement
- Regulation efficiency calculation
- Maximum efficiency measurement
- The polarity of transformer
- Y-Y electrical connection practices
- Δ-Δ electrical connection practices
- Δ-Y electrical connection practices
- Y-Δ electrical connection practices
- V-V electrical connection practices
- Operational practices on transformer (series / parallel)

SPECIFICATIONS

Input voltage	3-phase AC 220V
	Circuit breaker : 1ea
	Power indicator lamp : 3ea
Variac (variable power)	Power range : 0 ~ 240V (3-phase)
	Input terminal : R, S, T
	Output terminal : U, V, W, N
Transformer	Rated capacity (500VA) : 3ea
	Primary : 0V / 110V / 220V
	Secondary : 0V / 110V / 220V
Input measuring meter	Voltmeter (0 ~ 300V) : 3ea
	Ammeter (0 ~ 3A) : 3ea
	Wattmeter (0 ~ 750W) : 1ea
Output measuring meter	Voltmeter (0 ~ 300V) : 3ea
	Ammeter (0 ~ 3A) : 3ea
	Wattmeter (0 ~ 750W) : 1ea
Load resistor (Switch control type)	200Ω /400W : 3ea
	400Ω/200W : 3ea
	600Ω/300W : 3ea

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- User's guide & experimental manual: 1ea

CPE-ER1500

Electrical Machine Trainer



FEATURES

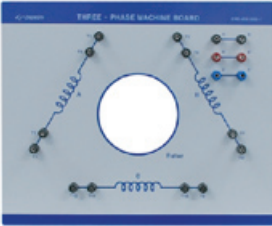

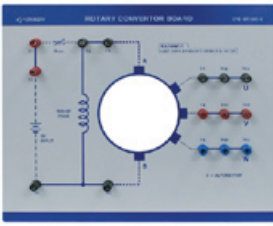


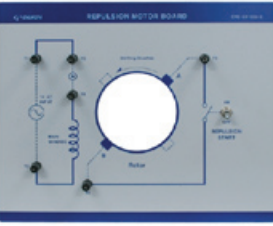
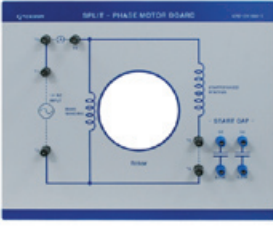
- Modular structure with a two-layer vertical mount rack for experimental boards and modules
- Includes a chest of drawers for experimental modules and a cabinet for assembling machine parts
- Helps the user understand how to assemble and a and disassemble the motor and generator components
- 1-phase and 3-phase structure for system operation and load practice
- Activates the circuit protection function at standby time

EXPERIMENTAL CONTENTS

- Principles of generator
- Single-phase AC generator using permanent magnet
- DC generator using permanent magnet
- Separately excited DC shunt generator
- Self excited DC shunt generator
- Load characteristics of separately excited DC shunt generator
- Revolving-field type single-phase AC shunt generator
- Load characteristics of AC generator
- Principles of three-phase generator
- Revolving-field type three-phase AC generator
- Revolving-armature type three-phase AC generator
- Principles of Rotary converter
- Principles of motor
- DC motor using permanent magnet
- Series-wound motor using field coil
- Shunt-wound motor in use of starter and field resistor
- DC compound-wound motor
- Commutating field of three-phase induction motor
- Squirrel-cage induction motor
- 2-step speed control of induction motor
- Repulsion motor
- Split-phase motor

SPECIFICATIONS

• Experimental Boards (7EA)

3-Phase Machine (CPE-ER-1500-1)	DC Machine (CPE-ER-1500-2)	Rotary Converter (CPE-ER-1500-3)	Compound-Wound Motor (CPE-ER-1500-4)
			
Induction Motor - Speed Control (CPE-ER-1500-5)	Repulsion Motor (CPE-ER-1500-6)	Split-Phase Motor (CPE-ER-1500-7)	
			

• **Experimental Modules (13EA)**

Field Rheostat (CPE-ER-1500-8) : 1EA



The Field Rheostat Module is used as a rheostat by connecting the field coil of DC machine. It is designed to control voltage of generator and also control the speed of motor.

- Variable resistor : 100W, 100Ω
- 4mm insulated terminal (black color): 3ea
- Dimension : 190(W) x 75(D) x 309(H) mm

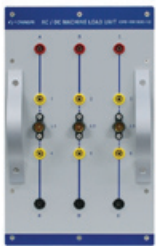
Starting Rheostat (CPE-ER-1500-9) : 1EA



The Starting Rheostat Module controls the current values with a variable resistor on DC motor and 3-phase induction motor.

- Variable resistor : 100W, 50Ω
- 4mm insulated terminal (black color): 3ea
- Dimension : 190(W) x 75(D) x 309(H) mm

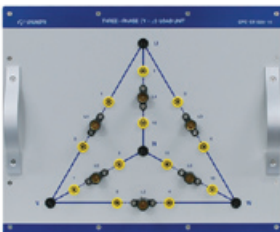
AC/DC Machine Load (CPE-ER-1500-10) : 1EA



The AC Machine Load Module uses a 3V lamp, 6.3V lamp or 12V lamp as a single-phase load based on the capacity of voltage.

- Lamp: 3V, 6.3V, 12V
- Socket : 6.3T socket (3ea)
- 4mm insulated terminal (black color): 3ea
- 4mm insulated terminal (yellow color): 6ea
- Dimension : 190(W) x 45(D) x 309(H) mm

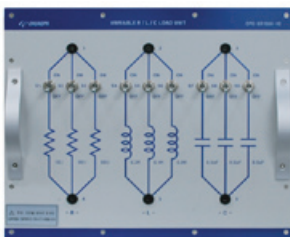
3-Phase (Y-Δ) Load (CPE-ER-1500-11) : 1EA



The 3-Phase (Y-Δ) Load Module is designed for 3-phase load experiments when practicing 3-phase voltage. The user can select two types of load: Y and Δ.

- Lamp: 3V, 6.3V, 12V
- Lamp socket : 6.3T socket (6ea)
- 4mm insulated terminal (black color): 4ea
- 4mm insulated terminal (yellow color): 12ea
- Dimension: 380(W) x 45(D) x 309(H) mm

R,L,C Load (CPE-ER-1500-12) : 1EA



The R,L,C Load Module is designed for RLC load experiments. Each load has a toggle switch, so the user can change various load values by the switch operation.

- Resistor: 20W 10Ω (1ea), 20W 30Ω (1ea), 20W 50Ω (1ea)
- Coil : 0.2H (1ea), 0.4H (1ea), 0.8H (1ea)
- Capacitor (220V 8.5uF) : 3ea
- Toggle switch : 9ea
- 4mm insulated terminal (black color): 6ea
- Dimension: 380(W) x 130(D) x 309(H) mm

CPE-ER1500

• Experimental Modules (13EA)

Power supply (CPE-ER-1500-13) : 1EA



The Power Supply Module receives external power source of 220V and provides the user with various types of AC voltage through the internal transformer. It generates AC voltage in 6.3V, 12V, 24V, 50V and more, and offers various types of DC voltage to a motor and a generator through the diodes.

- AC voltmeter (0 ~ 80V) : 1 ea
- DC voltmeter (0 ~ 80V) : 1 ea
- Power switch : 1 ea
- 4mm insulated terminal (black color): 12 ea
- 4mm insulated terminal (red color): 1 ea
- Dimension: 380(W) x 130(D) x 309(H) mm

AC Voltmeter & Ammeter (CPE-ER-1500-14) : 1EA



The AC Voltmeter & Ammeter Module is used for measuring AC current and voltage. It can measure AC voltage in the unit of 5V, 10V and 50V whereas it measures AC current in the unit of 0.1A, 1A, 2.5A and 5A.

- AC voltmeter (5V, 10V, 50V) : 1 ea
- AC ammeter (0.1A, 1A, 2.5A, 5A) : 1 ea
- 4mm insulated terminal (black color): 9 ea
- Dimension : 190(W) x 45(D) x 309(H) mm

DC Voltmeter & Ammeter (CPE-ER-1500-15) : 1EA



The DC Voltmeter & Ammeter Module is used for measuring DC current and voltage. It can measure DC voltage in the unit of 5V, 10V and 50V whereas it measures DC current in the unit of 0.1A, 1A, 2.5A and 5A.

- DC voltmeter (5V, 10V, 50V) : 1 ea
- DC ammeter (0.1A, 1A, 2.5A, 5A) : 1 ea
- 4mm insulated terminal (black color): 2 ea
- 4mm insulated terminal (red color): 7 ea
- Dimension : 190(W) x 45(D) x 309(H) mm

DC Milliammeter (CPE-ER-1500-16) : 1EA



The DC Milliammeter Module can detect minute DC current and measure the DC current in the range of -5mA ~ +5mA. By changing its range, the DC Milliammeter Module can measure -500mA ~ +500mA.

- DC milliammeter (-5mA ~ +5mA, -500mA ~ +500mA) : 1 ea
- Rotary switch (3-step) : 1 ea
- 4mm insulated terminal (black color): 1 ea
- 4mm insulated terminal (red color): 1 ea
- Dimension : 190(W) x 45(D) x 309(H) mm

AC/DC Field Machine Frame (CPE-ER-1500-17) : 2EA



The AC/DC Field Machine Frame Module is essential for creating basic structure of generators and motors. By placing assembling machine parts on the field machine frame, the user can assemble various types of motor and generator such as DC generator, 1-phase and 3-phase AC generator, DC motor, DC compound-wound motor, squirrel-cage induction motor, repulsion motor and split-phase motor.

- Field frame (Ø190 x 18) : 1ea
- Board holder (Ø12 x 68) : 4ea
- 4mm insulated terminal (black color): 10ea
- Dimension : 308(W) x 45(D) x 309(H) mm

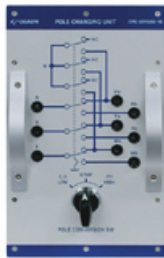
Starting Motor (CPE-ER-1500-18) : 1EA



The Starting Motor Module consists of a motor, a motor pulley, a cam switch and a speed controller. The operation of a cam switch will change the direction of revolution. Also, the speed controller can control the revolution speed of the motor and can adjust the amount of generation.

- Motor (single-phase 220V 6W) : 1ea
- Motor pulley (Ø20 x Ø30 x 85) : 1ea
- Analog speed controller : 1ea
- RPM meter : 1ea
- Power switch : 1ea
- 3-position cam switch: 1ea
- Dimension: 380(W) x 130(D) x 309(H) mm

Pole Changing Controller (CPE-ER-1500-19) : 1EA



Controls the speed by modulating the number of pole of 3-step induction electric motor

- 3-position cam switch: 1ea
- 4mm insulated terminal (black color): 9ea
- Dimension: 190(W) x 130(D) x 309(H) mm

• Assembling Machine Parts

- | | |
|---|-----------------------------------|
| - Disk Slot Rotor Coil : 1ea | - Field coil (700-turn) : 2ea |
| - 2-Pole Rotor : 1ea | - Field coil (1700-turn) : 2ea |
| - 3-Pole Rotor : 1ea | - Brush & Holder Set: 3sets |
| - Wound Rotor : 1ea | - Rotor fixture : 2ea |
| - Squirrel-Cage Rotor : 1ea | - Magnetic Pole fixture : 10ea |
| - Disk Slot Rotor's Short Ring : 1ea | - Bolt : 10ea |
| - Compass : 1ea | - Spanner : 1ea |
| - Round-Type Permanent Magnet : 2ea | - Driving Belt : 1ea |
| - Wide Magnetic Pole for Permanent Magnet : 2ea | - 3V Load Lamp : 5ea |
| - Wide Magnetic Pole for Field Coil : 5ea | - 6.3V Load Lamp : 5ea |
| - Narrow Magnetic Pole for Field Coil : 6ea | - 12V Load Lamp: 5ea |
| - Polarized Magnetic Pole for Field Coil : 2ea | - Bar Type Permanent Magnet : 1ea |
| - Field coil (300-turn) : 6ea | |

STANDARD ACCESSORIES

- Power cord: 2ea
- Connection cable (4Ø plug): 1set
- Vertical mount module rack: 1ea
- Chest of drawers [510(W) x 500(D) x 670(H) mm]: 1ea
- Storage cabinet [680(W) x 440(D) x 1390(H) mm]: 1ea
- Module support rack [1600(W) x 250(D) x 800(H) mm]: 1ea
- User's guide manual: 1ea
- Experimental manual: 1ea

OPTIONS

- Worktable: 1800(W) x 800(D) x 730(H) mm

CPE-ER1601

DC Motor (Shunt/Series) and DC Compound Generator



FEATURES

- Designed to teach the characteristics of a DC shunt/series motor and a DC compound generator
- Equipped with digital indication meters such as a voltmeter, an ammeter and a RPM
- Coupling of a motor and a generator through the Electronic Clutch method

EXPERIMENTAL CONTENTS

- DC shunt-wound motor's starting and load characteristics
- DC series-wound motor's starting and load characteristics
- Loss and efficiency of the DC motor
- Relationship between of motor's speed and electromotive force
- Load characteristics of the DC compound motor
- Comparison of cumulative compound characteristics with differential compound characteristics
- Generator's rotation speed and output characteristics
- DC compound generator's loss and efficiency

SPECIFICATIONS

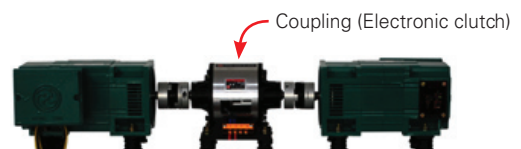
CPE-ER1601			
MOTOR		GENERATOR	
Winding type	Shunt/Series	Winding type	Compound-wound
Speed	1250 ~ 1800 RPM	Speed	1250 ~ 1800 RPM
Input voltage	DC 120V 3.5A Approx	Output	DC 0 ~ 120V 1A
Horse power	1/3HP	Number of poles	2 poles
Number of poles	2 poles	Field excitation	Self-excited
Shunt Field Exc.	0.4A(Sep.), 120V	Shunt Field Rheostat	0~300Ω, 50W
Shunt Field Rheostat	0~300Ω, 50W	Series Field Rheostat	0~50Ω, 50W
Armature Rheostat	0~10Ω, 80W	Load resistance	48Ω~480Ω, 500W
Digital Meter	Ammeter: 2ea Voltmeter: 1ea RPM: 1ea	Digital Meter	Ammeter: 2ea Voltmeter: 1ea RPM: 1ea
Overload trip	4A (approx.)	Overload trip	2A (approx.)
COUPLING		GENERAL INFORMATION	
Type	Electronic clutch	Main power	Single-phase AC 220V
Friction torque	1.0Kg•m	Power switch	MCCB 15A
Input voltage	DC 24V, 15W	Normal operation	30min.
Max. speed	6000 RPM	Dimension	870x390x630mm

STANDARD ACCESSORIES

- Power cord: 1ea
- Circuit connection cable: 1set
- User's guide manual: 1ea

OPTIONS

- Power Electronics & Green Energy CAD Software (CASPOC)



CPE-ER1602

Squirrel Cage Induction Motor and DC Shunt Generator



FEATURES

- Designed to teach the characteristics of a squirrel cage induction motor and a separately excited DC shunt-wound generator
- Equipped with digital indication meters including a voltmeter, an ammeter, a RPM and a wattmeter
- Coupling of a motor and a generator through the Electronic Clutch method

EXPERIMENTAL CONTENTS

- Start and load characteristics of squirrel cage induction motor
- Changing the direction of squirrel cage induction motor's rotation
- Induction motor's slip speed and torque
- Induction motor's load/no-load power factor
- Load characteristics of separately excited DC Shunt-Wound Generator
- DC shunt-wound generator's no-load saturation characteristics
- Shunt field and output
- DC shunt-wound generator's loss and efficiency

SPECIFICATIONS

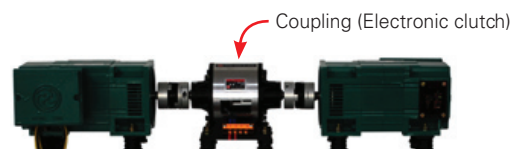
CPE-ER1602			
MOTOR		GENERATOR	
Winding type	Squirrel cage rotor Split-phase stator	Winding type	Shunt-wound (Separately excited)
Speed	1450 ~ 1750 RPM	Speed	1450 ~ 1750 RPM
Input voltage	AC 110V 50/60Hz, 6.6A	Output	DC 120V 1A
Horse power	1/3HP	Number of poles	4 poles
Starting capacitor	180~220 μ F	Field excitation	Separately excited
Digital Meter	Ammeter: 1ea Voltmeter: 1ea RPM: 1ea Wattmeter: 1ea	Shunt Field Rheostat	0~300 Ω , 50W
		Exciting power	DC 0 ~ 120V 1A
Overload trip	7A (approx.)	Load resistance	48 Ω ~480 Ω , 500W
COUPLING	Electronic clutch	Digital Meter	Ammeter: 2ea Voltmeter: 2ea
		Overload trip	2A (approx.)
		GENERAL INFORMATION	
		Type	Electronic clutch
Friction torque	1.0Kg·m	Power switch	MCCB 15A
Input voltage	DC 24V, 15W	Normal operation	30 minutes
Max. speed	6000 RPM	Dimension	870(W)x390(D)x630(H)mm

STANDARD ACCESSORIES

- Power cord: 1ea
- Circuit connection cable: 1set
- User's guide manual: 1ea

OPTIONS

- Power Electronics & Green Energy CAD Software (CASPOC)



CPE-ER1603

Wound-Rotor Induction Motor (3-Phase) and DC Generator (Shunt/Compound)



FEATURES

- Designed to teach the characteristics of a 3-phase wound-rotor induction motor and DC shunt/compound generator
- Equipped with digital indication meters including a voltmeter, an ammeter and a RPM and a wattmeter
- Coupling of a motor and a generator through the Electronic Clutch method

EXPERIMENTAL CONTENTS

- Wound-rotor induction motor's starting characteristics
- Wound-rotor induction motor's speed and torque
- Wound-rotor induction motor's power factor
- Y and Δ -connections
- Comparison of a shunt-wound generator with a compound generator
- Generator's speed and output in accordance on the winding type
- Loss and efficiency comparisons depending on the winding type

SPECIFICATIONS

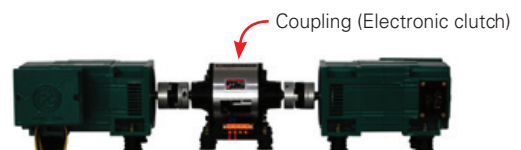
CPE-ER1603			
MOTOR		GENERATOR	
Winding type	Winding rotor and stator	Winding type	Shunt / Compound
Speed	1450 ~ 1750 RPM	Speed	1450 ~ 1750 RPM
Input voltage	AC 208V, 50/60Hz, 3-phase (* 360V in case of Y-connection)	Output	DC 115V 1.5A
Horse power	1/3HP	Number of poles	2 poles
Max. load current	1.7A	Field excitation	Self-excited
Number of poles	4 poles	Shunt Field Rheostat	0~300 Ω , 50W
Digital Meter	Ammeter: 2ea Voltmeter: 1ea RPM: 1ea Wattmeter: 1ea	Series Field Rheostat	0~50 Ω , 50W
		Digital Meter	Ammeter: 2ea Voltmeter: 2ea
Overload trip	3A (approx.)	Load resistance	48 Ω ~480 Ω , 500W
Overload trip	4A (approx.)	Overload trip	4A (approx.)
COUPLING		GENERAL INFORMATION	
Type	Electronic clutch	Main power	3-phase AC 220V/380V
Friction torque	1.0Kg•m	Power switch	MCCB 30A
Input voltage	DC 24V, 15W	Normal operation	30 minutes
Max. speed	6000 RPM	Dimension	870(W)x390(D)x630(H)mm

STANDARD ACCESSORIES

- Power cord: 1ea
- Circuit connection cable: 1set
- User's guide manual: 1ea

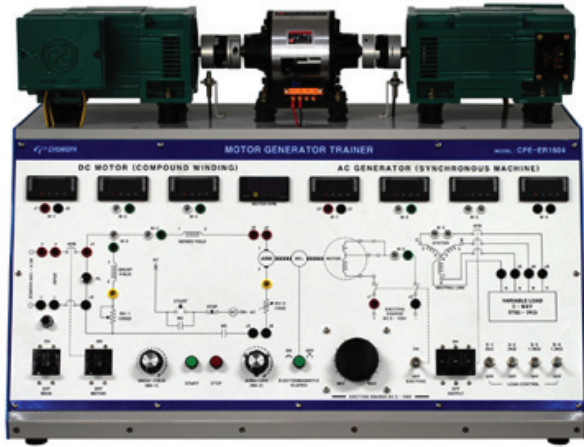
OPTIONS

- Power Electronics & Green Energy CAD Software (CASPOC)



CPE-ER1604

DC Motor (Shunt/Compound) and AC Synchronous Generator



FEATURES

- Designed to teach the characteristics of a DC shunt/compound motor and an AC synchronous generator
- Equipped with digital indication meters such as a voltmeter, an ammeter and a RPM
- Coupling of a motor and a generator through the Electronic Clutch method

EXPERIMENTAL CONTENTS

- DC motor's load characteristics
- DC motor's loss and efficiency
- Motor's speed and torque
- Changing the direction of the motor's rotation
- 3-phase AC generator's loss and efficiency
- 3-phase AC generator's saturation curve
- Y and Δ connections

SPECIFICATIONS

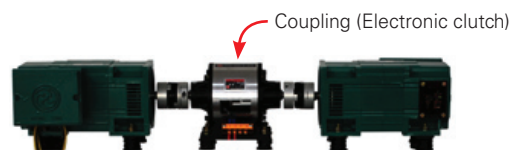
CPE-ER1604			
MOTOR		GENERATOR	
Winding type	Shunt/Compound	Winding type	Synchronous Machine
Speed	1250 ~ 1800 RPM	Speed	1250 ~ 1800 RPM
Input voltage	DC 120V 3.6A	Alternator power	120VA
Horse power	1/3HP	Output	AC 200V 3-phase 4-wire
Number of poles	2 poles	Number of poles	4 poles
Shunt Field	120V 1.4A (approx.)	Frequency	50/60Hz
Shunt Field Rheostat	0~300 Ω , 50W	Exciting power	DC 0 ~ 120V 1A
Series Field Rheostat	0~10 Ω , 80W	Load resistance	375 Ω ~2k Ω , 600W
Digital Meter	Ammeter: 2ea Voltmeter: 1ea RPM: 1ea	Digital Meter	Ammeter: 2ea Voltmeter: 2ea
Overload trip	4A (approx.)	Overload trip	2A (approx.)
COUPLING		GENERAL INFORMATION	
Type	Electronic clutch	Main power	Single-phase AC 220V
Friction torque	1.0Kg·m	Main power switch	MCCB 15A
Input voltage	DC 24V, 15W	Normal operation	30 minutes
Max. speed	6000 RPMC	Dimension	870(W)x390(D)x630(H)mm

STANDARD ACCESSORIES

- Power cord: 1ea
- Circuit connection cable: 1set
- User's guide manual: 1ea

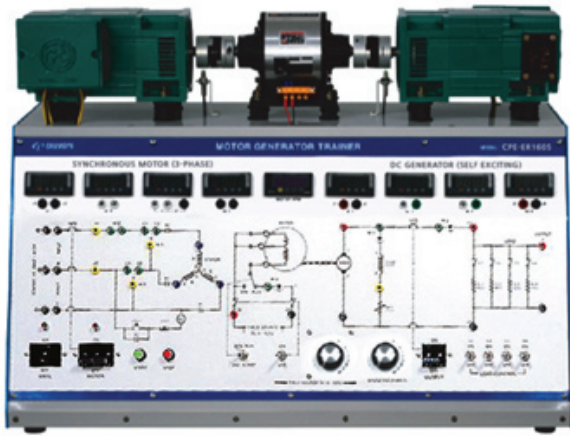
OPTIONS

- Power Electronics & Green Energy CAD Software (CASPOC)



CPE-ER1605

AC Synchronous Motor (3-Phase) and DC Shunt Generator



FEATURES

- Designed to teach the characteristics of a 3-phase AC synchronous motor and a self-excited shunt-wound DC generator
- Equipped with digital indication meters including a voltmeter, an ammeter, a RPM and an wattmeter
- Coupling of a motor and a generator through the Electronic Clutch method

EXPERIMENTAL CONTENTS

- 3-phase AC synchronous motor's start and sync characteristics
- 3-phase AC synchronous motor's V-curve characteristics
- 3-phase AC synchronous motor's loss and efficiency
- DC shunt generator's load characteristics
- Shunt field and output
- Speed and output characteristics of generator
- DC shunt generator's loss and efficiency

SPECIFICATIONS

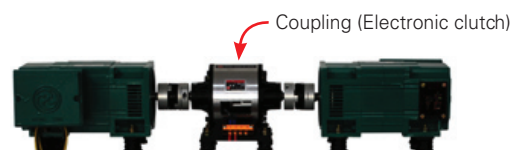
CPE-ER1605			
MOTOR		GENERATOR	
Winding type	Synchronous Machine	Winding type	Shunt-wound
Speed	1450 ~ 1750 RPM	Speed	1450 ~ 1750 RPM
Input voltage	3-phase 4-wire AC 208/220V 50/60Hz	Output	DC 100/120V 1A
		Polarity	2 poles
Horse power	1/3HP	Field excitation	Self-excited
Number of poles	4 poles	Shunt Field Rheostat	0~300Ω, 50W
Current	1.7A (approx.)	Load resistance	48Ω~480Ω, 500W
Starting method	Ind. Start/Syn. Run	Digital Meter	Ammeter: 2ea Voltmeter: 2ea RPM: 1ea Wattmeter: 1ea
Overload trip	2A (approx.)	Overload trip	2A (approx.)
COUPLING		GENERAL INFORMATION	
Type	Electronic clutch	Main power	3-phase AC 220V/380V
Friction torque	1.0Kg•m	Power switch	MCCB 15A
Input voltage	DC 24V, 15W	Normal operation	30 minutes
Max. speed	6000 RPM	Dimension	870(W)x390(D)x630(H)mm

STANDARD ACCESSORIES

- Power cord: 1ea
- Circuit connection cable: 1set
- User's guide manual: 1ea

OPTIONS

- Power Electronics & Green Energy CAD Software (CASPOC)



Load Resistor (1-Phase / 3-Phase)

CPE-RL203K / CPE-RL303K



CPE-RL203K (1-phase)



CPE-RL303K (3-phase)

FEATURES

- Supports a measuring experiment on the output value on each load with input voltage of single-phase and three-phase (R/S/T) AC 0-220V/60Hz
- Designed to suspend movement for safety in case there is a malfunctioning circuit
- Equipped with three cooling fans operating at increased temperature
- [1-phase] Configuration of 3kW load capacity and 10 steps of load
- [3-phase] Configuration of 1kW load capacity and 10 steps of load

LIST OF EXPERIMENTS

- Voltage measurement resulted from the load adjustment per step
- Current measurement resulted from the load adjustment per step
- Frequency measurement resulted from the load adjustment per step

SPECIFICATIONS

MODEL		CPE-RL203K (1-phase)	CPE-RL303K (3-phase)
Input voltage		AC 220V 60Hz	3-phase AC 220V 60Hz
Load capacity		3KW	3KW (1kW per a rotary switch)
Step		10 steps	10 steps (10 steps per a rotary switch)
Digital power meter	Voltage range	AC 10 ~ 380V	
	Current range	AC 0.05 ~ 10A	
	Rated frequency	60Hz	
Switch button		2ea (Load ON / OFF)	
Rotary switch knob		1ea (load input)	3ea (3-Phase Load-R, 3-Phase Load-S, 3-Phase Load-T)
Cooling fan		3ea	
Terminal block		1ea (load input)	1ea (3-phase AC 220V load input)
Communication terminal		RS-485	
Earth terminal		1EA	
Power switch		1EA	

STANDARD ACCESSORIES

- Power cord: 1ea
- User's Guide manual: 1ea

CPE-ER1105

DC Power Supply Trainer



FEATURES

- Hands-on practice on the DC constant voltage circuit, rectifier circuit and shunt/series regulator
- Carrying case system for easy storage and mobility
- DC output: 0 ~ 30V 3A

EXPERIMENTAL CONTENTS

- Full-wave rectifier and half-wave rectifier circuits
- Bridge rectifier circuit
- Smoothing circuit
- Shunt voltage regulator
- Simple series regulator
- Constant voltage control circuit
- Constant current control circuit

SPECIFICATIONS

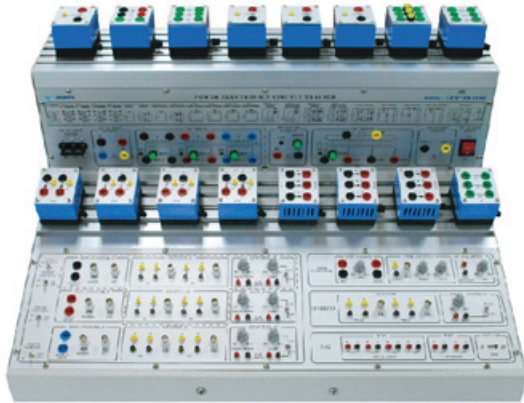
• MAIN FRAME		
AC power output	34V CT(17V+17V) 3A	
DC power output	+12V(0.1A), -12V(0.1A)	
Voltmeter	Voltage : 0 ~ 30V Current : 0 ~ 3A	
Load	50Ω (30W) / 100Ω (20W) / 200Ω (10W) / 500Ω (5W)	
Input power	AC 220V	
• EXPERIMENTAL CIRCUITS		
Category	Main Configuration	Experimental Contents
Rectifier circuit	Rectifier : 4ea	Half-wave rectifier circuit Full-wave rectifier circuit Bridge rectifier circuit
	Smoothing condenser : 1000μF, 2000μF	
Smoothing circuit	Smoothing coil : 10mH, 100mH, 1H	Practicing diverse characteristics of smoothing circuit such as condenser input, choke input and RC circuit
	Smoothing condenser : 100μF (2ea) and 10μF (2ea)	
	Resistor : 200Ω 10W	
Parallel / Series constant voltage	Power transistor : 1ea	Design of constant voltage circuit using Zener diode How to obtain constant voltage in simple ways
	Zener diode : 6V, 12V	
Constant voltage / Constant current	OP-Amp : 2ea	Practicing power circuit (output: 0 ~ 30V, 0 ~ 3A) by the configuration of rectifier circuit, smoothing circuit and parallel/series constant voltage circuit
	Variable resistor : 2ea	
	Constant voltage & current control circuits	

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- Experimental manual : 1ea

CPE-ER1400

Power Electronics Circuit Trainer



FEATURES

- Modular design of electrical power elements and RLC elements
- Covers the principles of the converter circuit, phase control and PWM control
- Ensures safe experiments through the built-in overcurrent protection circuit
- Equipped with the wave form generator circuit for various types of wave forms
- Supports a BNC terminal for oscilloscope for waveform measurement practices
- Applied experiments on characteristics simulation with Power Electronic Circuits Simulation Software (CASPOC)

EXPERIMENTAL CONTENTS

- 1 \emptyset transformer circuit
- 3 \emptyset transformer circuit (Δ - Δ connection)
- 3 \emptyset transformer circuit (Δ -Y connection)
- 3 \emptyset transformer circuit (Y- Δ connection)
- 3 \emptyset transformer circuit (Y-Y Connection)
- 1 \emptyset half-wave rectifier circuit
- 1 \emptyset full-wave rectifier circuit
- 1 \emptyset half-wave control rectifier circuit
- 1 \emptyset full-wave control rectifier circuit
- 1 \emptyset phase control converter circuit (ON/OFF control)
- 1 \emptyset phase control converter circuit (phase control)
- 1 \emptyset full-wave control converter circuit (R load)
- 1 \emptyset full-wave control converter circuit (L load)
- 3 \emptyset half-wave rectifier circuit
- 3 \emptyset half-wave control rectifier circuit
- 3 \emptyset full wave rectifier circuit
- 3 \emptyset full wave control rectifier circuit
- 1 \emptyset cycloconverter circuit
- Buck converter circuit
- Boost converter circuit
- Buck-boost converter circuit
- 1 \emptyset inverter circuit

SPECIFICATIONS

Basic Circuits	1-phase transformer circuit 3-phase transformer circuit (Δ - Δ connection) 3-phase transformer circuit (Δ -Y connection) 3-phase transformer circuit (Y- Δ connection) 3-phase transformer circuit (Y-Y Connection) 1-phase half-wave rectifier circuit 1-phase full-wave rectifier circuit 1-phase half-wave control rectifier circuit 1-phase full-wave control rectifier circuit 1-phase phase control converter circuit (ON/OFF control) 1-phase phase control converter circuit (phase control) 1-phase full-wave control converter circuit (R load) 1-phase full-wave control converter circuit (L load) 3-phase half-wave rectifier circuit 3-phase half-wave control rectifier circuit 3-phase full wave rectifier circuit 3-phase full wave control rectifier circuit 1-phase cycloconverter circuit Buck converter circuit Boost converter circuit Buck-boost converter circuit 1-phase inverter circuit	Component modules	FET (200V 10A x 1ea) : 4sets SCR (400V 4A x 2ea) : 4sets Diode (1000V 1A x 3ea) : 2sets Diode (SBD x 3ea) : 1set L load (10uH x 1ea, 100mH x 2ea) : 1set C load (330uF x 1ea, 100uF x 1ea, 0.47uF x 1ea) : 1set R load (500 Ω 10W x 3ea) : 1set R load(2k Ω 5W x 3ea) : 1set Lamp load (24V x 3ea) : 1set
		Phase Control	Zero crossing : 3ea Phase width control : 3ea Ramp control : 3ea BNC output terminal : 12ea
		PWM Converter	Frequency control : 1ea DTC Control : 1ea F/B input : Buck, Boost, Buck-Boost BNC output terminal : 1ea
Single-phase transformer	Output : 220V, 110V, 30V, 0V AC input terminal (4mm) : 2ea AC output terminal (4mm) : 4ea	Inverter Control	PWM A, B BNC output terminal : 2ea
Three-phase transformer	R-S-T phase : 30V 300mA AC input terminal (4mm) : 6ea AC output terminal (4mm) : 6ea	Power supply	DC 24V 1A : 1ea 1-phase AC 220V : 1ea 3-phase AC 220V : 1ea
DAQ	ADC: 4 channels DAC: 2 channels USB I/F PC interface structure	Input voltage	1-phase AC 220V 60Hz

STANDARD ACCESSORIES

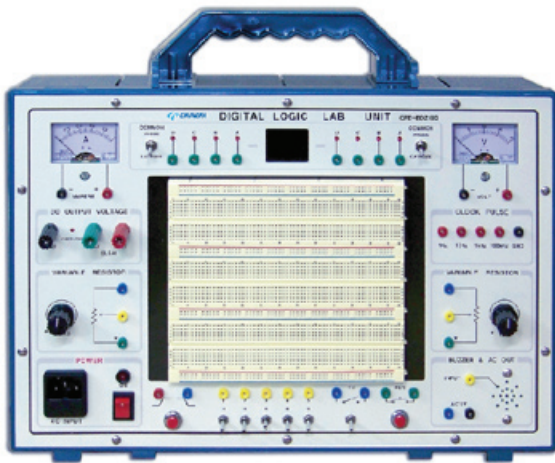
- Power cord : 1ea
- Connection cable : 1set
- User's guide manual : 1ea

OPTIONS

- Power Electronics & Green Energy CAD Software (CASPOC)

CPE-EO2100

Digital Logic Lab Unit



FEATURES

- Suitable for designing various type of digital circuits
- Enables practicing IC circuits (TTL and C-MOS) with the built-in $\pm 5V$ power source
- 2-digit hexadecimal FND indicator
- Carrying case system for easy storage and mobility

SPECIFICATIONS

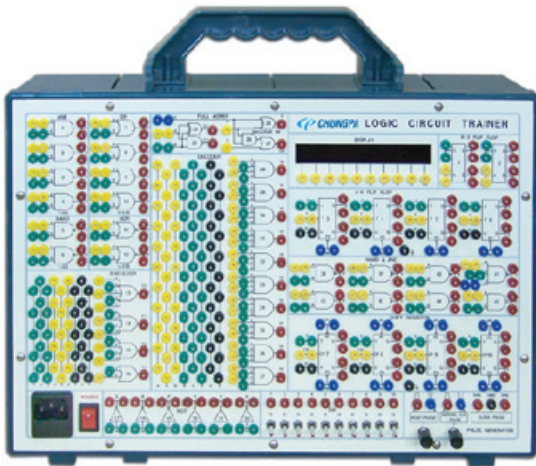
DC output	+5V, -5V 0.5A (Ripple 5mv Max.) Protection for overload
Numeric presentation	2 digits (hexadecimal number indication) 1 2 3 4 5 6 7 8 9 A B C D E F 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Polarity indication	Mode selection: Anode / Cathode
Clock pulse output	1Hz / 10Hz / 1kHz / 100kHz 4.5V (high) and 0.2V (low)
Logic switch	Toggle switch (bounceless output) : 5ea Push button (positive & negative) : 1ea
Control switch	Push button: 1ea Floating contact
Protection	DC overload protection (warning indication & alarm)
Buzzer	Low power driver (2V ~ 7V 1mA)
Variable resistor	500k Ω (1ea) and 10k Ω (1ea)
Voltmeter	Full scale 20V (DC)
Ampere meter	Full scale 1A (DC)
Breadboard	Socket strip (630 holes) : 3ea Bus strip : 4ea
Input power	AC 220V 50/60Hz
Dimension	385(W) \times 260(D) \times 130(H) mm

STANDARD ACCESSORIES

- Power cord : 1ea
- Jumper wire package : 1set
- User's guide manual : 1ea

CPE-E02110

Digital Logic Circuit Trainer



FEATURES

- Easy wire connection practices through the indicated symbol of gates and terminals
- Shows the logic value ("1" or "0") through the FND numeric indicator
- Built-in pulse generator and logic input switch
- Carrying case system for convenient storage and mobility

EXPERIMENTAL CONTENTS

- AND GATE
- OR GATE
- NOT GATE
- NAND GATE
- NOR GATE
- XOR GATE
- Adder circuits
- Encoder
- Decoder
- R/S flip flop circuits
- J/K flip flop circuits
- Shift register using NOT circuit
- De Morgan's theorem
- Asynchronous counters

SPECIFICATIONS

2-Input AND Gate	10ea
4-Input AND Gate	10ea
2-Input OR Gate	5ea
4-Input OR Gate	2ea
5-Input OR Gate	1ea
NOT Gate	6ea
2-Input NAND Gate	5ea
3-Input NAND Gate	1ea
2-Input NOR Gate	2ea
2-Input XOR Gate	2ea
R-S flip flop	2ea
J-K flip flop	4ea
1-bit shift register	4ea
Indicator LED ("1" & "0")	10
Clock	10Hz / 1000 Hz
One Short Pulse	1ea
Pulse Generator (manual type)	1ea
Level setting switch	10ea
Front panel	FR-4 (1.6T)
Dimension	385(W) × 260(D) × 130(H) mm

STANDARD ACCESSORIES

- Power cord : 1ea
- Jumper wire package : 1set
- User's guide manual : 1ea

CPE-E02120

Analog Lab Unit



FEATURES

- Practices on various types of analog circuits
- No soldering requirement for circuit experiments
- Built-in frequency counter and oscillator
- Equipped with AC voltage output terminals
- Carrying case system for convenient storage and mobility

SPECIFICATIONS

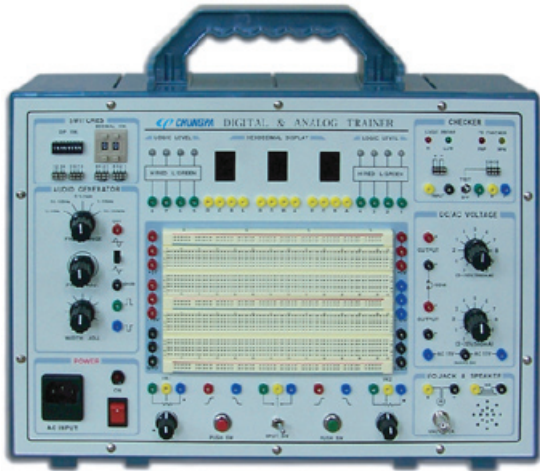
DC output	Dual output: 3V / 5V / 6(0.7A) / 9V / 12V / 15V(0.4A)
AC output	AC 30V CT (15V+15V) 100mA
Audio generator	100Hz ~ 10kHz (2 ranges) & continuously variable
AF output	100mV ~ 1V (Decade attenuator control) Square 10Vp-p fixed
Programmable resistor	1k Ω ~ 15k Ω , 10k Ω ~ 150k Ω
Decade capacitor	0.001 μ F ~ 0.099 μ F (2 dials)
Variable resistor	1k Ω (1ea) , 100k Ω (1ea)
Control switch	Slide (1ea), Toggle (1ea), Push (1ea)
Ammeter	DC Current: 2 ranges (0 ~ 10mA / 100mA)
Speaker	8 Ω 1W (max.)
Frequency counter	3digits, INT/EXT conversion
Circuit protection	DC overload indication and alarm
Breadboard	Socket tie-point : 1260 points Bus tie-point: 300 points
Input voltage	AC 220V 60Hz
Dimension	385(W) \times 260(D) \times 130(H)mm

STANDARD ACCESSORIES

- Power cord : 1ea
- Jumper wire package: 1set
- User's guide manual : 1ea

CPE-E02130

Digital & Analog Lab Unit



FEATURES

- Practices on various types of transistor circuits and OP amp circuits
- Supports "transistor check" function for determination of the transistor quality [good / bad]
- Hexadecimal indication by the built-in decoder and the 3 digit 7-segment indicators
- Displays the logic level by the eight LEDs in two different colors
- Carrying case system for convenient storage and mobility

SPECIFICATIONS

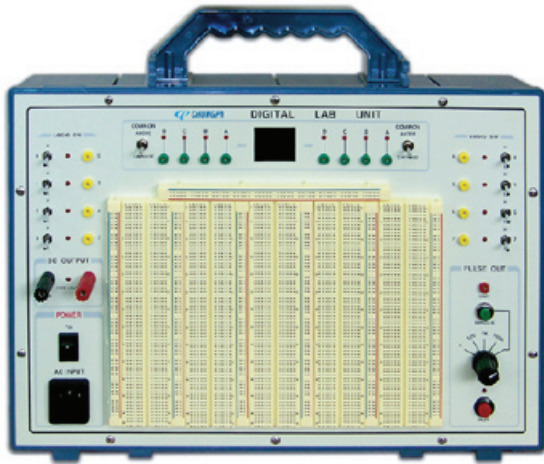
Power Supply	Positive DC variable power : DC 3V ~ 20V 0.5A Negative DC variable power : DC 3V ~ 20V 0.5A
	DC fixed power : DC 5V 1A DC ±12V 0.5A
	AC fixed power : AC 15V 0.1A
Oscillator	Sine wave : 1Hz~100kHz (5 ranges)
	Triangle wave : 1Hz~100kHz (5 ranges)
	Square wave : 1Hz~100kHz (5 ranges)
Logic indicator	2-color indicator LED : 8ea - Types of color: H (red color) and L (green color)
	Logic probe LED - Types of color: H (red color) and L (green color) - Threshold voltage: 1V
Hexadecimal indicator	Displays '0~9' and 'A~F' by the 7-segment indicators (3ea) Decoder: binary inputs (8, 4, 2, 1)
Logic input	BCD switch (2ea) / binary data switch (2ea) / logic switch (2ea)
Circuit elements	Potentiometer : 1kΩ (1ea), 100kΩ (1ea)
	Speaker (80 kΩ 0.3W) : 1ea
	SPDT switch : 1ea
	BNC I/O conversion jack: 1ea
Transistor check	Checks NPN / PNP transistors E.B.C check for the transistors
Breadboard	Socket tie-point : 1260 points Bus tie-point : 300 points
Input voltage	AC 220V 50/60Hz
Dimension	385(W) x 260(D) x 130(H) mm

STANDARD ACCESSORIES

- Power cord : 1ea
- Jumper wire package : 1set
- Spare fuse (0.5A) : 2ea
- User's guide manual : 1ea

CPE-E02140

Digital Lab Unit



FEATURES

- Equipped with a large size breadboard supporting complex circuits design
- Hands-on circuit practices on digital circuits, transistor circuits and linear IC circuits
- Selection of waveform (1Hz, 100Hz, 1kHz and 100kHz) by the pulse generator
- Two FND indicators installed for hexadecimal indication
- Built-in power supply (DC 5V 3A)
- Carrying case system for convenient storage and mobility

SPECIFICATIONS

DC Output	DC +5V 3A (Ripple 5mv max.) Overload protection and warning alarm
BCD indicator	2 digits (Hexadecimal number indication)
Polarity indicator	Mode selection: Anode / Cathode
Clock pulse output	1Hz / 100Hz / 1kHz / 100kHz Manual single pulse (High : 4.5V / Low : 0.2V)
Logic switch	Toggle switch (bounceless output): 8ea
Input indicator	LED : 8ea
Run output	DC 5V
Bread Board	630-hole IC socket strip: 5ea 100-hole bus strip: 7ea
Input voltage	AC 220V 50/60Hz
Dimension	385(W) × 260(D) × 130(H) mm

STANDARD ACCESSORIES

- Power cord : 1ea
- Jumper wire package : 1set
- User's guide manual : 1ea

CPE-EO2200

Analog Semiconductor Circuit Trainer



EXPERIMENTAL CONTENTS

- Semiconductor diode characteristics
- Zener diodes
- Bipolar transistors
- Characteristics of common emitter amplifier
- Characteristics of Junction FET
- Characteristics of insulated gate FET
- SCR characteristics
- UJT Characteristics
- Characteristics of LED and phototransistor
- DC amplifier circuit

FEATURES

- 24 experimental modules and 52 circuit practices
- Capable of performing applied experiments through the breadboard
- Built-in dual power supply and overload protection
- Equipped with AF generator and frequency counter
- Carrying case system for convenient storage and mobility

- Complementary amplifier circuit
- Differential amplifier circuit
- Operational amplifier
- Active filter
- Unregulated power supply
- Tank circuit resonance
- Oscillator
- Wien Bridge Oscillator
- Monostable multivibrator
- 555 Timer
- Integrator amplifier
- Amplitude modulation

SPECIFICATIONS

• Main system unit

- 1) DC Output : $\pm 0 \sim 15V$ (0.5A) tracking output
- 2) Decade Capacitor : $0.001\mu F \sim 0.999\mu F$ (3-dial)
 $100\text{pF} \sim 99900\text{pF}$ (3-dial)
- 3) Decade Resistor : $1\text{k}\Omega \sim 15\text{k}\Omega$
 $10\text{k}\Omega \sim 150\text{k}\Omega$
 $100\text{k}\Omega \sim 1.5\text{M}\Omega$
- 4) AF Generator : $10\text{Hz} \sim 100\text{Hz}$ (4 ranges & digital counter display)
Output : $1V / 10V$ (2 ranges)
Waveform : Sine and square
- 5) Multi-tester : DC Voltage : $20\text{mV} \sim 500\text{V}$ (auto range)
AC Voltage : $2V \sim 500\text{V}$ (auto range)
Buzzer & Diode Checker (or DC current $0 \sim 300\text{mA}$)
- 6) AC Output : $30V$ CT ($15V + 15V$) $0.1A$
- 7) Resistor : $1\Omega \sim 30\text{M}\Omega$
- 8) Switch : Slide switch (1ea), toggle switch (1ea), push button (1ea)
- 9) Breadboard : Socket Tie-Point : 1260 points
Bus Tie-Point : 300 points
- 10) Input Power : $220V$ 60Hz
- 11) Dimension: $380(W) \times 260(D) \times 130(H)$ mm

• Carrying case for modules storage

- Storage capacity : 24 modules
- Dimension : $380(W) \times 260(D) \times 130(H)$ mm

• Experimental modules (24ea)

- 1) Semiconductor characteristics (7ea)
 - M01 : Characteristics of diode and zener-diode
 - M02 : Characteristics of transistor and common emitter ground
 - M03 : Characteristics of FET and MOSFET
 - M04 : SCR characteristics
 - M05 : UJT characteristics
 - M06 : SCR and TRIAC applications
 - M07 : Characteristics of LED and photo device
- 2) Semiconductor circuit experiments (5ea)
 - M08 : Base and common emitter ground amp.
 - M09 : DC amplifier
 - M10 : Complementary amplifier
 - M11 : Differential amplifier
 - M12 : Operational amplifier
- 3) Electronics circuit experiments (12ea)
 - M13 : Active filter (LPT, HPF, BPF)
 - M14 : Unregulated power supply
 - M15 : DC voltage regulator
 - M16 : Variable voltage DC power supply
 - M17 : Tank circuit and resonance
 - M18 : LC oscillator (Hartley & Colpitt)
 - M19 : Crystal oscillator
 - M20 : Wien Bridge Oscillator
 - M21 : Multivibrator and Schmitt Trigger
 - M22 : Timer IC application
 - M23 : Ramp generator
 - M24 : Modulation and demodulation
- 4) Board size : $110(D) \times 200(W) \times 40(H)$ mm

STANDARD ACCESSORIES

- Power cord : 1ea
- Circuit connection cable : 1set
- User's guide manual : 1ea

CPE-E02210

Electronic & Semiconductor Circuit Trainer



FEATURES

- Hands-on practices on the characteristics semiconductor, semiconductor circuits and electrical circuits
- Consists of 24 experimental modules and 52 circuit experiments
- Supply of power and signal from the Main Auxiliary Module
- Includes aluminum board rack and storage cabinet as product components

EXPERIMENTAL CONTENTS

- Characteristics of semiconductor diode
- How to test semiconductor and Zener diodes
- Bipolar transistors
- Characteristics of common-emitter amplifier
- Insulated gate FET characteristics
- Characteristics of SCR, UJT, Junction FET
- Characteristics of LED and Phototransistor
- DC amplifier circuit
- Complementary amplifier circuit
- Differential amplifier circuit
- Operational amplifier
- Active filter
- Unregulated power supply
- Tank circuit resonance
- Oscillator
- Wien bridge oscillator
- Monostable multivibrator
- 555 timer
- Integrator amplifier
- Amplitude modulation

SPECIFICATIONS

I. Experimental board (24ea)

- 1) Dimension: 380(W)×260(D)×85(H)mm / each
- 2) Characteristics of semiconductor (7ea)
 - M01 : Characteristics of diode and Zener diode
 - M02 : Characteristics of transistor and common emitter ground
 - M03 : FET and MOSFET Characteristics
 - M04 : SCR Characteristics
 - M05 : UJT Characteristics
 - M06 : SCR and TRIAC applications
 - M07 : Characteristics of LED and photo devices
- 3) Semiconductor circuit experiments (5ea)
 - M08 : Base and common emitter ground amplifier
 - M09 : DC amplifier
 - M10 : Complementary amplifier
 - M11 : Differential amplifier
 - M12 : Operational amplifier
- 4) Electronic circuit experiments (12ea)
 - M13 : Active filter circuit (LPT, HPF, BPF)
 - M14 : Unregulated power supply
 - M15 : DC voltage regulator
 - M16 : Variable voltage regulator
 - M17 : Tank circuit and resonance
 - M18 : LC oscillator (Hartley and Colpitt)
 - M19 : Crystal oscillator
 - M20 : Wien bridge oscillator
 - M21 : Multivibrator and Schmitt Trigger
 - M22 : Timer IC application
 - M23 : Ramp generator
 - M24 : Modulation and demodulation

II. Experimental board rack (1ea)

- 1) Dimension : 1300(W)×350(D)×620(H) mm
- 2) Installed board capacity : 3ea

III. Board Storage Cabinet (2ea)

- 1) Dimension : 720(W)×520(D)×990(H) mm / each
- 2) Stored board capacity : 24ea (2 cabinets x 12ea)
- 3) Material: Wood
- 4) Casters: Equipped with Lockable casters

IV. Main Auxiliary Module

- 1) DC output : 3V, 5V, 6V, 9V, 12V, 15V Dual output
- 2) Decade capacitor : 0.001 μ F ~ 0.099 μ F (2 digits)
- 3) Decade resistor : 1 k Ω ~ 999 k Ω (3 digits)
- 4) AF generator
 - Frequency: 100Hz ~ 10kHz (in 2 ranges)
 - Output : 1V / 10V (in 2 ranges)
 - Waveform : Sine wave and square wave
- 5) Multi-tester
 - DC voltage: 10V / 50V / 250V / 500V
 - DC current: 250mA
 - AC voltage: 50V / 250V / 500V
 - Resistance: $\times 10 / \times 1K$ (max. 500k Ω)
 - Battery check: 1.5V / 9V
- 6) AC output : 30V CT (15V+15V) 0.1A (Max.)
- 7) Variable resistor : 1[k Ω] and 100[k Ω]
- 8) Switch : Slide, Push and SPDT toggle
- 9) Input voltage : 220V 60Hz
- 10) Dimension : 380(W)×260(D)×85(H) mm

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- User's guide manual : 1ea

CPE-EO2220N

Basic Electricity & Electronics Trainer



EXPERIMENTAL CONTENTS

- Electric current flow
- Ohm's Law
- Conductor resistance
- Resistance and temperature
- Resistance in series / parallel connection
- Voltage divider in series resistance
- Current divider in parallel resistance
- Voltage drop by resistance
- Principles of voltmeters and voltage measurement
- Principles of ammeters and current measurement
- Principles of ohmmeters and ohm measurement
- Principles of the voltmeter
- Principles of the ammeter
- Principles of the ohmmeter
- Transformer and voltage transformation
- Δ and Y connection in 3-phase transformers
- Inductance and RL circuits
- Inductance in series / parallel connection
- Capacitance and RC circuits
- Capacitance in series / parallel connection
- Resonance of LC circuits
- Kirchhoff's laws
- Resistance bridge
- Single-phase and full-wave rectification
- Induced electromotive force
- How to use relays

FEATURES

- Consists of one modular rack, one storage cabinet and 14 types of panel modules
- Circuit diagrams printed on each of the panel modules
- Equipped with the parts and components complying a safety requirement
- Can provide an optional plug-in module for configuration of diverse circuits

SPECIFICATIONS

- I. Panel module (14ea)
 - 1) Dimension: 380(W) × 260(D) × 86(H)mm
 - 2) M01: Ohm's Law
 - 3) M02: Voltmeter
 - 4) M03: Ammeter
 - 5) M04: Ohm meter
 - 6) M05: Transformer & Voltage Transformation
 - 7) M06: Inductor & Inductance
 - 8) M07: Capacitor & Capacitance
 - 9) M08: LC Circuit & Resonance
 - 10) M09: Kirchhoff's Law
 - 11) M10: Resistance Bridge
 - 12) M11: 3-Phase Transformer Connection
 - 13) M12: Relay & Latch Circuit
 - 14) M13: Half & Full Wave Rectifier (1 \emptyset)
 - 15) M14: Generation of Electromotive Force
- II. Modular rack : Two-layer structure (aluminum)
- III. Storage cabinet: 1ea
- IV. Input voltage : 1-phase AC 110/220V, 3-phase AC 220V, DC 0 ~ 12V
- V. Plug-in module [OPTION]
 - 1) Resistance :
2.2 Ω , 4 Ω , 4.7 Ω , 10 Ω , 15 Ω , 20 Ω , 50 Ω , 100 Ω , 330 Ω , 470 Ω ,
1k Ω , 2k Ω , 2.7k Ω , 4k Ω , 10k Ω , 22k Ω , 100k Ω , 111k Ω , 2M Ω
 - 2) Lamp : 12V, 100V
 - 3) Toggle switch : 2ea
 - 4) Diode : 1ea
 - 5) Manganese : 0.5 \emptyset 1m, 0.5 \emptyset 0.5m, 0.25 \emptyset 1m, 0.25 \emptyset 0.5m
 - 6) Jump resistance : 2ea
 - 7) Copper wire: 0.1 \emptyset /1m (1ea)
 - 8) Capacitor : 0.001 μ F, 0.047 μ F, 0.1 μ F, 2.2 μ F, 4.7 μ F, 100 μ F, 470 μ F

STANDARD ACCESSORIES

- Power cord: 1ea
- Connection cable : 1set
- User's guide manual : 1ea

CPE-E02240

Analog OP AMP Circuit Trainer



FEATURES

- Composed of a main unit and 10 modules for 28 circuit experiments
- Various types of IC and transistor elements for application practices
- Carrying case type structure for the main unit ensuring easy storage

EXPERIMENTAL CONTENTS

- Operational amplifier (OP AMP)
- Linear amplifier circuit
- Differentiator and integrator
- Voltage and current circuit
- Non-linear signal processing circuit
- Active Filter
- Subtract or /Adder circuit
- Absolute value circuit
- Interface circuit

SPECIFICATIONS

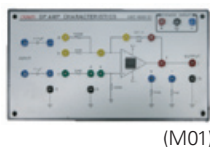
I. Main Unit (1ea)

- 1) DC output : $\pm 0\sim 15V$ (0.5A) Tracking Output
- 2) Decade capacitor : $0.001\mu F \sim 0.999\mu F$ (3 dials)
 $100pF \sim 99900pF$ (3 dials)
- 3) Decade resistor : $1k\Omega \sim 15k\Omega$, $10k\Omega \sim 150k\Omega$, $100k\Omega \sim 1500k\Omega$
(Selected by BCD x 3ea)
- 4) AF generator
 - Frequency: $10Hz \sim 100kHz$ (in 4 ranges) (Digital Counter Display)
 - Output : $1V / 10V$ (2 ranges)
 - Waveform : Sine wave and Square wave
- 5) Multi-tester
 - DC (auto range) : $20mV \sim 500V$ ($3\frac{1}{2}$ digits)
 - AC (auto range) : $2V \sim 500V$
 - Resistor (auto range) : $200\Omega \sim 20M\Omega$
 - Diode checker and buzzer
- 6) AC output : $30V$ CT ($15V+15V$) $0.1A$ max.
- 7) Variable resistor : 1000Ω and $100k\Omega$
- 8) Switch : Slide switch, push button, and toggle switch (SPDT)
- 9) Input voltage : AC $220V$ $60Hz$
- 10) Dimension : $380(W) \times 260(D) \times 130(H)$ mm

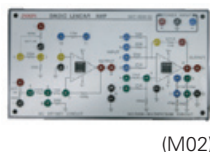
II. Experimental Modules (11ea)

- 1) Dimension: $200(W) \times 108(D) \times 45(H)$ mm (each module)

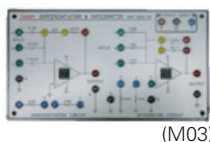
- 2) OP AMP Characteristics (Module: M01)
 - Measurement of input off-set voltage
 - Measurement of input bias current
 - Measurement of internal input impedance
 - Slow rate Measurement
 - Measurement of Common Phase Rejection Ratio (CMRR)
 - Measurement of Closed Loop Response



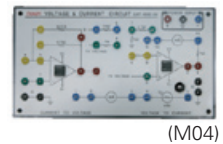
- 3) Basic Linear Amp (Module: M02)
 - Characteristics of non-inverting amplifier
 - Characteristics of inverting amplifier
 - DC offset characteristics
 - Voltage follower
 - Summing amplifier
 - Differential amplifier



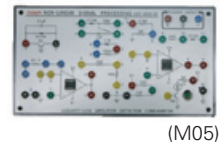
- 4) Differentiator and Integrator (Module: M03)
 - Differentiator in use of OP-Amp
 - Integrator in use of OP-Amp



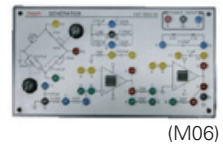
- 5) Voltage and Current Circuits (Module: M04)
 - Source of constant current
 - Current-to-voltage converter
 - Voltage-to-current converter
 - Reversed voltage-to-current amplifier
 - Non-inverting voltage-to-current amplifier



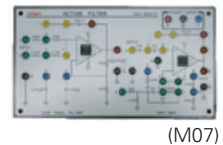
- 6) Non-Linear Signal Processing (Module: M05)
 - Comparator
 - Peak detector
 - Half-wave rectifier
 - Full-wave rectifier
 - Logarithmic amplifier



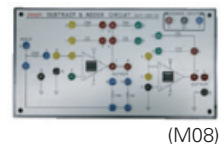
- 7) Generator (Module: M06)
 - Sine & cosine oscillator
 - Square wave oscillator
 - Triangle wave oscillator



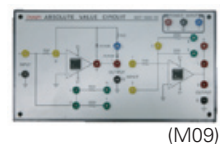
- 8) Active Filter (Module: M07)
 - Equal-component VCVS butter
 - Worth low-pass filter
 - Band-pass filter
 - Status variable filter



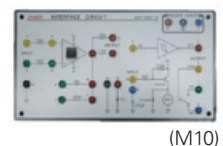
- 9) Subtractor/ Adder Circuit (Module: M08)
 - Adding circuit
 - Subtracting Circuit



- 10) Absolute Value Circuit (Module: M09)
 - Absolute value circuit
 - Absolute value amplifier circuit



- 11) Interface Circuit (Module: M10)
 - Interfacing with relay



- 12) Breadboard (Module: M11)
 - Socket strip: 1260 points (630 holes $\times 2$ ea)
 - Bust strip: 300 points (100 holes $\times 3$ ea)

STANDARD ACCESSORIES

- Power cord : 1ea
- Jump wire : 1set
- Module storage case: 1ea
- User's guide manual : 1ea

CPE-EP1000

Electric Power Distribution Trainer



FEATURES

- Designed to help understand the structure of power distribution system and wiring connections
- Highly durable steel structure with lockable casters
- Hands-on practice using actual electrical power
- Equipped with a voltmeter, an ammeter, a power meter, a power factor meter and indicator lamps

EXPERIMENTAL CONTENTS

- Structure of electric power distribution system
- Hands-on practice on wiring connections
- Power distribution using actual electrical power

STANDARD ACCESSORIES

- 3-phase power cord : 1ea
- Connection cable : 1set
- User's guide manual: 1ea

SPECIFICATIONS

Measuring unit	Voltmeter (analog round type)	AC600V	1ea
	Power meter (analog round type)	8kW, 100A/5A	1ea
	Power factor meter (analog round type)	Lead 0.5~1~LAG 0.5	1ea
	Ammeter (analog round type)	AC100A, 100A/5A	1ea
	Voltage display selector switch	Selection: OFF, R-S, S-T and T-R	1ea
	Current display selector switch	Selection: R, S and T	1ea
Control unit	Push button switch	Contact: 1a1b Color: SET (green color), RESET (yellow color)	1set
	Indicator lamp	Color: ON1 (red), ON2 (red), OFF1 (green), OFF2 (green)	1set
	Selector switch	Contact: 2-step 1a1b Selection: HAND1/AUTO1, HAND2/AUTO2	1set
Main MCCB		100A / 4-pole RSTN	1ea
Auxiliary MCCB		50A / 4-pole RSTN (2ea) 50A / 3-pole RST (2ea)	1set
Auxiliary ELCB		50A / 3-pole RST (2ea) 15A / 2pole LN (2ea)	1set
CT (round type)		For phase current measurement	3ea
SR Relay		Input: AC220V Output: DC12/24V(500mA) Contact capacity: 7A	1ea
Electronic contactor		AC220V, 1a2b	2ea
EOCR		2CT & 1a1b contact	2ea
Fuse socket and fuse		Channel type socket	4ea
Terminal block		Port: 12P (1ea), 24P (1ea)	1set
Booth bar		Color: R (black), S (red), T (blue), N (white)	1set
Grounding bar		Point: 8 points	1ea
Safety cover		Material: Transparent acryl	1ea
Wire duct		High strength type	1set
Enclosure		Type: Steel case in rectangular shape Equipped with a door, a lock device and casters	1ea
Circuit diagram		Displays circuit diagrams inside the door	1ea
Input voltage		3-phase AC380V 50/60Hz	-
Dimension		700(W) x 500(D) x 1600(H) mm	-

CPE-K330

Power IT Electrical Distribution Trainer



FEATURES

- Consists of High Voltage Distribution System, Low Voltage Distribution System and Base Power Generation System
- Hands-on practice on manipulation and operation of the electrical distribution system
- Designed to learn how to control the system by analog and digital protective relays
- Power distribution simulation software to maximize learning effects

EXPERIMENTAL CONTENTS

- How to control Load Break Switch Control System
- How to control the Power Fuse & Power Transducer System
- Operation of 24KV Vacuum Circuit Breaker System
- Rectifier System and Transformer System
- Air Circuit Breaker & Automatic Transfer Switch Control System
- Simulation of the base power generation system

STANDARD ACCESSORIES

- Power cord: 1ea
- Connection cable : 1set
- Power distribution simulation software : 1ea
- User's guide manual : 1ea

SPECIFICATIONS

Enclosure Cabinet	Dimension: 800(W) x 1500(D) x 2350(H) mm Door : Digital protective relay (upper part), Analog protective relay (lower part)	Distribution circuit breaker	Rated capacity : 4P 225AF / 225AT 4P 100AF / 100AT 3P 100AF/100AT Rated breaking capacity : 14kA (based on 460VAC)
Vacuum circuit breaker	Type : Draw-out type Operating power : DC 110V	ELCB	Rated capacity : 2P 50AF / 50AT 2P 30AF / 20AT Rated breaking capacity : 2.5kA (based on 220VAC)
Vacuum contactor	Type : Draw-out type Operating power : DC 110V	Low pressure instrument transformer	Type : Dry type Rated voltage : 380V (primary) and 110V (secondary) Test terminals for low voltage instrument transformer
Metering transformer (earth type)	Type : indoor 1-phase mold type Usage : Protective digital relay for high voltage training system Test terminals for high voltage training system	Analog type instrument	Type : Wide angle type Measurement functions : V, A, kW, PF Phase voltage selector switch & phase current selector switch
Metering converter	Type : indoor 1-phase mold type Rated current : 5A (primary) and 5A (secondary) Usage : Protective digital relay for high voltage training system Test terminals for high voltage training system	Analog type protective relay	Type : Induction disc type Protection : Phase overvoltage relay Phase-to-ground overvoltage relay Undervoltage relay
Digital protective relay	Protective relay elements - Overcurrent, phase-to-ground overcurrent, overvoltage, undervoltage Measurement elements - Phase voltage, phase-to-phase voltage, phase-to-phase current, active power, reactive power, volt-ampere, power factor, frequency Display : Character LCD and LED Communication : RS-232 (front panel) RS-485 (rear panel)	Electric leakage alarm	Type : Digital 5 circuits
		Base power generation system	Supply of base power to low voltage distribution board Selector switch : 3-phase 4-wire 380V or 3-phase 3-wire 220V Output : 3-phase 4-wire AC 0~380V 3-phase 4-wire AC 0~10A, DC 110V
Air circuit Breaker	Type : Draw-out Operating power : DC 110V Operation mode : Motor charge method		

CPE-ER1991

Fire Fighting Electrical Application Trainer



FEATURES

- Type of system structure: Work table type (CPE-ER1991T) or carrying case type (CPE-ER1991B)
- Hands-on wiring practice for electrical circuit connections that would meet the Fire Services Act
- Utilization of the PC software for designing and verifying firefighting protocols

EXPERIMENTAL CONTENTS

- Electrical circuit connections for firefighting system installation
- Characteristics of fire fighting system
- Operation of R-Type Compound Receiver
- Understanding of PC software for firefighting operations

PRODUCT COMPOSITION

1. Fire Fighting Mosaic Modules

- Understanding fire fighting equipments and electrical circuit drawings
- Operation of the warning system, evacuation equipment and fire extinguisher
- Hands-on practice on wiring connections

2. Fire Fighting Electrical Circuit Modules

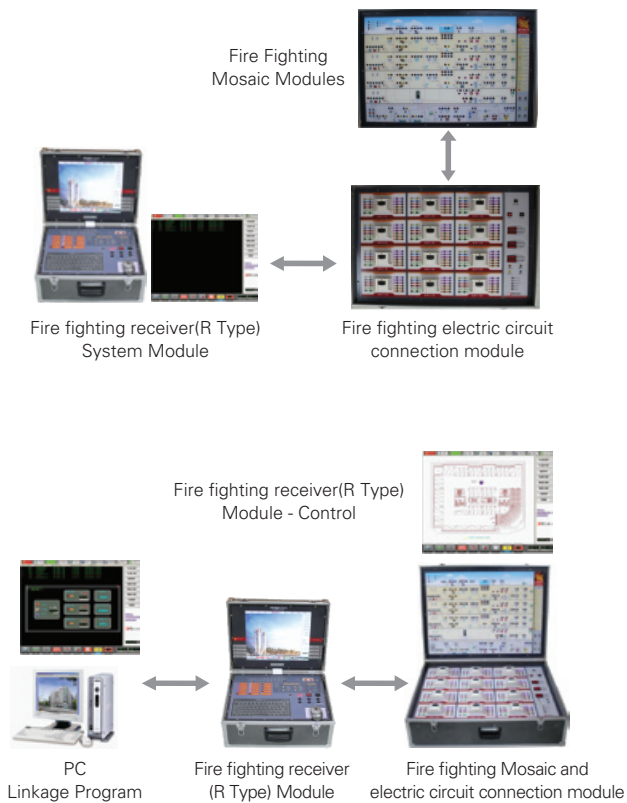
- Understanding fire fighting electrical machine and apparatus
- Learning principles of fire fighting electrical machine and apparatus
- Circuit connection practices for the fire fighting electrical machine and apparatus

3. Fire Fighting Receiver System

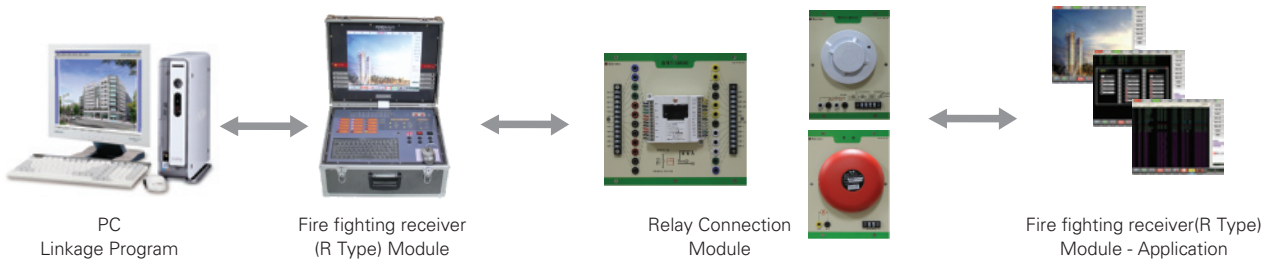
- Understanding fire fighting receiver system
- Learning principles of fire fighting receiver system
- Interlocking operations of fire fighting receiver system

4. PC software for firefighting operations (YS-TPRS2006 S/W)

- Creation and design of fire fighting programs on the computer
- Verification of the fire fighting programs that were created
- How to control the Fire Fighting Receiver System using the PC



CPE-ER1991



SPECIFICATIONS

1. Fire Fighting Mosaic and Electrical Circuit Module

- Rated Voltage : AC220V(50/60Hz) or DC24V
- Circuit voltage : DC 24V±10%
- Operating Temperature : -10℃ ~ 50℃
- Operating Humidity : RH 93%
- Communication control : CAN method
- Transfer method : ROM BIOS
- Dimension : 1200(W) × 200(D) × 800(H) mm

2. Fire Fighting Receiver System

- Type : Compound receiver (R-type)
- Features: LCD display and high speed CPU
- Rated Voltage : AC220V 50Hz/60Hz
- Number of system : maximum 60ea
- Number of repeater in connection : maximum 96ea
- Data storage: Saves up to 1000 events simultaneously
- Accommodation capacity
 - Surveillance line : 384 ~ 23040 lines
 - Control line : 288 ~ 17280 lines
- Communication control : CAN method
- Communication speed : 20k bps
- Transfer method : ROM BIOS
- Operating temperature : -10 ~ 50℃
- Operating humidity : RH 10 ~ 90%
- Dimension: 600mm(W) × 200mm(D) × 450mm(H)

STANDARD ACCESSORIES

- Power cord: 1ea
- Connection cable (for modules) : 1set
- Digital multimeter : 1ea
- User's guide manual: 1ea



Fire Fighting Receiver (R Type) System



Fire fighting Mosaic and electrical circuit modules

CPE-ER1992

Fire Fighting Electrical Wiring Trainer

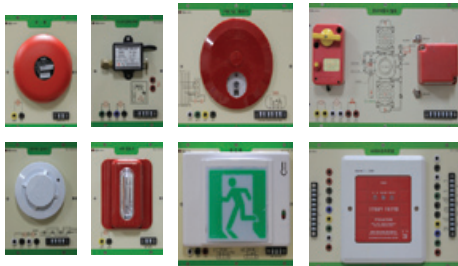


FEATURES

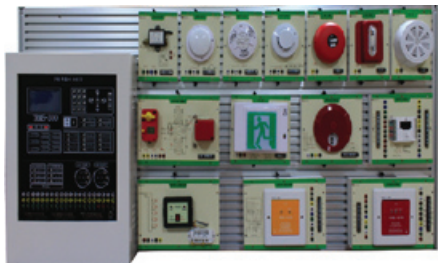
- Designed to practice circuit connections and understand the principles of fire fighting system
- P-type compound receiver for controlling a pump and gas-based equipment
- Durable aluminum profile experimental plate structure with a worktable and module storage drawers

EXPERIMENTAL CONTENTS

- Principles of the fire fighting system
- Understanding the electrical schematic drawings of firefighting system
- Wiring practices on the auto fire detector, sprinkler system, smoke control system and fire extinguisher
- Operation of the warning system, evacuation equipment and fire extinguisher
- Interlocking operation of the sprinkler and smoke control equipment
- Hands-on operation of P-type compound receiver



Individual Modules



Fire Fighting Wiring Module Set



Fire Fighting Electrical Wiring Device Application

SPECIFICATIONS

1. Fire Fighting Receiver System

- Type : Compound receiver (P-type)
- Features: LCD display and high speed CPU
- Rated Voltage : AC220V 50Hz/60Hz
- Power source: Ni-Cd battery DC 24V 1.8Ah (1ea)
- Communication control : CAN method
- Surveillance / control : Input - 20 circuits
Output - 20 circuits
- Operating temperature : -10 ~ 50°C
- Operating humidity : RH 10 ~ 90%
- Dimension: 600mm(W) × 200mm(D) × 450mm(H)

2. Experimental modules

(1) List of modules

- P-type System Module / Transmitter Module / Repeater Module
- Indicator Lamp Module / Alarm Bell Module / Fireproof Shutter Module
- Differential Sensor Module / Fixed Temperature Sensor Module
- Smoke Sensor Module / Visual Alarm module
- Exit Sign Module / Supervisory Panel Module
- Siren module / Pre-action Valve Module
- Alarm Valve Module / Pump Module
- Gas System Module / Damper Motor Module
- Damper Control Panel module / Damper Controller Module
- Gas System Control Panel Module

(2) Characteristics of modules

- Rated voltage: AC220V 50/60Hz or DC24V
- Power source (circuit) : DC 24V ±10%
- Operating temperature: -10°C ~ 50°C
- Operating Humidity: R.H 93 %
- MCC operation mode: AUTO / MANUAL

3. Working board for experimental modules

- Material: Aluminum
- Dimension: 1200(W) x 800(D) x 800(H) mm

STANDARD ACCESSORIES

- Power cord: 1ea
- Connection cable (for modules): 1set
- Connection cable (for the exit sign): 1set
- Digital multimeter : 1ea
- Basic tool set: 1set
- Worktable: 1ea
- Experimental plate: 1ea
- Module storage drawer: 2ea
- User's guide manual: 1ea

CPE-ER1993

Fire Fighting Simulation Trainer



FEATURES

- Designed to help the user understand the elements and principles of fire fighting system
- Consists of Fire Sprinkler Simulator, Electrical Fire Fighting Simulator, Fire Extinguisher Simulator, and Integrated Disaster Control System
- Hands-on practice on operation of the firefighting simulation apparatus and I/O verifications
- Records a fire event on CCTV and transmits visual data to the surveillance center
- All-in-one structure with a worktable, an working board and module storage drawers

EXPERIMENTAL CONTENTS

- Simulation of fire sprinkler
- Simulation of electrical fire fighting apparatus
- Fire pump and gas extinguisher
- Wiring connection of fire fighting system
- Operation and testing of fire extinguisher
- Understanding of integrated disaster system



PRODUCT COMPOSITION

1. Fire Sprinkler Simulator (CPE-ER1993A)

The Fire Sprinkler Simulator consists of a water tank, a water pump and a fire fighting valve for hands-on operation.

- Experiments on fire pump operation for spraying water
- Experiments on automatic or manual MCC operation
- How to test operation of Fire Fighting Receiver (P-type compound)
- How to check operation of a pre-action valve and an alarm valve
- How to interlock alarm system with fire fighting apparatus (pump, valve and sensor)
- How to set a pressure switch for starting a fire pump

2. Electrical Fire Fighting Simulator (CPE-ER1993B)

The Electrical Fire Fighting Simulator is designed to operate the P-type Fire Fighting Receiver and various types of fire fighting equipments. The user can check input and output by operation of the simulation apparatus.

System Components

P-type compound receiver / transmitter / position indicator lamp / starting indicator lamp / alarm bell / temper switch / visual alarm system / pump pressure switch / MCC panel / siren / differential sensor / smoke sensor/ exit sign / pressure switch for an alarm valve and a pre-action valve





3. Fire Extinguisher Simulator (CPE-ER1993C)

The Fire extinguisher simulator simulates operation of fire extinguisher and help practice I/O control of firefighting equipment.

- Experiments on automatic fire detector
- Experiments on sprinkler system
- Experiments on smoke control system
- Experiments on gas-type fire extinguisher
- Experiments on evacuation equipment (exit sign)



4. Integrated Disaster Control System (CPE-ER1993D)

The Integrated Disaster Control System automatically records a fire event on CCTV and transmits visual data to the surveillance center through security sensors if there is fire outbreak in a fire zone.

Components

- | | |
|---------------------------------|---------------------------|
| - P-type receiver & transmitter | - Exit sign |
| - Differential sensor | - Smoke sensor |
| - Visual alarm system | - Position indicator lamp |
| - Alarm bell | - LCD panel |
| - Proximity IR sensor | - Speaker system |

STANDARD ACCESSORIES

- Power cord: 1ea
- Connection cable (for modules) : 1set
- Digital multimeter : 1ea
- Basic tool set: 1set
- Worktable with a vertical mount rack : 1ea
- Drawers: 2ea
- User's guide manual: 1ea

CPE-ER1994

Integrated Firefighting Control Software



FEATURES

- Intensive monitoring function through the firefighting control panel
- Not required to install switches per line through the adoption of TAN-KEY enabling manual control of fire fighting system
- Automatic operation of fire fighting system such as alarm and sprinkler by the fire detector in case of fire outbreak
- Easy to notice the occurrence of any problem or trouble on the wide LCD touch screen
- Easy to trace the location of fire outbreak through visual display of the LCD screen: emergency areas, buildings and floors
- Automatic monitoring functionality to check disconnection of receiver circuits

INTRODUCTION

With development of industry, multi-functional and high-rise buildings are drastically on the rise, and chances of getting exposed to fire hazard are also increasing. It is no doubt that scale of damage in human life and property in relation to the outbreak of fire is in geometrical progression.

Our "disaster prevention control system", based on CAN communication methods, boasts not only adaptability for critical situations in and out of a multi-functionalized modern building, but also functional stability in controlling and reducing data errors drastically. Also, it is a complete system that FEATURES the modularized repeater for convenient site operation and reduces a chance for wrong connection by the structural design for easy circuit connection.



PROGRAM COMPOSITION

1. CRT program in WINDOWS environment

- 1) Capable of monitoring the current status of fire through the monitoring system that runs on Microsoft Windows
- 2) Various types of circuit and symbol offered by Graphic Editor

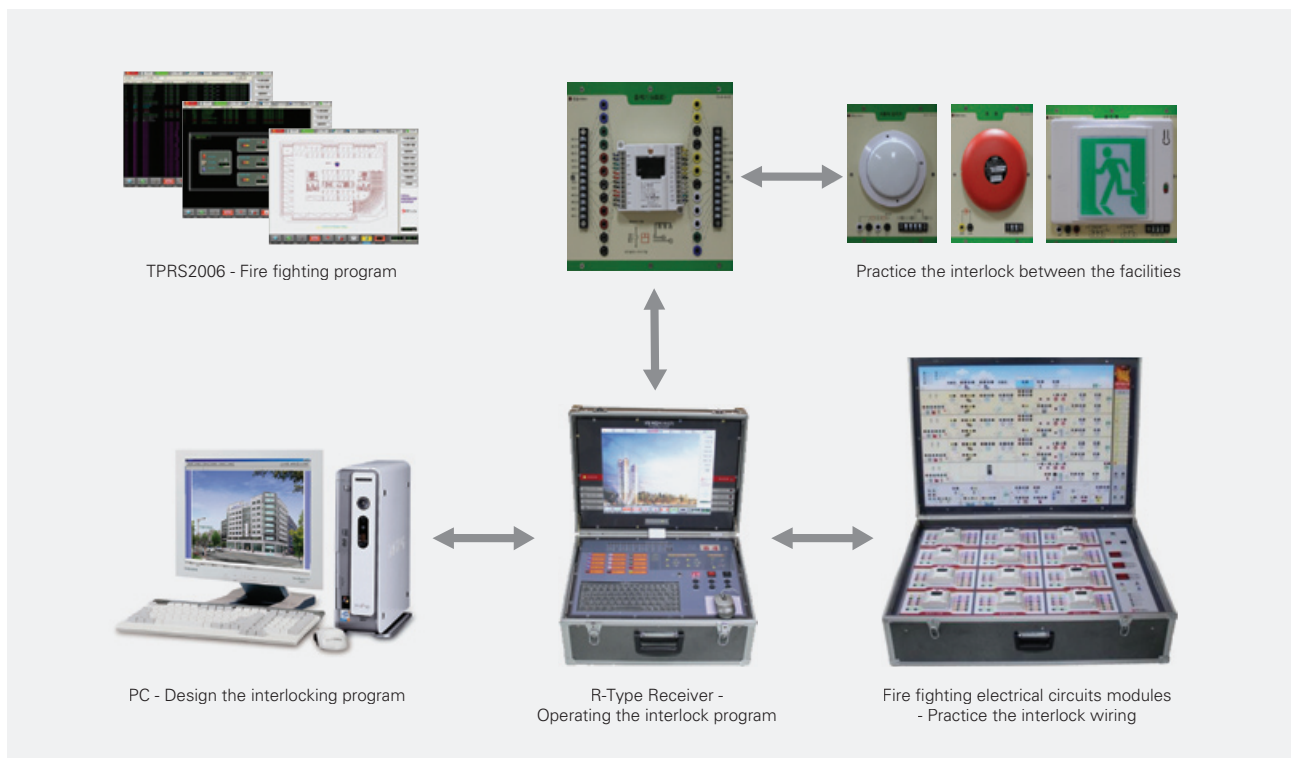
2. Computer reception function

- 1) Equipped with high-performance CPU for fast and accurate data acquisition
- 2) Color LCD
 - Various graphical user interface and easy to operate "disaster prevention control system"
- 3) 60 CPU channels
 - Input: 23,000 points
 - Output: 23,000 point
- 4) Access to 96 repeaters per channel
- 5) Data collection & processing within two seconds
- 6) Designed to show all circumstances of the repeater
- 7) 2048-point DO output (emergency broadcast)
- 8) Repeater: To prevent troubles caused by the malfunction of existing communication circuit
- 9) System classification of the transmitter and telephone signals
- 10) Easy to download the program data

PC ENVIRONMENT (recommended)

- 1) CPU : Pentium 3 or higher
- 2) RAM : 1024M Byte
- 3) HDD : 100G Byte
- 4) Serial port: 2 ports or more
- 5) Resolution : 1280 x 1024
- 6) Operating System : Microsoft Windows Professional

Configuration and Connection of Fire Fighting Electrical Application Software and Hardware.





New & Renewable Energy

Contents

- 93 Smart Grid (Solar/Wind/Fuel Cell) Training System | CPE-EN4500
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Wind & Solar Hybrid Energy Training System | CP-S120C
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11.2kW Grid-tied Solar Energy Training System | CP-GTS1.2KC
3kW Grid-tied Solar Energy Training Systems | CP-GTS3KC
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- 122 Wind Energy Training System | CP-WS350
- 123 Wind Turbine Training System | CP-WIN400 / CP-WIN900 / CP-WIN1000
- 124 Professional Fuel Cell Training System | CP-392E
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- 126 Fuel Cell Analyzer | PRO-200F
- 127 Renewable Energy Data Analyzer | CPE-SM3010



CPE-EN4500

Smart Grid (Solar/Wind/Fuel Cell) Training System

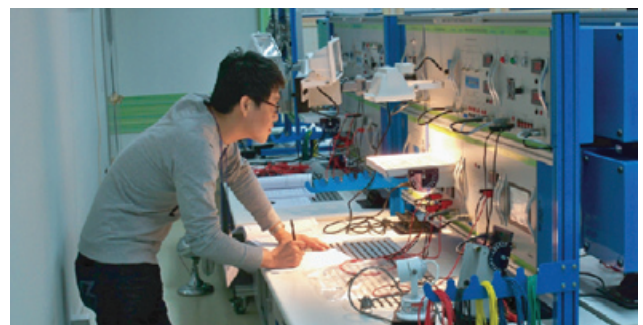


FEATURES

- Integrated training system designed to help the user learn basic principles of renewable energy and practice circuit configuration throughout theory verification and simulation
- Hands-on power control practices covering various power generation system: off-grid, grid-tied, hybrid and smart grid
- Voltage /current/load experiments per grid in both solar PV and wind power generation
- Modularized structure with a modular rack for easy attachment and detachment of modules
- Rigid and durable worktable in aluminum profile structure, plus module storage drawers allowing user convenience in keeping experimental modules safe
- Supports various experiments in relation to a shift in the position of the Sun by applying the artificial light source
- With charging controller and rechargeable batteries for energy restoration
- Use an Inverter to practice an AC load experiment
- Standalone or integrated monitoring on the voltage and current values of experimental modules

EXPERIMENTAL CONTENTS

- Basic principles of solar PV power generation
- Solar PV system related practices
- Characteristics of power generation by the solar amount
- Electrical characteristics such as open circuit voltage and short-circuit current
- I-V, P-V characteristics by the incidence angle of solar modules
- I-V, P-V characteristics according to the distance of solar modules
- I-V, P-V characteristics based on the temperature characteristics of solar modules
- I-V, P-V characteristics based on the irradiance of solar modules
- V-I characteristics and load in solar generation according to the solar cell connection in series or parallel
- Battery charge-discharge practices using a charging controller
- Power conversion through the off-grid inverter
- Power conversion through the grid-tied inverter
- Smart grid monitoring practices with the voltage value and current value per system
- Streetlight control practice based on sunrise and sunset
- MPPT control practice
- Principles and systems of wind power generation
- Characteristics of a wind power generator in terms of rotating speed and load
- Characteristic curves of hydrogen electrolysis
- The faraday efficiency and electrolysis's energy efficiency
- Principles and systems of electrical power generation from a hydrogen fuel cell
- Characteristic curves of a fuel cell connected in series or parallel
- Hydrogen fuel cell's characteristics in terms of power generation amount and load
- Solar PV-Wind hybrid power generation
- Solar PV-Hydrogen hybrid power generation
- Wind-Hydrogen hybrid power generation
- Solar PV-Wind-Hydrogen hybrid power generation
- Data measurement and control practice using RS-485 serial port



PRODUCT COMPOSITON

• Experimental Module package (3 types)

Hybrid & Smart Grid Electric Power Control					
Grid-Tied Solar Power Generation (* Wind Generator: Optional)			PK2	PK3	Option
Off-Grid Solar PV Power Generation (* Wind Generator: Optional)		PK1			
• CPE-EN4500-T01	Experimental Table Set	0	0	0	
• CPE-EN4500-M01	AC Power Source Module	0	0	0	
• CPE-EN4500-M02	Arm Type Light Source Module	0	0	0	
• CPE-EN4500-M03	Photovoltaic Cell Module A	0	0	0	
• CPE-EN4500-M04	Photovoltaic Cell Module B	0	0	0	
• CPE-EN4500-M05	Hybrid Charging Controller Module	0	0		
• CPE-EN4500-M06	Battery Bank Module	0	0		
• CPE-EN4500-M07	Stand-alone Inverter Module	0	0		
• CPE-EN4500-M08	DC Load Module	0	0	0	
• CPE-EN4500-M09	AC Load Module	0	0		
• CPE-EN4500-M11	Automatic Charger Module	0	0	0	
• CPE-EN4500-M12	Wind Generator Module (Propeller type)	* (option)	* (option)	0	
• CPE-EN4500-M13	Photovoltaic Cell Connection Module	0	0	0	
• CPE-EN4500-M15	Hydrogen Load & DC/DC Converter Module			0	
• CPE-EN4500-M16	Hydrogen Generator Module			0	
• CPE-EN4500-M18	Multi-type Battery Bank Module				0
• CPE-EN4500-M19	Multi-type Charging Controller Module				0
• CPE-EN4500-M20	Multi-type Grid-Connected Inverter Module			0	
• CPE-EN4500-M21	Distributed Power Control Module			0	
• CPE-EN4500-M22	Smart Home Appliance Load Module			0	
• CPE-EN4500-M23	AC Meter Module			0	
• CPE-EN4500-OP1	Smart Grid Monitoring Module	0	0	0	
• CPE-EN4500-OP2	Virtual Photovoltaic Array Module				0
• CPE-EN4500-OP3	1.2kw Grid Connected Inverter Module				0
• CPE-EN4500-OP4	Adjustable Angle Solar Module	0	0	0	
• CPE-EN4500-OP5	Electricity Meter Module		0		
• CPE-EN4500-OP6	MPPT Module		0	0	
• CPE-EN4500-OP8	DC Meter Module				0
• CPE-EN4500-OP9	Analog Watt Hour Meter Module		0		
• CPE-EN4500-OP10	300W Grid Connected Inverter Module		0		

CPE-EN4500

SPECIFICATIONS

EXPERIMENTAL TABLE SET

- 1) Worktable : 1ea
 - Structure: Aluminum profile
 - Upper plate : HPM lumber (at intervals of 25mm)
 - Caster (noise-reduction type): 4ea
 - Dimension : 1600(W) x 800(D) x 820(H)mm
 - AC 220V Outlet : 2ea
- 2) Module storage drawers : 2ea
 - with hinged doors and module slots
- 3) Frame for experimental modules : 1ea
 - Structure: Slot board type in Aluminum profile (at intervals of 25mm)
Easy attachment/detachment of experimental modules
 - Size : 900(W) x 305(D)mm
- 4) Experimental modular rack
 - Structure: Double stack structure in Aluminum Profile
 - Module fixation: Up-and-down railway type
 - Size : 1,600(W) x 750(H)mm



AC POWER SOURCE MODULE (M01)

- 1) ELCB (AC220V 60Hz, 15A/15mA): 1ea
- 2) AC inlet (with built-in fuse, 5A) : 1ea
- 3) AC power lamp : 1ea
- 4) Earth connection terminal (insulation type): 1ea
- 5) AC 220V output connector (3/4pin) : 1ea
- 6) AC 220V module connection cord (3/4pin) : 1ea
- 7) Dimension : 250(W) x 309(D) x 120(H)mm



LIGHT SOURCE MODULE (M02)

- 1) Output : 300W
- 2) Power : 220V 50/60Hz
- 3) Halogen lamp
- 4) Heat-resistant glass
- 5) Dimming control : 0~100%
- 6) Arm attachment type



PHOTOVOLTAIC CELL [A] MODULE (M03)

- 1) Solar cell
 - Maximum power (pm) : 5W
 - Maximum power voltage (Vmp) : 17.5V
 - Maximum power current (Imp) : 300mA
 - Open-circuit voltage (Voc) : 21.4V
 - Short-circuit current (Isc) : 390mA
- 2) PV output terminal (4mm) : 1set
- 3) Dimension : 380(W) x 309(H) x 120(D)mm



PHOTOVOLTAIC CELL [B] MODULE (M04)

- 1) Solar cell
 - Maximum power (pm) : 0.5W
 - Maximum power voltage (Vmp) : 6V
 - Maximum power current (Imp) : 85mA
 - Open-circuit voltage (Voc) : 6.6V
 - Short-circuit current (Isc) : 95mA
- 2) PV output port (PV1~PV6) : 1set
- 3) Dimension : 380(W) x 120(D) x 309(H) mm



HYBRID CONTROLLER MODULE (M05)

1) Charging controller

- Normal voltage : 12V
- Boost voltage : 13.5V (25°C), 2 hours
- Equalization voltage : 14.8V (25°C), 2 hours
- Float voltage : 13.7V (25°C)
- Low voltage defense (LVD) : 11.4~11.9V (controlled by a charged state), 11.0V (controlled by voltage)
- Load re-connection voltage : 12.8V
- Temperature compensation : -4mV/Cell*k
- Maximum input current (Solar Panel) : 5A / 8A / 10A / 15A / 20A
- Maximum load current (Load) : 5A / 8A / 10A / 15A / 20A



- 4) PV input terminal (4mm) : 1set
- 5) Battery input terminal (4mm) : 1set
- 6) 4mm output terminal: DC load output (1set) and inverter output (1set)
- 7) Dimension : 380(W) x 120(D) x 309(H) mm

BATTERY MODULE (M06)

- 1) Battery (12V, 7AH) : 2ea
- 2) Battery output terminal (4mm) : 1set
- 3) DC Voltmeter : 1ea
 - Maximum measuring input : DC500V
 - Maximum display range : -1999 ~ 9999
 - Hi/Low scale function
 - AC frequency measurement (0.1 ~ 9999Hz)
 - Communication : RS485
 - Voltage input terminal (4mm) : 1set
- 4) Dimension : 380(W) x 120(D) x 309(H) mm



STAND-ALONE INVERTER MODULE (M07)

1) Inverter

- Output (AC): 300W 60Hz frequency
- Input (DC):
 - Low voltage (warning at 10.5±0.3V / automatic shutdown in case of 10.5±0.3V)
 - High voltage (automatic shutdown in case of 16.5V or higher)
- Protection function: Overheat, short-circuit, overload
- Warning function: Alarm sound and red LED lamp (low battery power or overheat notice)



- 4) AC outlet (AC220V): 1ea
- 5) Power switch: 1ea
- 6) Inverter alarm monitoring lamp: 1ea
- 7) DC input terminal (4mm / 10.5V ~ 16.5V): 1set
- 8) AC output terminal (4mm) : 1set
- 9) Dimension : 380(W) x 120(D) x 309(H) mm

DC LOAD MODULE (M08)

- 1) DC lamp and socket (DC12V/10W) : 2ea
- 2) Buzzer (DC12V) : 1ea
- 3) Fan (DC12V, with protection cover) : 1ea
- 4) Variable resistor (Open, 60 Ω /30 Ω /20 Ω /15 Ω /12Ω) : 1ea
- 5) DC input terminal (4mm) : 1set
- 6) Load selector switch (for standalone control of lamp-1, lamp-2, buzzer, fan and resistor) : 1set
- 7) Dimension : 380(W) x 120(D) x 309(H) mm



AC LOAD MODULE (M09)

- 1) AC lamp and socket (AC220V) : 2ea
- 2) Buzzer (AC220V) : 1ea
- 3) AC motor (AC220V, rotary disc type) : 1ea
- 4) AC motor variable power controller : 1ea
- 5) AC input terminal (4mm) : 1set
- 6) Load switch (for standalone control of lamp-1, lamp-2, buzzer and motor): 1set
- 7) Dimension : 380(W) x 120(D) x 309(H) mm



SPECIFICATIONS

AUTOMATIC CHARGER MODULE (M11)

- 1) Indication lamp: Fully charged battery
Battery charging in progress
- 2) Selector for a charging voltage: 13.4V or 14.4V
- 3) Charging current: Rated current 10A
- 4) Function:
 - Output short-circuit protection
 - High efficient automatic charging
 - Reverse polarity protection (DC output cut-off)
- 5) AC Inlet (with built-in fuse): 1ea
- 6) DC output terminal (4mm): 1set
- 7) Insulated ground connection terminal: 1ea
- 8) Dimension: 380(W) x 120(D) x 309(H) mm



WIND GENERATOR MODULE (M12)

- 1) Rated output : 3W
- 2) WV output terminal : 1set
- 3) Dimension: 380(W) x 120(D) x 309(H) mm



PHOTOVOLTAIC CELL CONNECTION MODULE (M13)

- 1) Schottky diode (reverse current protection): 6ea
- 2) Bypass Schottky diode: 6ea
- 3) I/O terminal: 24ea
- 4) DC voltmeter (2ea) and DC ampere meter (2ea)
 - Maximum measuring input : DC 500V, DC 5A
 - Maximum display range : -1999 ~ 9999
 - AC frequency measurement: 0.1 ~ 9999Hz
 - Communication: RS485



- Voltage input terminal (4mm): 1set
- Current input terminal (4mm): 1set
- 5) Dimension : 380(W) x 120(D) x 309(H) mm

HYDROGEN LOAD & DC/DC CONVERTER MODULE (M15)

- 1) DC voltmeter (2ea) and DC digital ampere meter (1ea)
 - Maximum measuring input: DC 500V, DC 5A
 - Maximum display range: -1999 ~ 9999
 - Communication type: RS485
 - Voltage input terminal (4mm): 1set
 - Current input terminal (4mm): 1set
- 2) Load resistor : 0.3 Ω / 0.5 Ω / 1 Ω / 2 Ω / 3 Ω / 5 Ω / 10 Ω / 20 Ω / 50 Ω / 100Ω / Open
- 3) DC/DC converter: 1ea
 - Input: DC 1.2V ~ 2V
 - Output DC: 12V
- 4) Auto charger function
- 5) Dimension : 380(W) x 120(D) x 309(H) mm



HYDROGEN GENERATOR MODULE (M16)

- 1) Electrolyzer : 1ea
 - Voltage at continuous operation : 1.4V ~ 1.8V
 - Voltage at peak load periods: 2.0V
 - Current : 0 ~ 4000mA
 - Hydrogen production : Max. 28ml/min
 - Hydrogen and Oxygen storage tank (Transparent type)
- 2) 2PEM Fuel Cell : 1ea
 - Membrane surface area : 2 x 10 cm²
 - Voltage output : Parallel connection (0.4V ~ 1.0V)
Serial connection (0.8V ~ 2.0V)
 - Current output : Parallel connection (max. 4000mA)
 - Hydrogen consumption : Max. 28ml/min (at 4000mA)
- 3) Power supply : Fixed 1.8V 2A (max.)
- 4) Connection tube : 1set
- 5) Dimension: 380(W) x 120(D) x 309(H) mm



MULTI-TYPE BATTERY BANK MODULE (M18)

- 1) Battery(12V, 7AH) : 3ea
- 2) Battery output terminal (4mm) : 3sets
- 3) Power switch (3ea) and power display (3ea)
- 4) Dimension: 380(W) x 120(D) x 309(H) mm



MULTI-TYPE CHARGING CONTROLLER MODULE (M19)

- 1) Charging Controller: 3ea
 - Normal voltage: 12V
 - Boost voltage: 13.5V(25°C), 2hrs
 - Equalization voltage: 14.8V(25°C), 2hrs
 - Float Voltage: 13.7V(25°C)
 - Status indicator (5-step): 3sets
- 2) DC voltmeter (3ea) and DC digital ampere meter (3ea)
 - Maximum measuring input: DC 500V, DC 5A
 - Maximum display range: -1999 ~ 9999
 - Communication type: RS485
 - Voltage input terminal (4mm): 1set
 - Current input terminal (4mm): 1set
- 3) PV terminal (4mm): 3sets
- 4) Battery terminal (4mm) : 3sets
- 5) Output terminal (4mm): 3sets
- 6) Dimension: 380(W) x 120(D) x 309(H) mm



MULTI-TYPE GRID CONNECTED INVERTER MODULE (M20)

- 1) Grid connected inverter: 3ea
 - Rated AC output : 270W
 - Maximum AC output : 300W
 - DC input voltage range : 10.8V ~ 30V
 - Rated output : AC 220V 60 Hz
- 2) PV input terminal (4mm) & ON/OFF switch: 3sets
- 3) AC output terminal (4mm) & indicator : 3sets
- 4) Dimension: 380(W) x 120(D) x 309(H) mm



DISTRIBUTED POWER CONTROL MODULE (M21)

- 1) Commercial electricity grid-connection and regional power generation (renewable energy)
- 2) Facing short circuit and overload of commercial electricity: Supply of power by regional generation
- 3) Facing short circuit and overload of regional generation: Supply of power by the user's setting
- 4) Smart grid function: Distributed generation control
- 5) AC input terminal (4mm) and indicator lamp: 3sets
- 6) Digital AC power meter (regional generation measurement): 3ea
- 7) Digital watt-hour meter (regional generation & load measurement): 2ea
- 8) AC output outlet (1ea) and indicator lamp (1ea)
- 9) AC power inlet (1ea), circuit breaker (1ea) and indicator lamp (1ea)
- 10) Dimension: 380(W) x 120(D) x 309(H) mm



SMART HOME APPLIANCE LOAD MODULE (M22)

- 1) Smart home appliance 1 - Lighting (LED lamp)
- 2) Smart home appliance 2 - Electric fan (AC fan with variable speed)
- 3) Smart home appliance 3 - Washing machine (AC motor with dimming Control)
- 4) Smart home appliance 4 - Continuously variable load
- 5) Digital AC power meter: 1ea
- 6) Smart home appliance power outlet: 1ea
- 7) Smart home appliance ON/OFF control switch: 4ea
- 8) Dimension: 380(W) x 120(D) x 309(H) mm



AC METER MODULE (M23)

- 1) Digital AC power meter: 1ea
- 2) Insulated input terminal (4mm): 2sets



SMART GRID MONITOR MODULE (OP1)

- 1) Smart Grid Monitor: 1ea
 - Operating system: Windows CE 5.0
 - User Interface: RS485 and USB
 - Development environment: Microsoft eMbedded Visual C++ 4.0 and Visual Studio 2005
 - CPU: 32Bit RISC MP2530F (700 MIPS Performance)
 - Memory: RAM: DDR 64MB+32MB
NAND: 64MB
SUB: SD-CARD / 1.8" IDE HDD (option)
 - Touch screen LCD: 7" wide & LED backlight
 - Power : 12V 500mA
 - Monitoring the voltage and current values of experimental modules
- 2) Download interface: USB
- 3) Dimension: 380(W) x 120(D) x 309(H) mm



SPECIFICATIONS

VIRTUAL PHOTOVOLTAIC ARRAY MODULE (OP2)

- 1) Output Voltage : 0 ~ 100VDC
- 2) Output Current : 0 ~ 15ADC
- 3) DC Output terminal (0 ~ 100VDC 15A) : 1set
- 4) Voltage setting knob : 1ea
- 5) Current setting knob: 1ea
- 6) Dimension: 380(W) x 120(D) x 309(H) mm



GRID CONNECTED INVERTER MODULE (OP3)

- 1) Rated input : DC 48V ~ 100V 15A
- 2) Rated output : AC 220V 60Hz, 1kW
- 3) Inverter power level display : 4 steps
- 4) Import watt-hour meter: 1ea
- 5) Export watt-hour meter : 1ea
- 6) AC power line ELCB (AC220V 60Hz, 15A / 15mA) : 1ea
- 7) AC Load Circuit ELCB (AC220V 60Hz, 15A / 15mA) : 1ea
- 8) DC ON/OFF circuit breaker: 1ea
- 9) Insulated DC input terminal (48 ~ 100VDC 15A, 4mm) : 1set
- 10) AC power line inlet (AC 220V 60Hz & built-in fuse) : 1ea
- 11) AC load outlet (AC 220V 60Hz) : 1ea
- 12) Insulated AC output terminal (4mm) : 1set
- 13) Dimension: 380(W) x 240(D) x 309(H) mm



ADJUSTABLE ANGLE OF SOLAR MODULE (OP4)

- 1) PV Cell
 - One-touch clamp in two mountable positions
 - Adjustable angle: Up / down / left / right
 - Vmpp : 4.08V
 - Voc : 4.92V
 - Imp : 250mA
 - Isc : 270mA
 - PSTC : 1W
- 2) Halogen Lamp module: 1ea
 - One-touch clamp in two mountable positions
 - Adjustable angle: Up / down
 - Halogen Lamp (Circular type with a switch)
 - 220V 20W



ELECTRICITY METER MODULE (OP5)

- 1) Single-phase 2-wire (1P2W)
- 2) Load capacity: 220V, 6.6kW
- 3) Maximum current: 30A
- 4) Test current: 10A
- 5) Voltage : 220V 60Hz
- 6) Power loss : 3.7 / 0.42(VA)
- 7) Error : ±2%
- 8) Dimension: 250(W) x 120(D) x 309(H) mm



MAXIMUM POWER POINT TRACKING (MPPT) MODULE (OP6)

- 1) Graphical visualization: MPPT Schematic diagram (V-P and V-I characteristics)
- 2) Self-tracking function by the fluctuation of solar cell voltage
- 3) DC ampere meter : 2ea
- 4) DC voltmeter : 2ea
- 5) DC watt meter : 2ea
- 6) Solar cell input : 2ea
- 7) DC load (25W) : 2ea
- 8) Dimension: 380(W) x 120(D) x 309(H) mm



DC METER MODULE (OP8)

- 1) DC voltmeter: 1ea
- 2) DC ampere meter: 1ea
- 3) Voltage input terminal: 2ea
- 4) Current input terminal: 2ea
- 5) Dimension: 124(W) x 120(D) x 309(H) mm



ANALOG WATT HOUR METER MODULE (OP9)

- 1) Function: Real-time power consumption monitoring
- 2) Rotation:
Forward rotation at the time of power consumption
Reverse rotation upon transmitting the generated power
- 3) Power source : Single-phase 2-wire
- 4) Wiring connection : Up and down / left and right
- 5) Rated voltage : 220V 60Hz
- 6) I/O ON/OFF switch: 2sets
- 7) Insulated I/O terminal (4mm): 2sets
- 8) AC power inlet: 1ea
- 9) Output outlet : 1ea
- 10) Dimension: 380(W) x 120(D) x 309(H) mm



300W GRID CONNECTED INVERTER MODULE (OP10)

- 1) Rated input: 10.8V ~ 30V
- 2) Rated output: 270W (AC 220V 60Hz)
- 3) Maximum output: 300W (AC 220V 60Hz)
- 4) Inverter power level display: 4 steps
- 5) Import watt-hour meter: 1ea
- 6) Export watt-hour meter: 1ea
- 7) AC power line ELCB (AC220V 60Hz, 15A / 15mA): 1ea
- 8) AC load circuit ELCB (AC220V 60H, 15A / 15mA): 1ea
- 9) DC ON/OFF circuit breaker: 1ea
- 10) Insulated DC input terminal (4mm): 1set
- 11) AC power line inlet (grid connection) : 1ea
- 12) AC load outlet (AC 220V 60Hz) : 1ea
- 13) Insulated AC output terminal (4mm) : 1set
- 14) Dimension: 380(W) x 120(D) x 309(H) mm



STANDARD ACCESORRIES

- AC Power cord : 1set
- Connection cable (insulation type) : 1set
- Power supply cable for modules (round type 3/4pin) : 1set
- RS485 communication cable : 1set
- User's manual & experimental manual : 1set

CPE-EN4500

Installation Site References



<Gyeonggi College of Science and Technology>



<New Technology Training Center of Korea Polytechnic>



<Gwangju campus of Korea Polytechnic V>



<Seoul Gangseo campus of Korea Polytechnic I >



<Hongseong campus of Korea Polytechnic IV>



<Korea University of Technology and Education>

CPE-EN4600

Solar/Wind/Fuel Cell Training System



FEATURES

- Integrated training system designed to help the user learn basic principles of renewable energy and practice circuit configuration throughout theory verification and simulation
- Supports minimized installation spaces to perform indoor experiments by each group of two persons
- Comprehensive experiments, from the basic to advanced level, on characteristics of solar cells, PV modules, off-grid inverter, grid-tied inverter, AC load and DC load
- Modularized structure with a modular rack for easy attachment and detachment of modules
- Provides PC program for monitoring and data analysis for the voltage, current and temperature values of experimental modules
- Hands-on power control practices covering various power generation system: off-grid, grid-tied, hybrid (option) and smart grid (option)

EXPERIMENTAL CONTENTS

- Basic principles of solar PV power generation
- Solar PV system related practices
- Characteristics of power generation by the solar amount
- Electrical characteristics such as open circuit voltage and short-circuit current
- I-V, P-V characteristics by the incidence angle of solar modules
- I-V, P-V characteristics according to the distance of solar modules
- I-V, P-V characteristics based on the temperature characteristics of solar modules
- I-V, P-V characteristics based on the irradiance of solar modules
- V-I characteristics and load in solar generation according to the solar cell connection in series or parallel
- Characteristics of battery
- Battery charge-discharge practices using a charging controller
- Power conversion through the off-grid inverter
- Off-grid inverter's load / no load
- Power conversion through the grid-tied inverter
- The faraday efficiency and electrolysis's energy efficiency
- Data measurement and control practice using RS-485 serial port
- Voltage / current / temperature measurement using software
- Characteristics of Reverse voltage protection diodes

SPECIFICATIONS

AC Power Source Module (M01)

- Dimension: 150(W) x 309(H) x 120(D)mm
- ELCB(AC220V/60Hz/15A/15mA): 1ea
- AC Inlet (built-in fuse, 5A): 1ea
- AC power lamp: 1ea
- AC 220V I/O connector (3 / 4 pins): 1ea



Diode Module (M02)

- Dimension: 150(W) x 309(H) x 120(D)mm
- Schottky Barrier Diode: 4ea
 - Max. power voltage (Vmp): 40V
 - Max. reverse Voltage (Vmp): 40V
 - Max. current (Io) : 5A



Fuse Module (M03)

- Fuse: 4ea
- Rated voltage: 250V 5A
- Dimension: 150(W) x 309(H) x 120(D)mm



Charging Controller Module (M04)

- Dimension: 150(W) x 309(H) x 120(D)mm
- Charging Controller
 - Normal Voltage : 12V
 - Boost Voltage : 13.5V(25°C), 2hr
 - Equalization Voltage : 14.8V(25°C), 2hr
 - Float Voltage : 13.7V(25°C)
 - Low voltage cut-off function (LVD):
 - 11.4~11.9V (Controlled by the charging status)
 - 11.0V (Controlled by voltage)
 - Load re-connection voltage: 12.8V
 - Temperature compensation: -4mV/Cell*k
 - Maximum input current (solar panel):
 - 5A / 8A / 10A / 15A / 20A
 - Maximum load current (load): 5A / 8A / 10A / 15A / 20A



Battery Module (M05)

- Dimension: 150(W) x 309(H) x 120(D)mm
- Battery (12V, 17AH): 1ea
- Battery I/O terminal (4mm insulation)
 - Solar input: 1 pair
 - Inverter output: 1 pair
- Battery Switch: 1ea
- Battery status indicator: 1ea



Stand-Alone Inverter Module (M06)

- Dimension : 150(W) x 309(H) x 120(D)mm
- Inverter
 - Output(AC): 250W quasi-sine wave
 - Frequency: 60Hz
 - Protection: overheat, short-circuit, overload
 - Warning: Alarm beep and red light at the time of low power and overheat



DC Load Module (M07)

- Dimension: 380(W) x 309(H) x 120(D)mm
- DC lamp and socket (DC12V/10W): 2ea
- Buzzer (DC12V): 1ea
- Fan (DC12V, protection cover): 1ea
- Variable resistor (50W/10 Ω , 50W/50 Ω): 1ea
- DC Voltmeter: 1ea
- DC Ampere Meter: 1ea
- DC input terminal (4mm insulation type): 1 set
- Load selector switch: 5ea



AC Load Module (M08)

- Dimension: 380(W) x 309(H) x 120(D)mm
- AC lamp and socket (AC220V): 2ea
- Buzzer (AC220V): 1ea
- AC motor (AC220V, rotary-disc type): 1ea
- AC motor control (phase control) device: 1ea
- Selector switch (AC motor and lamp): 1ea
- AC voltmeter: 1ea
- AC ampere meter: 1ea
- Load selector switch: 5ea



Grid-tied Inverter Module (M09)

- Dimension: 380(W) x 309(H) x 120(D)mm
- Output power: 1,100W at 50°C (1,250W Max)
- Import watt-hour meter: 1ea
- Export watt-hour meter: 1ea
- ELCB(AC220V/60Hz/15A/30mA): 2ea
- DC Circuit Breaker: 1ea



Shunt Module-A(1A, 50mV)(M10)

- Rating: 1A/50mV
- Terminal block
 - INPUT terminal
 - 50mV +. - terminal



Shunt Module-B(5A, 50mV)(M11)

- Rating: 5A/50mV
- Terminal block
 - Input terminal
 - 50mV +. -terminal



PV Meter Module (M12)

- Dimension : 150(W) x 309(H) x 120(D)mm
- DC voltmeter: 1ea
- DC ampere meter: 1ea
- Connector (RS-485): 2ea
- RS-485 connection cable: 1ea



Watt-Hour Meter Module (M13)

- Dimension : 250(W) x 309(H) x 120(D)mm
- Single-phase 2-wire type (1P2W)
- Current: 30(10)A
- Voltage: 220V



Automatic Charger Module (M14)

- Dimension: 150(W) x 309(H) x 120(D)mm
- Indicator: Displays the battery charging status
- Chargeable voltage selection: 13.4V, 14.4V
- Charging current: Rated 10A
- Output short-circuit protection
- High-efficient automatic recharge function
- AC Inlet (built-in fuse): 1ea
- DC output terminal (4mm insulation type): 1 set
- DC voltmeter: 1ea



RS-485 / USB Converter Module (M15)

- Dimension : 150(W) x 309(H) x 120(D)mm
- Connector (RS-485): 2ea
- AC 220V I/O connector (3-pin & 4-pin): 1 set
- AC 220V connection cable (3-pin & 4-pin): 1ea



Data Collector Module (M16)

- Dimension: 380(W) x 309(H) x 120(D)mm
- Connector (USB terminal): 1ea
- Variable resistance (0~200Ω): 1ea
- AC 220V connection cable: 1ea
- Data Collect Display: 1ea
- Load characteristics
 - Motor (DC 12V) : 1ea
 - Lamp-1 (DC 24V): 2ea
- PV & Sensor Input
 - Photovoltaic (4-pin): 1ea
 - Temperature actinometry (8-pin): 1ea



Light & PV Array Module (M17)

- PV Module
 - Maximum output (Max. Power : Pm) : 10W x 2EA
- Halogen lamp
 - Output: 300W
 - Heat resistant glass
 - Dimming control : 0~100%



STANDARD ACCESORIES

- AC power cord: 1ea
- Connection cable (insulation type): 1set
- RS-485 communication cable: 1set
- AC 220V input connector (3 pins and 4 pins): 1set
- AC 220V output connector (3 pins and 4 pins): 1set
- PC Software CD (monitoring program)
- Experimental manual: 1ea

OPTIONS

- Hybrid and smart grid experimental modules (CPE-EN4500)
- Experimental table set

CP-S120

Standalone Solar Energy Training System



FEATURES

- Standalone inverter and built-in batteries to perform standalone solar power generation
- Hands-on practices on real solar energy system using solar cells, batteries, inverter and charging controller
- Can perform indoor experiments using the artificial solar module
- Easy wiring connection with surface-mounted circuits
- Supports an interlocking control practice coupled with a street light

EXPERIMENTAL CONTENTS

- Stand-alone solar power generation system
- Principles of solar PV cells
- Types and characteristic of Solar PV cells
- Operation of inverter, battery and charging controller
- How to build a solar PV power generation system

CP-S120C

Wind & Solar Hybrid Energy Training System



FEATURES

- Standalone inverter and built-in batteries to perform standalone solar power generation
- Supports monitoring of power generation and statistical analysis through the integrated renewable energy system software

EXPERIMENTAL CONTENTS

1. Wind & solar hybrid power generation system
2. Principle of solar PV cells
3. Types and characteristic of Solar PV cells
4. Inverter, batteries and charging controller
5. Principles of wind power generation

SPECIFICATIONS

Model	CP-S120	CP-S120C
Solar Power Module	DC voltmeter (199.9V): 1 ea DC ampere meter (19.9A): 1 ea Solar input terminal: 1ea Solar output terminal: 1ea Shunt (50mV 20A) : 1ea Circuit breaker : 1ea	—
Solar & Wind Power Module	—	DC voltmeter (500V): 1ea DC ampere meter (5A): 1ea Solar & wind input terminal: 1ea Solar & wind output terminal: 1ea Solar & wind indicator : 2ea Shunt (50mV 200A) : 1ea Circuit breaker : 1ea
Solar Charge Controller Module	Solar charge controller : 1ea Circuit breaker : 1ea Fixed terminal block : 3ea Lighting control switch : 1ea	Solar charge controller : 1ea Circuit breaker : 1ea Fixed terminal block : 3ea
Stand Alone Inverter Module	AC voltmeter (400V): 1ea AC ampere meter (5A): 1ea AC power meter (1100W): 1ea Frequency meter (60Hz): 1ea Inverter (600W 50Hz): 1ea Fixed terminal block: 2ea	AC voltmeter (500V): 1ea AC ampere meter (5A): 1ea AC power meter (1200W): 1ea Frequency meter (60Hz): 1ea Inverter (1200W 50Hz): 1ea Fixed terminal block: 3ea
AC Outlet Module	Circuit breaker : 2ea Fixed terminal block: 3ea (Streetlight connection terminal: 1ea) Grounding type power outlet: 2ea	Digital timer : 1ea Circuit breaker : 2ea Grounding type power outlet: 2ea
Battery Bank Module	Battery (12V 100A) : 2ea Main system power switch : 1ea Circuit breaker (80A) : 1ea Main system power lamp : 1ea DC voltmeter (19.99V) : 1ea DC ampere meter (199.9A) : 1ea	Battery (12V 100A): 2ea Main system power switch: 1ea Circuit breaker (200A): 1ea Main system power lamp: 1ea DC voltmeter (500V): 1ea DC ampere meter (200A): 1ea RS-485 serial port: 2ea RS-232C serial port: 1ea
System Enclosure (hard case)	Dimension : 600(W)×750(D)×1600(H) mm	
Artificial Solar Module	Light stand	Halogen(300W) : 4ea Switch: Lamp ON/OFF switch Type: Aluminum profile
	Solar module stand	PV module : 120W x 1ea Angle adjustment : 90° Type: Aluminum profile
Installation Kit	—	Type: SUS or Aluminum profile External wiring or piping connection

Training System

CP-GTS1.2K Grid-tied Solar Energy Training System



FEATURES

- Hands-on practices on the on-grid power line connection through a grid-tied inverter
- Equipped with built-in Power Quality Analyzer
- Easy wiring connection with surface-mounted circuits
- Supports monitoring of power generation and statistical analysis through the integrated renewable energy system software

EXPERIMENTAL CONTENTS

- Composition of solar power generation system
- Principles of solar PV modules
- Using a Power Quality Analyzer for solar power generation system
- Grid-tied inverter module
- Wiring connection for V meter and A meter
- Directional control of the sunlight
- Characteristics of 1.2kW solar power generation system
- PC monitoring and data analysis

CP-GTS1.2KC 1.2kW Grid-tied Solar Energy Training System



FEATURES

- Hands-on practices on the on-grid power line connection through a 1.2kW grid-tied inverter
- Performing indoor experiments using a built-in power supply and an artificial luminous source
- Easy wiring connection with surface-mounted circuits
- Supports monitoring of power generation and statistical analysis through the integrated renewable energy system software

EXPERIMENTAL CONTENTS

- Composition of solar power generation system
- Principles of solar PV modules
- How to use solar and wind power generation modules
- Grid-tied inverter module
- Wiring connection for V meter and A meter
- Directional control of the sunlight.
- Characteristics of 1.2kW solar power generation system
- PC monitoring and data analysis

CP-GTS3KC 3kW Grid-tied Solar Energy Training Systems



FEATURES

- Hands-on practices on the on-grid power line connection through a 3kW grid-tied inverter
- Easy wiring connection with surface-mounted circuits
- Supports monitoring of power generation and statistical analysis through the integrated renewable energy system software

EXPERIMENTAL CONTENTS

- Composition of solar power generation system
- Principle of solar PV modules
- How to use solar and wind power generation modules
- Grid-tied inverter module
- Wiring connection for V meter and A meter
- Directional control of the sunlight
- Characteristics of 3kW solar power generation system
- PC monitoring and data analysis

CP-GT2000 Solar Tracker Training System



FEATURES

- Hands-on practices on the on-grid power line connection through a 3kW grid-tied inverter
- GPS-based solar tracking solar cells suitable for the generation quantity practices in various climatic conditions
- Easy wiring connection with surface-mounted circuits
- Supports monitoring of power generation and statistical analysis through the integrated renewable energy system software

EXPERIMENTAL CONTENTS

- Composition of solar power generation system
- Principle of solar PV modules
- How to use solar and wind power generation modules
- Grid-tied inverter module
- Wiring connection for V meter and A meter
- Directional control of the sunlight
- Characteristics of 3kW solar power generation system
- PC monitoring and data analysis

SPECIFICATIONS

Model	CP-GTS1.2K	CP-GTS1.2KC	CP-GTS3KC	CP-GT2000
Grid connection	1.2kW	1.2kW	3kW	Tracking type 3kW
Solar Power Module	DC voltmeter (500V) : 2ea Solar input terminal : 2ea Solar output terminal : 1ea Shunt (50mV 20A) : 1ea Circuit breaker : 1ea	—	DC voltmeter (500V) : 2ea Solar output terminal : 2ea Solar input terminal : 1ea Shunt (50mV 20A) : 1ea Circuit breaker : 1ea LED Indicator : 1ea	DC voltmeter (500V) : 2ea Solar output terminal : 2ea Solar input terminal : 1ea Shunt (50mV 20A) : 1ea Circuit breaker : 1ea LED Indicator : 1ea
Solar & Wind Power Module	—	DC Power Supply (100V 30A) : 1ea Voltage VR : 1ea Current VR : 1ea DC voltmeter (500V) : 2ea Solar output terminal : 2ea Shunt (50mV 20A) : 1ea Circuit breaker : 1ea LED indicator: 5ea	—	—
Grid-tied Inverter Module	AC voltmeter (500V) : 1ea AC ampere meter (5A) : 1ea Frequency meter (60Hz) : 1ea AC input terminal: 1ea AC output terminal : 2ea Circuit breaker : 2ea Grid-tied inverter (1.2kW) : 1ea Inverter indicator : 4ea Export watt-hour meter : 1ea Import watt-hour meter: 1ea	AC voltmeter (500V) : 1ea AC ampere meter (5A) : 1ea Frequency meter (60Hz) : 1ea Solar & wind output terminal : 1ea Inverter output terminal : 1ea Circuit breaker : 2ea Grid-tied inverter (1.2kW) : 1ea Inverter indicator : 4ea	AC voltmeter (500V): 1ea AC ampere meter (5A): 1ea Frequency meter (60Hz): 1ea Solar output terminal : 1ea Inverter output terminal : 1ea Circuit breaker : 2ea Grid-tied inverter (3kW) : 1ea	AC voltmeter (500V) : 1ea AC ampere meter (5A) : 1ea Frequency meter (60Hz): 1ea Solar output terminal : 1ea Inverter output terminal : 1ea Circuit breaker : 2ea Grid-tied inverter (3kW) : 1ea
AC Outlet Module	Circuit breaker : 2ea Fixed terminal: 2ea Grounded power outlet : 2ea PQA output terminal : 4ea Export watt-hour meter: 1ea	—	—	—
Export & Import Meter Module	—	—	AC input terminal : 1ea AC output terminal : 1ea Circuit breaker : 1ea Export watt-hour meter : 1ea Import watt-hour meter: 1ea	AC input terminal : 1ea AC output terminal : 1ea Circuit breaker : 1ea Export watt-hour meter : 1ea Import watt-hour meter: 1ea

Training System

SPECIFICATIONS

Model	CP-GTS1.2K	CP-GTS1.2KC	CP-GTS3KC	CP-GT2000
Grid connection power	1.2kW	1.2kW	3kW	Tracking type 3kW
Power Quality Analyzer Module	Power quality analyzer: 1ea Current input: 6ea Voltage input: 4ea RS-485 serial port: 1ea RS-232C serial port: 1ea Power switch: 1ea	—	—	—
Display & AC Outlet Module	AC voltmeter (500V) : 1ea AC ampere meter (5A) : 1ea AC power meter (1200W) : 1ea Frequency meter (60Hz) : 1ea Grounded power outlet : 2ea Circuit breaker : 2ea Digital timer : 1ea	—	AC voltmeter (500V) : 1ea AC ampere meter (5A) : 1ea AC power meter (3000W) : 1ea Frequency meter (60Hz) : 1ea Grounded power outlet : 2ea Circuit breaker : 2ea Digital timer : 1ea	AC voltmeter (500V) : 1ea AC ampere meter (5A) : 1ea AC power meter (3000W) : 1ea Frequency meter (60Hz) : 1ea Grounded power outlet : 2ea Circuit breaker : 2ea Digital timer : 1ea
Main System Power Module	Power switch : 1ea Circuit breaker : 1ea Indicator lamp : 1ea	Power switch : 1ea Circuit breaker : 1ea Indicator lamp : 1ea	Circuit breaker : 1ea Indicator lamp : 1ea RS-485 serial port: 2ea RS-232C serial port: 1ea	Circuit breaker : 1ea Indicator lamp : 1ea RS-485 serial port: 2ea RS-232C serial port: 1ea
System Enclosure	Dimension : 600(W)×750(D)×1600(H)mm			
External Installation Kit	Type : SUS or aluminum profile External piping and wiring connections			
Tracking Type Solar Module	—	—	—	Angle : Up/down 60° Method : GPS Turning radius : 6,400cm Height : 3,600cm
Software	Integrated Renewable Energy Generation Software			

SOFTWARE

Integrated Renewable Energy Generation Software

- Real-time display of the power generation status
- Real-time display of the surrounding environment status
- Real-time display in graphs
- Creation of graphs and reports
- Notice & announcement function



OPTIONS

- Power Generation Monitoring System (indoor type / outdoor type)

Indoor system



Outdoor system



Wind generator



CPE-ST20P

Solar Tracking Control Trainer



FEATURES

- Miniaturized solar tracking system with a PLC controller
- Five solar simulation lamps installed on the support fixture
- 2-axis actuator control along with the sensors for solar tracking practices
- Real-time control according to the intensity of radiation and positional changes of a solar source
- Position control software designed for PC interface
- Lockable casters for convenient relocation of the training system

INTRODUCTION

The CPE-ST20P is a hands-on solar tracking control trainer designed to help estimate the generation quantity in relation to solar altitude. The CPE-ST20P is the miniaturized solar tracking system with a programmable logic controller. The CPE-ST20P can control the motor and sensors through PC interface and also rotate in any directions (top/bottom/left/right) based on the 2-axis actuators.

EXPERIMENTAL CONTENTS

- Principles of solar tracking system
- PLC control through the D-SUB cable connection
- Solar cell tracking control

SPECIFICATIONS

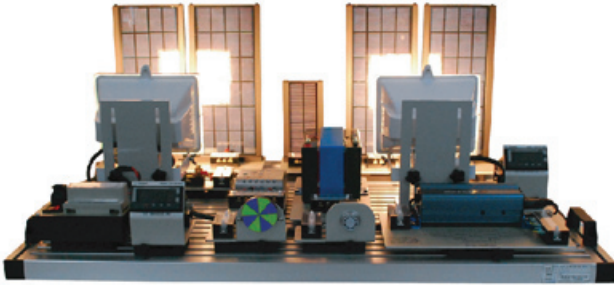
Solar tracking controller	CPE-ST20P	<ul style="list-style-type: none"> • Programmable logic controller (GLOFA GM4) *Note: Other types of PLC can be customized • Power switch (halogen lamp ON/OFF) • Solar cell voltmeter • Analog input (CDS input, 8-channel) • ISP input • Limit input
Terminal box unit		<ul style="list-style-type: none"> • DC output (lamp and motor) • CDS sensor output • Motor control (horizontal vs. vertical) • Limit control (horizontal vs. vertical) • DC 24V input
Solar cell unit		<ul style="list-style-type: none"> • 10W solar cells (5W x 2ea) • 8-channel CDS input • DC geared motor
Support fixture		<ul style="list-style-type: none"> • Type: Arc type • Rotation: Vertical / horizontal • Equipped with simulation lamps (5ea)

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- User's guide manual : 1ea

CPE-S25

Photovoltaic System Assembly & Disassembly Trainer



FEATURES

- Miniaturized solar PV system using the artificial solar source
- Capable of performing off-grid and grid-tied practices
- Supports assembly and disassembly practices by the modular system structure

EXPERIMENTAL CONTENTS

- Basic principles of solar power generation
- Electrical characteristic of solar PV modules
- I-V, P-V characteristics by distance of solar PV modules
- I-V characteristics and load practices according to series/parallel connection of solar PV modules
- Battery charge-discharge practices through the charging controller
- Power conversion through the off-grid inverter
- Power conversion through the grid-tied inverter

PRODUCT COMPOSITION

- Base panel (M00)
- Solar PV cell module [A-type] (M01) × 2
- Solar PV cell module [B-type] (M02) × 4
- Halogen light module (M03) × 2
- Diode module (M04-A, M04-B)
- Charging controller module (M05)
- Battery module (M06)
- AC/DC inverter module (M07)
- AC lamp module (M08)
- AC motor module (M09)
- AC buzzer module (M10)
- Digital meter module (M11)
- Grid connected inverter module (M12)
- Energy meter module (M13)
- Fuse module (M14)
- Variable resistor module (M15)
- Shunt module (50mV 1A) (M16)
- Shunt module (50mV 5A) (M17)
- DC voltmeter module (M18)
- DC ampere meter module (M19)
- AC voltmeter module (M20)
- AC ampere meter module (M21)
- AC input terminal block Module (M22)

SPECIFICATIONS

Solar PV Cell Module [A-type] (M01)

- Size of cell : 60(W) x 150(H)mm
- Maximum power (Pm) : 1W
- Maximum power voltage (Vmp) : 12V
- Maximum power current (Imp) : 85mA



Solar PV Cell Module [B-type] (M02)

- Cell size : 120(W) x 300(H)mm
- Maximum power (Pm) : 4W
- Maximum power voltage (Vmp) : 6V
- Maximum power current (Imp) : 660mA



Halogen Light Module (M03)

- Output: 300W
- Power source : 220V 50/60Hz
- Halogen linear lamp
- Heat-resistant glass
- Angle control function



Diode Module : DIODE-A, B (M04)

- Size : 115(W) x 75(H)mm
- Schottky barrier diode : 8ea
- Maximum voltage (Vmp) : 40V
- Maximum inverse Voltage (Vmp) : 40V
- Maximum current (Io) : 5A



Charging Controller Module (M05)

- Size : 90(W) x 185(H)mm
- Normal voltage : 12V
- Boost voltage : 13.5V (25°C), two hours
- Equalization voltage : 14.8V (25°C), two hours
- Float voltage : 13.7V (25°C)
- Low voltage disconnection (LVD):
 - 11.4 ~ 11.9V (controlled by the charging status)
 - 11.0V (controlled by voltage)
- Load reconnection voltage : 12.8V
- Temperature compensation : -4mV /cell*k
- Maximum input current (solar panel) : 5A / 8A / 10A / 15A / 20A
- Maximum load current (load) : 5A / 8A / 10A / 15A / 20A



Battery Module (M06)

- Size : 380(W) x 120(D) x 309(H)mm
- Battery (12V, 12AH) : 1ea



AC/DC Inverter Module (M07)

- Size : 270(W) x 160(H)mm
- Output (AC) : 250W
- Frequency : 60Hz
- Protection function : Overheat, short circuit and overload protection
- Alert function : Warning sound and red indicator lamp in case of low battery (or overheat)



SPECIFICATIONS

AC Lamp Module (M08)

- Size : 123(W) x 69(H)mm
- AC Lamp (AC 220V 1W): 1ea



AC Motor Module (M09)

- Size : 115(W) x 69(H)mm
- AC 220V motor with 5.3W rotary disk : 1ea
- AC Motor Phase Controller : 1ea



AC Buzzer Module (M10)

- Size : 115(W) x 69(H)mm
- Buzzer (AC 220V 13.5W) : 1ea



Grid Connected Inverter Module (M12)

- DC input voltage : 12V and 24V (10.8 ~ 30 VDC)
- Power output : 250W (* peak power: 300W)
- Efficiency : 92%
- Power factor : 0.99
- Output waveform : Sine wave
- Frequency : 46 ~ 65Hz
- Output voltage : 190 ~ 260 VAC
- MPPT : Built-in MPPT function
- Protection : Overcurrent and over-voltage circuit protection



Energy Meter Module (M13)

- Size : 130(W) x 130(D) x 220(H)mm
- Single-phase 2-wire type (1P2W)
- Current : 30(10)A
- Voltage : 220V



Fuse Module (M14)

- Fuse : 4ea
- Rating : 250V 5A



Variable Resistor Module (M15)

- Resistance range : 0 ~ 50Ω
- Maximum consumption power : 50W



Shunt Module (M16)

- Rating : 50mV 1A



Shunt Module (M17)

- Rating : 50mV 5A



DC Voltmeter Module (M18)

- Maximum measuring input : DC 500V
- Maximum display range : -1999 ~ 9999
- Hi/Low scale function



DC Ampere Meter Module (M19)

- Maximum measuring input : DC 5A
- Maximum display range : -1999 ~ 9999
- Hi/Low scale function



AC Voltmeter Module (M20)

- Maximum measuring input : AC 5A
- Maximum display range : -1999 ~ 9999
- Hi/Low scale function



AC Ampere Meter Module (M21)

- Maximum measuring input : AC 500V
- Maximum display range : -1999 ~ 9999
- Hi/Low scale function



AC Input Terminal Block Module (M22)

- AC 220V 5A
- AC output_L : 6ea
- AC output_N : 6ea

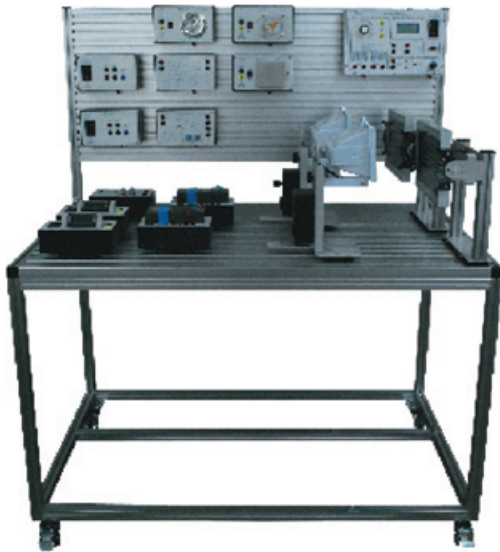


STANDARD ACCESSORIES

- Power cord : 1ea
- Y-connection cable : 1set
- User's guide manual : 1ea
- Experimental manual : 1ea

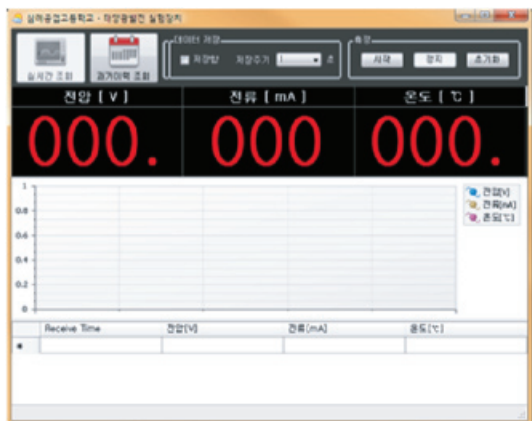
CP-S30

Energy Conversion Trainer



FEATURES

- Miniaturized solar PV system designed for indoor practices using the artificial solar source
- Capable of converting data values of voltage, current and temperature into Excel data and showing them in graphs
- Three types of breadboard module for designing the charging controller, boost converter and inverter
- PC software program for monitoring and analyzing solar PV generation



EXPERIMENTAL CONTENTS

- Principles of solar PV power generation
- Measurement of voltage/current/temperature using software
- Ohm's Law and simulation of photoelectric effects
- Series and parallel connections of Solar PV Cell Modules
- Shading practice using the 5W Solar PV Cell Modules
- Characteristics of battery charge and discharge with Battery Module
- Characteristics of inverter with load or no-load
- Circuit design practices using a breadboard

PRODUCT COMPOSITION

- 5W Solar PV Cell (2ea)
- 300W Light Source (2ea)
- Charger Module (1ea)
- Inverter Module (1ea)
- AC Lamp Module (1ea)
- Motor Module (1ea)
- Variable Resistor Module (1ea)
- Buzzer Module (1ea)
- Data Collection Module (1ea)
- SMPS Module (1ea)
- Battery Module (1ea)
- AC Voltmeter Module (1ea)
- AC Ammeter Module (1ea)
- Breadboard A: Charging controller (1ea)
- Breadboard B: Boost converter (1ea)
- Breadboard C: Inverter (1ea)

EXPERIMENTAL MODULES

5W Solar PV Cell Module	300W Light Source Module	Charger Module	Inverter Module
			
AC Lamp Module	Motor Module	Variable Resistor Module	Buzzer Module
			
Data Collection Module	SMPS Module	Battery Module	AC Voltmeter Module
			
AC Ammeter Module	Breadboard - A type	Breadboard - B type	Breadboard - C type
	Charging controller (Option) 	Boost converter (Option) 	Inverter (Option) 

STANDARD ACCESSORIES

- Power cord : 1ea
- 4mm connection cable : 1set
- PC software program CD : 1ea
- User's guide manual: 1ea
- Experimental manual: 1ea

CP-S22P

Portable Solar Energy Trainer



FEATURES

- Selection of control mode: battery charge control or inverter control
- Carrying case type structure designed for convenient storage and mobile measurement
- Can separate the plate of Solar Cell Module and change the plate's position and direction
- Built-in digital meters for AC/DC voltage and AC/DC current

EXPERIMENTAL CONTENTS

- Principles of solar PV power generation
- Series and parallel connection of Solar PV Cell Module
- Power conversion and photo-electric effects
- Measurement of voltage and current (Solar Cell Module and Inverter)
- Battery charge and discharge practices
- Characteristics of power generation by AC load and DC load
- Commercial use of solar energy system

SPECIFICATIONS

Solar Cell	20W / 18V
Battery	12V-7Ah
Inverter	250W
Charge Controller	DC 12V
Digital Meter	AC voltmeter: 0 ~ 500V AC ammeter: 0 ~ 5.00A DC voltmeter: 0 ~ 199.9V DC ammeter: 0 ~ 19.99A
DC Load	DC 12V lamp
AC Load	AC 220V lamp (2ea)
Circuit Breaker Unit	15A
Dimension	750(W) × 400(D) × 300(H)mm
Weight	11Kg

STANDARD ACCESSORIES

- Connection cable : 1set
- User's guide manual : 1ea

OPTIONS

- 300W halogen lamp : 1ea

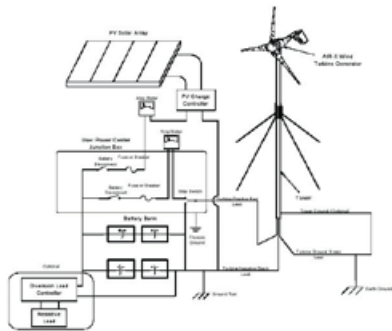
CP-SOLAR100 / 200 / 400

Solar Street Light Training System



FEATURES

- Consists of Solar Cell Panel, LED light fixture, Solar Charge Controller, Battery and Support Pole Set
- Simple button operation and digital display of Solar Charge Controller
- Auto detection of system voltage (12VDC / 24VDC)
- Various types of circuit protection such as overload protection and short circuit protection



EXPERIMENTAL CONTENTS

- Introduction to renewable energy generation system
- Principles and characteristics of solar street light system
- Charging Controller and Solar Cell Module
- Battery charge and LED light fixture
- Installation and wiring practices

SPECIFICATIONS

Category	CP-SOLAR100	CP-SOLAR200	CP-SOLAR400
Solar Cell Panel	100 W	200 Watt	400 Watt
Battery	DC 12V 18 Ah battery x 5ea	DC 12V 18 Ah battery x 10ea	DC 12V 18 Ah battery x 20ea
Solar Charge Controller		DC 12V / 24V	
LED Light Fixture		40W LED / DC 12V	
Support Pole Set		Steel (hot-dip coating type)	

STANDARD ACCESSORIES

- Connection cable : 1set
- Bolt and nut : 1set
- User's guide manual : 1ea

CP-WS300

Wind Energy Training System (Hybrid Type)



FEATURES

- Hands-on practice on the 400W wind generator for minute air current (responding to 3m/s wind speed)
- Electrical power control method that supports hybrid experiments using wind power and solar power
- Equipped with various types of sensor for measuring wind and solar power generation environments
- PC interface for real-time data analysis and management on wind and solar output data
- PC operation software for analyzing efficiencies of the hybrid power generation

EXPERIMENTAL CONTENTS

- Characteristics of wind power generation
- Interlocking experiments with solar cell panel
- Load devices of wind & solar energy training system
- How to measure IV characteristic curves from the solar cell module
- How to measure photocurrent according to the angle and distance
- Measurement and data management through the PC software

SPECIFICATIONS

Wind generator	300W
Output	7.5A @ 19 knots (12V system)
Turbine	Diameter: 910mm
Solar cell panel	Nominal voltage (module) : 12V Rated power (module) : 50W Open circuit voltage : 21V Short circuit current : 3.87A Voltage at rated power : 16.8V
Weather sensor	Type of sensor: NTC Thermistor Anemometer : Rotating cup type Wind speed: 3m/s ~ 35m/s Temperature : -20°C + 40°C Size: 110mm × 165mm
Power monitor & PC interface	Light level : LDR 0 lux ~ 30000 lux Voltage controller WG ammeter : 1 ~ 10A PV ammeter : 0 ~ 5A Load current : 0 ~ 10A Battery voltage : 0 ~ 20V Protection fuse Terminal block PC connection: D-connector (25-pin)
Load panel	DC input : 4Φ (4ea) Resistor : 1ea

STANDARD ACCESSORIES

- Power cord: 1ea
- Connection cable: 1set
- PC interface module : 1ea
- Halogen lamp : 4ea
- Wind generation fan : 1ea
- PC software CD: 1ea
- User's guide manual & experimental manual : 1set

CP-WS350

Wind Energy Training System



FEATURES

- See-thru inner structure equipped with a generator, a rotor and a motor
- Hands-on wind power training system designed to help understand the course of electrical production
- Wind speed sensor installed in front of the rotor for measuring the RPM and wind speed
- Real-time data monitoring and control

EXPERIMENTAL CONTENTS

- Principles of wind power generation system
- V-characteristics according to wind power generator's speed
- How to measure the rectified DC voltage
- Charging and discharging batteries
- Voltage and current of DC load
- Voltage and current of AC load
- Manual break system for the wind power generator

SPECIFICATIONS

AC Power Source Module	<ul style="list-style-type: none"> • ELCB (AC220V 60Hz, 15A/15mA) • AC power inlet (fuse built-in, 5A) • AC power indicator lamp • AC output connector (4-pin) 	Inverter	<ul style="list-style-type: none"> • 3-phase inverter <ol style="list-style-type: none"> 1) Motor : 1HP (0.75kW) 2) Rated output <ul style="list-style-type: none"> - Rated capacity: 1.9kVA - Rated current: 5A - Rated frequency: 0 ~ 400Hz - Output voltage: 3-phase 220V • Rated input <ol style="list-style-type: none"> 1) Voltage: 3-phase 220V (±10%) 2) Frequency: 50 ~ 60Hz (±5%) • Cooling : forcibly cooling type • Control <ol style="list-style-type: none"> 1) Type of control: V/F and sensorless 2) Frequency setting resolution • Digital: 0.01Hz (below 100Hz) • Analog: 0.06Hz / 60Hz • Frequency <ol style="list-style-type: none"> 1) Digital : 0.01 % of a maximum frequency 2) Analog : 0.01 % of a maximum frequency • V/F ratio: linear and user V/F • Overload withstand: 150% (1 minute) • Torque boost: manual (0 ~ 15% setting) and automatic
Wind Generator (400W)	<ul style="list-style-type: none"> • Rotor : Permanent magnet type • Stator : Coreless type • Rectified DC voltage : 24V • Output voltage : 3-phase AC • Output power : 400W • Rate speed : 450 RPM • Diameter : 245mm • Length : 61mm • Weight : 8kg 		<ul style="list-style-type: none"> • 3-phase induction motor <ol style="list-style-type: none"> 1) Power : 3-phase AC 220V 2) Type : 4 poles, Y-Δ Starting 3) Sensor (rotational detection) : 2ea
Wind Controller	<ul style="list-style-type: none"> • Operation switch • Emergency switch • Control : 0~100% 		
Multimeter	<ul style="list-style-type: none"> • Voltmeter • Ampere meter • Wind speed meter • RPM meter 		
Wind Power Output & Communication	<ul style="list-style-type: none"> • 4mm insulated output terminal • RS-485 communication • RS-232C communication • AC output connector (4-pin) • Toggle switch 		

STANDARD ACCESSORIES

- Power cord: 1ea
- Connection cable (3/4 pins): 1ea
- Wind power generation examples CD: 1ea
- User's guide manual: 1ea

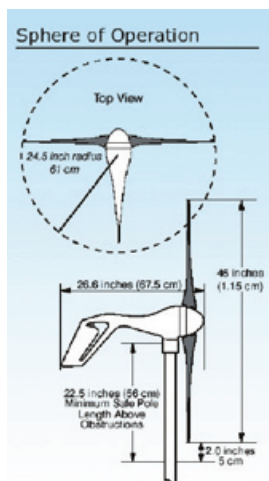
CP-WIN400 / CP-WIN900 / CP-WIN1000

Wind Turbine Training System



FEATURES

- Basic understanding of renewable energy system
- Principles of wind power generation system
- Characteristics of wind turbine generators
- How to control wind turbine generators



INTRODUCTION

Wind is considered the one of important alternative energy sources. The wind turbine generator also can be used as the energy source of hydrogen power generation. We provide three types of wind turbine training system according to the size of rotor and power capacity.

SPECIFICATIONS

Category	CP-WIN400	CP-WIN900	CP-WIN1000
Rotor size	1.15 m	2.1 m	2.7m
Weight	5.85Kg	22.56Kg	39.46Kg
Start-up wind speed	3.85m/s	3.4m/s	3.1m/s
Voltage	12 / 24 / 48VDC	12 / 24 / 48VDC	12 / 24 / 48VDC
Rated power	400 watts (12.5m/s)	900 watts (12.5m/s)	1000 watts (12.5m/s)
Overspeed protection	Electronic torque control	Side-furling	Side-furling
Watt hour / month	Max. 38 Kwh	Max. 100 Kwh	Max. 158 Kwh

CP-392E

Professional Fuel Cell Training System



INTRODUCTION

The CP-392E Professional Fuel Cell Training System is equipped with a 7W electrolyzer and 2.5W fuel cells in the dual structure. The Professional Fuel Cell Training System can measure the characteristics and generation quantity of fuel cells according to the hydrogen generation. It helps the user understand the power generation characteristics of parallel and serial connections and also learn energy conversion through the electrolysis practices in connection to solar energy generation.

EXPERIMENTAL CONTENTS

- Characteristic curves of the solar PV module
- Characteristic curves of the electrolyzer
- Faraday's Law
- Faraday efficiency and energy efficiency using the electrolyzer
- Characteristic curves of fuel cells in series / parallel connection
- Faraday efficiency and energy Efficiency of the fuel cell
- Faraday's 1st Law using fuel cell

FEATURES

- Capable of hybrid combination practices using a solar cell and a fuel cell
- Transparent acrylic PEM and unit fuel cells enhancing the training effectiveness
- Dual fuel cell structure enabling power generation practices related to power connection
- Easy acquisition of generating efficiency data through the digital voltmeter and ammeter

SPECIFICATIONS

Solar Cell Module	<ul style="list-style-type: none"> • Power output : 1.6W • Max. voltage : 2.0 VDC • Max. current : 1.2A
Electrolyzer	<ul style="list-style-type: none"> • Storage volume : 65 ml (hydrogen) / 65 ml (oxygen) • Hydrogen production rate : 28 ml/min (max.)
Fuel Cells	<ul style="list-style-type: none"> • Open circuit voltage (in series) : 1.9VDC • Maximum current (in parallel): 4A • Maximum power (in parallel): 2.5W
Load	<ul style="list-style-type: none"> • Resistance : 0.3 Ω / 0.5 Ω / 1 Ω / 3 Ω / 5 Ω / 10 Ω / 20 Ω / 50 Ω / 100 Ω / 500 Ω • Motor <ul style="list-style-type: none"> - Operating voltage: 0.2 ~ 3V - Current: 10 ~ 15mA • Lamp <ul style="list-style-type: none"> - Operating voltage: 1.5V - Current: 80mA
Digital Meter	<ul style="list-style-type: none"> • Voltmeter : 0 ~ 2V, 0 ~ 20V • Ammeter : 0 ~ 2A, 0 ~ 20A

STANDARD ACCESSORIES

- Power cord: 1ea
- Power adapter: 1ea
- User's guide CD : 1ea
- User's guide manual & experimental manual: 1set

OPTIONS

- 300W standing lamp : 1ea
- Distilled water (800ml) : 1ea

CP-HD500

Hydrogen Fuel Cell Generation System



FEATURES

- Direct hydrogen supply through 760 NI hydrogen storage tank and solenoid valve
- Small-size hydrogen fuel cell stacks with rated output of 40W
- PC interface for data analysis through RS232C
- PC operation software for analyzing efficiencies and power generation status of hydrogen fuel cells
- Power conversion experiments using DC/DC Converter and Inverter

EXPERIMENTAL CONTENTS

- Introduction to the Hydrogen Fuel Cell Generation System
- Characteristics of hydrogen generation
- Characteristics of DC load
- Characteristics of AC load

SPECIFICATIONS

Fuel cell unit	<ul style="list-style-type: none"> • Rated output : 40W • Maximum output : 50W • Rated voltage : 5.0 VDC • Open circuit voltage : 9.0VDC • Data interface : RS-232 • Single solenoid valve • Electronic flow meter • Fan • Cable set
Hydrogen storage tank	<ul style="list-style-type: none"> • Metal hydride canister with quick coupler • H₂ capacity: 760 NI (max.)
Flow meter	<ul style="list-style-type: none"> • Fast response & high accuracy • Pressure: 400 bar (max.)
Pressure regulator	<ul style="list-style-type: none"> • Dual stage pressure reducer • Inlet : Quick coupler to connect metal hydride canisters • Outlet : 1/8" compression fitting
DC load panel	<ul style="list-style-type: none"> • Lamp / Buzzer / Motor / Main NFB (No Fuse Breaker)
Inverter system panel	<ul style="list-style-type: none"> • DC power Input • AC power output • Inverter ON/OFF switch
AC 200V load panel	<ul style="list-style-type: none"> • Lamp / single-phase 6W motor / AC 220V load outlet
Battery	<ul style="list-style-type: none"> • Capacity: 12V-100Ah
DC/DC voltage converter	<ul style="list-style-type: none"> • Data interface: RS232 • Input voltage: 2 ~ 10 VDC • Output voltage: 12 VDC • Input current: 10 A (max.)
Inverter	<ul style="list-style-type: none"> • Output power <ul style="list-style-type: none"> - Maximum: 1000W - Continuous: 800W
System enclosure	600(W) × 600(D) × 1600(H)mm Aluminum case with heat strengthened glass

STANDARD ACCESSORIES

- Power cord: 1ea
- PC interface cable : 1ea
- PC operation software CD : 1ea

PRO-200F

Fuel Cell Analyzer



FEATURES

- Standalone operation without using the PC
- Precise measurement and control
- Fuel supply, air supply and cell temperature control
- Measurement of voltage values along with the change of current
- Remote control for reciprocal communications
- Capable of converting data files to Excel format

INTRODUCTION

The PRO-200F Fuel Cell Analyzer is capable of measuring basic output values of the fuel cells and stacks as well as the efficiency of power generation. The PRO-200F does not require a computer software and can directly show output values, thereby saving space and time. Also, it can be connected to a computer through the PC interface, and you can easily convert data files to the spreadsheet formats on the PC. The Fuel Cell Analyzer will organize data with great accuracy by the expression of output values in graphs and numerical values.

SPECIFICATIONS

Power source	AC 110/220V (free voltage)
Temperature sensor	Thermocouple (K-type) 3 channels (Stack, environment and extra temperature)
Heater	Room temperature: up to 99°C Heater: 300W
Load	5V 10A, 1V 15A, 0.1V 20A
Air supply	0.1 ~ 0.7 l/min
Fuel supply	0.2 ~ 4.0 ml/min
Interface	RS232C (SUB 9-PIN)
Dimension	250(W) × 300(D) × 132.5(H) mm
Weight	5kg

STANDARD ACCESSORIES

- Power cord: 1ea
- Probe (for load & V-sensor) : 1ea
- Thermocouple : 3ea
- Heater : 2ea
- User's guide manual : 1ea

CPE-SM3010

Renewable Energy Data Analyzer



FEATURES

- User-friendly touch screen and durable carrying case
- Wireless operation enabling measurement of in a distance up to 300 meter
- Easy data transfer through a RS485 communication port and I/O terminals
- Efficient data management and data storage by classifying days, months and years
- Supports analysis of the measured data by the interlocking capability with spreadsheets



INTRODUCTION

The CPE-SM3010 New & Renewable Energy Analyzer is a simulation-based measuring equipment for determining an optimized site and environment of solar/wind power generation. The CPE-SM3010 New & Renewable Energy Analyzer can connect the PC, and you can do database management in graphs and spreadsheets on the PC for analysis of wind direction, wind speed, humidity and solar radiation. It is equipped with a touch screen as an user-friendly interface and a durable carrying case for outdoor measurement and maneuverability.

SPECIFICATIONS

Display screen	LCD	10.2" TFT wide screen	Outdoor temperature	Type	Precision RTD	
	Resolution	800 x 480		Range	-40 ~ 65 °C	
	Touch panel	Built-in analog controller (resistive / capacitive)		Accuracy	0.5 °C	
	Operating system	Windows XP embedded	Indoor humidity	Type	Capacitance	
	CPU	AMD Geode LX800		Range	10 ~ 90 %	
	RAM	512MB DDR		Accuracy	5% RH	
	VGA	AMD Geode LX800	Outdoor humidity	Type	Capacitance	
	HDD	8GB FLASH HDD		Range	0 ~ 100 %	
Size of screen	224 x 135 mm	Accuracy		3% RH		
DC voltage Input	Channel	4 channels (isolated)	Dew point	Type	-76 ~ 54 °C	
	Range	2 ranges (0 ~ +100V / 0 ~ +1000V)		Range	1 °C	
	Resolution	0.1V (100V range) 1V (1000V range)		Accuracy	1.5 °C	
	Isolation	1500Vac	Real-time data	Time	day / month / 24 hours	
	4mm insulated input terminal	Black color (4ea) and red color (4ea)		Accuracy	0.8 sec/mon	
DC clamp Input	Channel	4 channels (isolated)	Precipitation measurement	Range	Day : 0 ~ 9999 mm	
	Range	0V ~ +1V			Month : 0 ~ 19,999 mm	
	BNC input terminal	4ea			Year : 0 ~ 19,999 mm	
DC clamp	Size of conductor	23mm	Accuracy : 4%		UV rays measurement	Ultraviolet index
	Manual range selection	4A (100mV/A) , 40A (10mV/A), 200A (1mV/A)	Evaporation loss measurement	Range		Day : 0 ~ 999.9 mm
	Power source	1.5V SUM-3AA battery x 2ea				Month : 0 ~ 1,999.9 mm
	Power consumption	6mA				Year : 0 ~ 1,999.9 mm
AC voltage input & meter	Maximum input	AC 500V	External sensor installation kit	Type	Tripod	
	Maximum indication range	-1999 ~ 9999		Fixation	Lower part fixation	
	AC frequency measurement	0.1Hz ~ 9999Hz		Hard case	Aluminum	
	Communication interface	RS485	SOFTWARE	1. Solar PV generation energy analysis software		
	Voltage input terminal	4mm insulated terminal x 1set		- Measures and monitors the current status of power generation in real time		
AC current input & meter	Maximum input	AC 5A (capable of using an external clamp)		- Displays graph data (can save in the format of Microsoft Excel)		
	Maximum indication range	-1999 ~ 9999		- Displays a report (can save in the format of Microsoft Excel)		
	AC frequency measurement	0.1Hz ~ 9999Hz		- Real-time data saving		
	Communication interface	RS485	- Remote communication with a control system server			
Wind speed sensor	Type	Large-cup anemometer	- Setting function: DC clamp magnification, warning indication and measurement mode			
	Range	1 ~ 54 m/s (193 kph)	2. Weather environment analysis software			
	Accuracy	1 m/s (or 5%)	- Monitoring: wind direction / wind speed / temperature / humidity / precipitation / ultraviolet rays / irradiation			
Indoor temperature	Type	Precision RTD	- Reporting accumulated data : day / month / year			
	Range	0 ~ 60 °C	- Various types of format such as Excel and txt			
	Accuracy	0.5 °C	- Diagram and graph data			



LED

Contents

- 131 LED Drive Circuit Trainer | CPE-EO2700
- 134 Integrated LED Panel Trainer | CPE-EO2820
- 137 LED Signage Display Training System | CPE-EO2830
- 139 Panorama LED Bar Trainer | CPE-EO2840



CPE-EO2700

LED Drive Circuit Trainer



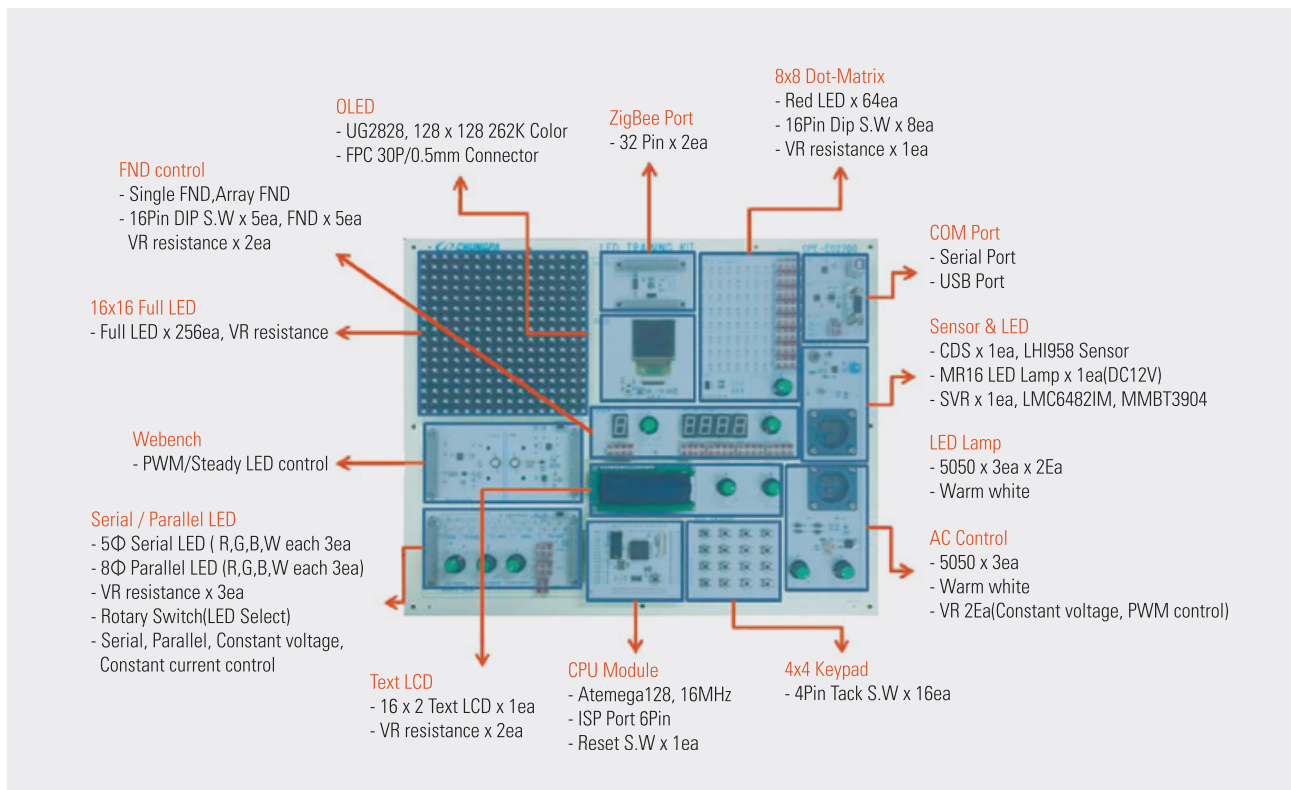
FEATURES

- Atmega128 microprocessor and PC monitoring software
- Carrying case type system structure
- RGB, FND and sensor control practices
- Communication by ZigBee, Bluetooth or TCP/IP
- Supports expandability through the expansion ports

EXPERIMENTAL CONTENTS

- Operational control of LED - RGB and FND
- Composition of series and parallel circuits with LED
- PWM control practices using MICOM
- Design of LED driver using WEBENCH simulation tools
- Various control practices - Dot Matrix, LCD, OLED and full color LED
- CdS and human detection sensor for LED lighting control

Function



Monitoring Software



- Shows scan speed input values : Single FND, array FND and dot matrix 8x8
- Shows character string in scroll entered by the user on the 16x16 Color dot matrix
- Shows ON/OFF status of MR16 LED pursuant to the value and status of human detection sensor
- Shows PWM duty ratio of MR16 LED pursuant to the value and status of CdS sensor
- START/STOP control for OLED display
- Shows key values entered by IR remote controller
- Shows character string entered by the user on the 16x2 Character LED

SPECIFICATIONS

Basic Experimental Modules			
CPU	<ul style="list-style-type: none"> • ATmega128-16AU, 16MHZ • ISP port 6P • 128K Bytes of in-system reprogrammable flash • 4K Bytes EEPROM 	8X8 dot matrix	<ul style="list-style-type: none"> • Red color LED : 64ea • 16-pin dip switch: 8ea • IC: 74HC138/sop • Transistor: MMBT3906 • Volume resistor
Communication port	<ul style="list-style-type: none"> • USB port (1ea) and UART port (1ea) • ISP 4-pin dip switch • ZigBee, Bluetooth and TCP/IP 	16X16 full LED	<ul style="list-style-type: none"> • Full LED: 256ea • 16-bit LED Driver: MBI5026 • Volume resistor
Basic LED experiments	<ul style="list-style-type: none"> • Base LED: 4ea (R.G.B.W) • Voltage LED: 4ea (R.G.B.W) • Current LED: 4ea (R.G.B.W.) • Serial LED: 5ea (Red) • Parallel LED: 5ea (Red) • TP point: 24ea • Selector switch: 3ea (color, voltage and current) • Dip switch: 3ea (parallel, serial, current) 	16X2 text LCD	<ul style="list-style-type: none"> • 16X2 text LCD: 1ea • Volume resistor: 2ea
		Sensor control LED lamp	<ul style="list-style-type: none"> • CDS:1ea (LHI958) • SVR: 1ea • LED Lamp : 5050 warm white LED : 3ea, DC 7.2V~18V
Constant current chip LED	<ul style="list-style-type: none"> • 2012 : red (1ea), green (1ea), blue (1ea) • 3216 : red (1ea), green (1ea), blue (1ea) • 3528 : red (1ea), green (1ea), blue (1ea) • Push Switch (4-pin): 1ea 	OLED	<ul style="list-style-type: none"> • UG2828 • 128 X 128 (color: 262K)
		3X4 key pad	<ul style="list-style-type: none"> • 4P tact switch : 12ea
WebBench Experimental Module	<ul style="list-style-type: none"> • White color LED: 2ea • Steady TP point: 7ea • PWM TP point: 8ea • Power ON/OFF switch: 1ea 	Communication expansion port	<ul style="list-style-type: none"> • 32P: 2ea • ZigBee module (option) • RS485 module (option) • Bluetooth module (option)
Module expansion port	<ul style="list-style-type: none"> • 32 pins : 2ea • Dot matrix, FND, IrDA volume (option) 		

CPE-EO2700

Expansion pack modules			
IrDA Module (Option)	<ul style="list-style-type: none"> • Infrared emitting diode: CL-1L5R • Receiver module: KSM603LM • Transistor: MMBT390 • LED (2012): Green color • Tact switch : 8ea • 32-pin connector : 2ea 	Breadboard Module	<ul style="list-style-type: none"> • 12 lines x 35 columns • 20-pin GND connector : 1ea
		Color detector (Option)	<ul style="list-style-type: none"> • TCS230 color sensor: 1ea • SVR : 3ea • LED (R,G,B): 1ea • 32-pin connector: 2ea
Dot matrix Module (Option)	<ul style="list-style-type: none"> • 8x8 dot matrix : 2ea • 8-channel source driver: UDN2981 (2ea) • IC: 74LCX138/SO (2ea) • 32-pin Connector : 2ea 	FND Module (Option)	<ul style="list-style-type: none"> • Single FND : 1ea • Array FND: 1ea • Volume resistance : 2ea • 32-pin connector: 2ea

STANDARD ACCESSORIES

- Power cord : 1ea
- USB cable : 1ea
- Serial cable : 1ea
- AVR-ISP : 1ea
- PC software program CD : 1ea
- User's guide & experimental manual: 1ea

CPE-EO2820

Integrated LED Panel Trainer



FEATURES

- Complete learning system to teach the configuration and operation of various LEDs such as halogen lamp, LED lamp (pin type and socket type) and panorama bar lamp
- Understanding the driving circuits based on the configuration and characteristics of LED modules
- Supports controlling the CPE-EO2820 with the use of smartphones
- Easy control practices and wire connection practices for effective experiments

EXPERIMENTAL CONTENTS

- Various types of LEDs
- Characteristics and principles of LEDs
- Industrial LEDs
- Lighting control by Smartphone
- Application of the LED display signage
- LED lighting system

SPECIFICATIONS

• Full Color display panel

- Color : 256 full colors
- Input voltage : AC 220V
- Size : 300 x 1500mm
- Weight : 12kg
- Language : English

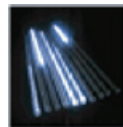
• LED power supply

- Input voltage : AC 110~220V
- Output voltage DC 12V 29A 350W
- Dimension: 115(W) x 277(D) x 495(H) mm

LED Lamp



Type of LED: LED chain light (2W/m)
Materials: Steel and LED
Operating voltage : 220V
Color : White



Type of LED lamp: 60 bulbs (panorama)
Color : White & transparent
Length: 1 meter
Diameter: 30mm
Power consumption: 10W



Input voltage: DC12V
Brightness : 28.9W
Color : Daylight (R.G.B)
Red / yellow/ blue / green / white color



Operating voltage: 12V
Power consumption : 7W
Color : R.G.B
Chip size : 0.5cm
Number of chip: 30ea



Operating voltage : 220V
Power consumption : 2W
Luminous color: Red / blue / yellow / green color
Size : 13mm

CPE-E02820

LED LIGHT BULB (PIN TYPE)



Operating voltage : DC 12V
Power consumption : 35mA
Bulb type : MR16
Average life time: 50,000 hours
Socket (base) : GU5.3



Operating voltage : DC12V
Power consumption : 3W
Average life time: 30,000 hours
Luminous color : Daylight color
Socket (base) : GU5.3



Operating voltage : DC12V
Power consumption : 50mA
Bulb type: MR16
Average life time: 50,000 hours
Luminous color: Daylight color (white),
yellow / red / blue / green color
Socket(Base) : GU5.3



Operating voltage : DC12V
Power consumption : 3W
Average life time: 50,000 hours
Luminous color: Daylight color, bulb color
blue / green color
Socket(Base) : GU5.3



Operating voltage : DC12V
Power consumption : 1.5W
Average life time: 40,000 hours
Luminous color: Daylight color (white),
bulb color



Operating voltage : 220V
Power consumption : 3W
Average life time: 50,000hours
Luminous color: Daylight color, bulb color



Operating voltage: DC12V
Power consumption: 3W
Average life time: 20,000 hours
Luminous color: daylight color (white),
bulb color
Socket(Base) : G4



Operating voltage: DC12V
Power consumption: 4W
Average life time: 30,000 hours
Luminous color: Bulb color
Socket (Base) : GU5.3



Operating voltage: DC12V
Power consumption : 3W
Average life time: 30,000 hours
Luminous color: Pure white
Socket(Base) : GU5.3



Operating voltage: DC12V
Power consumption : 4W
Average life time: 30,000 hours
Luminous color: Bulb color
Socket (Base) : GU5.3

LED LIGHT BULB (SOCKET TYPE)



Operating voltage : 220V
 Power consumption : 4.4W
 Average life time : 50,000 hours
 Luminous color : Daylight color
 Socket(Base) : E26



Operating voltage : 220V
 Power consumption : 5.5W
 Average life time : 40,000 hours
 Luminous color : Daylight color
 Socket (Base) : E27



Operating voltage : 220V
 Power consumption : 4.7W
 Average life time : 50,000 hours
 Luminous color: Daylight color
 Socket (Base) : E26



Operating voltage : 220V
 Power consumption : 6W
 Average life time : 35,000 hours
 Luminous color : Cool white
 Socket (Base) : E14



Operating voltage : 220V
 Power consumption : 5W
 Average life time : 50,000 hours
 Luminous color : Daylight color
 Socket (Base) : E26



Operating voltage : 220V
 Power consumption : 7W
 Average life time : 40,000 hours
 Luminous color : Daylight color
 Socket (Base) : E27



Operating voltage : 220V
 Power consumption : 5W
 Average life time : 40,000 hours
 Luminous color : Daylight color
 Socket (Base) : E26



Operating voltage : 220V
 Power consumption : 7W
 Average life time : 30,000 hours
 Luminous color : Daylight color
 Socket (Base) : E26



Operating voltage : 220V
 Power consumption : 5.8W
 Average life time : 40,000 hours
 Luminous color : Daylight color
 Socket (Base) : E26



Operating voltage : 220V
 Power consumption : 7W
 Average life time : 45,000 hours
 Luminous colo : Cool white
 Socket (Base) : E26



CPE-E02830

LED Signage Display Training System

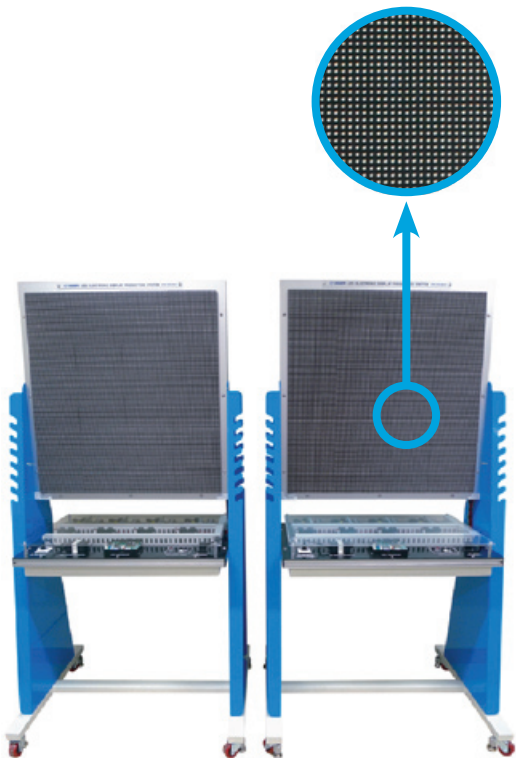


FEATURES

- Consists of the LED display module, controller and SMPS with focus on installation and production of LED signage display
- Hands-on assembly and operation practices on the LED module that are used in advertising display signage and landscape lighting
- Supports free-style display board configuration for the beginner
- Enables controlling the LED signage display through serial communication
- Hardware assembly techniques and command language practices on LED signage display

EXPERIMENTAL CONTENTS

- Characteristics and principles of LED signage display
- Applications of LED signage display
- Wiring and configuration of modules
- Insertion of images and video contents



SPECIFICATIONS

I. Main Controller

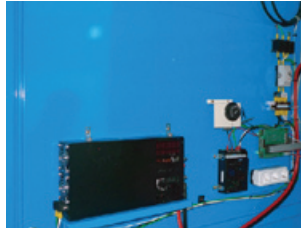
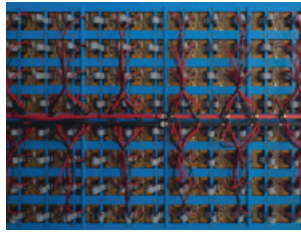
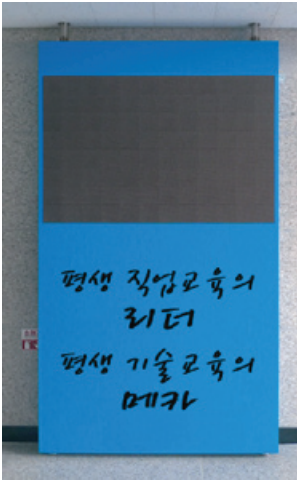
- Type: Fiber optic cable
- Optical port : 8 ports
- Flash ROM : 32M bit
- SD RAM : 64M bit
- Consumption power : DC 5V 0.4A
- Can interlock with LED software program

II. Section Controller

- CPU : 32 bit RISC
- Flash ROM : 32M bit
- SD RAM : 64M bit
- Consumption power : DC 5V 0.4A
- Can interlock with LED software program

III. Master Controller

- Full color images and visual effects
- CPU : 32 bit RISC
- Flash ROM : 32M bit
- SD RAM : 64M bit
- Consumption power : DC 5V 0.4A
- Can interlock with LED software program



IV. SMPS

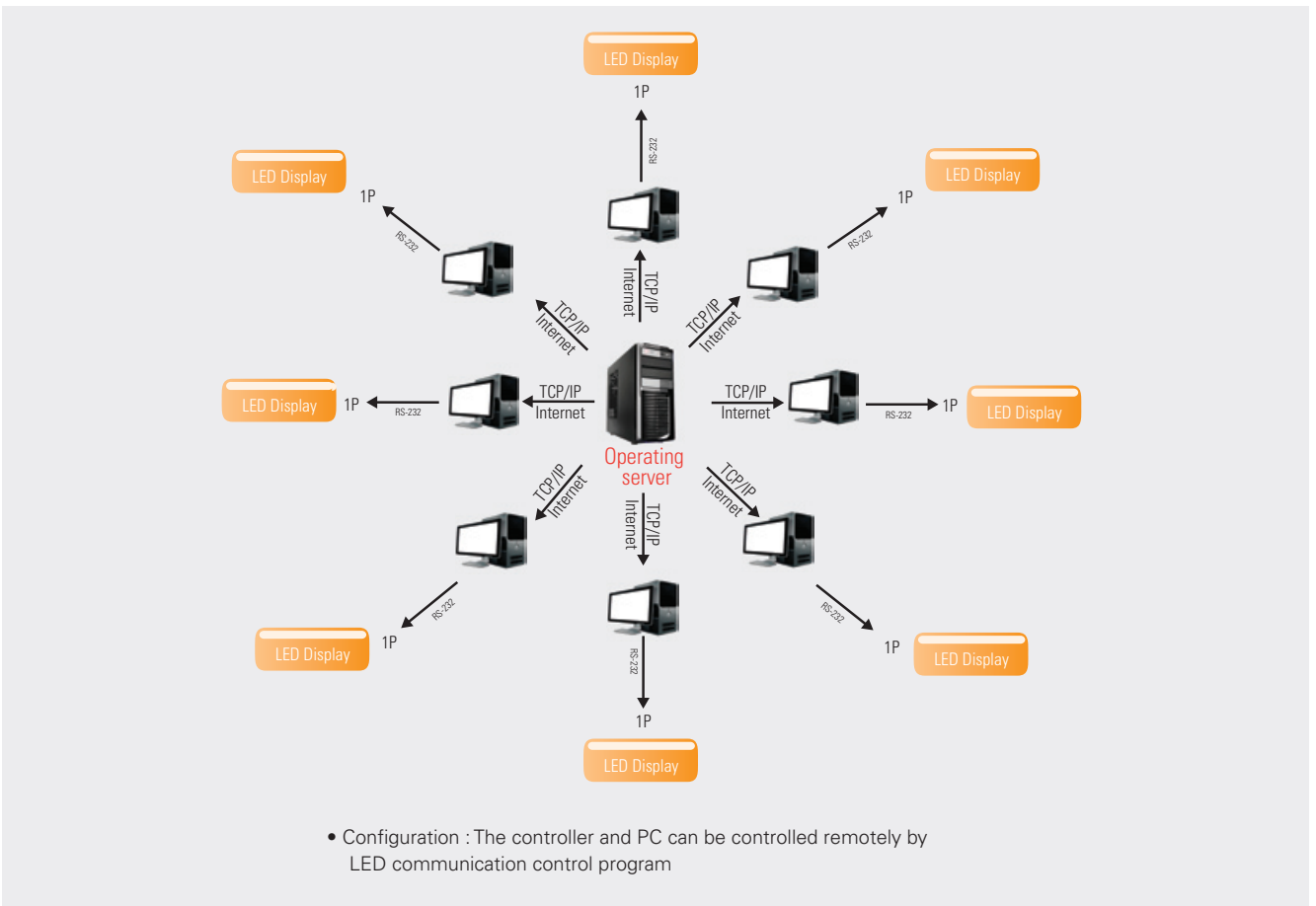
- Rated voltage : AC 220V
- Input voltage : AC 180V ~ 250V
- Input frequency : 15Hz ~ 70Hz
- Rated output voltage and setting range : +5V, $\pm 1\%$
- Current
 - Minimum: 2A
 - Maximum: 20A
- Output current : 100W
- Stability rate of output load voltage : $\pm 2.0\%$
- Short circuit protection
- Overcurrent Protection
- Overvoltage Protection

V. Modular Rack

- Material : Aluminum profile
- Dimension : 800(W) x 400(D) x 1600(H)mm

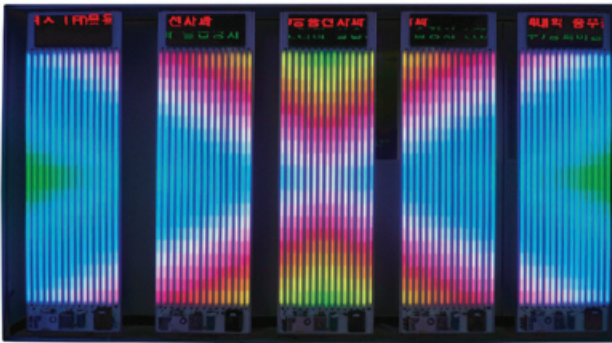
VI. PC Software Program

- Insert and modify words, select images, add calendar schedules, and set up brightness
- Various fonts, visual effects and animation functions
- Preview function: Capable of viewing created contents in simulation



CPE-E02840

Panorama LED Bar Trainer



FEATURES

- Designed to help understand the characteristics of LED and acquire knowledge and hands-on skills
- Contents design and operation practices on the actual panorama LED used in advertising and landscape lighting
- Easy-to-use LED light design software program capable of producing the mixed colors of panorama LED
- Private program command such as SAVE and OPEN for your own program
- Supports external memory extension and program examples

EXPERIMENTAL CONTENTS

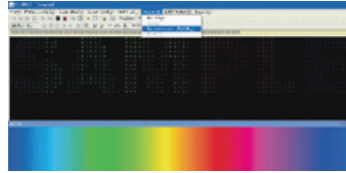
- Characteristics and principles of panorama LED bar
- How to use the software program and operate Panorama LED bar for advertising
- Configuration of the panorama LED bar for signage display
- Practices on programming and contents creation

SPECIFICATIONS

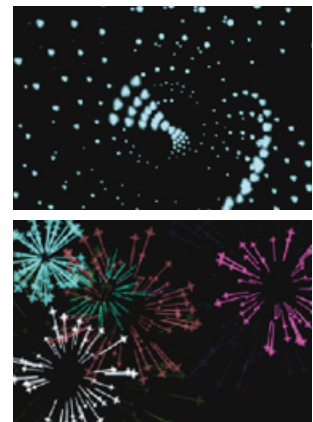
Panorama LED Module	
Panorama LED Bar	<ul style="list-style-type: none">• Color resolution : 24bit• Frame rate : 30fps• Resolution : 40 modules/bar x 50 bars• Module pitch : 25mm• Exterior : Aluminum frame and diffusion PC cover• Dimension: 25(W) x 2050(D) x 29(H) mm
SMPS	<ul style="list-style-type: none">• Rated input : AC 220V 60Hz• Input range : AC 185V ~ 265V 40~70Hz• Output voltage : DC 12V
Installation Bar	<ul style="list-style-type: none">• Material: Steel and rail type• Supports direct connection with LED bars
Panorama Controller	<ul style="list-style-type: none">• Conversion to a signal necessary for the LED operation IC by exporting contents to SD card• Select Files function• Input power : 12V 1.5A



PC software program



Field application cases



PC Software Program

**Panorama
LED Bar Software**

- Automation design : Can designate pixels in your own design and automatically create a port
- Manual design : Can be switched to "Manual" for complicated design arrangements
- Import and convert image files : Can refer to the images after retrieving them for creation of maps
- Dxf file: Complicated images can be converted to Dxf files from AutoCAD
- Automatic or manual design
- Import / Convert image files
- Import Dxf files
- Other functions: Control speed, Capture screens, Record and Export

**Contents Manager
Software**

- Creating maps, recording flash contents, contents production, execution and conversion
- Video screen capture and recording capability
- Check function to verify the recorded contents
- Convert function to meet the size of contents to Panorama Controller
- LED color change, up/down/left/right conversion, spread/focus effect
- SAVE and IMPORT functions for created contents and maps





Information Communication / Ubiquitous / Mobile

Contents

- 143 Wireless Communication & Antenna Trainer | CPE-TC5010
- 146 FM Stereo Transmitter & Receiver Trainer | CPE-TC5000
- 147 AM/FM Transmitter & Receiver Trainer | CPE-TC5030
- 148 CDMA/GPS Microprocessor Training Kit | UDT-350A
- 149 Ubiquitous Mobile Tracking System Series | CPE-MP500 Series
- 151 Ubiquitous Mobile Tracking System - TM | CPE-MP500-TM
- 153 Ubiquitous Mobile Tracking System - SM | CPE-MP500-SM
- 155 Ubiquitous Mobile Tracking System - SUB | CPE-MP500-SUB

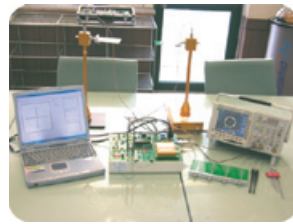
CPE-TC5010

Wireless Communication & Antenna Trainer



FEATURES

- 2-in-1 training system for antenna and wireless communication
- Standalone operation or PC dependent operation using an operation software
- Multi-channel RF sources: 500MHz / 2GHz / 10GHz
- Consists of various types of antenna such as Yagi, Dipole, Monopole and Microstrip
- Can practice PWM and PLL-VCO (Phase Locked Loop-Voltage Controlled Oscillator)
- Understanding the characteristics of various antennas and practicing frequency measurement and analysis

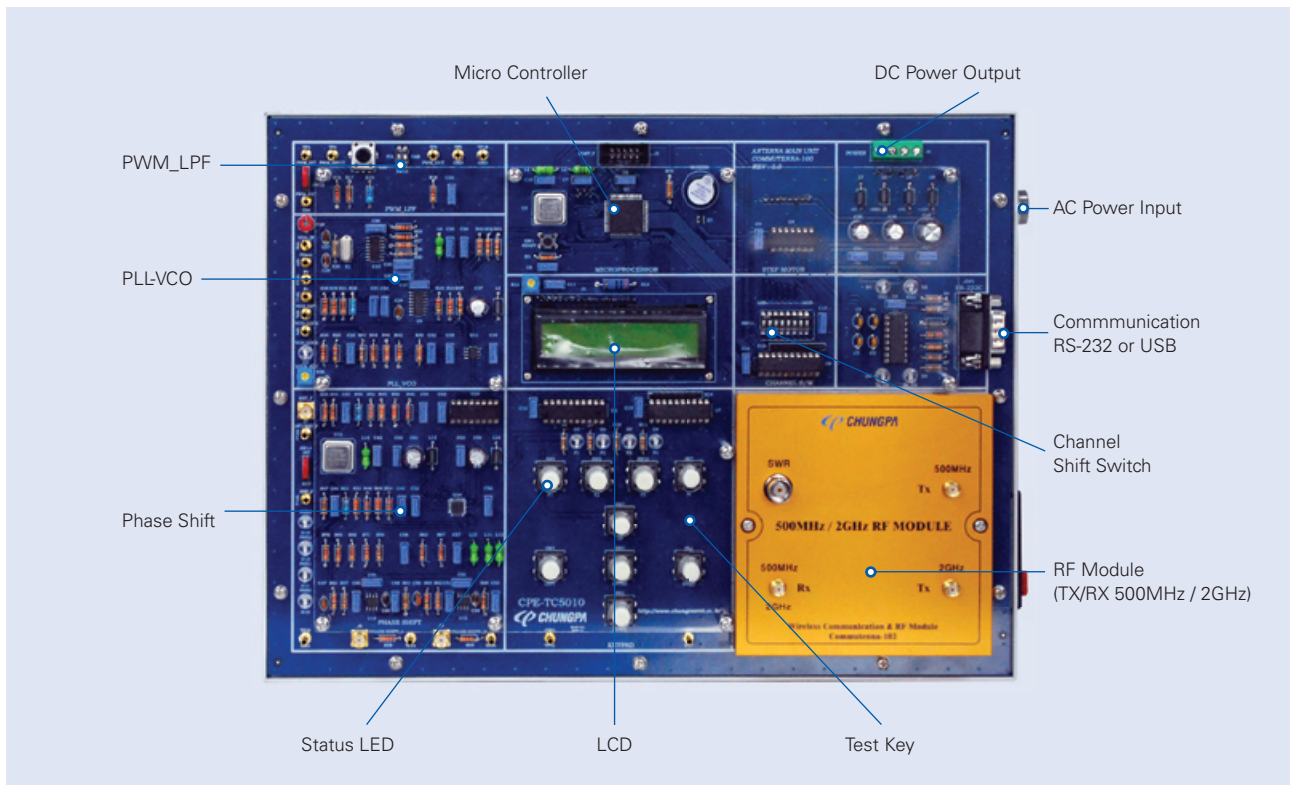


INTRODUCTION

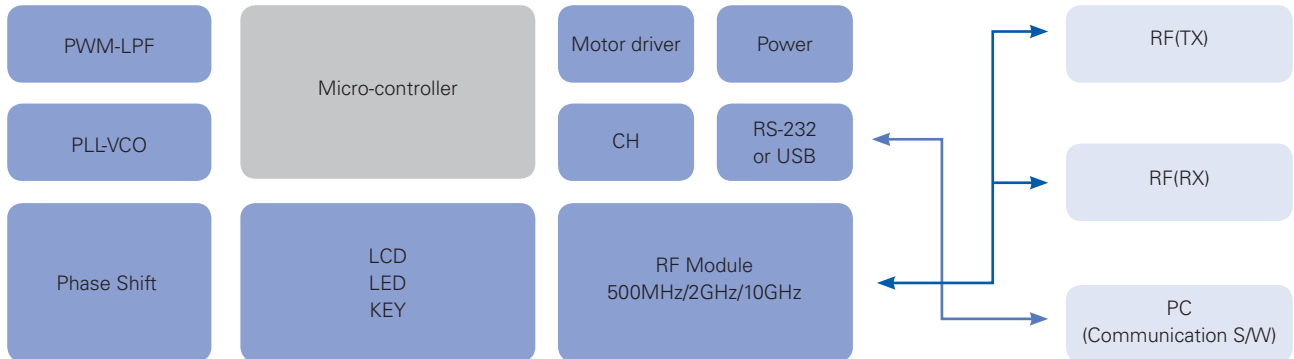
The CPE-TC5010 Wireless Communication & Antenna Trainer is a 2-in-1 training system designed to help understand the principles of antenna and wireless communication. The Wireless Communication & Antenna Trainer can operate automatically as standalone or manually using the computer and software provided. It enables students to plot the radiation of an antenna and provides experiment on the propagation characteristics of antenna in a small area. The software in CD format has capability to simulate the radiation pattern and characteristics of antenna as well as PWM and VCO experiments.

EXPERIMENTAL CONTENTS

- Principles of different types of antenna
- Understanding RC Passive Filter
- R-C Low Pass Filter (LPF)
- R-C response to square-wave inputs.
- Understanding PLL-VCO
- Basic PLL configuration and theory
- Principles of Low-Pass Filter
- Principles of Loop Filter
- Principles of Voltage Controlled Oscillator (VCO)
- Understanding of Phase Shift
- Gain and Radiation Pattern



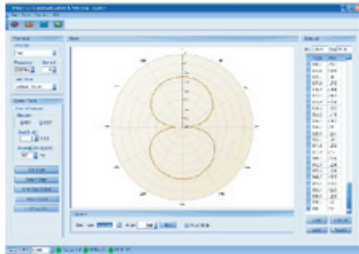
System block diagram: CPE-TC5010



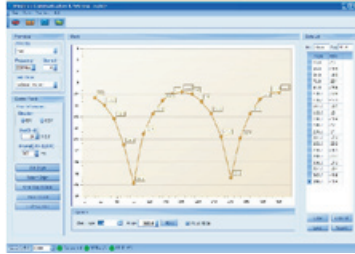
SPECIFICATIONS

RF Generator	Frequency range	Standard: 500MHz, 2GHz (COMMUTENNA-102) and 10GHz (COMMUTENNA-110)
	Power range	10mW (nominal)
	Modulation frequency	1kHz ±3%
	Channel	500MHz (32-CH)
	Output impedance	50 Ohm (nominal)
	Type of antenna	Yagi, Dipole, Loop, Monopole, Spiral, Helical, Horn and Micro strip
RF Receiver & Main Controller	Angle step	400 steps (0.9°/step)
	Control motor	2-phase stepping motor
	Angle range	0 ~ 360 degree
	User Display	16 x 2 text LCD back light
	User LED	5mm LED : 10ea
	Keys	Tack switch : 9ea
	PC interface & control	RS232C & 19200bps-8-N-1
	Channel switch	8-bit dip switch
	PLL-VCO lock	5mm LED (yellow color)
	EXT. input	EXT-PWM, EXT-Freq (SMA)
	INT. output	PWM, VCO, Phase Shift, Ref-Frequency
	AC power input	AC 90~240V / 50~60Hz
DC power output	DC -5V, +5V, +12V	
Antenna Transmitter Unit	Fixation (for polarized wave)	Horizontal / Vertical
	Directional control	Manual
Antenna Receiver Unit	Fixation	Horizontal / Vertical
	Directional control	Manual / PC interface (RS232C or USB)

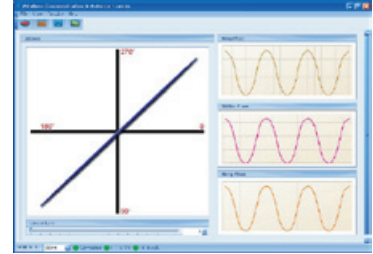
Antenna & Communication Engineering Software



Radiation pattern analysis: polar coordinate representation



Radiation pattern analysis: cartesian coordinate representation



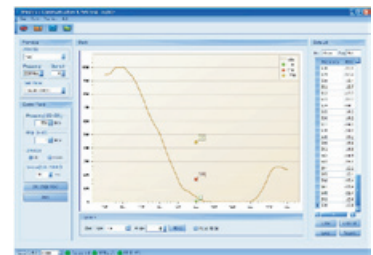
Impedance analysis by changed frequencies



PWM experiments

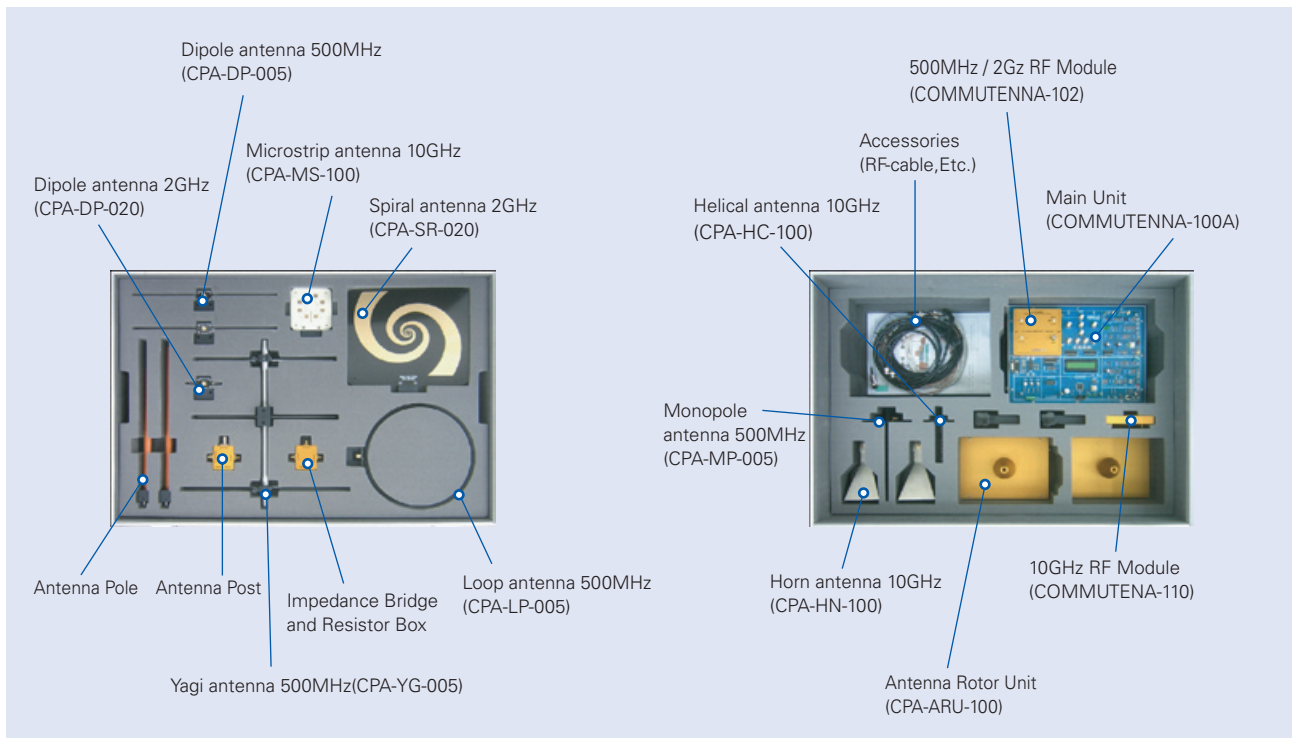


VCO experiments



Phase shift analysis

PRODUCT COMPOSITION



STANDARD ACCESSORIES

- Power cord : 1ea
- Basic antenna : 8ea
- RF cable (SMA to SMA) [1.5 meter]: 1ea
- RF cable (SMA to SMA) [3 meter]: 1ea
- BNC-SMA cable [1.5 meter] : 2ea
- Motor cable : 1ea
- Serial cable : 1ea
- PC software CD : 1ea
- User's guide manual : 1ea

OPTIONS

- Worktable: 1500(W) x 800(D) x 850(H) mm

CPE-TC5000

FM Stereo Transmitter & Receiver Trainer



FEATURES

- Modular structure based on five experimental modules with a rack
- Designed to help understand the principles of FM transceiver and stereo
- Tone control practices on the equalizer circuit
- Realistic simulation of FM stereo broadcast

EXPERIMENTAL CONTENTS

- FM receiver
- FM transmitter
- Stereo signal generator
- Stereo amplifier
- Stereo demodulation & Multiplexer
- Speaker

PRODUCT COMPOSITION

FM Receiver (CPE-TC5001)	RF Amplifier, Local oscillator & Mixer, BPF, IF Amp & Limiter, FM Detector
Stereo Demodulator & Multiplexer (CPE-TC5002)	Stereo Demodulation & Separation, Pilot Detector, De-emphasis
Stereo Amplifier (CPE-TC5003)	Main Amp., Equalizing Amp. Pre-Amp., Tone control
Stereo Signal Generator (CPE-TC5004)	Balanced Modulation, Sub-Carrier generator, Composite circuit, Matrix, Pre-emphasis
FM Transmitter (CPE-TC5005)	Reactance modulation, Frequency multiplier, AFC, Power Amp.

SPECIFICATIONS

Transmitter part	Frequency range	88 ~ 108MHz (2-channels in FM broadcasting band)
	RF output	100mW
	Modulation mode	Reactance modulation
	Frequency control mode	PLL
	Deviation	±75kHz
	Audio input	0dBm and -40dB (for microphone)
Receiver part	Frequency range	88 ~ 108MHz (FM broadcasting band)
	Sensitivity	2μV (Approx.)
	Intermediate frequency	10.7MHz
	AF output	0dBm (Approx.)
Stereo part	Pilot frequency	19kHz±5Hz
	Separation	50dB in 400Hz ~ 1kHz 40dB in 100Hz ~ 10kHz
	Frequency response	50Hz ~ 15kHz
	AF output	2W x 2 channels
General information	Input power	DC ±12V 1A
	Dimension	Experimental module : 285(W) x 61(D) x 208(H) mm Modular rack : 1500(W) x 300(D) x 460(H) mm
	Weight	12.55kg

STANDARD ACCESSORIES

- Experimental Speaker Module (CPE-TC5000-1) : 2ea
- Microphone (dynamic) : 1ea
- Circuit connection cord : 1set
- Modular rack: 1ea
- User's guide manual : 1ea

CPE-TC5030

AM/FM Transmitter & Receiver Trainer



INTRODUCTION

The CPE-TC5030 AM/FM Transmitter & Receiver Trainer highlights hands-on practices by understanding AM/FM transmission and reception mainly used in the radio circuit. Through this training system, students can be familiar with laboratory experiments in the wireless communication field. It will require a separate DC power supply ($\pm 15V$) for the experiments.

EXPERIMENTAL CONTENTS

- RF Amplifier
- Local oscillator
- IF Amp
- 100MHz FM oscillator
- 1kHz/1MHz oscillator
- Single sideband AM demodulation
- AM/FM detector
- AM signal generation and transmission
- Superheterodyne radio reception

FEATURES

- Practical training on AM/FM radio transmission and reception
- Helps understand radio characteristics through the course of experiments
- Frequency response practices using the power amplifier circuit

SPECIFICATIONS

Radio Circuit Module I



- AM/FM/RING adjustment
- HF/IF amplifier
- AM/FM detector
- Superheterodyne radio reception

Radio Circuit Module II



- Transmitter
- 100MHz FM oscillator
- 1KHz oscillator
- 1MHz oscillator
- Amplitude modulation

STANDARD ACCESSORIES

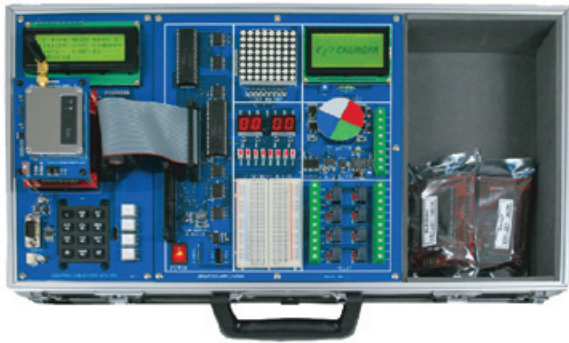
- Connection cable: 1set
- User's guide & experimental manual : 1ea

OPTIONS

- DC power supply (*model: CPM-3032)
- Oscilloscope (*model: CPM-1005BE)
- AM/FM high-frequency signal generator

UDT-350A

CDMA/GPS Microprocessor Training Kit



FEATURES

- Various processor applications (AVR)
- Serial communication applications (RS232)
- MiCOM programming through the utilization of ISP
- Sensor application techniques: how to digitize analog signals from various sensors and collect data using a wireless/wired network
- Remote control and measurement for wireless and wired communication
- Building an intelligent home network
- Tracking wireless communication

INTRODUCTION

The UDT-350A CDMA/GPS Microprocessor Training Kit is a hands-on training system designed to help understand the principles of CDMA and GPS which are known as the core Ubiquitous technology. You can obtain skills and techniques on how to transmit and receive wireless data through the control of a CDMA modem or cellular phone.

The training kit covers microprocessor control practices using C programming language and compiler, external interface practices with other electronic devices, and wireless data transmission and reception practices. It supports various types of microprocessor experiments on I/O, Interrupt, Timer, A/D Converter, and USART. Especially, you will be able to practice home network control by manipulating a display, a motor and a relay, or by receiving the sensor data on temperature and humidity using the CDMA modem.

EXPERIMENTAL CONTENTS

- Microprocessor practices with C programming language and Mobile Program Compiler
- Ubiquitous wireless communication
- Basic control of home network system
- Sensor application technology
- Remote control by other electronic device through RS232
- Application devices through applying CDMA or GPS technology

SPECIFICATIONS

CPU	ATmega128
Serial communication	RS232C × 1ea
Character LCD	20 characters × 4 lines (backlight)
Graphic LCD	128 × 64 (backlight)
8×8 dot matrix	Diameter ø4.8mm & 3 colors
7-segment	4 digits
DC motor	DC 12V
Relay	DC 12V, 2C × 8ea
Temperature sensor	Low voltage temperature sensor
Breadboard	110mm × 165mm
Compiler	CodeVisionAVR Evolution V1.24.6
Control program	CDMA module, RS232, LCD, DC motor, dot matrix, Keypad, sensor and 7-segment
Dimension	460(W) × 360(D) × 130(H)mm
Weight	3.6Kg

STANDARD ACCESSORIES

- Power cord : 1ea
- PC interface cable : 1ea
- PC software program CD : 1ea
- User's guide manual

OPTIONS

- CDMA USB host cable
- Tracking wireless communication module
- RFID experimental module

PC Software Program



login



DOT Matrix control



LED/Relay control



AD/DA control

CPE-MP500 Series

Ubiquitous Mobile Tracking System Series



Main System
(CPE-MP500-SM)



Main System
(CPE-MP500-TM)



Sub System
(CPE-MP500-SUB)

INTRODUCTION

The CPE-MP500 Ubiquitous Mobile Tracking System series consist of a teacher-centered main system, a student-centered main system, a subsystem for teachers or students, and mobile tracking server software. The subsystem can send various sensor and GPS data to the control center. It is a composite training system based on the next-generation telecommunication technology. You can access the mobile control system anytime anywhere as long as you are connected to the Internet.

You can perform various telecommunication experiments on CDMA, Wi-Fi, ZigBee, TCP/IP, GPS and RFID. You will gain hands-on experiences in home network control through the course of setting up a network using the main system and the subsystem and controlling various components such as a gas valve, an automatic door, a warning light and a signage display.

FEATURES

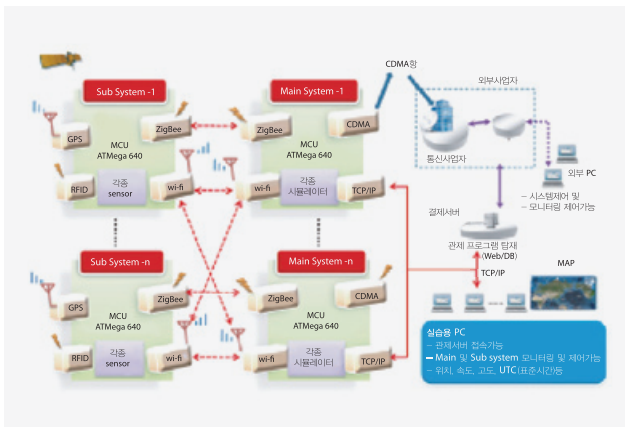
- Real-time monitor and control capabilities for a main system and a sub system
- Remote access and monitoring through a CDMA communications network and a Web server
- Measures temperature, humidity, solar radiation and gas amount
- Capable of sending the location data by the GPS function
- Easy system manipulation by the LCD touch screen panel and key pad
- Displays various types of sensor data on the LCD screen
- GPS module control and data analysis
- Supports GEO-Fence configuration and control functions



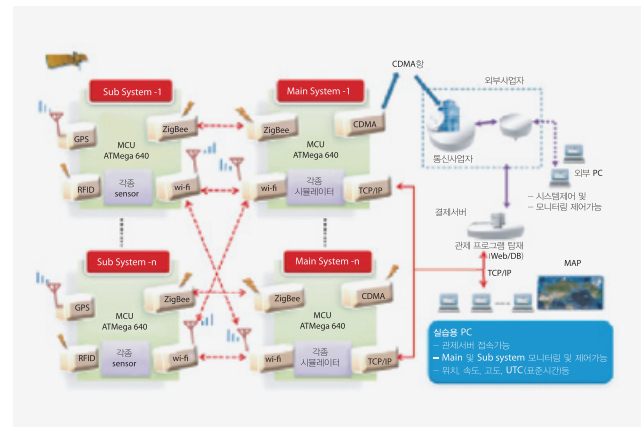
Mobile Tracking Server Software (Web-based)

- Real-time mobile monitoring (Subsystem & Main system)
- Real time system control in a web environment (Subsystem & Main system)
- Excel data conversion and analysis
- GEO-Fence setting and control function
- Indication of a current location in the electronic map
- Checking the travel status in the electronic map by obtaining GPS information (latitude and longitude)
- Communication program (TCP/IP network server)
 - Capable of proceeding in the ratio of 1:3000
 - Build the distributed communication system
 - Distributed processing for stable communication

Mobile Tracking System Component



Education & Application



CPE-MP500-TM

Ubiquitous Mobile Tracking System - TM (Teacher-centered main system)



FEATURES

- Real-time monitor and control capabilities for the student-centered main system and sub system
- Self-system control on the teacher-centered main system
- Remote access and monitoring through the CDMA communications network, the Internet network and a Web server
- Supports CDMA, ZigBee, TCP/IP and Wi-Fi services
- Monitors and controls various sensor values of the sub system
- Capable of tracking the sub system in real time using a GPS
- Easy system manipulation by the LCD touch screen panel and key pad
- Broadcast control through "Mobile Transmitter & Receiver"
- Rack attachment type system structure

INTRODUCTION

CPE-MP500-TM is a teacher-centered main system designed to build an Ubiquitous mobile control system and can link with the student-centered main system and subsystem, thereby comprising various types of the Ubiquitous communication network. Through our optional Web-based Mobile Tracking System Software, you can perform experiments on remote monitoring and remote control.

Especially, it is equipped with ATmega640 microprocessor on which you can easily follow programming. The training system supports various experimental designed to help gain essential techniques for integrated mobile control system as well as complete communication system.

EXPERIMENTAL CONTENTS

- Principles of the wireless/wired communication protocols (TCP/IP, Internet & Web Service)
- Ethernet Communication Module
- Wi-Fi Communication Module
- Send messages using CDMA
- Communications using "AT command" of Zigbee Module
- How to receive GPS data by the GPS Module
- How to receive RFID tag data by the RFID Module

STANDARD ACCESSORIES

- Power cord: 1ea
- USB cable : 1ea
- LAN cable : 1ea
- RS232 Cable : 1set
- Connection cable : 1set
- User's guide & experimental manual : 1ea

OPTIONS

- [CPE-MP500-TM] Teacher-centered Main System
- [CPE-MP500-SM] Student-centered Main System
- Mobile Tracking Server Software

SPECIFICATIONS

• Main System (teacher-centered)	
MCU	<ul style="list-style-type: none"> • ATmega 640 • Advanced RISC architecture • Non-volatile memory segments (high endurance) • JTAG interface (IEEE standard 1149.1 compliant) • 54/86 Programmable I/O lines
Mobile Transmitter & Receiver	<ul style="list-style-type: none"> • Frequency range : [Transmission] 869 ~ 894MHz [Reception] 824 ~ 849MHz • Channel : 20 channels • SMS (Short Message Service) functionality • User-defined GPIO (2-port assigned) • RS-232 (UART x 2ea)
ZigBee	<ul style="list-style-type: none"> • Power output : 10mW ~ EIRP • Communication distance : [Indoor] 100m (max.) [Outdoor] 1.6km (max.) • Current (at 3.3V) : 270mA (Transmission) and 55mA (Reception) • Power-down sleep current : <10μA • Frequency range : 2.4000 ~ 2.4835GHz • Serial data interface : 3V CMOS UART
Wi-Fi	<ul style="list-style-type: none"> • Core CPU : 32bit RISC ARM7 TDMI, low leakage, 0.13 micron, running at 48MHz Marvell 88W8686 802.11b/g Chipset • Flash memory : EN29LV800B 8M bit boot sector flash • Host data rate : Up to 3Mbps in serial mode
TCP/IP	<ul style="list-style-type: none"> • MCU : 8051 compliant TCP/IP W5100 • Protocol : TCP, UDP, IP, ARP, ICMP, MAC, DHCP, PPPoE, and DNS • Network interface : 10/100 Mbps (auto detection) and RJ-45 connector • Serial interface : RS232 (DB9) • Serial signal : TXD, RXD, RTS, CTS, GND
TFT LCD	<ul style="list-style-type: none"> • 7" touch panel • Resolution : 800RGB(H) X 480(V)
Text LCD	<ul style="list-style-type: none"> • 20x4 line, backlight
Voice	<ul style="list-style-type: none"> • Recording time : 20 ~ 60 seconds
AC power inlet	<ul style="list-style-type: none"> • AC220V output ON/OFF control
Warning light	<ul style="list-style-type: none"> • 1ea
Lamp	<ul style="list-style-type: none"> • 1ea
Buzzer	<ul style="list-style-type: none"> • 1ea
DC geared motor	<ul style="list-style-type: none"> • Operating power : 1.5V ~ 6V • Rotary disk type
Automatic door	<ul style="list-style-type: none"> • OPEN/CLOSE control
Gas valve	<ul style="list-style-type: none"> • OPEN/CLOSE control valve
Display screen	<ul style="list-style-type: none"> • Dot matrix 96x16 (red color)
Binary I/O	<ul style="list-style-type: none"> • Relay: 2-channel output • Photo Coupler : 2-channel input
Input voltage	<ul style="list-style-type: none"> • AC 220V 60Hz
Software	<ul style="list-style-type: none"> • Real-time system control in the Web environment • Monitors communication and collects information on sensors, GPS and RFID

CPE-MP500-SM

Ubiquitous Mobile Tracking System - SM (Student-centered main system)



FEATURES

- Real-time monitor and control capabilities for the student-centered main system and sub system
- Can interlock with the teacher-centered main system
- Remote access and monitoring through the CDMA communications network, the Internet network and a Web server
- Supports CDMA, ZigBee, TCP/IP and Wi-Fi services
- Monitors and controls various sensor values of the sub system
- Capable of tracking the sub system in real time using a GPS
- Easy system manipulation by the LCD touch screen panel and key pad
- Broadcast control through "Mobile Transmitter & Receiver"
- Carrying case type system structure

INTRODUCTION

CPE-MP500-SM is a student-centered main system designed to build an Ubiquitous mobile control system and can link with the teacher-centered main system and subsystem, thereby comprising various types of the Ubiquitous communication network. Through our optional Web-based Mobile Tracking System Software, you can perform experiments on remote monitoring and remote control.

Especially, it is equipped with ATmega640 microprocessor on which you can easily follow programming. The training system supports various experimental designed to help gain essential techniques for integrated mobile control system as well as complete communication system.

EXPERIMENTAL CONTENTS

- Principles of the wireless/wired communication protocols (TCP/IP, Internet & Web Service)
- Ethernet Communication Module
- Wi-Fi Communication Module
- Send messages using CDMA
- Communications using "AT command" of Zigbee Module
- How to receive GPS data by the GPS Module
- How to receive RFID tag data by the RFID Module

SPECIFICATIONS

• Main System (student-centered)	
MCU	<ul style="list-style-type: none"> • ATmega 640 • Advanced RISC architecture • Non-volatile memory segments (high endurance) • JTAG interface (IEEE standard 1149.1 compliant) • 54/86 Programmable I/O lines
Mobile Transmitter & Receiver	<ul style="list-style-type: none"> • Frequency range : [Transmission] 869 ~ 894MHz [Reception] 824 ~ 849MHz • Channel : 20 channels • SMS (Short Message Service) functionality • User-defined GPIO (2-port assigned) • RS-232 (UART x 2ea)
ZigBee	<ul style="list-style-type: none"> • Power output : 10mW ~ EIRP • Communication distance : [Indoor] 100m (max.) [Outdoor] 1.6km (max.) • Current (at 3.3V) : 270mA (Transmission) and 55mA (Reception) • Power-down sleep current : <10μA • Frequency range : 2.4000 ~ 2.4835GHz • Serial data interface : 3V CMOS UART
Wi-Fi	<ul style="list-style-type: none"> • Core CPU : 32bit RISC ARM7TDMI, low leakage, 0.13 micron, running at 48MHz Marvell 88W8686 802.11b/g Chipset • Flash memory : EN29LV800B 8M bit boot sector flash • Host data rate : Up to 3Mbps in serial mode
TCP/IP	<ul style="list-style-type: none"> • MCU : 8051 compliant TCP/IP W5100 • Protocol : TCP, UDP, IP, ARP, ICMP, MAC, DHCP, PPPoE, and DNS • Network interface : 10/100 Mbps (auto detection) and RJ-45 connector • Serial interface : RS232 (DB9) • Serial signal : TXD, RXD, RTS, CTS, GND
TFT LCD	<ul style="list-style-type: none"> • 7" touch panel • Resolution : 800RGB(H) X 480(V)
Text LCD	<ul style="list-style-type: none"> • 20x4 line, backlight
Voice	<ul style="list-style-type: none"> • Recording time : 20 ~ 60 seconds
AC power inlet	<ul style="list-style-type: none"> • AC220V output ON/OFF control
Warning light	<ul style="list-style-type: none"> • 1ea
Lamp	<ul style="list-style-type: none"> • 1ea
Buzzer	<ul style="list-style-type: none"> • 1ea
DC geared motor	<ul style="list-style-type: none"> • Operating power : 1.5~6V • Rotational disk attachment
Binary I/O	<ul style="list-style-type: none"> • Relay: 2-channel output • Photo coupler : 2-channel input
Input voltage	<ul style="list-style-type: none"> • AC 220V 60Hz
Software	<ul style="list-style-type: none"> • Real-time system control in the Web environment • Monitors communication and collects information on sensors, GPS and RFID

STANDARD ACCESSORIES

- Power cord: 1ea
- USB cable : 1ea
- LAN cable : 1ea
- RS232 Cable : 1set
- Connection cable : 1set
- User's guide & experimental manual : 1ea

OPTIONS

- [CPE-MP500-TM] Teacher-centered Main System
- [CPE-MP500-SM] Student-centered Main System
- Mobile Tracking Server Software

CPE-MP500-SUB

Ubiquitous Mobile Tracking System - SUB (Teacher-centered & Student-centered subsystem)



FEATURES

- Real-time monitor and control capabilities for the student-centered main system and sub system
- Can interlock with the teacher-centered main system
- Remote access and monitoring through the CDMA communications network, the Internet network and a Web server
- Supports CDMA, ZigBee, TCP/IP and Wi-Fi services
- Measures temperature, humidity, solar radiation and gas amount
- Monitors and controls various sensor values of the sub system
- Capable of tracking the sub system in real time using a GPS
- Easy system manipulation by the LCD touch screen panel
- Battery power functionality for outdoor GPS tracking practices
- Carrying case type system structure

INTRODUCTION

CPE-MP500-SUB is a subsystem for teachers or students designed to build an Ubiquitous mobile control system and can link with the teacher-centered main system and subsystem, thereby comprising various types of the Ubiquitous communication network. Through our optional Web-based Mobile Tracking System Software, you can perform experiments on remote monitoring and remote control. Especially, it is equipped with ATmega640 microprocessor on which you can easily follow programming. The training system supports various experimental designed to help gain essential techniques for integrated mobile control system as well as complete communication system.

EXPERIMENTAL CONTENTS

- Principles of the wireless/wired communication protocols (TCP/IP, Internet & Web Service)
- Ethernet Communication Module
- Wi-Fi Communication Module
- Send messages using CDMA
- Communications using "AT command" of Zigbee Module
- How to receive GPS data by the GPS Module
- How to receive RFID tag data by the RFID Module

SPECIFICATIONS

• Sub System (teacher-centered & student-centered)	
MCU	<ul style="list-style-type: none"> • ATmega 640 • Advanced RISC architecture • Non-volatile memory segments (high endurance) • JTAG interface (IEEE standard 1149.1 compliant) • 54/86 Programmable I/O lines
ZigBee	<ul style="list-style-type: none"> • Power output : 10mW ~ EIRP • Communication distance : [Indoor] 100m (max.) [Outdoor] 1.6km (max.) • Current (at 3.3V) : 270mA (Transmission) and 55mA (Reception) • Power-down sleep current : <10μA • Frequency range : 2.4000 ~ 2.4835GHz • Serial data interface : 3V CMOS UART
Wi-Fi	<ul style="list-style-type: none"> • Core CPU : 32bit RISC ARM7TDMI, 0.13 micron, low leakage, running at 48MHz Marvell 88W8686 802.11b/g Chipset • Flash memory : EN29LV800B 8M bit boot sector flash • Host data rate : Up to 3Mbps in serial mode
GPS	<ul style="list-style-type: none"> • Chipset : SiRF GSC3f/LP • Frequency : L1, 1575.42MHz • Channels : 20 channels • DGPS : WAAS, EGNOS, MSAS
RFID	<ul style="list-style-type: none"> • RF frequency : 13.56MHz • Power : DC 4.5 ~ 5V • RF Power : 100mW (at 5V)
TFT LCD	<ul style="list-style-type: none"> • 2.6" touch panel • Pixel : 400 x 240 • RS232 communication MAX232 IC (built-in)
Text LCD	<ul style="list-style-type: none"> • 20x4 lines, Backlight
Solar cells	<ul style="list-style-type: none"> • Output : 4V 80mA
Temperature sensor	<ul style="list-style-type: none"> • Range : -270$^{\circ}$C ~ +1370$^{\circ}$C • Output voltage : -6.458~+54.886mV
Gas sensor	<ul style="list-style-type: none"> • CO sensing range : 10 ~ 1000 ppm • Sensitivity : 1.5 ~ 3.0
Humidity sensor	<ul style="list-style-type: none"> • 1ea
Input voltage	<ul style="list-style-type: none"> • AC 220V 60Hz & built-in battery (automatic switching)
Software	<ul style="list-style-type: none"> • Real-time system control in the Web environment • Monitors communication and collects information on sensors, GPS and RFID

STANDARD ACCESSORIES

- Power cord: 1ea
- RS232 Cable : 1set
- User's guide & experimental manual : 1ea

OPTIONS

- [CPE-MP500-TM] Teacher-centered Main System
- [CPE-MP500-SM] Student-centered Main System
- Mobile Tracking Server Software



Automation/Mechatronics

Contents

159	Pneumatic Trainer CPE-PN7000 Electro-Pneumatic Trainer CPE-PN7500	230	2-Axis Cartesian Coordinate Robot Trainer CPE-RO9001
163	Hydraulic Trainer CPE-HY8000 Electro-Hydraulic Trainer CPE-HY8500	231	4-Axis SCARA Robot Trainer CPE-RO9002
167	Electro-Pneumatic Control Trainer CPE-PN2100	232	6-Axis Multi Joint Robot Trainer CPE-RO9003
170	Smart PLC Trainer CPE-MP150	233	Smart Servo Control Trainer CPE-AT4430
171	Integrated Automation PLC System CPS-APLC	234	2-Axis Servo Control Trainer CPE-AT4440
173	Universal Programmable Logic Controller Trainer CPS-3520U	235	2-Axis Servo Motor Trainer CPE-AT4460
175	Modular PLC Application Trainer CPS-3550U	236	Intelligent 2-Axis Servo Control Trainer CPE-AT4400
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183	Multiple-PLC Application Trainer CPE-PN7540	242	Water Level Control Trainer CPE-AT4450
185	Automation PLC Training Kit CPS-3750M	244	Mini-MPS Trainer (Mitsubishi PLC) CPE-AT3500A
186	Portable PLC Trainer CPS-3710, CPS-3720, CPS-3720M	246	Mini Automation Multiprogramming Trainer CPS-AT3450U
187	Siemens PLC Trainer CPS-3800	248	Mini Automation Multiprogramming Trainer CPS-AT3450
188	PLC Communication Control Trainer (Siemens) CPE-AT3810A	250	Pneumatic Auto Door Trainer CPE-PN2500, CPE-PN2500A, CPE-PN2500B
189	Portable Siemens PLC Trainer CPS-3541	251	Factory Automation Trainer CPE-AT3680
190	Multi-purpose PLC Demonstration Unit CPS-3540-SIM	253	Motion Control Trainer CPE-AT4410
192	PLC Application Process Control Trainer CPS-3542	254	Conveyor Control Trainer CPE-AT3805
193	PLC Application Mini Auto Door Trainer CPS-3543	255	Conveyor Control Trainer CPE-AT3810
194	Sequence Control Trainer CPS-3140/CPS-3143/CPS-3210	256	Mini Pneumatic Control Trainer CPS-AT3460
196	Electrical Sequence Control Trainer CPS-3100B	257	Smart I/O Control Pneumatic Trainer CPS-AT3470
197	Electrical Sequence Control Trainer CPS-3100A	258	Smart I/O Control PLC Trainer CPS-3470M
198	Electrical Sequence Control Trainer CPS-SQ38	259	Portable Electro-Pneumatic Training Kit CPE-PN7520
199	Modular Sequence Control Trainer CPE-ER1200	260	Portable Pneumatic Training Kit CPE-PN7530
202	Touch Panel Trainer CPE-AT3092M	261	Pneumatic Components Set CPE-PMAP
203	Graphic Panel Trainer CPE-AT3090	262	Elevator Trainer CPS-AT3900
204	Factory Automation Trainer CPE-AT8030N	263	Traffic Signal Control Trainer CPE-AT3030
206	Flexible Manufacturing System CPE-FMS	264	Temperature Control Trainer CPE-AT3700
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219	Modular Production Training System I CPE-MPS200	266	Auto Pump Trainer CPE-AT3720
225	Modular Production Training System II CPE-MPS300	267	Auto Warehouse Robot Trainer CPE-RO8010
		268	Auto Warehouse Robot Trainer CPE-RO8020
		269	Parking Tower System Trainer CPE-AT3910
		270	PTP Robot Trainer CPE-RO8000
		271	Educational Programming Oriented Robot EPOR



CPE-PN7000 / CPE-PN7500

Pneumatic Trainer / Electro-Pneumatic Trainer



FEATURES

- Basic and advanced level of training courses on pneumatic components (or electro-pneumatic components)
- One-touch clamping devices mounted on the experimental modules and efficient use of space by fixing them vertically or horizontally
- Diverse experimental modules and components for building basic circuits and application circuits
- Consists of an experimental table with a working board, storage cabinet, experimental modules, and various components
- Industrial standard symbols and names shown on each experimental module to maximize learning effectiveness
- Hands-on field practices using actual industrial pneumatic and electro-pneumatic components
- Excellent choice for preparing a skills qualification test and Skills Competition Olympics
- A complete training system covering basic-to-advanced engineering control technologies, supporting connection with a programmable logic controller.

* Please refer to our separate catalogue of Pneumatic/Hydraulic Training System for detailed information and specifications.

LEARNING OBJECTIVES

The CPE-PN7000 Pneumatic Trainer and the CPE-PN7500 Electro-Pneumatic Trainer is a training system designed to help the user obtain in-depth knowledge on basic laws and principles of pneumatic energy, characteristics of pneumatic (or electro-pneumatic) control components, types of contact, and circuit design

The user will learn how to design basic and complex applied circuits using various types of valves comprising the pneumatic system, how to design Cascade circuits and Stepper circuits, and how to control a timer and a counter for sequence control circuit design.

EXPERIMENTAL CONTENTS

- Types of automated system and patterns of control
- Characteristics and composition of automated system
- Basic principles of physics related to pneumatic technology
- Optimized production and distribution of the compressed air
- Functions of pneumatic and electrical control devices
- Understanding of logics using pneumatic control valves (direction / pressure / logic)
- Pneumatic sequence circuit design using Timer and Counter
- Types of electric contact and sensors
- Speed control of cylinders
- Structure and operational principles of solenoid valves
- Pneumatic circuits and self-holding electric circuits (how to use a relay)
- Cascade and stepper control circuit
- Analog and digital signal (including signal conversion)
- Trouble shooting for the pneumatic and electro-pneumatic control system

SOFTWARE AND MANUAL

- Fluid power/pneumatic simulation software: Automation Studio (Option)
- User's guide manual for pneumatic control technology
- User's guide manual for electro-pneumatic control technology

STANDARD ACCESSORIES

- Pneumatic air hose (30 meter)
 - Inner diameter: 6mm
 - Outer diameter: 4mm
- Piping component: T-shape connector
- Maintenance component: 1 set
- Power cord (for electro-pneumatic system): 1ea

OPTIONS

- Low-noise air compressor (1/2 HP)
- Pneumatic circuit symbol set
- Function generator
- Oscilloscope
- Multifunctional digital electric meter
- PLC Trainer (experimental board-mountable structure)
- Microprocessor Trainer (experimental board-mountable structure)



CPE-PN7000 / CPE-PN7500

PRODUCT COMPOSITION

• Pneumatic Trainer (Model: CPE-PN7000)

No.	Part code	Description	Basic	Advanced	Option
1	7001	Single side worktable	1		
2	7002	Single side experimental board	1		
3	7011	Double side worktable			1
4	7012	Double side experimental board			1
5	7050	Air service unit	1		
6	7051	Air distributor	1		
7	7100	3/2-way push button valve (N.C)	2		
8	7101	3/2-way push button valve (N.O)	2		
9	7102	3/2-way selector switch valve (N.C)	1	1	
10	7103	5/2-way selector switch valve	1	1	
11	7120	4/3-way hand lever valve (PABR closed center)		1	
12	7121	4/3-way hand lever valve (ABR connection)		1	
13	7150	3/2-way one-way roller lever valve (left)	1	1	
14	7151	3/2-way one-way roller lever valve (right)	1	1	
15	7152	3/2-way bi-directional roller lever valve (left)	2		
16	7153	3/2-way bi-directional roller lever valve (right)	2		
17	7180	Reflexive sensor		1	
18	7181	Back pressure regulator		1	
19	7182	Pneumatic proximity sensor		1	
20	7200	3/2-way pneumatic valve (N.C)	2		
21	7201	3/2-way pneumatic valve (N.O)	1		
22	7206	4/2-way single acting pneumatic valve			1
23	7202	4/2-way double acting pneumatic valve			1
24	7203	5/2-way single acting pneumatic valve	1		
25	7204	5/2-way double acting pneumatic valve	1		
26	7205	2/2-way single acting pneumatic valve		2	
27	7220	5/3-way double acting pneumatic valve (PABR closed center)		1	
28	7221	5/3-way double acting pneumatic valve (ABR connection)		1	
29	7222	5/3-way double acting pneumatic valve (PAB connection)		1	
30	7250	One-way flow control valve	2		
31	7251	Pressure regulating valve	1	1	
32	7252	Quick exhaust valve	1		
33	7253	Pressure sequence valve	1		
34	7260	Low pressure control valve		1	
35	7261	Pressure regulating valve with a gauge			1
36	7262	Pressure regulating valve with a check valve (built-in)		1	
37	7300	Check valve	1		
38	7301	Shuttle valve (OR)	3	2	
39	7302	Dual-pressure valve (AND)	2	2	
40	7305	Pilot check valve		1	
41	7310	Shuttle valve (OR combination)		1	
42	7311	Dual-pressure valve (AND combination)		1	
43	7350	Time delay valve (N.C)	2		
44	7351	Time delay valve (N.O)	1		
45	7353	Pneumatic counter	1	1	
46	7360	Stepper module A-type		1	
47	7361	Stepper module B-type		1	
48	7400	Pneumatic single acting cylinder	1		
49	7401	Pneumatic single acting cylinder with a flow control valve		1	
50	7402	Pneumatic double acting cylinder with built-in air cushion	2		
51	7403	Pneumatic double acting cylinder with a flow control valve	1	1	
52	7410	Rotary cylinder		1	
53	7420	Double load cylinder		1	
54	7430	Rodless cylinder		1	
55	7440	Vacuum generator & vacuum pad		1	
56	7442	Air finger		1	
57	7450	Pneumatic indicator lamp		1	
58	7455	Pressure gauge	1		
59	7456	Vacuum pressure gauge		1	
60	7480	Pressure amplifier		1	
61	7851	Low noise air compressor (1/3HP)	1		
62	7852	Low noise air compressor (1/2HP)			1

* Note: Your selection of "Advanced" will include "Basic" components plus "Advanced" components.

PRODUCT COMPOSITION

• Electro-Pneumatic Trainer (Model: CPE-PN7500)

No.	Part code	Description	Basic	Advanced	Option
1	7001	Single side worktable	1		
2	7002	Single side experimental board	1		
3	7011	Double side worktable			1
4	7012	Double side experimental board			1
5	7050	Air service unit	1		
6	7051	Air distributor	1		
7	7250	One-way flow control valve	2		
8	7301	Shuttle valve (OR)	1		
9	7302	Dual-pressure valve (AND)	1		
10	7350	Time delay valve (N.C)	1		
11	7351	Time delay valve (N.O)	1		
12	7400	Pneumatic single-acting cylinder	1		
13	7401	Pneumatic single acting cylinder with a flow control valve		1	
14	7402	Pneumatic double acting cylinder with built-in air cushion	2		
15	7403	Pneumatic double acting cylinder with a flow control valve	1	1	
16	7404	Pneumatic double acting cylinder with a proximity switch	1	1	
17	7602	3/2-way single acting solenoid valve (N.C)	2		
18	7603	3/2-way single acting solenoid valve (N.O)	1		
19	7605	5/2-way single acting solenoid valve	3		
20	7606	5/2-way single acting solenoid combination valve		1	
21	7610	5/2-way double acting solenoid valve	3		
22	7611	5/2-way double acting solenoid combination valve		1	
23	7620	3/2-way double acting solenoid valve (N.C)		1	
24	7621	5/3-way double acting solenoid valve (PABR closed center)		1	
25	7622	5/3-way double acting solenoid valve (ABR connection)		1	
26	7623	5/3-way double acting solenoid valve (PAB connection)		1	
27	7650	Pressure switch (pneumatic-electric signal conversion)	1		
28	7550	Optical sensor - PNP (Directly reflective)	1		
29	7551	Optical sensor - NPN (Directly reflective)		1	
30	7552	Fiber optic sensor - PNP (Directly reflective)		1	
31	7553	Fiber optic sensor - NPN (Directly reflective)		1	
32	7554	Capacitive proximity sensor (PNP)	1		
33	7555	Capacitive proximity sensor (NPN)		1	
34	7556	Inductive proximity sensor (PNP)	1		
35	7557	Inductive proximity sensor (NPN)	1		
36	7560	Electrical proximity switch			1
37	7562	Electrical limit switch (left)	3		
38	7563	Electrical limit switch (right)	3		
39	7710	4-pair relay module	2	1	
40	7711	Digital timer module	1		
41	7712	Digital counter module	1		
42	7713	Signal input switch module A	1		
43	7714	Signal input switch module B	1		
44	7716	Emergency switch module	1		
45	7718	Electric distributor module			1
46	7720	Buzzer & lamp module	1		
47	7750	Power supply	1		
48	7755	Connection cable set	1		
49	7875	Microprocessor trainer (attachable structure)			1
50	7892	Cable holder			1
51	CPE-AT3220	PLC trainer (attachable structure)			1
52	7851	Low noise air compressor (1/3HP)	1		
53	7852	Low noise air compressor (1/2HP)			1

* Note: Your selection of "Advanced" will include "Basic" components plus "Advanced" components.

CPE-HY8000 / CPE-HY8500

Hydraulic Trainer / Electro-Hydraulic Trainer



FEATURES

- Basic and advanced level of training courses on hydraulic components (or electro-hydraulic components)
- Eco-friendly couplers designed to prevent oil leak
- One-touch clamping devices mounted on the experimental modules and efficient use of space by fixing them vertically or horizontally
- Consists of an experimental table with a working board, storage cabinet, experimental modules, and various components
- Industrial standard symbols and names shown on each experimental module to maximize learning effectiveness
- Hands-on field practices using actual industrial hydraulic and electro-hydraulic components
- Excellent choice for preparing a skills qualification test and Skills Competition Olympics
- A complete training system covering basic-to-advanced engineering control technologies, supporting connection with a programmable logic controller.

* Please refer to our separate catalogue of Pneumatic/Hydraulic Training System for detailed information and specifications.

LEARNING OBJECTIVES

The CPE-HY8000 Hydraulic Trainer and the CPE-HY8500 Electro-Hydraulic Trainer is a training system designed to help the user obtain in-depth knowledge on basic laws and principles of hydraulic energy, characteristics of hydraulic (or electro-hydraulic) control components, types of contact, and circuit design

The user will learn how to design basic and applied circuits using various types of valves comprising the hydraulic system, how to use the accumulator, and how to operate the hydraulic power package system.

EXPERIMENTAL CONTENTS

- Characteristics of hydraulic system elements
- Characteristics and principles of hydraulic energy
- Basic hydraulic control circuits (including motor and speed control circuit)
- Position and speed control circuits
- Pressure, flow and pressure loss measurement
- Understanding hydraulic devices and hydraulic valves (pressure / direction / flow)
- Functions and principles of hydraulic solenoid valves
- Circuit design and system composition of hydraulic and electro-hydraulic sequence control circuits
- Trouble shooting for the hydraulic and electro-hydraulic control system

SOFTWARE & MANUAL

- Fluid power/hydraulic simulation software: Automation Studio (Option)
- User's guide manual for hydraulic control technology
- User's guide manual for electro-hydraulic control technology

STANDARD ACCESSORIES

- Oil filter cartridge
- Hydraulic hose holder
- Maintenance component: 1 set
- Power cord (for electro-hydraulic system): 1 ea

OPTIONS

- Diaphragm accumulator
- Hydraulic circuit symbol set
- Hydraulic cut-away model (valves & actuators)
- Pressure filter module
- Multifunctional digital electric meter
- PLC Trainer (experimental board-mountable structure)
- Microprocessor Trainer (experimental board-mountable structure)



CPE-HY8000 / CPE-HY8500

PRODUCT COMPOSITION

• Hydraulic Trainer (Model: CPE-HY8000)

No.	Part code	Description	Basic	Advanced	Option
1	8001	Single side worktable	1		
2	8002	Single side experimental board	1		
3	8011	Double side worktable			1
4	8012	Double side experimental board			1
5	8050	Hydraulic pump unit A (2HP)	1		
6	8060	Hydraulic hose set (10/10/5)	1		
7	8061	Hydraulic hose - 1500mm		1	
8	8062	Hydraulic hose - 1000mm		1	
9	8063	Hydraulic hose - 600mm		1	
10	8070	Hydraulic distributor A (3 connectors x 2)	1	1	
11	8071	Hydraulic distributor B (6 connectors x 1)		1	
12	8100	2/2-way hand lever valve (N.C)	1		
13	8101	2/2-way hand lever valve (N.O)	1		
14	8102	3/2-way hand lever valve (N.C)	1		
15	8103	3/2-way hand lever valve (N.O)	1		
16	8105	4/2-way hand lever valve	1		
17	8150	2/2-way roller lever valve (N.C)	1		
18	8151	2/2-way roller lever valve (N.O)	1		
19	8190	4/3-way hand lever valve (PT bypass)		1	
20	8191	4/3-way hand lever valve (PABT closed center)		1	
21	8192	4/3-way hand lever valve (ABT connection)		1	
22	8193	4/3-way hand lever valve (PABT connection)		1	
23	8194	4/3-way hand lever valve (PAT connection)		1	
24	8200	Direct-acting pressure relief valve	2		
25	8201	Indirect-acting pressure relief valve		1	
26	8202	Externally piloted pressure relief valve		1	
27	8203	Pressure sequence valve		1	
28	8210	One-way hydraulic control valve	2		
29	8211	Bi-directional hydraulic control valve	1		
30	8212	Flow control valve with pressure compensation		1	
31	8220	Decompression valve		1	
32	8230	Counter balance valve	1		
33	8250	Check valve (1bar)	1		
34	8251	Check valve (5bar)	1		
35	8255	Indirect-acting check valve	1		
36	8260	Shut-off valve		1	
37	8280	Flow distribution valve		1	
38	8300	Hydraulic single acting cylinder			1
39	8301	Hydraulic double acting cylinder	2		
40	8303	Hydraulic differential cylinder		1	1
41	8304	Hydraulic double acting cylinder with a brake		1	1
42	THY-8300	Transparent single acting cylinder		1	1
43	THY-8301	Transparent double acting cylinder		1	1
44	8305	Hydraulic motor		1	
45	8340	Cylinder guide			1
46	8371	T-shaped connector	2	2	
47	8400	Pressure gauge	1		
48	8401	Hydraulic distributor with a pressure gauge	2	1	
49	8410	Pressure remover	1		
50	8420	Load A (5kg, square shape)			1
51	8421	Load B (5kg, circular shape)			1
52	8430	Flow level meter	1		
53	8680	Hydraulic hose holder (attachable structure)	1		
54	8681	Hydraulic hose holder (stand type structure)			1
55	8770	Hydraulic circuit symbol set			1

* Note: Your selection of "Advanced" will include "Basic" components plus "Advanced" components.

PRODUCT COMPOSITION

• Electro-Hydraulic Trainer (Model: CPE-HY8500)

No.	Part code	Description	Basic	Advanced	Option
1	8001	Single side worktable	1		
2	8002	Single side experimental board	1		
3	8050	Hydraulic pump unit A (2HP)	1		
4	8060	Hydraulic hose set (10/10/5)	1		
5	8070	Hydraulic distributor A (3 connectors x 2)	1	1	
6	8071	Hydraulic distributor B (6 connectors x 1)		1	
7	8200	Direct-acting pressure relief valve	2		
8	8201	Indirect-acting pressure relief valve		1	
9	8202	Externally piloted pressure relief valve		1	
10	8203	Pressure sequence valve		1	
11	8210	One-way hydraulic control valve	2		
12	8211	Bi-directional hydraulic control valve	1		
13	8212	Flow control valve with pressure compensation		1	
14	8220	Decompression valve		1	
15	8230	Counter balance valve	1		
16	8250	Check valve (1bar)	1		
17	8251	Check valve (5bar)	1		
18	8255	Indirect-acting check valve	1		
19	8300	Hydraulic single acting cylinder			1
20	8301	Hydraulic double acting cylinder	2		
21	8303	Hydraulic differential cylinder		1	1
22	8304	Hydraulic double acting cylinder with a brake		1	1
23	THY-8300	Transparent single acting cylinder		1	1
24	THY-8301	Transparent double acting cylinder		1	1
25	8305	Hydraulic motor		1	
26	8340	Cylinder guide			1
27	8371	T-shaped connector	2	2	
28	8400	Pressure gauge	1		
29	8401	Hydraulic distributor with a pressure gauge	2	1	
30	8410	Pressure remover	1		
31	8420	Load A (5kg, square shape)			1
32	8421	Load B (5kg, circular shape)			1
33	8430	Flow level meter	1		
34	8501	2/2-way single acting solenoid valve (N.C)	1		
35	8502	2/2-way single acting solenoid valve (N.O)	1		
36	8503	3/2-way single acting solenoid valve (N.C)	1		
37	8504	3/2-way single acting solenoid valve (N.O)	1		
38	8505	4/2-way single acting solenoid valve	2		
39	8506	4/2-way single acting solenoid valve	2		
40	8540	4/3-way double acting solenoid valve (PT bypass)	2		
41	8541	4/3-way double acting solenoid valve (PABT closed center)	2		
42	8542	4/3-way double acting solenoid valve (PABT connection)		1	
43	8543	4/3-way double acting solenoid valve (ABT connection)		1	
44	8544	4/3-way double acting solenoid valve (PAB connection)		1	
45	8550	Pressure switch (hydro-electric signal conversion)	1		
46	7550	Optical sensor - PNP (Directly reflective)		1	
47	7551	Optical sensor - NPN (Directly reflective)		1	
48	7552	Fiber optic sensor - PNP (Directly reflective)		1	
49	7553	Fiber optic sensor - NPN (Directly reflective)		1	
50	7554	Capacitive proximity sensor (PNP)	1		
51	7555	Capacitive proximity sensor (NPN)		1	
52	7556	Inductive proximity sensor (PNP)	1		
53	7557	Inductive proximity sensor (NPN)	1		
54	7562	Electrical limit switch (left)	2	1	
55	7563	Electrical limit switch (right)	2	1	
56	7710	4-pair relay module	2	1	
57	7711	Digital timer module	1		
58	7712	Digital counter module	1		
59	7713	Signal input switch module A	1		
60	7714	Signal input switch module B	1		
61	7716	Emergency switch module	1		
62	7718	Electric distributor module			1
63	7720	Buzzer & lamp module	1		
64	7750	Power supply	1		
65	7755	Connection cable set	1		
66	7892	Cable holder			1
67	8680	Hydraulic hose holder (attachable structure)	1		
68	8681	Hydraulic hose holder (stand type structure)			1
69	8770	Hydraulic circuit symbol set			1

* Note: Your selection of "Advanced" will include "Basic" components plus "Advanced" components.

CPE-PN2100

Electro-Pneumatic Control Trainer



FEATURES

- Miniaturized in size through the use of an integrated electrical control panel
- Increased relay contact (8C) suitable for configuration of complicated circuits
- Diverse experimental modules and components for building basic circuits and application circuits
- One-touch clamping devices mounted on the experimental modules allowing efficient use of space
- Industrial standard symbols and names shown on each experimental module to maximize learning effectiveness
- Supports easy connection to a programmable logic controller for wide range of experiments
- Customizable offer by two choices: all-in-one table structure and standalone desktop structure

* Please refer to our Pneumatic/Hydraulic Training System Catalog for more information and detailed specifications.

INTRODUCTION

The CPE-PN2100 Electro-Pneumatic Control Trainer features very practical integrated control panels in two types. Through the control panels, it offers power supply, signal input elements (switches), signal output elements (buzzer and lamp) and control elements (relay, timer and counter) for hands-on pneumatic and electro pneumatic practices.

The slim system structure and one-touch clamp devices mounted on the experimental modules provide the user convenience and effective learning environment. Especially, the power supply equipped with an overload protection circuit ensures safety and prevents malfunction of the components caused by wiring mistakes.

EXPERIMENTAL CONTENTS

- Basic electronic engineering principles
- Basic concept of electro pneumatic system
- Principles and structure of solenoid valve operation
- Functions of pneumatic and electrical control devices



SPECIFICATIONS

• Electro-Pneumatic Control System (CPE-PN2100-M)	
Main components	Experimental board , Integrated control panel (top & bottom) and control components
Integrated control panel - C	Power supply, electric distributor, relay, lamp, buzzer and tester
Integrated control panel - D	Electric distributor, timer (ON/OFF delay), switch and counter
Structure	2 types: All-in-one table structure and standalone desktop structure
Dimension	900(W) × 510(D) × 770(H) mm
• Electro-Pneumatic System Table (CPE-PN2100-T)	
Component cabinet (*customizable)	Equipped with built-in slot board and lock device Dimension: 840(W) × 650(D) × 150(H) mm
Drawer (*customizable)	3 rows / 4 rows (steel or wood) Dimension: 450(W) × 600(D) × 500(H) mm
Caster	Brake attachment type : 4ea
Dimension	900(W) × 750(D) × 750(H) mm
• Single Experimental Board (CPE-PN2100-W)	
Number of slot	20ea (*slot interval: 25mm)
Dimension	900(W) × 30(D) × 502 (H) mm
Adjustable angle	45° ~ 60°

STANDARD ACCESSORIES

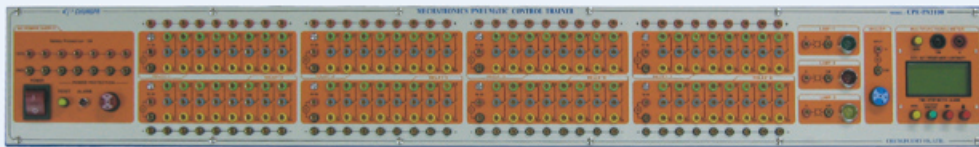
- Power cord : 1ea
- Connection cable : 1set
- Air hose and air cutter : 10m [diameter: 6mm (inner) /4mm (outer)]
- Piping components : T-shape connector
- Maintenance components : 1set
- User's guide manual: 1ea

OPTIONS

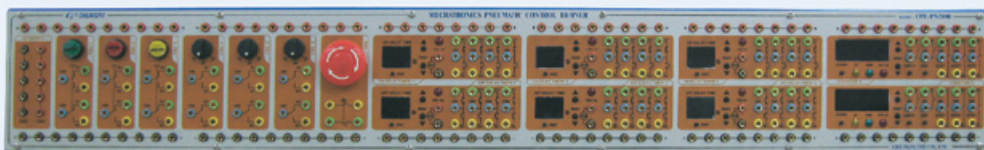
- Simulation software for automation system (*order model: Automation Studio)
- Low noise air compressor
- Pneumatic cut-away set (connectors , valves and actuators)
- Pneumatic symbols set
- Modular PLC trainer (attachable to the experimental board)
- Microprocessor trainer (attachable to the experimental board)

CPE-PN2100

PN-7702: Integrated control panel C type components (power supply, electric distributor, relay, lamp, buzzer and tester)



PN-7703: Integrated control panel D type components (electric distributor, timer, switch and counter)



Components	PN-7702	PN-7703
DC power supply & electric distributor - DC24V 5A, overload protection and alarm functions	1ea	—
Manual operation auto-return push button - 16Ø, 3 colors (red, green, yellow), 2C	—	3ea
Manual operation sustaining lever switch (3-position, 2C)	—	3ea
Emergency switch (AC 250V 6A, 1a1b)	—	1ea
8-pair electronic relay (DC 24V, bipolar characteristics) - DC30V 5A, 8C, 2-color indicator LED	8ea	—
Lamp (16Ø circular shape) - 3 colors (red, green and yellow)	3ea	—
Buzzer (85dB, continuous sound)	1ea	—
Digital multi-function tester - LCD display (9999 counts) - Measurement : DC1000V, AC 750V, 9999Ω - With stopwatch, clock and alarm functions	1ea	—
8-port multi terminal (+/-)	—	3 sets
9-port multi terminal (+/-)	4 sets	1 set
10-port multi terminal (+/-)	—	2 sets
Electric distributor (+24V, GND)	7 sets	5 sets
Timer (ON delay type, 0.1 ~ 99 seconds) - Contact : DC30V 5A, 4C	—	3ea
Timer (OFF delay type, 0.1 ~ 99 seconds) - Contact : DC30V 5A, 4C	—	3ea
Electronic counter (UP/DOWN type, 0 ~ 9999 times) - Output : DC 30V 5A, 3C	—	2ea

CPE-MP150

Smart PLC Trainer



FEATURES

- Sequence control by the Android smartphone application
- Direct access from smartphones for monitoring and control
- Enables connection to the wireless communication network
- Configuration and control of various types of digital I/O output in the smartphone application environment
- Carrying case structure for the user's convenience and excellent mobility

EXPERIMENTAL CONTENTS

- Ladder Diagram edit and control practices in the smartphone application mode
- Automation control practices by mobile interfaces
- How to control automation components such as cylinders, valves, relays and motors
- Direct access from smartphones for monitoring and control
- Control practices by connecting to the wireless communication network
- PC-based control practices

STANDARD ACCESSORIES

- Power cord: 1ea
- User's guide & experimental manual: 1ea



SPECIFICATIONS

• Android based smartphone application	
Radio protocol	IEEE 802.11b/g/n compatible
Data rate	11Mbps, 5.5Mbps, 2Mbps, 1Mbps (IEEE 802.11b)
Modulation	DSSS and CCK
Type of antenna (*option)	Chip antenna and U.FL connector for external antenna
Network protocol	UDP, TCP/IP (IPv4), DHCP, ARP, DNS, HTTP/HTTPS Client and Server(*)
Power consumption (typical)	Standby (34μA), Reception (125mA), Transmission (135mA)
RF output power (typical)	8 ± 1dBm
Security protocol	WEP, WPA/WPA2/PSK, Enterprise, EAP-FAST, EAP-TLS, EAP-TTLS, PEAP
I/O interface	UART, SPI(*), I2C(*), WAKE, ALARM, GPIOs
AVR board	ATmega128
Flash memory	128Kbytes (self-programmable)
EEPROM	4K bytes
Internal SRAM	4K bytes
WRITE/ERASE cycles	10,000 Flash/100,000 EEPROM
I/O terminal	Input terminal: 16 points (8-point /1COM)
	Output terminal: 6 points (8-point /1COM)
Digital I/O Simulator	Input switch : Toggle switch (4ea), Push button (4ea)
	Output Indicator lamp (DC 24V) : 8ea
Structure	Aluminum carrying case
32 x 8 general purpose working registers + peripheral control registers	
133 powerful instructions	
Up to 16 MIPS at 16MHz	
On-chip 2-cycle multiplier	
In-system programming by on-chip boost program	
Optional external memory space up to 64K Bytes	
JTAG interface (IEEE 1149.1 compliance)	
Real-time counter with the separate oscillator	

CPS-APLC

Integrated Automation PLC System



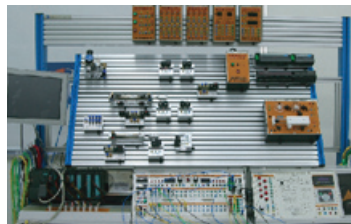
FEATURES

- All-in-one integrated training system designed to cultivate excellent technical professionals
- Consists of PLC System, Electro-Pneumatic Trainer, Servo Motor Trainer, Inverter Trainer, HMI Touch Panel and Automation Simulation Software
- Universal-type modularized PLC system supporting interlocking practices on the I/O unit marked in different colors
- Capable of attaching and detaching three types of programmable logic controller : LS, Mitsubishi and Siemens
- Various types of electrical application modules and sensor simulation modules comprising the Electro-Pneumatic Trainer
- Inverter Trainer and Servo Motor Trainer for hands-on automation practices

EXPERIMENTAL CONTENTS

1. Principles of PLC operation
2. A/D Simulator and D/A Simulator
3. Operation of motors by timer and counter
4. Operation of motors by proximity sensors
5. Operation of output sequence by the analog switch
6. Operation of conveyor
7. Operation of pneumatic components
8. Applications of the counter by photo sensor
9. How to operate the stepping motor
10. How to operate the position simulator
11. CW/CCW revolution of motors
12. Close-loop control on AI and AO by a programmable logic controller
13. Control practices of smart I/O
14. Control practices of 2-axis servo robot
15. Control practices of HMI Touch panel and SCADA
16. Programming practice using PLC application software

Installation Site - Korea University of Technology and Education



SPECIFICATIONS

PLC System (CPS-3500U)

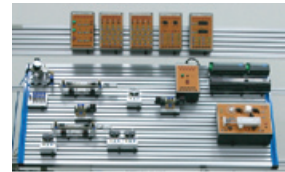
- PLC Unit Module
 - Select one from three types of module: LS, Mitsubishi and Siemens
 - Includes a support bracket for PLC system
- DC Power supply
- Input : 32 points (8 points / 1COM)
- Output : 32 points (8 points / 1COM)



- I/O Simulator : Lamp and buzzer
- A/D Simulator & D/A Simulator

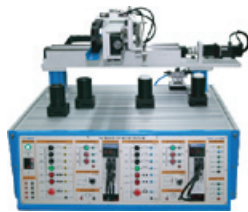
Electro-Pneumatic Trainer (CPE-PN7500)

- One-touch clamp lever
- Horizontal and vertical installation of module components
- Various types of electrical application module
- Various types of sensor module



Servo Motor Trainer (CPE-AT4400)

- Servo motor : 50W
- Servo drive
- Main frame and control panel
- Pneumatic forward & reverse absorption: Z-axis
- Storage cell : 4ea



Inverter Trainer (CPE-ER1010)

- 3-phase inverter : 1HP (0.75KW)
- 3-phase induction motor :
- 3-phase AC 220V
- Close-loop control on AI and AO using a PLC



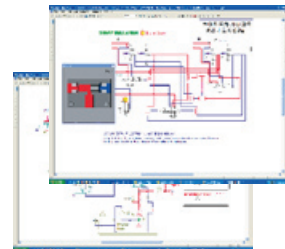
Touch Panel System

- LCD screen : TFT color LCD
- Screen size : 10.4" or 15"
- Color : 65,536 colors
- Luminance : 400cd/m2
- Structure: Equipped with the touch panel system installed on the aluminum profile



Integrated Automation Simulation Software (Automation Studio)

- Pneumatic & hydraulic control
- Proportional & Servo hydraulic control
- Electrical control
- HMI control
- Automation System
- Mechatronics



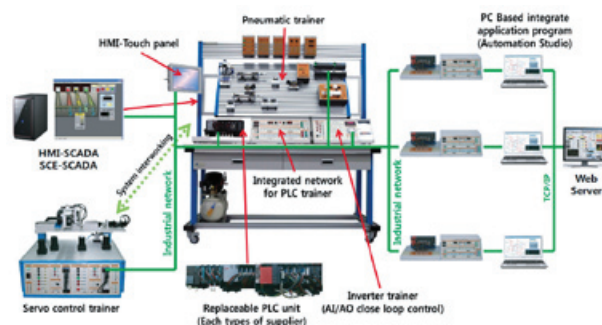
Mitsubishi CC-Link (CPS-3625M2 & CPS-3625M3)

- CC-Link Input Module (CPS-3625M2) : 1ea
- CC-Link Output Module (CPS-3625M3) : 1ea



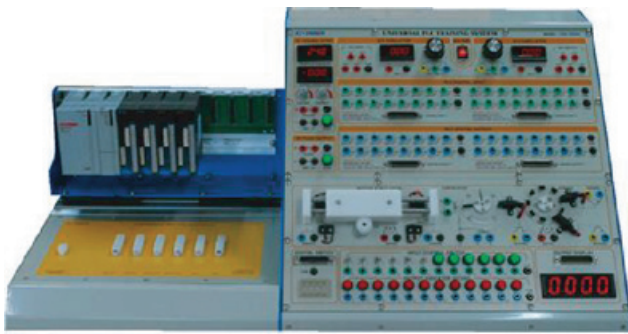
STANDARD ACCESSORIES

- Power cord : 1ea
- 4Ø connection cable : 1set
- 25-pin connector cable : 2ea
- RS-232C cable : 1ea
- PLC application software CD : 1ea
- User's guide manual : 1ea
- User's guide & experimental manual : 1ea



CPS-3520U

Universal Programmable Logic Controller Trainer



FEATURES

- Cost-saving PLC system platform designed to replace one PLC with other
- Compatible with programmable logic controllers mostly popular in the market
- Easy installation of a modularized PLC and replacement of it with other type of PLC
- Supports configuration of diverse I/O conditions for realistic PLC experiments on (FMS and other automated system)
- Equipped with a DC 24V power supply and an aluminum profile plate for mounting pneumatic components easily

INTRODUCTION

The CPS-3520U Universal Programmable Logic Controller Trainer is compatible with world's famous PLC brands such as LS, Mitsubishi and Siemens. The Universal Programmable Logic Controller supports easy installation of one particular PLC or a replacement PLC. It also supports easy installation of experimental modules for diverse range of experiment.

The CPS-3520U Universal Programmable Logic Controller Trainer features interlocking connectivity with the automated system such as Solar Energy Training System, Electro-Pneumatic Trainer and Sequence Trainer. In addition, it supports configuration of diverse I/O conditions for realistic PLC experiments (FMS and other automated system).

EXPERIMENTAL CONTENTS

- Principles of PLC operation
- A/D Simulator and D/A Simulator
- Digital input (DI) and digital output(DO)
- Operation of motors by timer and counter
- Operation of motors by proximity sensors
- Operation of output sequence by the analog switch
- Operation of buzzer sound by input signals
- Applications of the counter by photo sensor
- How to operate the stepping motor
- How to operate the position simulator
- Programming practice using PLC application software

SPECIFICATIONS

PLC	Standard PLC unit: XGI-CPUS (LS) * Other types of PLC (Mitsubishi or Siemens) can be provided upon request.
I/O terminal	Number of I/O - Input: 32 points (8-point COM) - Output: 32 points (8-point COM) Expansion I/O connector : 4ea
DC output	Output: DC 0 ~ 24V / 0~2A Ripple : 0.02% + 2mV Regulation : 0.02% + 1mV DVM, DAM Protection : Overload trip & Reset switch
DC output	Output: DC 24V 2A (fixed) Ripple : 0.0% + 2mV Regulation : 0.02% + 1mV Protection : Overload trip & Reset switch
Power source	AC 220V 50/60Hz
Dimension	775(W) x 400(D) x 335(H) mm

Experimental Module

A/D & D/A Simulator

- 1) Variable signal system
 - 10-turn variable resistor: 2ea
 - 4Ø terminal block: Voltage (3ea), Current (3ea) and I/O (3ea)
- 2) Digital Voltmeter
 - DC15V scale voltmeter: 2ea
 - 4Ø terminal block: A/D (2ea) and D/A (2ea)
- 3) Analog input terminal : 4CH / 1COM
- 4) Analog output terminal : 4CH / 1COM

Digital Switch and Display

- 1) Digital switch
 - Digital switch (4 digits, 0~ 9) : 1ea
 - 25-pin connector (compatible with the 25-pin connector for PLC input) : 1ea
 - COM terminal (4Ø) : 1ea
- 2) Digital display
 - 4-digit digital display : 1ea
 - 25-pin connector (compatible with the 25-pin connector for PLC output) : 1ea

Motor Simulator

- 1) Position Simulator : 1ea
 - Input control : PLC contact signal
 - Feeder
 - Left & right round trip (by gears)
 - White color acetal
 - Feeder guide : 2ea
 - Limit sensor (left and right) : 2ea
 - Position sensor (left and right) : 2ea
 - Feeder motor : 2ea
 - DC 24V operation, reduction gear
 - 4Ø input terminal block
- 2) Count Simulator : 1ea
 - DC Motor (DC 24V, 100 RPM) : 1ea (*4Ø input terminal: 2ea)
 - Rotary disc for detecting revolution: 16 steps per revolution
 - Photo Sensor (DC 24V) : 2ea
- 3) Stepping Motor Simulator (2-phase) : 1ea
 - Stepping motor: DC 24V, 2-phase, 1.8°
 - Rotary disc for detecting revolution: Displays in scales
 - 4Ø input terminal block: 5ea (A, A', B, B' and CT)

Digital I/O Simulator

- 1) Input switch : Toggle switch (6ea) and Push button (6ea)
 - 4Ø output terminal : 1COM, 12 points
- 2) Output simulation lamp (DC24V) : 12ea
 - 4Ø input terminal : 1COM, 12 points

STANDARD ACCESSORIES

- Power cord: 1ea
- Connection cable (4Ø): 1set
- 25-pin connector cable: 2ea
- RS-232C cable: 1ea
- PLC application software CD: 1ea
- User's guide & experimental manual: 1ea



CPS-3550U

Modular PLC Application Trainer



FEATURES

- Cost-saving PLC system platform designed to replace one PLC with other
- Compatible with programmable logic controllers mostly popular in the market
- Easy installation of PLC special units for diverse level of PLC practices
- Supports configuration of diverse I/O conditions for realistic PLC experiments on (FMS and other automated system)

EXPERIMENTAL CONTENTS

1. Principles of PLC operation
2. A/D Simulator and D/A Simulator
3. Operation of motors by timer and counter
4. Operation of motors by proximity sensors
5. Operation of output sequence by the analog switch
6. Operation of conveyor
7. Operation of pneumatic components
8. Operation of buzzer sound by input signals
9. Applications of the counter by photo sensor
10. How to operate the stepping motor
11. How to operate the position simulator
12. CW/CCW revolution of motors
13. Close-loop control on AI and AO by a PLC
14. Control practices of 3-phase motor control by inverter
15. Control practices of smart I/O
16. Control practices of 1-axis servo robot
17. Control practices of HMI Touch panel
18. Programming practice using PLC application software



SPECIFICATIONS

• Worktable Set

Worktable	L-type panel structure (aluminum profile frame)
Main experiment panel (horizontal type)	Size : 800(W) x 605(D) mm
	Aluminum profile (each slot in the gap of 25mm) Flexible space utilization by fixing modules vertically or horizontally
Auxiliary panel (vertical type)	Size : 740(W) x 155(D) mm
	Aluminum profile (each slot in the gap of 25mm) Flexible space utilization by fixing modules vertically or horizontally
Drawer	Double drawer structure with a lock system Particle board (Low Pressure Melamine)
Cable holder	Number of mounting hole: 4ea Mounted to the side of worktable
Casters	Wheel with a lock: 4ea
Dimension	Worktable with Auxiliary panel - 800(W) x 605(D) x 1105(H) mm
	Worktable without Auxiliary panel - 800(W) x 605(D) x 750 (H) mm

Selectable System Configuration

(1) PLC Module (LS / Mitsubishi)

LS XGT PLC (*Select CPS-3550X or CPS-3625K)

XGT PLC Module (CPS-3550X)

- CPU Module : 1ea
- Power Module : 1ea
- Input Module : 2ea
- Output Module : 2ea
- Power Switch : 1ea
- Control Input : 2ea
- Control Output : 2ea



XGT PLC Module (CPS-3625K)

- CPU Module : 1ea
- Power Module : 1ea
- Input Module : 2ea
- Output Module : 2ea
- A/D Module : 1ea
- D/A Module : 1ea
- Positioning Module : 1ea
- Ethernet Module : 1ea



Mitsubishi PLC (*Select CPS-3550M or CPS-3625M)

MELSEC PLC Module (CPS-3550M)

- CPU Module : 1ea
- Power Module : 1ea
- Input Module : 2ea
- Output Module : 2ea
- A/D Module : 1ea
- D/A Module : 1ea
- Positioning Module : 1ea



MELSEC PLC Module (CPS-3625M)

- CPU Module : 1ea
- Power Module : 1ea
- Input Module : 2ea
- Output Module : 2ea
- A/D Module : 1ea
- D/A Module : 1ea
- Positioning Module : 1ea
- CC Link Module : 1ea



MITSUBISHI CC-Link

- CC-Link Input Module (CPS-3625M2) : 1ea
- CC-Link Output Module (CPS-3625M3) : 1ea



* Remark: Other brands of PLC such as Siemens can be provided upon request.

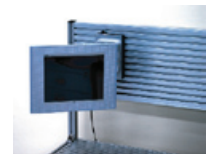
(2) Demonstration System (CPS-3550U)

- AC input voltage : AC220V 60Hz
- DC output voltage : DC 0~24V, 0~2A (variable) / DC 24V 2A (fixed), DVM, DAM
- I/O Terminal:
 - Input: 32 points
 - Output: 32 points
 - Connector (25-pin): 4ea
- A/D & D/A Simulator



(3) Touch Panel Module

- Type of screen : TFT Color LCD
- Screen size : 10.4" ~ 15"
- Display color : 65,536 Colors
- Luminance : 400cd/m2



(4) Servo Motor Trainer (CPS-AT4430)

- 50W Servo motor : 1ea
- Servo actuator unit : 1ea
- Signal detector
- Torque level analog
- Control switch
- Position input
- Positioning module



(5) Inverter Trainer (CPE-ER1010)

- 3-phase inverter : 1HP (0.75KW)
- 3-phase induction motor : 3-phase AC 220V
- I/O devices

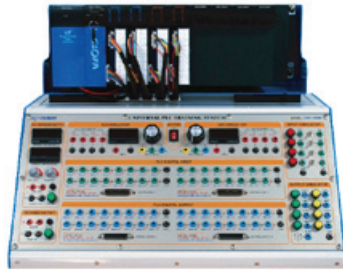


STANDARD ACCESSORIES

- Power cord: 1ea
- Connection cable (4Ø): 1set
- 25-pin connector cable: 2ea
- RS-232C cable: 1ea
- PLC programming software CD: 1ea
- User's guide & experimental manual: 1ea

CPS-3500U

Universal PLC Training System



CPS-3500UB



CPS-3500UA

FEATURES

- All-in-one integrated training system designed to cultivate excellent technical professionals
- Capable of installing and replacing three types of PLC: Mitsubishi, LS and Siemens
- Easy installation of a modularized PLC and replacement of it with other type of PLC
- Equipped with a DC 24V power supply and an aluminum profile plate for mounting experimental modules easily
- 4-digit DC power monitoring device to check the status of power

EXPERIMENTAL CONTENTS

- Functions of the programmable logic controller
- 1:1 contact control by the input switches
- Group control of lighting by the analog switch
- Motor control by a timer and a counter
- Output sequence control by the analog switch
- Counter application by the photo sensor
- Motor control by the proximity sensor
- Controlling the buzzer sound by input signals
- Operations of the position simulator
- Interlock Circuit

SPECIFICATIONS

• Main Frame		
DC output power	Voltage	0~24V variable / 24V fixed
	Current	0~2A variable / 2A fixed
	Ripple	0.02% + 2mV
	Regulation	0.02% + 1mV
	Voltmeter	DVM
	Ammeter	DAM
	DC output protection	Overvoltage / overcurrent / overload protection, Alarm function
	Reset switch	1ea
I/O terminal	Input terminal	32 points (8 points / 1COM) 25-pin connector : 2ea
	Output terminal	32 points (8 points / 1COM) 25-pin connector : 2ea
	Analog input terminal	4 channels
	Analog output terminal	4 channels
I/O simulator	Input switch	Toggle switch (4ea), Push button (4ea) (Output terminal : 2COM, 8 points)
	Output lamp	8ea (input terminal : 1COM, 8 points)
	Output buzzer	1ea (input terminal : 1COM, 1 point)
A/D & D/A simulator	A/D signal variable system	10-turn variable resistor (for voltage I/O & current I/O) : 2ea 4Ø terminal block : 3ea
	Digital voltmeter	2ea (DC 15V scale)
	A/D input terminal	8 points / 1COM
	D/A output terminal	4 points / 1COM
Panel structure	Aluminum profile structure with each slot of 25mm Multi-connector for various PLC units	
Input voltage	AC 220V 50/60Hz	
Dimension	995(W) x 300(D) x 220(H) mm	

SPECIFICATIONS

• Mitsubishi PLC System (CPS-3500UA)		
CPU (Q03UDECPU)	Program capacity	28KB
	Device memory	29KB
	RAM	32KB
	Processing speed	0.079μs
Base Module (Q38B)	8 slots for installing the Q-series modules	
Power Module (Q62P)	Input voltage range	AC 100V ~ 240V
	Output voltage	DC 5V / 24V
	Output current	3A / 0.6A
Input Module (QX40 : 2ea)	16-point input	DC 24V 4mA
	Response time	1 / 5 / 10 / 20 / 70 ms
	16 points, 1 common	18-point terminal
Output Module (QY10 : 2ea)	16-point output	DC 24V / AC 240V 2A / 1 point, 8A / 1 common
	Response time	12 ms
	16 point, 1 common	18-point terminal
GX Developer (MELSEC PLC Programming software)	OS	WINDOWS 9x, XP, NT
	Program language	LD, SFC, ST, FB
	ALD language	ETHERNET, MELSECNET/H
	Network parameter setting	CC-LINK
PC Communication Cable		1ea
Main Frame		1ea
• LS GLOFA-GM4 PLC System (CPS-3500UB)		
CPU (GM4-CPUA)	Program memory	128KB
	Data memory	64KB
	Maximum I/O point	2048 points
Base Module (GM4-B08)	Number of slot	8ea (for mounting the GM4 module)
Power Module (GM4-PA2A)	Input voltage	AC220V
	Output voltage/current	DC5V 4A, DC24V 0.7A
Input Module (G4I-D22A): 2ea	16-point input	DC12V / 24V
	Rated input current	5mA / 11mA
	8 points 1 common	20-point terminal
Output Module (G4Q-RY2A): 2ea	16-point output	Relay
	Rated Load	DC12V / 24V, AC110/ 220V 2A
	8 points 1 common	20-point terminal
Analog Input Module (G4F-AD2A)	Voltage/current input type (4 channels)	DC -5 ~ +5V, -10 ~ +10V, -20 ~ +20mA
Analog Output Module (G4F-DA2V)	Voltage output type (4 channels)	DC -10 ~ +10V
PLC Programming Software	GMWin (GLOFA GM series software)	
PC Communication Cable	RS232C cable (1ea)	
Main Frame	1ea	

PLC Unit



CPS-3500U

• Siemens S7-1500 PLC System (CPS-3500UC)		
CPU	Processing speed	10ns
	Number of I/O modules	Maximum 8,192 ea
	Programming language	LAD, FBD, STL, SCL, Graph
	Power source	24VDC (reverse voltage prevention)
	Display	Diagonal 6.1cm
I/O Address Area	Digital input unit & voltage	32 contact points & 24VDC
	Digital output unit & voltage	32 contact points & 24VDC
	Analog input unit & voltage	8 channels & -10 ~ +10VDC (0 ~ 20mA)
	Analog output unit & voltage	4 channels & -10 ~ +10VDC (0 ~ 20mA)
PLC Programming Software	SIMATIC STEP 7 Professional	
PC Communication Cable	Ethernet cable (1ea)	
Main Frame	1ea	
• LS XGT PLC System (CPS-3500UD)		
CPU	Program memory	32K steps
	Self-diagnosis function	Arithmetic operation, memory error, I/O error, battery trouble, abnormal power
	Program port	RS-232C (1-channel), USB (1-channel)
Base module	Number of slot	8ea
Power module	Free Voltage	DC 5V 3A
		DC 24V 0.6A
Input module	Input 16 points (source)	DC 24V
Output module	Output 16 points	Relay
Analog Input module	Voltage input type (8 channels)	
Analog Output module	Voltage output type (4 channels)	
PLC Programming Software	XG5000	
PC Communication Cable	RS232C or USB cable (1ea)	
Main Frame	1ea	

* Select one of the four different PLC system: CPS-3500UA, CPS-3500UB, CPS-3500UC and CPS-3500UD

STANDARD ACCESSORIES

- Power cord : 1ea
- PLC download cable : 1ea
- Connection cable : 1set
- User's guide manual : 1ea

Integrated System Installation



CPS-3400

Programmable Logic Controller Trainer



INTRODUCTION

The CPS-3400 Programmable Logic Controller Trainer is based on tailor made production and compatible with various types of PLCs (LS, Mitsubishi, Siemens, Allen Bradley and etc.). The Programmable Logic Controller Trainer can have diverse scalability through the modularized I/O simulation devices. The mounting frame, made of aluminum profile, is compatible with experimental modules of Module Type Sequence Control Trainer, Pneumatic Trainer and Hydraulic Trainer.

EXPERIMENTAL CONTENTS

- Functions of the programmable logic controller
- AND circuit and OR circuit
- 1:1 contact control by the input switches
- Motor control by a timer and a counter
- Counter application by the photo sensor
- Interlock circuit
- Directional control of the motor (forward / reverse)
- Operation of stepping motor
- Operation of position simulator
- A/D Converter and D/A Converter
- Potentiometer
- Temperature sensor
- Photo control SCR circuits

STANDARD ACCESSORIES

- Power cord : 1ea
- 4Ø connection cable : 1set
- 25-pin connector cable : 1ea
- RS-232C cable : 1ea
- PLC programming software CD : 1ea
- User's guide & experimental manual: 1ea

FEATURES

- Hands-on programming practices on diverse range of application
- Modularized PLC I/O simulation devices
- Built-in encoder, 4-digit switch and indicator
- Equipped with a stepping motor, a DC motor and a linear transfer device
- Various experimental modules (3 standard modules and 14 optional modules)
- Extension connector designed to control external I/O devices

SPECIFICATIONS

- Types of PLC: LS, Mitsubishi, Siemens, Allen Bradley and etc.
- PLC communication & special unit: Options

I/O terminal	Input: 32 points (8-point COM.) Output: 32 points (8-point COM.)
	Expansion I/O connector : 4ea
DC 0 ~ 24V output	DC 0 ~ 24V / 0 ~ 2A
	Ripple : 0.02% + 2mV
	Regulation : 0.02% + 1mV
	DVM, DAM Protection : Overload trip
DC 24V output	DC 24V 2A (fixed)
	Ripple : 0.02% + 2mV
	Regulation : 0.02% + 1mV Protection : Over load trip
AC 220V output	AC 220V 2A (fixed)
	Protection : Over load trip
Rotary encoder block	100 pulses / circle
	Output phase : A, B
	Input voltage : DC 5V ~ 24V
Power source	AC 220V 50/60Hz
General information	Dimension : 780(W) x 440(D) x 410(H) mm
	Weight : 35kg (with three standard modules)

Standard Experimental Modules (3ea)

1) PLC Input Controller (CPS-3400A-01)



- Data input switch (toggle): 8ea
- Push button switch: 11ea
- Selector switch (SPDT): 1ea
- Digital switch (4 digits): 1ea

2) PLC Output Simulator (CPS-3400A-02)



- Output indicator (DC 24V): 16ea
- Output lamp (DC 24V): 2ea
- Buzzer (DC 24V): 1ea
- Binary counter (4 digits): 1set
- Input power: DC 24V

3) Count & Position Simulator (CPS-3400A-03)



- Type of input control: PLC contact signal
- DC Motor (900 RPM): 1ea
- DC deceleration motor: 1ea
- Stepping motor (2-phase): 1ea
- Photo sensor output: 3ea
- Limit sensor output: 2ea
- Input power: DC 24V

Optional Experimental Modules (14ea)

1) A/D Converter (CPS-3400A-04)



- Analog input: 0 ~ 10V DC
- Digital output: Binary 8 bits
- Conversion time: 100 μ s (variable)
- Clock frequency: 100kHz ~ 1MHz
- DC output: 0 ~ 15V
- Input power: AC 220V

2) D/A Converter (CPS-3400A-05)



- Digital input: Binary 8 bits
- Analog output: 0 ~ 10V DC
- Conversion time: 50 μ s
- Data switch (toggle): 8ea
- Analog monitor range: 1.5V, 15V (FS)
- Input power: AC 220V

3) Power & Terminal Transfer Unit (CPS-3400A-06)



- Terminal change (4 ϕ →2 ϕ): 20ea
- DC output: \pm 15V 500mA
- AC output: 110V 200mA
- Input power: AC 220V

4) Potentiometer & Meter Unit (CPS-3400A-07)



- Voltage signal: -15V ~ 0 ~ +15V
- Current signal: -500mA ~ 0 ~ +500mA
- Variable signal (10-turn variable resistor): 10k Ω / 3W
- Indicator (AVM, DC 0V ~ 15V): 2ea

5) Temperature Sensor Unit (CPS-3400A-08)



- Temperature sensing circuit: Wheatstone bridge
- Temperature control: Heater and cooling fan
- Resistance: 50Ω ~ 5kΩ
- Input power (Thermocouple): AC 220V

6) Photo Control SCR Circuit Unit (CPS-3400A-09)



- Input voltage: 0 ~ 10V DC
- SCR phase control: Photo coupler
- Output: AC 220V 10W (lamp)
- Input power: AC 220V

7) Emergency Switch Unit (PN-7716)



- Emergency button: 1a, 1b
- Contact capacity: DC 24V 5A

8) 4-pair Relay Unit (PN-7710)



- Relay (4PDT): 4ea
- Input voltage: DC 24V
- Contact capacity: DC 24V 3A / AC 110V 3A
- I/O terminal (4ø): 68ea

9) A-Type Signal Input Switch Unit (PN-7713)



- Latching type (2PDT): 1ea
- Momentary type (2PDT): 2ea
- Contact capacity: DC 24V 1.5A
- Button lamp (RED, GREEN): DC 24V
- I/O terminal (4ø): 30ea

10) B-Type Signal Input Switch Unit (PN-7714)



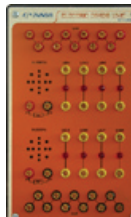
- Latching type (2PDT): 2ea
- Momentary type (2PDT): 1ea
- Contact capacity: DC 24V 1.5A
- Button lamp (RED, GREEN): DC 24V
- I/O terminal (4ø): 30ea

11) Buzzer & Lamp Unit (PN-7720)



- Buzzer (DC 24V): 2ea
- Indicator lamp (RED, GREEN): 8ea
- Lamp voltage: DC 24V
- I/O terminal (4ø) : 42ea

12) Electric Distributor Unit (PN-7718)



- Buzzer (DC 24V): 2ea
- Indicator LED: 8ea
- LED voltage: DC 24V
- I/O terminal (4ø): 42ea

13) PLC Data Distributor (CPS-3400A-16)



- Channel selection: 16 channels
- Input connection: 1ea
- Output connection: 16ea
- Connector: 9P (RS-232C)

14) Extension I/O Unit (CPS-3400A-17)



- Input: 32 points (8Com.x4)
- Output: 32 points (8Com.x4)
- 39P connection cord: 10 meter x 2ea
- I/O terminal (4ø): 72ea

CPE-PN7540

Multiple-PLC Application Trainer



FEATURES

- Compact size PLC & production automation trainer suited in a carrying case
- Hands-on simulation practices using essential pneumatic elements
- Equipped with three types of economical programmable logic controller (I/O combinational type) to improve site response capabilities
- Supports stand-alone operation using a single PLC through its unique I/O terminal
- User-driven experiments on a small automated production system
- Use 4mm insulated terminals for user convenience in wiring
- Various types of experiment through the programmable logic controller and pneumatic sequence control units

* The types of applicable PLC's can be changed upon customer's request.

EXPERIMENTAL CONTENTS

- PLC programming and basic control practices
- Basic pneumatic control
- Cylinder control
- Series (AND) circuit / Parallel (OR) circuit
- Double-acting cylinder with an automatic return circuit
- Double-acting cylinder with a shuttle circuit
- Automatic single/continuous cycle circuit
- Delay circuit with excitation

PRODUCT COMPOSITION

- Programmable Logic Controller
 - Mitsubishi PLC (1ea)
 - LS Industrial PLC (1ea)
 - Allen-Bradley PLC (1ea)
- Common PLC System Unit
- Sequence Control Unit
- Automated Production Cells

SPECIFICATIONS

Programmable Logic Controller	Mitsubishi PLC	Arithmetic processing: Stored program (repetitive operation)
		Program control: Batch-processing method, I/O refresh command, pulse catch function
		Program language: Relay symbol method + Step ladder method (supports SFC expression)
		Maximum memory capacity: 64,000 steps
		Input point: 16 points
		Output point: 16 points
	LS Industrial PLC	Program control: Stored program (repetitive operation), fixed cycle operation and interrupt operation
		I/O control type: Scan synchronization batch-processing or direct processing
		Arithmetic calculation speed : 0.1~0.9 μ s/step
		Input point : 12 points
	Allen-Bradly PLC	Output point : 12 points
		8 digital 24V DC inputs
		6 relay outputs
		3 fast 24V DC outputs
		3 normal 24V DC outputs
		4 analog (12 bits) inputs
Common PLC System Unit	2 analog (12 bits) outputs	
	Main power switch	
	DC Power Supply	
	- 24V output	
	- Built-in reset switch	
- Built-in overload indicator lamp		
PLC power switch: 3ea (for 3 types of PLC)		
Built-in I/O terminal structure (for 3 types of PLC)		

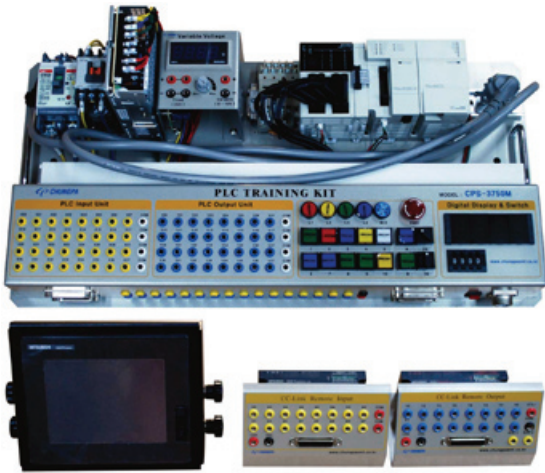
Sequence Control Unit		Relay - 3C Relay: 8ea - Operation indicator: LED
		Digital Timer - ON/OFF delay: 1ea (each) - Operation Type: Digital ON delay & OFF delay - Rated voltage: DC24V - Contact and output terminal: 4c x 2 sets
		Digital Counter - Up/Down Counter: 2ea - Operating method: Digital Up/Down Counter - Output contact capacity: DC 30V 5A - Contact and output terminal: 3c x 2 sets
		Signal input switch - Spring return push button (with a lamp): 2ea - Self-lock push button (with a lamp): 1ea - Contact and output terminal: 2c x 3 sets
Automated Production Cells	Service unit	Service unit : 1ea
	Solenoid valve	5/2-way single acting solenoid valve : 3ea 5/2-way double acting solenoid valve : 3ea
	Supply module	Feed cylinder : 1ea Feeding tube (with a work piece): 1ea
	Transfer module	Transfer conveyor : 1ea Cargo box: 2ea With DC 24V geared motor and polyurethane belt
	Sensor detection module	Capacitive proximity sensor : 1ea Inductive capacity sensor : 1ea
	Ejection module	Ejection cylinder: 1ea Carrying case for the passed: 1ea Carrying case for the rejected: 1ea
	Warehousing module	Pallet : 1ea Load cylinder : 1ea Directional change: left to right, right to left
	Input terminal (for standalone control)	Type: 4mm insulated terminal Number of terminals: 44ea
Structure	Hard case	Material: Aluminum
	Experiment panel	Schematization of the pneumatic element symbols

STANDARD ACCESSORIES

- AC power cord: 1ea
- Connection cable (4mm): 1set
- PLC download cable: 1ea
- User's guide & experimental manual: 1ea

CPS-3750M

Automation PLC Training Kit



FEATURES

- Carrying case structure for excellent storage and transport convenience
- Ethernet interface to communicate with a programmable logic controller
- Modularized I/O devices capable of linkage operations
- Wiring practices with 4mm plug terminals and 25-pin connectors
- Automated production line in miniature designed for enhanced skills training on PLC and control technologies

EXPERIMENTAL CONTENTS

- Communication between PLC and HMI (and CC-Link)
- Understanding of the system mechanism and learning installation methods
- Operation and verification with the PLC program
- Basic and applied PLC command languages
- Digital indicator unit (FND) and digital switch circuit
- PC monitoring by a HMI program and designing a remote control program

STANDARD ACCESSORIES

- AC power cord: 1ea
- 4mm connection cable: 1set
- PLC download cable : 1set
- User's guide manual: 1ea

PRODUCT CONFIGURATION

- PLC Module Set
- CC-Link Remote Input/Output
- Variable Voltage
- Power Supply
- Magnetic Contactor
- Earth Leakage Circuit Breaker
- Relay
- HMI Module

OPTIONS

- Elevator Trainer (CPE-AT3900)
- Automated Parking System Trainer (CPE-AT3910)
- Conveyor Control Trainer (CPE-AT3810)
- 2-Axis Servo Motor Trainer (CPE-AT4460)

SPECIFICATIONS

Category	Description
PLC Base Unit	DC24V sync input (32 points), TR sync output (32 points)
PLC Positioning unit	SSCNET III
CC-Link	CC-Link V2 interface block
Connector Conversion Adaptor	For combining special blocks and units
Touch Panel (HMI)	5.7 inch, color, Ethernet
CC-Link Remote I/O	16P DC input
CC-Link Remote I/O	16P TR output
Servo Drive	SSCNET III/H, 100W
Servo Motor	Small capacity, 100W
Power Supply	Input: AC200~240V Output: DC24V
Earth Leakage Circuit Breaker (ELCB)	2P 10A, 30mA, 2.5kA
Digital Indicator Unit (FND)	Character height: 14mm Indicator: RED, GREEN
Digital Switch	0 ~ 9 indication switch: 4ea
Terminal Relay	C contact & 4-point output
Digital Panel Meter	Output: DC 0~24V
Electronic Contactor	DC24V & DC operation type



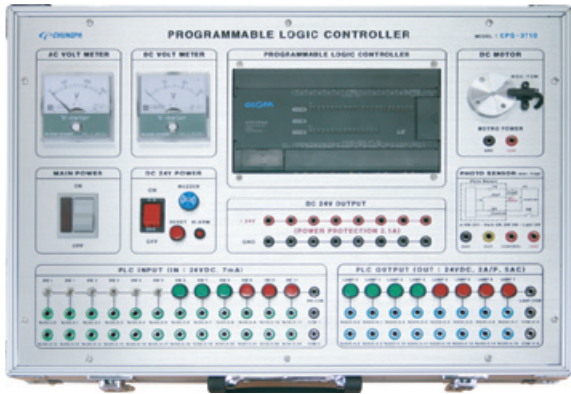
[PLC Training Kit]



[Touch panel and CC-Link Modules]

CPS-3710, CPS-3720, CPS-3720M

Portable PLC Trainer



FEATURES

- Portable PLC training system (LS GM-7 PLC / LS XGT Series PLC / Mitsubishi FX Series PLC)
- Carrying case structure for excellent storage and transport convenience
- Realistic simulation designed to help obtain professional engineer certificates
- Supports connecting the CPS-AT3450 Mini Multi Programming System Trainer for extensive learning purposes

EXPERIMENTAL CONTENTS

- Functions of the programmable logic controller
- 1:1 contact control by the input switches
- Various types of digital I/O operation
- Group control of lighting by the digital switch's signal input
- Motor control by a timer and a counter
- Directional control of the motor (forward / reverse)
- Counter application by the photo sensor

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- PLC download cable : 1ea
- User's guide manual : 1ea

SPECIFICATIONS

• CPS-3710 MODEL

PLC Unit (GM7U-DR40)	Control Method	Repetitive operation / Pre-timed Operation / Interrupt Operation / Fixed Cycle Scan
	Program language	Instruction List (IL) / LD (Ladder Diagram) / SFC (Sequential Function Chart)
	I/O terminal (DI, DO)	Input: 24 points Output: 16 points
	Command	Operator: LD (13ea), IL (20ea) Basic function: 194 types Basic function block: 12ea
	Processing speed	0.1 ~ 0.9 μ s / step
	Program Memory	132kbyte (including parameter area)
	Program block	100ea
	Operation Mode	RUN, STOP, PAUSE, DEBUG
	Self diagnosis	Watchdog timer, memory error and I/O error
	Input voltage	AC220V
DC power output	Voltage	24V
	Current	2A
Voltmeter	AC voltmeter	Range : 0 ~ 300V
	DC voltmeter	Range : 0 ~ 30V
I/O simulator	Input	12 points - Toggle switch: 6 points - Push button: 6 points
	Output	8 points (lamp)
Load	Motor	DC24V & Photo interrupter
	Photo Sensor	DC24, GND, CONTROL, OUTPUT

• CPS-3720 MODEL : XGB Series PLC unit (XBC / XEC)

• CPS-3720M MODEL : Mitsubishi PLC Unit (FX Series)

CPS-3800

Siemens PLC Trainer



FEATURES

- Helps the user learn how to control a Siemens Programmable Logic Controller (PLC) both in digital I/O and analog I/O
- Capable of performing related experiments on stepping motor and DC motor
- Use 4mm banana plug to ensure user's convenience
- With graphical display on the main panel that shows the circuit of each component and I/O terminals

SPECIFICATIONS

Programmable logic controller	CPU: SIEMENS S7-1214C
	Supplementary I/O Module: SM1223(DI/DO), SM1232(AO)
	Profi-Net communication port
Input voltage: AC 220V (AC power inlet with a power indicator lamp)	
Fixed power output: 1ea	Output: SMPS DC 24V 2A, +/-8 ports
	Power cut-off function for a short circuit or overload state
	Power cut-off lamp and Reset Switch
Variable power output: 2ea	Output range: 0 ~ 10V
	Digital indicator: Output voltage display
	Built-in ON/OFF switch
Digital voltmeter and ammeter: 1set	Input range: 0 ~ 200V / 0 ~ 200mA
Digital input (DC24V) : 1ea	Basic: 14 DI (7 points/1COM)
	Expansion: 8 DI (4 points/1COM)
Digital output (DC24V) : 1ea	Basic: 10 DO (5 points/1COM)
	Expansion: 8 DO (4 points/1COM)

Analog input (DC 24V, 2 AI): 1ea	
Analog output (DC 24V, 2 AO): 1ea	
7-segment (4-bit control, 2 digits): 1ea	
Toggle switch: 8ea (4 points/1COM)	
Emergency switch (1a1b, max. 5A): 1ea	
Buzzer (DC 24V): 1ea	
Push button: 8ea (Green: 4ea, Red: 4ea, 4-point/1COM)	
Lamp (DC 24V): 8ea (Green: 4ea, Red: 4ea, 4-point/1COM)	
DC Motor (DC 24V): 1ea	Enables CW/CCW control
	Rotary disk type
	Photo sensor: 2ea
Stepping Motor (DC 24V): 1ea	Includes a Stepping Motor Driver (2 Phase)
	Rotary disk type
	Photo sensor: 2ea

STANDARD ACCESSORIES

- AC cord: 1ea
- Connection cable: 1set
- User's guide & experimental manual: 1ea

CPE-AT3810A

PLC Communication Control Trainer (Siemens)



FEATURES

- Standalone communication control of a single Programmable Logic Controller (PLC) or dual PLC communication control in the use of two PLC's
- Designed to study how to perform communication control using the Programmable Logic Controller and Human Machine Interface (HMI)
- Allows the user to understand more about the circuits and improve the level of their wiring skills
- Equipped with a circuit of sensor protection as well as output current/voltage protection
- Easy to carry, move and store with a carrying case design

SPECIFICATIONS

1. Siemens PLC device (to control EtherNet & ProfiBus)
 - 1) CPU: 2ea
 - Program memory: 128kByte
 - Counter frequency: Max. 30kHz
 - DC 16 DI, Relay 16 DO
 - 2) Memory (64Kbyte): 2ea
 - 3) Front connector (40-pin): 4ea
 - 4) Ethernet Communication Module (CP313-1): 2ea
 - 5) Din Rail (530mm): 1ea
 - 6) ProfiBus cable: 1ea
 - 7) ProfiBus connector: 2ea
 - 8) Digital signal interface (16 DI, 16 DO): 2ea
 - One touch connector: 20-port x 2ea
2. Switching hub (5 ports, 10/100Mbps): 1ea
3. Touch panel: 1ea
 - TFT color LCD: 5.7", 65,536 colors
 - Memory: 10MB (512KB backup data)
 - Communication: Ethernet port and RS-232C port
4. Power output (DC 24V 2A): 1ea
 - One-touch connector: +/- 6 ports
 - ON/OFF switch
5. Emergency stop switch: 1ea
6. Simulator control section
 - 1) Conveyor Module #1 [1ea]
 - Dimension: 300(W) x 40(D) mm
 - Roller (with two ball bearings): 2ea
 - Motor (DC 24V, 60 RPM): 1ea
 - Conveyor belt (38mm in width): 1ea
 - 2) Conveyor Module #2 [1ea]
 - Dimension: 300(W) x 40(D) mm
 - Roller (with two ball bearings): 2ea
 - Motor (DC 24V, 60 RPM): 1ea
 - Conveyor belt (38mm in width): 1ea
 - 3) Rotational cylinder [3ea]
 - Power: DC 12 ~ 24V
 - Rotating angle: 35°
 - Solenoid valve: 34mm
 - Dimension: 34(W) x 74(D) mm
 - 4) Inductive sensor [1ea]
 - Power: DC 10 ~ 30V
 - Detecting distance: 8mm
 - Frequency: Max. 800Hz
 - 5) Capacitive sensor [1ea]
 - Power: DC 10 ~ 30V
 - Detecting distance: 4mm
 - Frequency: Max. 100Hz
 - 6) Photo sensor [1ea]
 - Power: DC 10 ~ 30V
 - Detecting distance: 100mm
 - Frequency: Max. 800Hz
 - 7) Fiber optic sensor [3ea]
 - Power: DC 12 ~ 24V
 - Current: 100mA
 - 8) Fiber optic sensor [3ea]
 - Type: M4 D1.0
 - Bracket: 2ea
 - 9) Slide box [3ea]
 - Thickness: 2.1t
 - Dimension: 91(W) x 78(D) x 20(H) mm
 - 10) Conveyor Relay (DC 24V, 1C) : 2ea
 - 11) Rotational cylinder relay (DC 24V, 1C) : 3ea
 - 12) Signal control lamp: 3ea
 - Color: green - 1ea, yellow - 1ea, red - 1ea
 - 13) One-touch connector for power and I/O connection: 8-port x 4ea
7. Carrying case: 1ea
 - Material: Aluminum
 - Dimension: 520(W) x 440(D) x 200(H) mm
8. Input voltage: AC 220V (AC power inlet with a power indicator lamp)

STANDARD ACCESSORIES

- AC cord: 1ea
- Connection cable: 1set
- Ethernet cable (1 meter): 4ea
- Work piece (AL 1ea, MC 2ea) : 1set
- Operating CD (software and study example files): 1ea
- User's guide & experimental manual: 1ea

CPS-3541

Portable Siemens PLC Trainer



FEATURES

- Portable PLC training kit with Siemens PLC unit (SIMATIC S7-1200)
- Motor control (forward/reverse rotation) and sensor application control experiments
- With SIMATIC PLC programming software package
- Provides both AC and DC power for experiments
- Power cut-off function for safety

SPECIFICATIONS

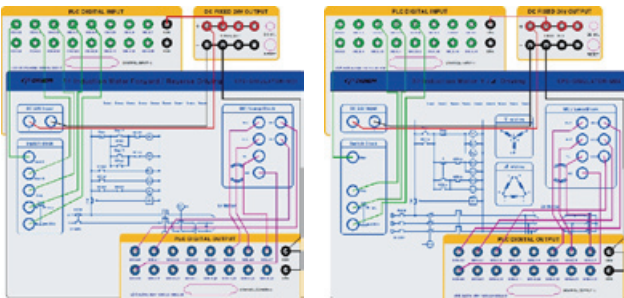
1. PLC Unit: SIMATIC S7-1200
 - Input voltage: 24V DC
 - I/O terminal: Input 14 points / Output 10 points
 - Analog input: 2 channels
 - Bit processing speed: 0.1 μ s
 - Word and error processing speed: 12 μ s
 - Interface port: Ethernet / Profi-Net port
 - Working memory: 50KB
 - Load memory: 2MB
 - Retentive memory: 2MB
2. AC 220V power output
 - Power cut-off safety function for overload and short circuit
 - Alarm lamp and reset switch (in case of a power cut-off event)
 - Output safety terminal: 2 set
3. DC 24V power output
 - Equipped with a power switch (with an internal lamp)
 - Power cut-off safety function for overload and short circuit
 - Alarm lamp and reset switch (in case of a power cut-off event)
 - 4mm banana output terminal: +/- 4 set
4. Input signal block
 - Non-lock type push switch: 7ea
 - Lock-type push switch: 1ea
 - 8 points /1COM
5. Output signal block
 - Signal-check lamp (Red, DC24V): 3ea
 - Signal-check lamp (Green, DC24V): 4ea
 - Signal-check buzzer (DC24V): 1ea
6. Digital I/O connection banana jack
 - Input: 14 points (7 points/1COM)
 - Output: 10 points (5 points/1COM)
7. BCD control block
 - Digital switch unit: for input signal
 - Signal processing: BCD signal output
 - Input indication: 00 ~ 99
 - Contact point: 8 points (4 points/1COM)
8. Segment display output block
 - Signal processing: BCD signal
 - Output indication: 00 ~ 99
 - Output method: 2-digit LED display (with a protective window)
 - Contact point: COMMON insulated 8 points
 - Power input terminal: DC 24V
9. Sensor & Motor Device
 - Proximity sensor: 1ea
 - Photo sensor: 1ea
 - DC deceleration motor: 1ea
 - With a rotary disc for sensor detection
10. AC inlet (built-in fuse type)
 - Input voltage: AC 220V, 50/60Hz
 - Equipped with a power switch (with an internal lamp)
11. Case: Aluminum carrying case

STANDARD ACCESSORIES

- Power cord: 1ea
- Connection cable: 1set
- Operating software CD: 1ea
- User's guide & experimental manual: 1ea

CPS-3540-SIM

Multi-purpose PLC Demonstration Unit



Practice circuit sample

FEATURES

- Diverse PLC application practices using 9 types of experimental modules (replace & plug type)
- Supports PLC connection through 4mm banana jacks
- External DC24V in use as main power source supporting PLC connection and ensuring safety
- Enables selecting the number of modules by a digital coding switch or a potentiometer
- Automatic main unit settings to carry out functional operations of the experimental modules

EXPERIMENTAL CONTENTS

- 1-phase induction motor: forward reverse operation
- 3-phase induction motor: direct starting, forward reverse operation and Y/Δ operation
- Two-lane traffic signal control
- Elevator operation (3 floors)
- Operation of auto pumping system
- 1-Axis position control

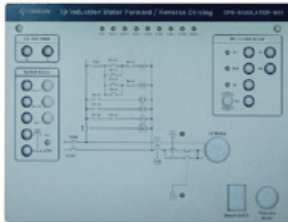
SPECIFICATIONS

• Main unit	
Hard case	Iron structure (painting treatment)
Module Selector	Digital coding switch (BCD 0 ~ 9) : 1ea
	Analog coding potentiometer (10-turn variable resistor): 1ea
	Digital coding switch and Analog coding potentiometer: Parallel structure
Module Indicator LED	9ea
PLC I/O banana jack (4mm)	17 points
Signal input switch	Push button (3ea), toggle switch (1ea)
Output indicator (3mm LED)	Red (26ea), green (5ea), yellow (2ea)
Output indication level meter (Level LED 10 steps)	2ea
Motor (with a rotary disc)	DC 24V
Buzzer	1ea
Input voltage	DC 24V
Hand grip	2ea (left and right hand side)

• Experimental Module

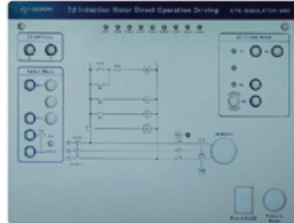
M01 : Forward reverse operation of 1-phase induction motor

- To practice forward reverse operation of 1-phase induction motor by the sequence circuit



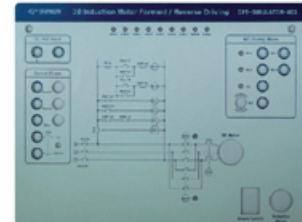
M02 : Direct starting of 3-phase induction motor

- To practice direct starting operation of 3-phase induction motor by the sequence circuit



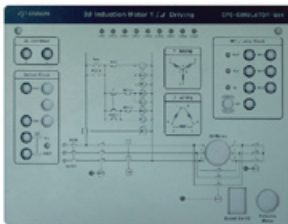
M03 : Forward reverse operation of 3-phase induction motor

- To practice forward reverse operation of 3-phase induction motor by the sequence circuit



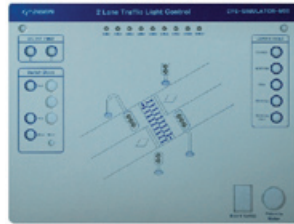
M04 : Y/Δ operation of 3-phase induction motor

- To practice Y/Δ operation of 3-phase induction motor by the interlock circuit



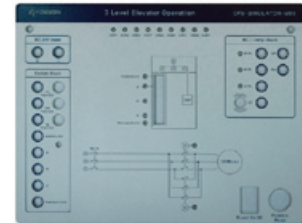
M05 : Two-lane traffic signal control

- To practice traffic light control and cross-walk signal control on a two-lane road



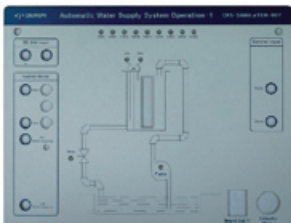
M06 : Elevator operation (3 floors)

- To practice of elevator control (3 floors) by forward reverse operation of the 3-phase induction motor



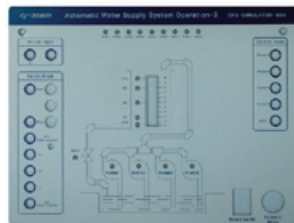
M07 : Auto pumping system - 1

- To practice how to operate the auto pumping system by manipulation of the pump and valve (analog level indication)



M08 : Auto pumping system - 2

- To practice how to operate the auto pumping system by the alternating / sequential operation of the pump as well as valve control (analog level indication)



M09 : 1-axis position control

- To practice 16-step position control and 5-position detection through the motor control



STANDARD ACCESSORIES

- 4mm banana jack: 2ea
- User's guide manual: 1ea

OPTIONS

- Programmable Logic Controller Trainer

CPS-3542

PLC Application Process Control Trainer



FEATURES

- Designed to help understand the configuration and principles of processing control
- Graphical indication of each processing step on the touch panel
- Illustrates PLC control in animated display on the screen of touch panel
- Small-size training kit for convenient storage and mobility

SPECIFICATIONS

Main system unit	Dimension: 335(W) x 210(D) x 230(H) mm
	All-in-one steel frame structure
Input voltage	AC 220V (with a power switch)
Power source	DC 24V
Logic panel I/O points	Input: 16 points
	Output: 16 points
	Banana jack (4mm): 4ea
Lamp: 3ea	DC 24V (external control type)
	Color: Red (1ea), Yellow (1ea), Green (1ea)
Communication port	RS 232C: 1ea
	Ethernet: 1ea
Touch Panel	LCD screen: TFT color LCD
	Resolution: 800 x 480 dot
	Color: 16,777,216 colors
	Size: 194mm x 134mm
	Communication: RS 232C, RS422, USB Host, USB Device, Ethernet
	I/O points: Input 16 points (1Com), Output 16 points (1Com)
Memory: 16MB	
	Maximum screens: 500 pages

STANDARD ACCESSORIES

- AC power cord: 1ea
- Connection cable: 1set
- User's guide and experimental manual: 1ea

CPS-3543

PLC Application Mini Auto Door Trainer



EXPERIMENTAL CONTENTS

- Understanding the principle and composition of the auto door system
- AUTO/MANUAL operation on the auto door
- Programming practices using programmable logic controller

FEATURES

- The mini training system designed to simulate the auto door system
- Enables advanced programming practices using the PLC Trainer
- Supports applied control of the automatic door system by sensor detection

SPECIFICATIONS

1. Main system unit
 - Dimension: 255(W) x 180(D) x 155(H) mm
 - All-in-one structure made of steel frame in L-shape
 - Mini door panel (vertical) and control panel (horizontal)
2. Power source: DC 24V (in connection with external power source)
3. Mini Door
 - Number of doors: 2ea
 - Dimension: 30(W) x 50(H) mm / each door
 - Material: Aluminum 2T
4. Motor for the auto door
 - DC24V geared motor
 - Built-in interlock circuit for motor protection
5. Sensor part
 - 1) Photo sensor: 1ea
 - Type: Directly reflective type
 - Controlled by DC 24V
 - 4mm banana input terminal: 3ea
 - 2) Limit switch: 2ea
 - Function: OPEN / CLOSE detection
 - 4mm banana input terminal: 4ea
 - 3) Select switch: 1ea
 - Function: MANUAL / AUTO mode
 - 4mm banana input terminal: 3ea
 - 4) Push button: 2ea
 - Function: OPEN / CLOSE manual control
 - Color: Red (1ea), Green (1ea)
 - 4mm banana input terminal: 3ea
 - 5) Lamp: 2ea
 - Function: OPEN / CLOSE status indication
 - Color: Red (1ea), Green (1ea)

STANDARD ACCESSORIES

- User's guide and experimental manual: 1set

CPS-3140 / CPS-3143 / CPS-3210

Sequence Control Trainer



CPS-3140



CPS-3143



CPS-3210

FEATURES

- Effective sequence control experiments using various electrical components being used in the field
- Designed to practice of wiring through the terminal block with freely placing of parts on board (CPS-3140/CPS-3143)
- Scalability and easy maintenance various application modules can be added and configured
- Practice of PLC and sequence in conjunction with PLC
- The components of sequence circuit are removable to increase the educational effectiveness
- Product qualified by KS or IEC regulations

EXPERIMENTAL CONTENTS

- Practice for the basic circuit of contact sequence
- Exercise the reverse rotation and Y Δ wiring of three-phase induction motor
- Motor overload protection test by EOCR
- Test of contact sequence logic circuit
- Practice of magnetic holding circuit and detection circuit
- Experiment for the applications of display circuit and sensors
- Experiment for the Preference circuit and inching circuit
- Timer circuit and counter circuit test etc.

SPECIFICATIONS

Control Panel Module	
Structure of the control panel	Front open and close type, symbol and name silk printing
Toggle switch : 2ea	Contact capacity : AC 125V 10A, AC 250V 6A Contact composition : 1a1b
Manually operated self-resetting push button: 4ea (red x 2ea, green x 2ea)	Type : \varnothing 22 round shape Contact capacity : AC 250V 6A Contact composition : 1a1b
Manually operated lever switch : 1ea	Type : \varnothing 22 round shape, 2-position manual single lever Contact capacity : AC 250V 6A Contact composition : 1a1b
Emergency switch : 1ea	Contact capacity : AC 250V 6A Contact composition : 1a1b
Lamp: 4ea (red x 2ea, green x 2ea)	Type : \varnothing 22 round shape Operating power : AC 220V
Buzzer : 1ea	Type : \varnothing 22 round shape & continuous sound Operating power : AC 220V 4VA

Fuse Holder Module : 3ea	
Standard	HY30C
Fuse	30A
Timer (30sec) Module : 1ea	
Operation	OFF delay
Rating	AC 220V / 60Hz / 2.5VA
Output contact capacity	AC 220V 1.5A (Resistive load)
Timer (30sec) Module : 1ea	
Operation	ON delay
Rating	AC 220V 60Hz / 2.5VA
Output contact capacity	AC 220V/1.5A (Resistive load)
Magnetic Contactor Module(MC) : 2ea	
Contact composition	5a2b
Coil voltage / current	AC 220V 60Hz / 41mA
Rated contact capacity	AC 240V/4.5kW/18A
Assistance contact rating	AC 240V/3A

CPS-3140 / CPS-3143 / CPS-3210

Auxiliary Electromagnetic Contactor(MC) Module : 1ea	
Contact composition	1a3b
Coil voltage / current	AC 220V 60Hz / 41mA
Rated contact capacity	AC 240V / 4.5kW / 18A
Rated auxiliary contact	AC 240V 3A
Electronic Overload Relay(EOCR, 1/2HP) Module : 2ea	
Internal CT	3CT (tunnel type)
Current range (adjustable)	0.3 ~ 1.5A
Time setting	0 ~ 30 seconds
Operating power	AC 100~260V 60Hz
Rated contact capacity	AC 250V 3A (Resistive load)
Counter Module : 1ea	
Power	AC 100 ~ 240V 60Hz
Output contact capacity	AC 250V 3A (Resistive load)
Display	Digital 4 digits
Preset setting	4 digits digital switch
PLC Module : 1ea	
Input power	AC 100 ~ 240V 60Hz
Input contact	DC 24V 6 points
Output contact	Relay output 4 points
Built-in download port	
Processing speed	0.1 μ s/step
Program capacity	10k step

20P Terminal Module: 1ea	
Structure	Two-stage 20 points
10P Terminal Module: 1ea	
Structure	Single-stage 10 points
Relay Module	
Relay Module 8-PIN	2ea
Relay Module 11-PIN	2ea
Relay Module 14-PIN	2ea
Base Panel : 1ea (* Select Type A, B or C)	
Type of base panel	Type A: Aluminum profile base (CPS-3140)
	Type B: Punching plate base (CPS-3143)
	Type C: Bakelite base (CPS-3210)
Size: 800(W) x 600(D)mm	
Rubber feet: 4ea	

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable (Y-terminal type) : 1set
- RS232C cable (for PLC download) : 1ea
- User's manual & Experimental manual : 1ea

CPS-3100B

Electrical Sequence Control Trainer



FEATURES

- Hands-on electrical sequence practices using various electrical components with electric contact
- Simulates real life components and power source that is being used in the field
- Designed to support connecting a PLC Trainer for diverse levels of applied experiments
- Ensures safety using insulated connection cables and insulated connection terminals

EXPERIMENTAL CONTENTS

- Basic circuit
- Logic circuit
- Self-holding circuit
- Timer circuit
- Priority circuit
- Detection circuit
- Lamp and alarm circuit
- Motor operational circuit
- Reactor-driving circuit
- Jog circuit
- Forward & reverse circuit
- Delay operation circuit
- Time activation circuit
- Y-Δ operational circuit

STANDARD ACCESSORIES

- Power cord : 1ea
- 4ø insulated connection cable : 1set
- User's guide & experimental manual : 1ea

SPECIFICATIONS

Power source	3-phase AC220V	
Earth leakage circuit breaker (ELCB)	Rated voltage : AC 220V 60Hz Rated current: 30A Rated residual current: 30mA	1ea
Electronic contactor (5a2b)	Contact capacity : AC 240V/ 18A / 4.5kW Auxiliary contact capacity : AC 240V 3A	3ea
Electronic overload relay (EOCR, 1/2HP)	Internal CT (sensor): 3-CT (tunnel type) Current setting: 0.3 ~ 1.5A Trip time setting: 0 ~ 30 sec. Contact capacity: AC 250V 3A (Resistive load)	1ea
Relay (4C)	Contact capacity : AC 220V 3A (Resistive load)	2ea
Timer (30 seconds)	Operational method : ON delay Output contact capacity: AC 220V 1.5A (Resistive load)	1ea
Flicker timer (6 seconds)	Operational method : ON Start Output contact capacity: AC 220V 2.5A (Resistive load)	1ea
3-phase induction motor	Operating voltage : 3-phase AC 220V / 380V / 25W Type of motor: Squirrel cage rotor, 4-pole and Y-Δ Starting Rotary disc : Rotational speed detection type Electronic brake : Intensity control function	1ea
Proximity sensor	Type of sensor : NPN Sensing distance: 8mm ±10%	1ea
Digital counter	Power source: AC 100V ~ 240V Output contact capacity: AC 250V 3A (Resistive load)	1ea
DC power supply	Output : DC 24V 1A (fuse)	1ea
Lamp	Operating voltage : AC 220V Lamp : DC 6.3V (Red x 2ea, Green x 2ea)	4ea
Buzzer	Operating voltage: AC 220V/4VA	1ea
Push button	Number of switch: 4ea (Red x 2ea, Green x 2ea)	4ea
Toggle switch (1a1b)	Output contact capacity: AC 125V 10A, AC 250V 6A	2ea
Fuse and fuse holder	Fuse: 5A	2ea
Stand	Supports angle adjustment	1ea

CPS-3100A

Electrical Sequence Control Trainer



EXPERIMENTAL CONTENTS

- Electrical sequence circuit control
- Sequence circuit for controlling a programmable logic controller
- Contact circuit for electric circuits
- Self-holding circuit
- On delay circuit
- Priority circuit
- Pulse generation circuit
- Lamp and alarm circuit
- Induction motor circuit

FEATURES

- Hands-on electrical sequence practices using various electrical components with electric contact
- Simulates real life components and power source that is being used in the field
- Designed to support connecting a PLC Trainer for diverse levels of applied experiments
- Ensures safety using insulated connection cables and insulated connection terminals

STANDARD ACCESSORIES

- Power cord : 1ea
- Insulated connection cable (4Ø) : 1set
- User's guide & experimental manual: 1ea

SPECIFICATIONS

Power source	3-phase AC220V 60Hz
Earth leakage circuit breaker (ELCB)	Rated voltage : Single-phase AC 220V 60Hz Rated current: 30A Rated residual current: 30mA Residual non-operating current: 15mA 1ea
Electronic contactor (5a2b)	Coil voltage: AC 220V 60Hz Coil current: 41mA Contact capacity : AC 240V / 18A / 4.5kW Auxiliary contact capacity: AC 240V 3A 3ea
Electronic overload relay (EOCR, 1/2HP)	Internal CT (sensor): 3-CT (tunnel type) Current setting: 0.3 ~ 1.5A Trip time setting: 0 ~ 30 sec. Relay control voltage: AC 100V ~ 260V 60Hz Auxiliary contact capacity: AC 250V 3A (Resistive load) 2ea
Relay (4C)	Coil voltage: AC 220V 60Hz Coil current: 6mA Contact operation time: ≤ 20ms Rated current: AC 220V 3A (Resistive load) AC 220V 0.8A (Inductive load) 4ea
Relay (2C)	Coil voltage: AC 220V 60Hz Coil current: 11.5mA Contact operation time: ≤ 25ms Rated current: AC 220V 7A (Resistive load) AC 220V 5A (Inductive load) 3ea

Timer (30 sec.)	Operational method : ON delay Rated power: AC 220V 60Hz 2.5VA Output contact capacity : AC 220V 1.5A (Resistive load) 1ea
Flicker Timer (6 sec.)	Operational method : ON start Rated power: AC 220V 60Hz 2.5VA Output contact capacity : AC 220V 2.5A (Resistive load) 1ea
3-phase Induction Motor	Operating voltage : 3-phase AC 220V / 380V / 25W Type of motor: Squirrel cage rotor, 4-pole and Y-Δ Starting 1ea
Lamp	Operating voltage : AC 220V Lamp : DC 6.3V (Red x 3ea, Green x 2ea) 5ea
Buzzer	Operating voltage: AC 220V/4VA 1ea
Push button	Color: Red (2ea) & Green (2ea) 4ea
Emergency switch	Output contact capacity: AC 250V 6A, 1a1b 1ea
Selector switch	1ea
Fuse and fuse holder	Fuse: 5A 2ea
Terminal block	6-point terminal block 1ea
Reactor	3-phase AC 400V Motor start function 1ea

CPS-SQ38

Electrical Sequence Control Trainer



EXPERIMENTAL CONTENTS

- Electrical sequence circuit control
- Sequence circuit for controlling a programmable logic controller
- Relay control sequence
- Earth Leakage circuit breaker (ELCB)
- Electronic contactor, timer circuit and electric switch circuit
- Sequence control using a proximity sensor
- Wiring connection of sequence circuits

FEATURES

- Hands-on electrical sequence practices using various electrical components with electric contact
- Simulates real life components and power source that is being used in the field
- Designed to support connecting a PLC Trainer for diverse levels of applied experiments
- Ensures safety using insulated connection cables and insulated connection terminals

STANDARD ACCESSORIES

- Power cord : 1ea
- Insulated connection cable (4Ø): 1set
- User's guide and experimental manual: 1ea

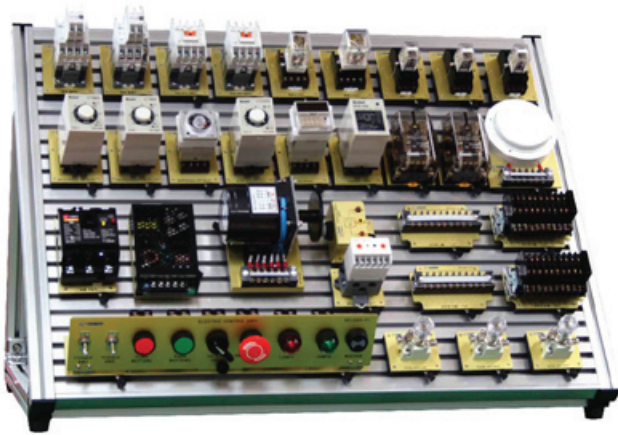
SPECIFICATIONS

Input voltage	3-phase AC220V 60Hz	
Earth leakage circuit breaker (ELCB)	Rated voltage : 3-phase AC 220V 60Hz Rated current: 30A Rated residual current: 30mA Residual non-operating current: 15mA Residual current off-time at I, n : ≤ 0.03 sec.	1ea
Electronic contactor (5a2b)	Coil voltage: AC 220V 60Hz Coil current: 41mA Contact capacity : AC 240V / 18A / 4.5kW Auxiliary contact capacity: AC 240V 3A	3ea
Auxiliary contactor (1a3b)	Coil voltage: AC 220V 60Hz Rated current: AC 240V 3A (Inductive load)	3ea
Electronic overload relay (EOCR, 1/2HP)	Internal CT (sensor): 3-CT (tunnel type) Current setting: 0.3 ~ 1.5A Trip time setting: 0 ~ 30 sec. Relay control voltage: AC 100V ~ 260V 60Hz Auxiliary contact capacity: AC 250V 3A (Resistive load)	1ea
Relay (2C)	Coil voltage: AC 220V 60Hz Coil current: 11.5mA Contact operation time: ≤ 25ms Rated current: AC 220V 7A (Resistive load) AC 220V 5A (Inductive load)	4ea
Timer (30 sec.)	Operational method : ON delay Rated power: AC 220V / 60Hz / 2.5VA Output contact capacity : AC 220V 1.5A (Resistive load)	2ea

Counter	Power source: AC 100V ~ 240V 60Hz Output contact capacity: AC 250V 3A (Resistive load)	1ea
Proximity Sensor	Type of sensor : NPN, NO Sensing distance: 8mm ±10% Standard detectable object: Iron [25(W) x 25(D) x 1(H) mm] Operating voltage: DC 24V (DC 10V ~ 30V)	1ea
3-phase Induction Motor	Operating voltage : 3-phase AC 220V / 380V / 25W Type of motor: Squirrel cage rotor, 4-pole and Y-Δ Starting	3ea
Lamp	Operating voltage : AC 220V Lamp : DC 6.3V (Green x 2ea, Red x 2ea)	1ea
Buzzer	Operating voltage: AC 220V/4VA	3ea
Push button	Color: Green x 2ea, Red x 2ea	1ea
Toggle switch	Output contact capacity: AC 125V 10A, AC 250V 6A, 1a1b	4ea
Emergency switch	Output contact capacity: AC 250V 6A, 1a1b	1ea
Fuse and fuse holder	Fuse: 5A	2ea
DC power output	Output: DC 24V 1A (Fuse)	3sets
Dimension	1075(W) x 350(D) x 660(H)mm	

CPE-ER1200

Modular Sequence Control Trainer



FEATURES

- Real-life wiring practice through the terminal blocks and various modular components being used in the field
- Hands-on electrical sequence practices using various electrical components with electric contact
- Free-style placement of parts on the aluminum profile experimental panel
- Supports connecting the pneumatic modules, hydraulic modules and PLC modules for extensive learning purposes

EXPERIMENTAL CONTENTS

- Basic contact sequence circuits
- Lamp and buzzer control using the control switches
- 3-phase induction motor: Y- Δ wiring connection and rotation
- Self-holding circuit & Detection circuit
- Sensor application practices
- Control practices using a programmable logic controller
- Design and control of a touch panel drawing program
- Applied practices using Electro-Pneumatic Trainer

SPECIFICATIONS

- Power source: 3-phase AC 220V 60Hz
- Module fixation: By the 2-position lever-type fixation clamp based on the built-in triple gear structure

Experimental Panel Set

- Structure : Aluminum profile (slot interval in 25mm)
- Size : 800(W) x 600(D) mm
- Rubber feet : 4ea
- Angle: Upright position in 45o

DC Power Supply Module



- Input power: AC 220V
- Output power : DC 24V 2A

Control Console Module



- Control Console : Open structure (front panel)
- Toggle switch : 2ea
 - Contact capacity: AC 125V 10A, AC 250V 6A
 - Contact: 1a1b
- Auto return push button (manual operation): 2ea
 - Color: Red (1ea), Green (1ea)
 - Type : Circular shape (Ø22)
 - Contact capacity: AC 250V 6A
 - Contact: 1a1b
- Manual lever switch : 1ea
 - Type : Circular shape (Ø22) & 2-step manual lever
 - Contact capacity: AC 250V 6A
 - Contact: 1a1b
- Emergency switch : 1ea
 - Contact capacity: AC 250V 6A
 - Contact: 1a1b
- Indicator lamp: 2ea
 - Color: Red (1ea), Green (1ea)
 - Type : Circular shape (Ø22)
 - Operational power: AC 220V
- Buzzer : 1ea
 - Type : Circular shape (Ø22) & continuous sound
 - Operational power : AC 220V/4VA

SPECIFICATIONS

Earth Leakage Circuit Breaker (ELCB) Module



- Rate current: 15A
- Rated voltage: 3-phase 220V 60Hz
- Rated sensitivity current: 30mA
- Rated deactivation current: 15mA

3-Phase Induction Motor Module



- Operation Power : 3-phase AC 220V/380V (25W), Y-Δ Starting
- I/O terminal: 6P terminal block
- Wiring diagram (Y/Δ) shown on the front panel
- Rotary disc: Speed detection sensor type

Magnetic Contactor (MC) Module



- Contact: 5a2b
- Coil voltage: AC 220V 60Hz
- Coil current: 41mA
- Rated contact capacity: AC 240V /18A / 4.5kW
- Auxiliary contact: AC 240V 3A

Electronic Overload Relay (EOCR, 1/2HP) Module



- Number of internal CT: 3ea (tunnel type)
- Current setting: 0.3 ~ 1.5A
- Time setting : 0 ~ 30 sec
- Auxiliary Contact : AC 250V 3A (resistive load)

Auxiliary Magnetic Contactor (MC) Module



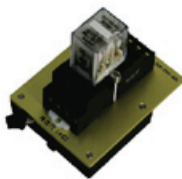
- Contact: 1a3b
- Coil voltage: AC 220V 60Hz
- Coil current: 41mA
- Rated contact capacity: AC 240V /18A / 4.5kW
- Auxiliary contact: AC 240V 3A

Timer (30sec) Module



- Type: On-delay timer
- Rating: AC 220V/ 60Hz / 2.5VA
- Output contact: AC 220V 1.5A (Resistive load)
- Timer socket (included)

Relay (4C) Module



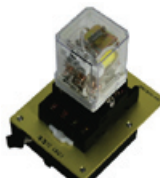
- Contact: 4C (14 pins)
- Coil voltage: AC 220V 60Hz
- Coil current: 6mA
- Rated contact capacity: AC 220V 3A (Resistive load)
- Relay socket (included)

Timer (30 sec.) Module



- Type: Off-delay timer
- Rating: AC 220V/ 60Hz / 2.5VA
- Output contact: AC 220V 1.5A (Resistive load)
- Timer socket (included)

Relay(3C) Module



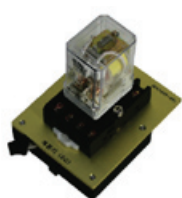
- Coil voltage: AC 220V 60Hz
- Coil current: 11.5mA
- Rated contact capacity: AC 220V 7A (Resistive load)
- Relay socket (included)

Flicker Timer (6 sec.) Module



- Type: On-start timer
- Rating : AC 220V/ 60Hz / 2.5VA
- Rated contact capacity: AC 220V 2.5A (Resistive load)
- Timer socket included

Relay(2C) Module



- Contact: 2C (8 pins)
- Coil voltage: AC 220V 60Hz
- Coil current: 11.5mA
- Rated contact capacity: AC 220V 7A (Resistive load)
- Relay socket (included)

Counter Module



- A. Power source: AC 100V ~ 240V 60Hz
- B. Rated contact capacity: AC 250V 3A (Resistive load)
- C. Indication : Digital 4-digit type
- D. Setting Preset: by 4-digit digital switch

Capacitive Proximity Sensor Module



- Type of operation : PNP, NO
- Detectable distance: 8mm \pm 10%
- Detectable object : Steel [25(W) x 25 (D) x 1(H) mm]
- Operational voltage : DC 24V (DC 10 ~ 30V)

Photo Sensor Module



- Type of operation: PNP, direct reflection
- Detectable distance: 100mm
- Operational voltage: DC 10V ~ 30V
- I/O terminal: 4P terminal block

Fuse Holder Module



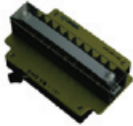
- Standard : HY30C
- Fuse : 30A

High-Frequency Proximity Sensor Module



- Type : PNP, NO
- Detectable distance: 8mm \pm 10%
- Detectable object : Steel [25(W) x 25 (D) x 1(H) mm]
- Operational voltage : DC 24V (DC 10 ~ 30V)

Terminal Block Module (10P)



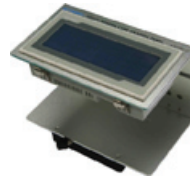
- Structure: Single-layer (10P)

Terminal Block Module (20P)



- Structure: Double-layer (20P)

Touch Panel Module



- Maximum number of screen: 500 pages (512KB memory)
- Resolution : 240 x 80 dot
- Display area : 112.8 x 37.6mm
- Power 24VDC \pm 10%
- LCD color MONO (blue, white)
- Interface : RS-232C (1ea), RS-422 / 485 (1ea)
- A download cable & an user program (included)

Power Relay Module (12P)



- Contact: 4a1b
- Coil voltage: AC 220V 60Hz
- Coil current: 41mA
- Rated contact capacity: AC 240V /18A / 4.5kW
- Auxiliary contact: AC 240V 3A

PLC Module



- Type : K7M-DR10A
- Input power : AC 100V ~ 240V 60Hz
- Input contact : DC 24V 6 points
- Output contact : Relay output 4 points
- Processing speed : 0.1us/step
- Program capacity : 10K step
- Auxiliary terminal block

Water Supply Control Switch



- Contact: Including power (8 pins)
- Coil voltage: AC 220V 60Hz
- Coil current: 5A
- Relay socket (included)

Fire Detector



- Power source: DC 24V
- Equipped with a spot-type detector
- Contact: Power 3(+) and 3(-)

Standard Accessories

- Power cord (3-phase plug) : 1ea
- Connection cable (Y-terminal type) : 1set
- User's guide manual: 1ea

Options

- Multifunctional Digital Electric Meter (CEM-2200)
- Power Electronics Circuit Simulation Software CASPOC)

CPE-AT3092M

Touch Panel Trainer



FEATURES

- Clear and realistic graphical expression with 10.4" TFT LCD screen
- Communication interface such as Ethernet, RS-232 and RS-422/495 for communication with a PLC and fast screen transmission of the drawing data
- Supports interlocking experiments with a programmable logic controller

SPECIFICATIONS

Display	TFT color LCD (wide angle view) Screen size: 289(W) × 200(D) mm
Resolution	800 × 600 (dot)
Color	65536 colors
Viewing angle	UP / DOWN: 88° / 88° LEFT / RIGHT: 88° / 88°
Memory	15MB
Communication Method	Ethernet, RS-422/495, RS-232
Input voltage	AC 220V
Dimension	303(W) × 214(D) × 49(H) mm

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- User's guide manual : 1ea

OPTIONS

- Programmable Logic Controller Trainer



CPE-AT3090

Graphic Panel Trainer



FEATURES

- Clear and realistic graphical expression with 5.7"~12.1" TFT LCD screen
- Built-in HMI software tool to support programming for automation control and operational verification
- Ethernet interface for communication with a PLC and fast screen transmission of the drawing data
- Various vector symbols and high quality raster symbols
- Data management by basic functions - logging, alarm, diagnosis, and maintenance

SPECIFICATIONS

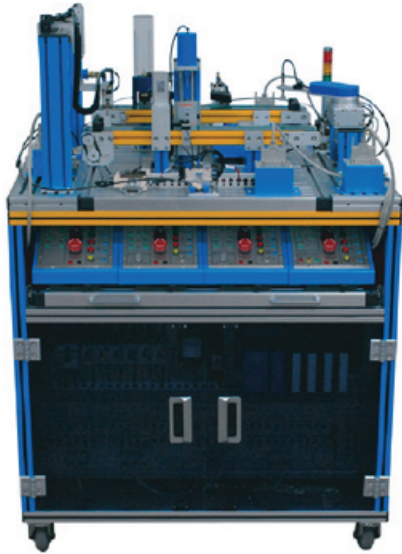
Display	TFT color LCD
Screen size	5.7" ~ 12.1" (customizable)
Backlight	CCFL, Auto ON/OFF, 50,000 times
Viewing Angle	UP / DOWN: 45° / 65° LEFT / RIGHT: 65° / 65°
Touch panel	8-line type
Operational LED	Green LED: normal operation (monitoring, downloading, etc.) Red LED : error (communication, drawing data, etc.)
Memory	Screen data: 10MB Backup data: 512KB (stores logging data and alarm data)
Ethernet	1ch, IEEE 802.3, 10/100 BASE
USB interface	USB HOST × 2
Serial	RS-232C (2 channels) : One port for PC communication RS-422/485(1 channel) : Mode selection function
Power source	Rated voltage: AC 100 ~ 220V, DC 24V Allowable voltage: AC 85 ~ 264VAC DC 19.2 ~ 28.8VDC
Case	Aluminum case (or steel case)

STANDARD ACCESSORIES

- Power cord : 1ea
- PC & PLC interface cable : 1set
- User's guide manual : 1ea

CPE-AT8030N

Factory Automation Trainer



FEATURES

- Designed to learn PLC control techniques for factory automation system
- PLC control practices per process and integrated PLC control practices
- Supports pneumatic and electro-pneumatic control practices
- Can separate four process stations and practice each standalone station

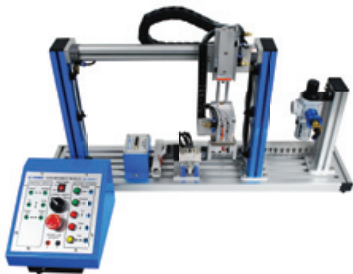
EXPERIMENTAL CONTENTS

- PLC Programming practices
- Linear transfer process
- Classification process
- Stopper process
- Pick & place process
- Pneumatic control
- Relay and Solenoid control
- Sensor detection
- Integrated system operation or standalone operation using each process station

PRODUCT COMPOSITION

- System table with double hinged doors
- Built-in PLC control unit
- Linear cylinder transfer process
- Conveyor transfer & classification process
- Conveyor & stopper process
- Handler transfer process

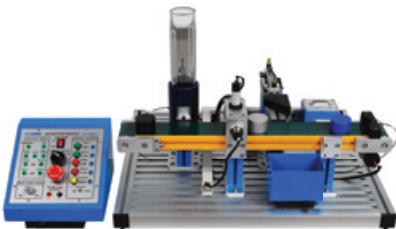
SPECIFICATIONS



CPE-AT8030N-01

Linear Cylinder Transfer Process

- 1) Horizontal cylinder
 - Rodless cylinder and speed controller
- 2) Vertical cylinder
 - Guide and speed controller
- 3) Finger cylinder
 - Speed controller
- 4) AUTO switch for horizontal movement (left & right)
- 5) AUTO switch for vertical movement (up & down)
- 6) AUTO switch for finger cylinder (grip & open)
- 7) 5/2-way solenoid valve
 - Double acting solenoid valve: 2ea
 - Single acting solenoid Valve: 1ea
- 8) Manifold block
- 9) Control Panel
 - Power switch :1ea
 - I/O control terminal: 11ea
 - Selector switch (AUTO / MANUAL) : 1ea
 - Push button: 4ea
 - Push button: (Auto Lock): 1ea
 - Emergency Switch : 1ea
 - SMPS (DC24V 1.3A): 1ea
 - D-SUB 25-pin connector
- 10) Input voltage : AC 85V ~ 264V, 50/60Hz

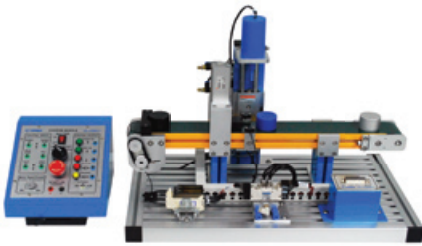


CPE-AT8030N-02

Conveyor Transfer & Classification Process

- 1) DC geared motor and speed controller
- 2) Directional controller for the conveyor
- 3) Feeding tube and feeder system
 - Multiple pneumatic cylinder with air cushion: 2ea
- 4) Inductive proximity sensor: 1ea
- 5) Capacitive proximity sensor : 1ea
- 6) Photo sensor: 1ea
- 7) Fiber optic sensor: 2ea
- 8) 5/2-way solenoid valve
 - Double acting solenoid valve: 2ea
- 9) Control panel
 - Power switch: 1ea
 - Selector switch (AUTO / MANUAL): 1ea
 - Toggle switch (FORWARD / REVERSE): 1ea
 - Push button : 5ea
 - Emergency switch: 1ea
 - I/O terminal : 14ea
 - SMPS (DC24V 1.3A): 1ea
 - D-SUB 25-pin connector
- 10) Input voltage : AC 85V ~ 264V, 50/60Hz

CPE-AT8030N



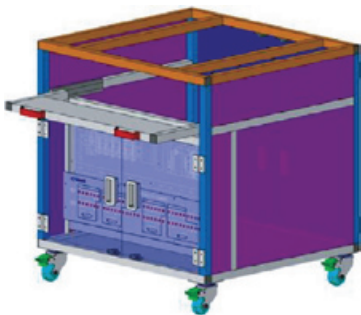
CPE-AT8030N-03 Conveyor & Stopper Process

- 1) DC geared motor and speed controller
- 2) Directional controller for the conveyor
- 3) Stopper
 - Multiple pneumatic cylinder with air cushion: 1ea
- 4) Processing process
 - Multiple pneumatic cylinder with air cushion: 1ea
- 5) Fiber optic sensor: 2ea
- 6) 5/2-way solenoid valve
 - Single acting solenoid valve: 1ea
 - Double acting solenoid valve: 1ea
- 7) Control panel
 - Power switch: 1ea
 - Selector switch (AUTO / MANUAL): 1ea
 - Toggle switch (FORWARD / REVERSE): 1ea
 - Push button : 5ea
 - Emergency switch: 1ea
 - I/O terminal : 11ea
 - SMPS (DC24V 1.3A): 1ea
 - D-SUB 25-pin connector
- 8) Input voltage : AC 85V ~ 264V, 50/60Hz



CPE-AT8030N-04 Handler Transfer Process

- 1) Vacuum generator and absorption pad
- 2) Rotational cylinder
 - Flow control valve and auto switch
- 3) Vertical cylinder
 - Rodless cylinder and speed controller
- 4) Horizontal cylinder
 - Flow control valve and AUTO switch
- 5) Warning light: 3 colors (red, yellow and green)
- 6) 5/2-way solenoid valve
 - Single acting solenoid valve: 1ea
 - Double acting solenoid valve: 2ea
- 7) Control panel
 - Power switch: 1ea
 - Selector switch (AUTO / MANUAL): 1ea
 - Push button : 5ea
 - Emergency switch: 1ea
 - I/O terminal : 13ea
 - DC Power supply (SMPS) : DC24V 1.3A
 - D-SUB 25-pin connector
- 8) Input voltage : AC 85V ~ 264V, 50/60Hz



CPE-AT8030N-05 PLC Control Unit & System Table

- 1) Earth leakage circuit breaker (ELCB) : 1ea
- 2) Circuit breaker : 6ea
- 3) Line filter: 1ea
- 4) SMPS (DC24V 1.3A): 1ea
- 5) PLC unit: GLOFA GM4 (INPUT: 32 points, OUTPUT: 32 points)
- 6) Control panel rack: Slide-thru structure
- 7) Control panel
 - I/O terminal : Input (32ea) and Output (32ea)
 - D-SUB 25-pin connector
- 8) Input voltage : AC 85V ~ 264V, 50/60Hz
- 9) System table
 - Material : Aluminum profile
 - Dimension : 840(W) x 760(D) x 850(H) mm

CPE-FMS

Flexible Manufacturing System



FEATURES

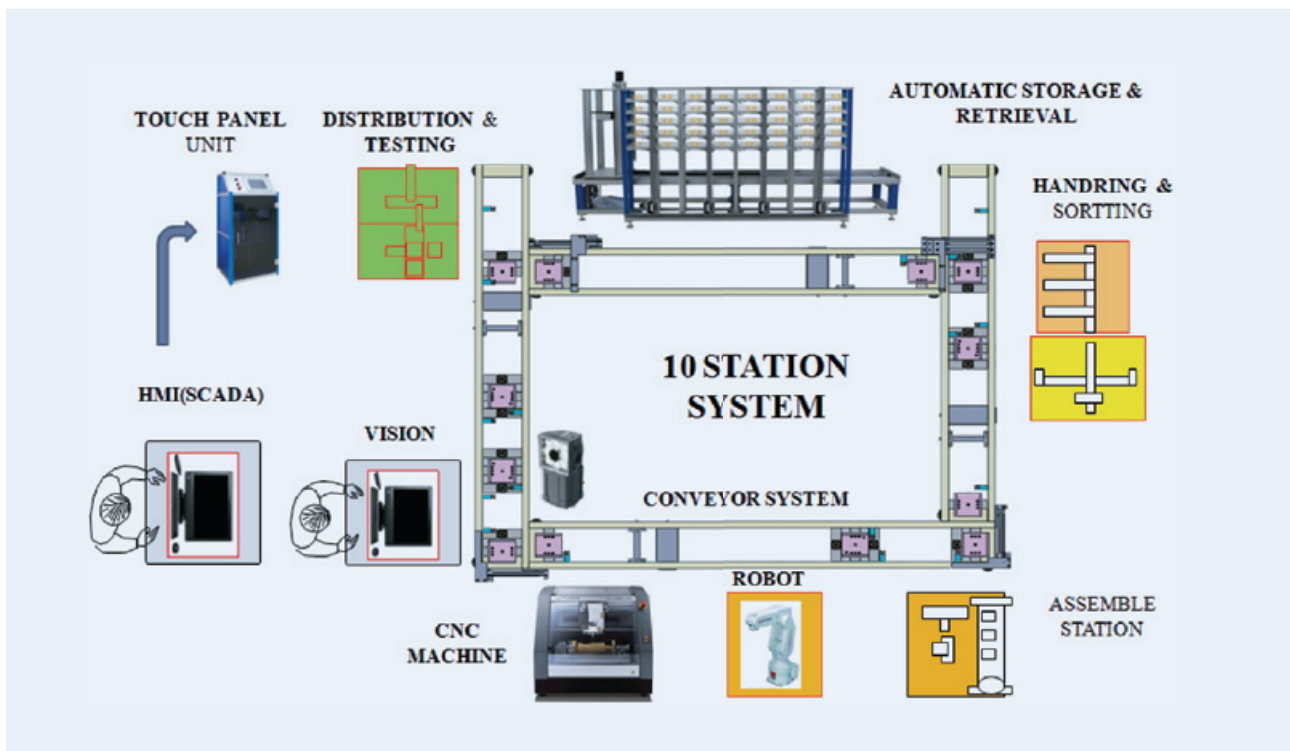
- Flexible modular production system that can adapt to different requirements of the customer through variations in its stations
- Designed to help the user learn the production mechanism and PLC programming
- Supports advanced levels of technical training on sensor, robot, PLC network and pneumatic technologies
- System configuration of each process: Conveyor, Distribution, Testing, Vision, CNC, Robot, Assembly, Automatic Storage & Retrieval, Handling, Sorting and HMI

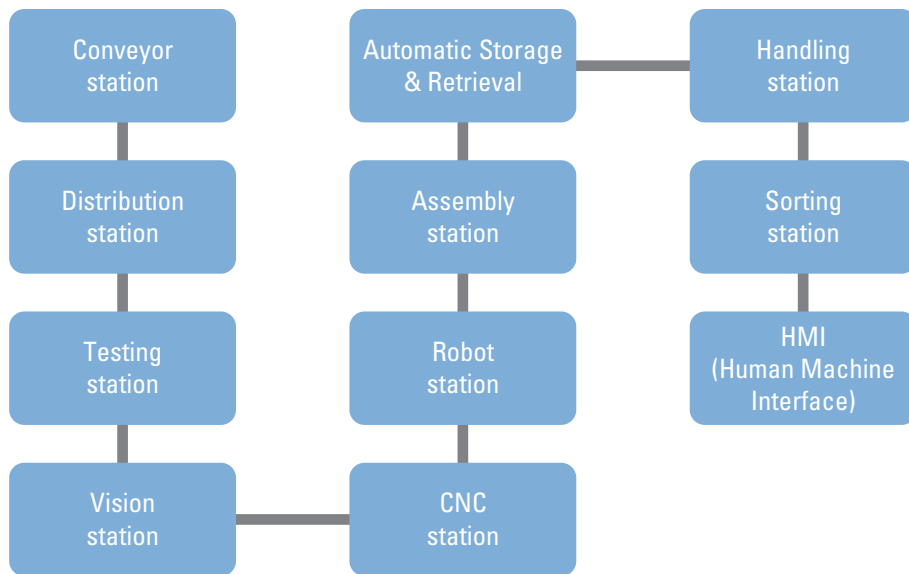
INTRODUCTION

A flexible manufacturing system (FMS) is a method for producing goods that is readily adaptable to changes in the product being manufactured, in which machines are able to manufacture parts and in the ability to handle varying levels of production.

The CPE-FMS Factory Manufacturing System comprises a total of 10 stations and consists of a robot, PLC system, vision system, numerical controlled machine (CNC), HMI, and SCADA software.

PRODUCT COMPOSITION





EXPERIMENTAL CONTENTS

Handling & Sorting System	Vision System	AS/RS Control	Conveyor System
<ul style="list-style-type: none"> • Pneumatic control • Electro-pneumatic control • Sensor • PLC control • Ethernet communication 	<ul style="list-style-type: none"> • Vision camera control • Data collection and transmission • External I/O interface • Ethernet communication 	<ul style="list-style-type: none"> • 3-axis servo motor control • Servo drive control • Encoder application • PLC programming • MRP 	<ul style="list-style-type: none"> • Conveyor mechanism • Conveyor application • Pallet stopper and cylinders • Pallet identification system • PLC interface • PLC programming

SPECIFICATIONS

Conveyor system (CS-100)

Training Techniques

- Electro-pneumatic technology
- Motor control
- Sensor technology
- PLC control

Training Contents

- Conveyor system mechanism
- Conveyor and buffer control
- Pallet stopper & cylinders
- Pallet identification system
- PLC programming
- PLC interface

Specifications

- 1) Conveyor
 - One-way direction conveyor
 - DC motor
 - Aluminum profile support
 - Pallet (160 x 160mm)
- 2) Controller
 - Pallet identification
 - PLC
 - Fieldbus or Ethernet TCP/IP interface

Distribution Station (DS-101)

Training techniques

- Pneumatic control
- Electro-pneumatic control
- Motor control
- Sensor technology
- Communication technology

Training Contents

- Pneumatic & electro-pneumatic components
- Magnetic sensor and optical sensor applications
- PLC programming
- Ethernet communication

Specifications

- The work pieces, through the feeding tube, will be distributed to the next station by the rotary cylinder and vacuum suction.
- Dimension: 500(W) x 500(D) x 1000(H) mm
- Weight: 40 kg
- Main power supply: AC 220V 60Hz
- Operating voltage: DC 24V 3A
- Operating pressure: 5 ~ 6 bar
- Logic: PNP

Testing Station (TS-107)

Training techniques

- Pneumatic control
- Electro-pneumatic control
- Sensor technology
- PLC control
- Communication technology

Training contents

- Pneumatic & electro-pneumatic components
- Magnetic sensor, optical sensor, capacitive sensor and inductive sensor
- Analogue sensor control
- PLC programming
- Pneumatic cylinder control
- Ethernet communication

Specifications

- The material of work piece is detected and identified by the sensors. After testing the height of the work piece, the failed will be rejected where as the passed will be transferred through the conveyor.
- Dimension: 500(W) x 500(D) x 1300(H) mm
- Weight: 43 kg
- Main power supply: AC 220V 60Hz
- Operating voltage: DC 24V 3A
- Operating pressure: 5 ~ 6 bar
- Logic: PNP

Vision Station (VS-104)

Training techniques

- Measurement technology
- Sensor technology
- Communication technology

Training contents

- Vision camera components
- Data acquisition & transmission
- External I/O interface
- Ethernet communication

Specifications:

- Image processing: True color
- Light: Pulse light (white)
- Number of items for inspection: 5ea
- Power source: 24V DC, 2.4A
- Operating temperature: 0 ~ 50°C
- Image Sensor: 1/3" CMOS (752 x 480 pixel resolution)
- Full frame rate: 75fps
- Electronic shuttering: 1/250 - 1/30,000 sec.
- External port: RJ-45 for Ethernet communication (10/100Mbps)
- Digital I/O: 24V DC

CNC Station (CS-102)

Training techniques

- Servo control technology
- Position control
- Mechanical tool control
- Communication technology

Training contents

- CNC programming
- Flow chart and drawing
- Ethernet communication

Specifications

- Worktable: 270(W) x 280(D) mm
- Operating limit: 200 (X) x 240 (Y) x 90 (Z) mm
- Operating speed: 0.1 ~ 70 mm/sec
- Motor: Micro step motor
- Spindle motor speed: DC Motor 12000 RPM
- Operating voltage: AC 220V±10%, 50/60 Hz
- Power consumption: 2.1A 210W
- Communication: USB 1.1
- Dimension: 700(W) x 730(D) x 750(H) mm
- Operating temperature: 5 ~ 40°C, RH 35 ~ 80%

Robot Station (RS-105)

Training techniques

- Servo technology
- Position control
- Multi axes control
- Communication technology

Training contents

- Robotics programming
- Teaching pendant operation
- Axis-coordination control
- Gripper control
- External I/O interface

Specifications

- The assembly station is designed to assemble the cover case for the work piece.
- Main power supply: AC 220V 60Hz
- Operating voltage: DC 24V 3A
- Operating pressure: 5 ~ 6 bar
- Logic: PNP

Assembly Station (AS-108)

Training techniques

- Sensor technology
- Pneumatic control
- PLC programming
- Communication technology
- Robotics control

Training contents

- Distribution of work piece
- Robot position control
- Servo drive
- Encoder application
- Sensor application
- PLC-to-robot interface
- Data transfer

Specifications

- The assembly station is designed to assemble the cover case for the work piece.
- Dimension: 500(W) × 500(D) × 1000(H) mm
- Weight: 60 kg
- Main power supply: AC 220V 60Hz
- Operating voltage: DC 24V 3A
- Operating pressure: 5 ~ 6 bar

Automatic Storage & Retrieval (RS-109)

Training techniques

- Sensor technology
- PLC
- Servo control
- Interface technology

Training contents

- Warehouse structure
- 3-axis servo motor control
- Servo drive control
- Encoder application
- Sensor application
- PLC programming
- MRP
- Data interface

Specifications

- Weight: 55 kg
- Input: AC 220V 60Hz
- Output: DC 24V 3A
- Operating pressure: 5 ~ 6 bar
- Logic: PNP

Handling Station (HS-106)

Training techniques

- Pneumatic control
- Electro-pneumatic control
- Sensor technology
- PLC control
- Communication technology

Training contents

- Pneumatic & electro-pneumatic components
- Magnetic sensor, optical sensor and limit switch
- Pneumatic cylinder control
- PLC programming
- Ethernet communication

Specifications

- The 2-axis handling device performs pick & place task.
- Weight: 43 kg
- Main power supply: AC 220V 60Hz
- Operating voltage: DC 24V 3A
- Operating pressure: 5 ~ 6 bar

Sorting Station (SS-103)

Training techniques

- Sensor technology
- Pneumatic control
- PLC
- Interface technology

Training contents

- Speed control of the conveyor
- Application of optical fiber sensor
- PLC programming
- Data interface

Specifications

- A work piece being transferred is sorted by the classification cylinder by the type of its material.
- Dimension: 750(W) × 750(D) × 950(H) mm
- Weight: 45 kg
- Main power supply: AC 220V 60Hz
- Operating voltage: DC 24V 3A
- Operating pressure: 5 ~ 6 bar

HMI (Human Machine Interface)

Basic function

- Real-time database management
- Alarm
- Trend analysis
- Making a report
- Data logging
- Scheduler
- Network
- Creating monitoring/control screen
- Graphic effect
- I/O device

PC environment

- CPU: Intel compatible
- Interface: Ethernet, USB
- HDD: 300G or more
- Windows 7 and Windows XP

STANDARD ACCESSORIES

- Power cord: 1ea
- User's guide manual: 1ea

CPE-FAS30

Smart Factory Training System



FEATURES

- Helps the user understand the functions and processes of smart factory system, as an essential part of Industry 4.0, tailored to perform monitoring of manufacturing processes by sensor and software, autonomous factory control and maintenance, as well as safety management of the workshop
- Designed to optimize the use of smart production processes through the fusion with IT, software and Internet-of-Things (IoT)
- Supports personalized hands-on practices toward product design, production and quality control by the adoption of advanced techniques such as IoT and factory simulation
- Two ways of system operation: integrated system control of the nine stations and standalone operation per station
- Ensures safety in every practice by the use of a station hard case for each process

EXPERIMENTAL CONTENTS

- Comprehensive smart factory experiments based on the advanced IoT and factory simulation techniques toward product design, production, and quality control
- Components of automation system such as cylinder, valve, relay and motor
- Understanding of the automation system
- Understanding and utilization of the machinery elements
- Network system communication among programmable logic controllers (PLC's)
- How to control analog signal and digital signal
- Programming language practices for PLC-based control and PC-based control

1st Testing
(CPE-FAS30C)



Vision Inspection Station
(CPE-FAS30B)



IoT Working
Materials



Distribution Station
(CPE-FAS30A)



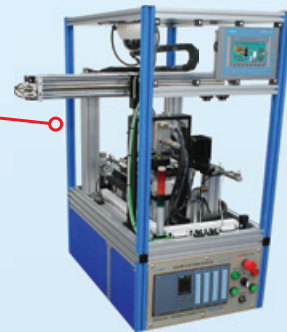
1st Sorting Station
(CPE-FAS30D)



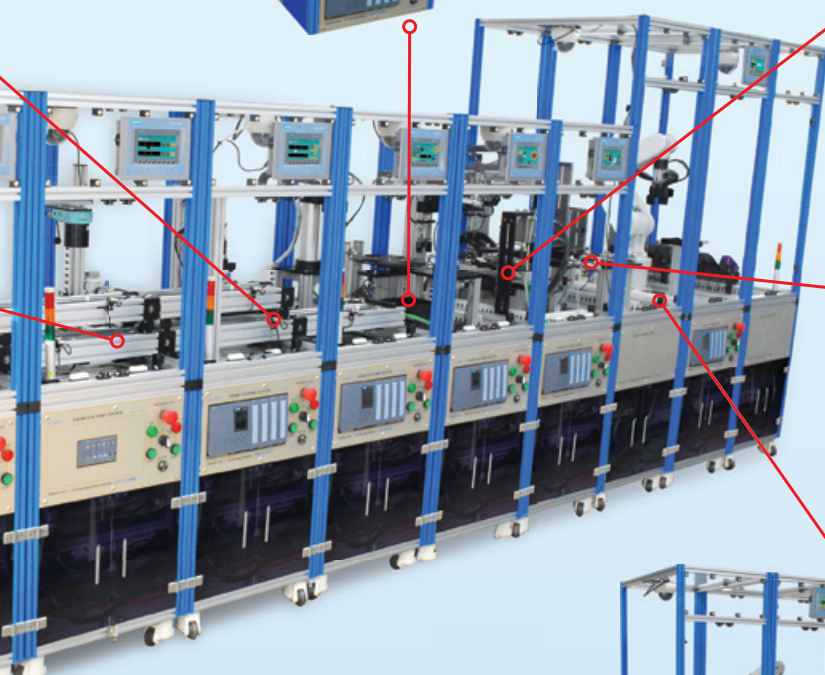
2nd Test & Sorting Station
(CPE-FAS30E)



Handling & Assembly
Station (CPE-FAS30F)



Packaging, Arm Robot, RFID &
Warehousing Station
(CPE-FAS30 G, H, I)



CPE-FAS30

PRODUCT COMPOSITION

Distribution Station (CPE-FAS30A)



- 1) Palette feed cylinder
- 2) Palette transfer cylinder
- 3) Working materials transfer cylinder and clamping cylinder
- 4) Palette load & transfer cylinder
- 5) Palette transfer control unit
 - Controls the direction of a conveyor
 - Motor (DC 24V, 20 RPM)
- 6) Palette load & transfer control unit
 - Controls the direction of a conveyor
 - Motor (DC 24V, 20 RPM)
- 7) Solenoid valve
 - 5/2-way pneumatic double acting solenoid valve: 3ea
- 8) Pneumatic regulator: 1ea
- 9) Station hard case
 - Built-in SMPS (DC24V, 2A)
 - Rack for fixing the control panel
 - With aluminum door at the bottom
- 10) Control panel
 - Power switch
 - Selector switch [AUTO/MANUAL]
 - Push button: 2ea
 - Emergency stop switch
 - Pilot lamp: 2ea
 - Buzzer
- 11) PLC module
- 12) HMI module

Vision Inspection Station (CPE-FAS30B)



- 1) Vision system
 - Number of items for inspection: 5 items
- 2) Palette transfer cylinder: 4 sets
- 3) Palette transfer control unit: 2 sets
 - Controls the conveyor's direction
 - Motor (DC 24V, 20 RPM)
- 4) Solenoid Valve
 - 5/2-way pneumatic double acting solenoid valve: 4ea
- 5) Pneumatic regulator: 1ea
- 6) Station hard case
 - Built-in SMPS (DC24V, 2A)
 - Rack for fixing the control panel
 - With aluminum door at the bottom
- 7) Control panel
 - Power switch
 - Selector switch [AUTO/MANUAL]
 - Push button: 2ea
 - Emergency stop switch
 - Pilot lamp: 2ea
 - Buzzer
- 8) I/O-Link

1st Testing Station (CPE-FAS30C)



- 1) 1st testing & transfer cylinder : 2 sets
- 2) 1st testing & transfer control unit: 2 sets
 - Controls the conveyor's direction
 - Motor (DC 24V, 20 RPM)
- 3) Sensor data measurement
 - Good/bad quality judgment on analog output values
 - Good/bad quality judgment on digital output values
- 4) JIG tool
- 5) Solenoid valve
 - 5/2-way pneumatic single acting solenoid valves: 1ea
 - 5/2-way pneumatic double acting solenoid valves: 2ea
- 6) Pneumatic regulator: 1ea
- 7) Station hard case
 - Built-in SMPS (DC24V, 2A)
 - Rack for fixing the control panel
 - With aluminum door at the bottom
- 8) Control panel
 - Power switch
 - Selector switch [AUTO/MANUAL]
 - Push button: 2ea
 - Emergency stop switch
 - Pilot lamp: 2ea
 - Buzzer
- 9) PLC module
- 10) HMI module

1st Sorting Station (CPE-FAS30D)



- 1) Conveyor transfer cylinder
- 2) Conveyor transfer guide: 2 sets
- 3) Palette absorption cylinder (forward / backward)
- 4) Palette absorption cylinder (up / down)
- 5) Pad and holder: 2ea
- 6) Palette absorption & rotation cylinder
- 7) Palette transfer control unit
 - Controls the conveyor's direction
 - DC motor: DC 24V, 20RPM
- 8) Solenoid Valve
 - 5/2-way pneumatic single acting solenoid valves: 1ea
 - 5/2-way pneumatic double acting solenoid valves: 3ea
 - 3/2-way pneumatic single acting solenoid valves (N.C): 2ea
- 9) Pneumatic regulator: 1ea
- 10) Station hard case
 - Built-in SMPS (DC24V, 2A)
 - Rack for fixing the control panel
 - With aluminum door at the bottom
- 11) Control panel
 - Power switch
 - Selector switch [AUTO/MANUAL]
 - Push button: 2ea
 - Emergency stop switch
 - Pilot lamp: 2ea
 - Buzzer
- 12) PLC module
- 13) HMI module

CPE-FAS30

2nd Test & Sorting Station (CPE-FAS30E)



1. 1st Assembly & Sorting Station

- 1) Index Table
 - 4 positions
 - DC 24V motor
- 2) Lower product cover supply cylinder
- 3) Assembly & press cylinder
- 4) Solenoid valve
 - 5/2-way pneumatic single acting solenoid valve: 2ea
- 5) Pneumatic regulator: 1ea
- 6) Station hard case
 - Built-in SMPS (DC24V, 2A)
 - Rack for fixing the control panel
 - With aluminum door at the bottom
- 7) Control panel
 - Power switch
 - Selector switch [AUTO/MANUAL]
 - Push button: 2ea
 - Emergency stop switch
 - Pilot lamp: 2ea
 - Buzzer
- 8) PLC module
- 9) HMI module

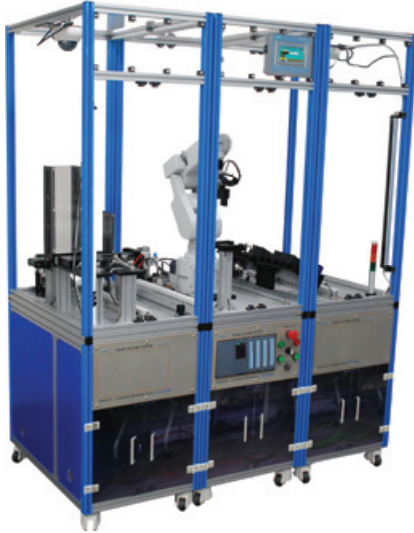
Handling & Assembly Station (CPE-FAS30F)



2. 2nd Assembly & Sorting Station

- 1) Product transfer cylinder
- 2) Gripper
- 3) Gripper up/down cylinder
- 4) Upper product cover feed cylinder
- 5) Upper product cover absorption cylinder (up / down)
- 6) Upper product cover absorption cylinder (rotational)
- 7) Vacuum generator
 - Pad and holder
- 8) Product transfer cylinder
- 9) PCB ON/OFF switching cylinder
- 10) Hydraulic press cylinder
- 11) Hydraulic pump
- 12) Solenoid Valve
 - 4/2-way hydraulic double acting solenoid valves: 1ea
 - 5/2-way pneumatic single acting solenoid valves: 3ea
 - 5/2-way pneumatic double acting solenoid valves: 5ea
 - 3/2-way pneumatic single acting solenoid valves (N.C): 1ea
- 13) Pneumatic regulator: 1ea
- 14) Station hard case
 - Built-in SMPS (DC24V, 2A)
 - Rack for fixing the control panel
 - With aluminum door at the bottom
- 15) Control panel
 - Power switch
 - Selector switch [AUTO/MANUAL]
 - Push button: 2ea
 - Emergency stop switch
 - Pilot lamp: 2ea
 - Buzzer
- 16) PLC module
- 17) HMI module

Packaging Station (CPE-FAS30G)



- 1) Inner box feed cylinder
- 2) Outer box feed cylinder
- 3) Tower-type storage rack for the working materials
- 4) Palette transfer control unit
 - Controls the conveyor's direction
 - DC motor: DC 24V, 20RPM
- 5) Solenoid Valve
 - 5/2-way pneumatic double acting solenoid valves: 2ea
- 6) Pneumatic regulator : 1ea
- 7) Station hard case
 - Equipped with an integrated area sensor package in the last three stations: 7th ~ 9th stations
 - Rack for fixing the control panel
 - With aluminum door at the bottom

Arm Robot Station (CPE-FAS30H)



- 1) Product packaging gripper
- 2) 6-axis arm robot
- 3) Robot controller
- 4) Solenoid valve
 - 5/2-way pneumatic single acting solenoid valve: 1ea
- 5) Pneumatic regulator: 1ea
- 6) Station hard case
 - Equipped with an integrated area sensor package in the last three stations: 7th ~ 9th stations
 - Rack for fixing the control panel
 - With aluminum door at the bottom
- 7) PLC module
- 8) HMI module

CPE-FAS30

RFID & Warehousing Station (CPE-FAS30I)



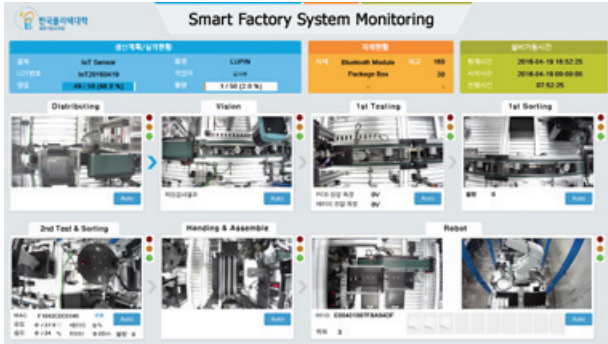
- 1) Warehouse module
 - Sensor slide for object detection: 2ea
- 2) RFID reader
- 3) Station hard case
 - Equipped with an integrated area sensor package in the last three stations: 7th ~ 9th stations
 - Rack for fixing the control panel
 - With aluminum door at the bottom
- 4) Control panel
 - Power switch
 - Selector switch [AUTO/MANUAL]
 - Push button: 2ea
 - Emergency stop switch
 - Pilot lamp: 2ea
 - Buzzer

IoT working materials (CPE-FAS30J)



- 1) MCU : Cortex M3
- 2) ISP : USB
- 3) Power Charger : Micro USB
- 4) Buzzer
- 5) GPS
- 6) LED
- 7) BLE Internal Antenna

Monitoring simulation software



1) Monitoring Simulation Software

- * MES [Manufacturing Execution System Shop Floor]
- MES system hardware / Wireless Access Point / MES system operation software / MES middleware / MES database / MES management

2) MES Monitor system

- * MES Client (.NET Framework based C#) / MES Mobile (Android)

SPECIFICATIONS

Category	Description
Distribution Station	Palette supply cylinder: 1.0 Mpa
Vision Inspection Station	Full frame rate: 75fps
1st Testing Station	Motor: DC 24V, 20RPM
2nd Testing & Sorting Station	Conveyor transfer cylinder: 1.0 Mpa
Handling & Assembly Station	Motor: DC 24V
Packaging Station	Cylinder: 10~30V DC
Robot System Station	Robot payload: max. 2Kg
RFID & Warehousing Station	RFID Reader: 13.56 MHz (passive)
Station hard case	Built-in PLC training system, 3-color tower stack light, casters with a lock
Control panel	Power switch, selector switch (AUTO/MANUAL), push button switch, emergency stop switch, pilot lamp, buzzer
Programmable logic controller	I/O: 32 points (analog input and output)
Input voltage	AC220V, 50/60Hz

* Please select a PLC unit: LS / Mitsubishi / Omron / Allen Bradley / Siemens

STANDARD ACCESSORIES

- AC power cord: 1ea
- Connection cable: 1set
- PLC operating software CD: 1ea
- Download cable for PLC, robot and RFID reader: 1ea
- User's guide & experimental manual: 1ea

OPTIONS

- Integrated control simulation software (Automation Studio)
- Smart factory MES software (CPE-MES30)

INTEGRATED SYSTEM CONFIGURATION



CPE-MPS200

Modular Production Training System I



The CPE-MPS200 Modular Production Training System I is an education-purpose factory automation system designed to nurture FA professionals through various control practices. This flexible modular production training system features linear transfer structure based on flexible configuration of the system stations.

The CPE-MPS200 includes various basic processes such as Distribution, Testing, Drilling, Buffer, Robot, Hydraulic Press and Warehouse Sorting. Each automation process will be handled by the programmable logic controller. The system features flexibility and expandability. It supports integrated system control as a whole and also standalone automation practices with each station. The user can start with one station and gradually add other stations after obtaining required skills.

With the CPE-MPS200, they will have clear understanding of the automated production system. They eventually will have integrated technical skills with electricity, electronics, sensor, PLC, robot, HMI software (SCADA) and pneumatic control.

FEATURES

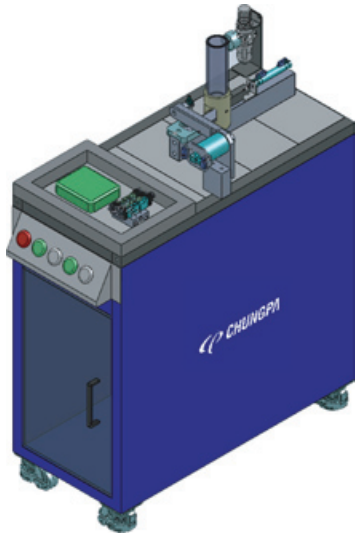
- Flexible modular production system that can adapt to different requirements of the customer through variations in its stations
- Designed to help the user learn the production mechanism and PLC programming
- Supports advanced levels of technical training on sensor, robot, PLC network and pneumatic technologies
- System configuration of each process: Distribution, Testing, Drilling, Buffer, Robot, Hydraulic Press and Warehouse Sorting

EXPERIMENTAL CONTENTS

- Principles of the automated production mechanism
- Assembly and disassembly practices with hardware components
- Advanced level of sensor, pneumatic, robot and PLC network technologies
- PLC programming and network control
- Practicing each process of the flexible modular production system
- Operation of Vision Sensors
- HMI(Human Machine Interface) / SCADA

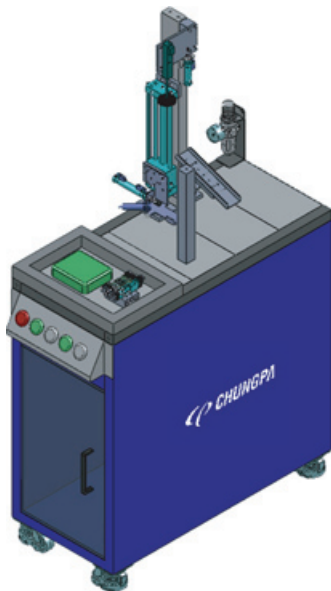
SPECIFICATIONS

Distribution Station (CPE-MPS200A)



- 1) Structure: Aluminum profile [750(W) x 750(D) x 30(H) mm]
Slot interval: 25mm
- 2) PLC interface
 - Input: 8 points
 - Output: 8 points
 - System I/O terminal: 25 pins
- 3) Pneumatic valve
 - 3/2-way pneumatic valve: 1ea
 - 5/2-way pneumatic valve: 1ea
 - Vacuum generator: 1ea
- 4) Feeding tube: $\varnothing 40$
- 5) Transfer of the feeding tube: Double acting cylinder (stroke: 80mm)
- 6) Pneumatic actuator: 2ea (linear x 1, rotary x 1)
- 7) Digital sensor: 7ea (optical sensor x 2, micro switch x 2, proximity sensor x 2, vacuum switch x 1)
- 8) Input & output: [Input] 7 points, [output] 5 points
- 9) Maintenance device: Pressure gauge, 3/2-way safety valve and pneumatic regulator
- 10) Working pressure: 5 ~ 6 Bar
- 11) Power source: 24VDC

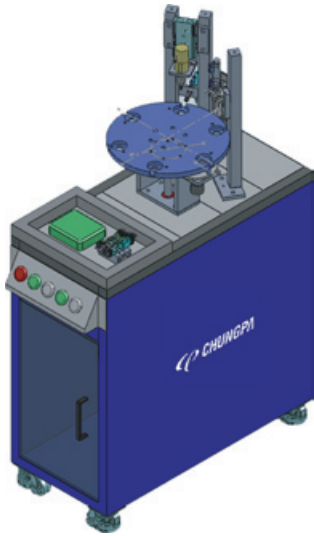
Testing Station I (CPE-MPS200B)



- 1) Structure: Aluminum profile [750(W) x 750(D) x 30(H) mm]
Slot interval: 25mm
- 2) PLC interface
 - Input: 8 points
 - Output: 8 points
 - System I/O terminal: 25 pins
- 3) Pneumatic valve
 - 3/2-way pneumatic valve: 2ea
 - 5/2-way pneumatic valve: 1ea
 - Air slide type 5/2-way valve: 1ea
- 4) Lifting: Rodless cylinder (stroke: 225mm)
- 5) Extraction slide: Extract cylinder (stroke: 70mm)
- 6) Object detection:
 - Material: Capacitive sensor
 - Height: Digital sensor
 - Color: Optical sensor
- 7) Pneumatic actuator: 2ea (linear x 1, rodless x 1)
- 8) Digital sensor: 8ea (optical sensor x 2, capacity sensor x 1, proximity sensor x 3, receiver x 1, analog comparator x 1)
- 9) Input & output: [Input] 8 points, [output] 5 points
- 10) Maintenance device: Pressure gauge, 3/2-way safety valve and pneumatic regulator
- 11) Working pressure: 5 ~ 6 Bar
- 12) Power source: 24VDC

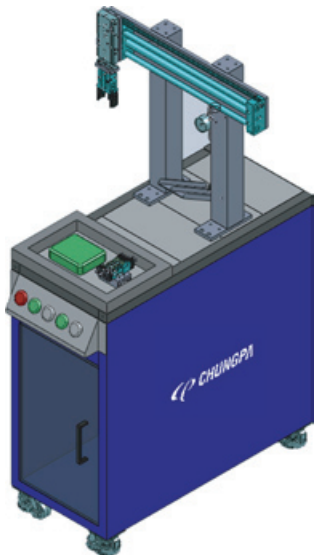
CPE-MPS200

Drilling Station (CPE-MPS200C)



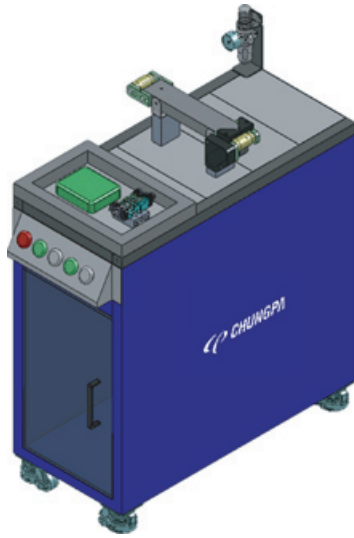
- 1) Structure: Aluminum profile [750(W) x 750(D) x 30(H) mm]
Slot interval: 25mm
- 2) PLC interface
 - Input: 8 points
 - Output: 8 points
 - System I/O terminal: 25 pins
- 3) Relay: 5ea
- 4) Transfer device: Rotary table (operated by DC 24V motor)
- 5) Inspection: Electric clamping device
- 6) Drilling: DC24V motor powered drilling (stroke: 100mm) / limit switch
- 7) Electric actuator: 3ea (gear motor index drive x 1, gear motor drill x 1, timing belt drive x 1)
- 8) Digital sensor: 8ea (capacity sensor x 3, high-frequency type sensor x 3, microswitch x 2)
- 9) Maintenance device: Pressure gauge, 3/2-way safety valve and pneumatic regulator
- 10) Working pressure: 5 ~ 6 Bar
- 11) Power source: 24VDC

Handling Station (CPE-MPS200D)



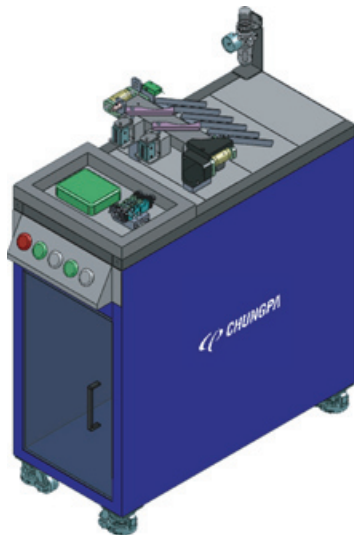
- 1) Structure: Aluminum profile [750(W) x 750(D) x 30(H) mm]
Slot interval: 25mm
- 2) PLC interface
 - Input: 8 points
 - Output: 8 points
 - System I/O terminal: 25 pins
- 3) Pneumatic valve
 - 3/2-way pneumatic valve: 2ea
 - 5/2-way pneumatic valve: 2ea
- 4) Object detection: Optical sensor and object holder
- 5) Transfer: X-axis - Pneumatic acting linear axis (600mm)
Z-axis - Plane linear cylinder
- 6) Gripper: 40mm (pneumatic acting type, built-in optical sensor)
- 7) Pneumatic actuator: 3ea (linear x 2, gripper x 1)
- 8) Digital sensor: 8ea (optical sensor x 2, proximity sensor x 5, receiver x 1)
- 9) Input & output: [Input] 8 points, [output] 5 points
- 10) Maintenance device: Pressure gauge, 3/2-way safety valve and pneumatic regulator
- 11) Working pressure: 5 ~ 6 Bar
- 12) Power source: 24VDC

Buffer Station (CPE-MPS200E)



- 1) Structure: Aluminum profile [750(W) x 750(D) x 30(H) mm]
Slot interval: 25mm
- 2) PLC interface
 - Input: 8 points
 - Output: 8 points
 - System I/O terminal: 25 pins
- 3) Pneumatic valve: 1 ea
- 4) Transfer device: Conveyor (750mm in length)
- 5) Drive: DC 24V motor
- 6) Classification: Short stroke cylinder (stroke: 10mm)
- 7) Pneumatic actuator: 1 ea (linear x 1)
- 8) Digital sensor: 6ea (optical sensor x 3, proximity sensor x2, transmitter/receiver x 1)
- 9) Input & output: [Input] 7 points, [output] 5 points
- 10) Maintenance device: Pressure gauge, 3/2-way safety valve and pneumatic regulator
- 11) Working pressure: 5 ~ 6 Bar
- 12) Power source: 24VDC

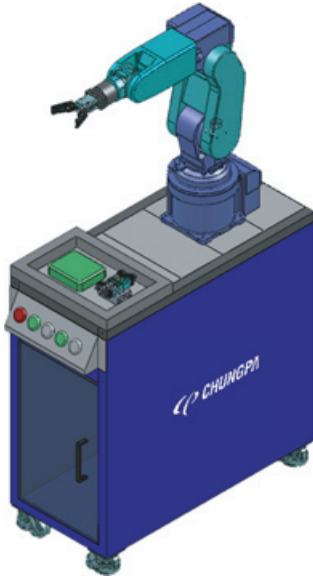
Sorting Station (CPE-MPS200F)



- 1) Structure: Aluminum profile [750(W) x 750(D) x 30(H) mm]
Slot interval: 25mm
- 2) PLC interface
 - Input: 8 points
 - Output: 8 points
 - System I/O terminal: 25 pins
- 3) Pneumatic valve
 - 5/2-way pneumatic valve: 3ea
- 4) Material & color detection: Inductive sensor and optical sensor
- 5) Transfer device: Conveyor (750mm in length)
- 6) Drive: DC 24V motor
- 7) Stopper: Short stroke cylinder (stroke: 10mm)
- 8) Pneumatic actuator: 3ea (linear)
- 9) Digital sensor: 8ea (optical sensor x 3, proximity sensor x4, transmitter/receiver x 1)
- 10) Input & output: [Input] 8 points, [output] 4 points
- 11) Maintenance device: Pressure gauge, 3/2-way safety valve and pneumatic regulator
- 12) Working pressure: 5 ~ 6 Bar
- 13) Power source: 24VDC

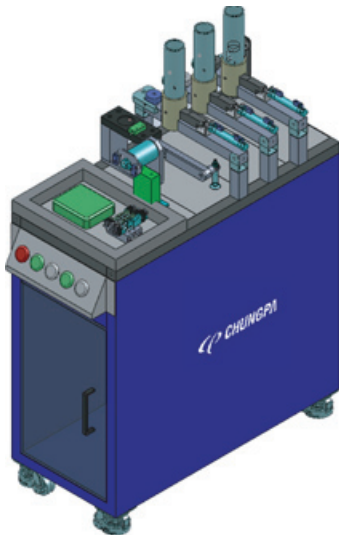
CPE-MPS200

Robot Station (CPE-MPS200G)



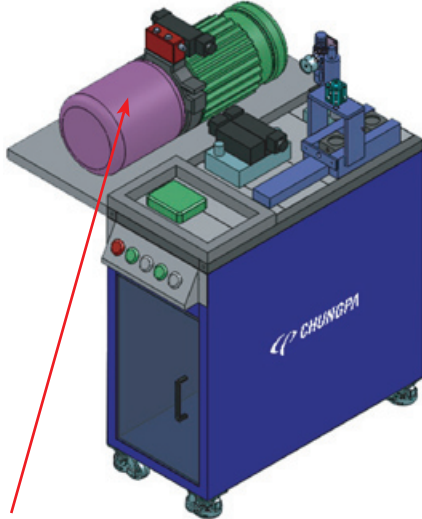
- 1) Structure: Aluminum profile [750(W) x 750(D) x 30(H) mm]
Slot interval: 25mm
- 2) PLC interface
 - Input: 8 points
 - Output: 8 points
 - System I/O terminal: 25 pins
- 3) Pneumatic valve: 1ea
- 4) Color detection: Optical sensor
- 5) Digital sensor: 4ea (optical sensor x 3, transmitter/receiver x 1)
- 6) Input & output: [Input] 4 points, [output] 1 point
- 7) Maintenance device: Pressure gauge, 3/2-way safety valve and pneumatic regulator
- 8) Working pressure: 5 ~ 6 Bar
- 9) Power source: 24VDC, AC220V, 1kW
- 10) Robot DOF: 6
- 11) Pay load: 2kg
- 12) Arm length: 230 + 270mm
- 13) Maximum radius: 504mm
- 14) Robot weight: 19kg
- 15) Gripper: Long stroke pneumatic gripper
- 16) Communication: RS232, Ethernet, USB

Assembly Station (CPE-MPS200H)



- 1) Structure: Aluminum profile [750(W) x 750(D) x 30(H) mm]
Slot interval: 25mm
- 2) PLC interface
 - Input: 8 points
 - Output: 8 points
 - System I/O terminal: 25 pins
- 3) Pneumatic valve
 - 5/2-way pneumatic valve: 2ea
- 4) Feeding tube: $\varnothing 40$ circular type (can accommodate 8 work pieces)
- 5) Detection: Capacitive sensor and optical sensor
- 6) Pneumatic actuator: 2ea (single acting x 1, double acting x 1)
- 7) Digital sensor: 8ea (proximity sensor x 4, micro switch x 1, optical sensor x 2, transmitter/receiver x 1)
- 8) Input & output: [Input] 8 points, [output] 4 points
- 9) Maintenance device: Pressure gauge, 3/2-way safety valve and pneumatic regulator
- 10) Working pressure: 5 ~ 6 Bar
- 11) Power source: 24VDC

Hydraulic Punching Station (CPE-MPS200I)



Hydraulic Power Unit : Pump
(CPE-MPS200I-HP)

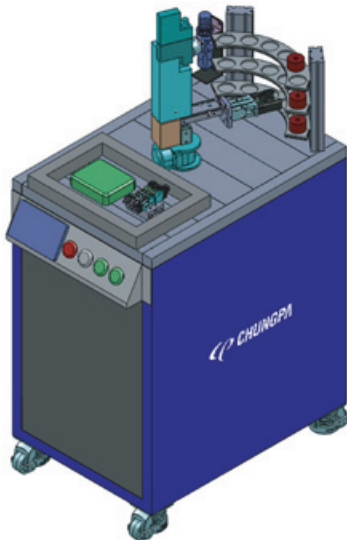
[Main Unit]

- 1) Structure: Aluminum profile [750(W) x 750(D) x 30(H) mm]
Slot interval: 25mm
- 2) PLC interface
 - Input: 8 points
 - Output: 8 points
 - System I/O terminal: 25 pins
- 3) Pneumatic valve
 - 5/2-way pneumatic valve: 3ea
- 4) Hydraulic valve
 - 2/2-way hydraulic valve: 2ea
 - 4/2-way hydraulic valve: 1ea
 - 4/3-way hydraulic valve: 1ea
- 5) Feeding tube: End cap vertical type
- 6) Pneumatic actuator: 3ea (single acting x 1, double acting x 2)
- 7) Digital sensor: 8ea (proximity sensor x 6, pressure sensor x 1, transmitter x 1)
- 8) Input & output: [Input] 8 points, [output] 4 points
- 9) Maintenance device: Pressure gauge, 3/2-way safety valve and pneumatic regulator
- 10) Working pressure: Max. 60 Bar
- 11) Power source: 24VDC

[Pump Unit]

- 1) Working pressure: Hydraulic 5 ~ 60 Bar
- 2) Power source: Single-phase 230VAC 50/60Hz
- 3) Hydraulic power pack: 650W, 3.1A, 1320 RPM, 5 liter tank
- 4) Hydraulic oil: 10 liter
- 5) Hose line: 1.5 meter

Warehouse Sorting Station (CPE-MPS200J)



- 1) Structure: Aluminum profile [750(W) x 750(D) x 30(H) mm]
Slot interval: 25mm
- 2) PLC interface
 - Input: 8 points
 - Output: 8 points
 - System I/O terminal: 25 pins
- 3) Pneumatic valve
 - 5/2-way pneumatic valve: 2ea
- 4) Detection: Optical sensor, color touch panel, 12 ~ 32mm
- 5) Level position: Motor, vertical encoder, servo controller
- 6) Slot position: Motor, vertical encoder, rotation controller
- 7) Pneumatic actuator: 2ea (double acting x 1, pneumatic parallel gripper x 1)
- 8) Digital sensor: 3ea (proximity sensor x 2, transmitter/receiver x 1)
- 9) Input & output: [Input] 8 points, [output] 8 points
- 10) Maintenance device: Pressure gauge, 3/2-way safety valve and pneumatic regulator
- 11) Working pressure: 5 ~ 6 Bar
- 12) Power source: 24VDC

STANDARD ACCESSORIES

- Power cord: 1set
- Connection cable: 1set
- Pneumatic hose: 30m
- Operating software CD: 1ea
- User's guide manual: 1ea



CPE-MPS300

Modular Production Training System II



The CPE-MPS300 Modular Production Training System II is an education-purpose factory automation system designed to nurture FA professionals through various control practices. This flexible modular production training system features linear transfer structure based on flexible configuration of the system stations.

The CPE-MPS300 includes various basic processes such as Distribution, Testing, Drilling, Robot, Assembly, Classification and Warehousing, and it can adapt to different requirements of the customer through variations in its stations. Each automation process will be handled by the programmable logic controller. The system features flexibility and expandability. It supports integrated system control as a whole and also standalone automation practices with each station. The user can start with one station and gradually add other stations after obtaining required skills.

With the CPE-MPS300, they will have clear understanding of the automated production system. They eventually will have integrated technical skills with electricity, electronics, sensor, PLC, robot, HMI software (SCADA) and pneumatic control.

SPECIFICATIONS

Inlet Lifter (CPE-MPS300A)



FEATURES

- Flexible modular production system that can adapt to different requirements of the customer through variations in its stations
- Designed to help the user learn the production mechanism and PLC programming
- Supports advanced levels of technical training on sensor, robot, PLC network and pneumatic technologies
- System configuration of each process: Distribution, Testing, Drilling, Robot, Assembly and Classification

EXPERIMENTAL CONTENTS

- Principles of the automated production mechanism
- Assembly and disassembly practices with hardware components
- Advanced level of sensor, pneumatic, robot and PLC network technologies
- PLC programming and network control
- Practicing each process of Supply, Testing, Drilling, Handling, Assembly and Storage
- Operation of Vision Sensors
- HMI(Human Machine Interface)/SCADA

System configuration

- 1) Pallet supplier and lift conveyor
- 2) Experimental plate base
- 3) Pneumatic supply system
- 4) Worktable
- 5) Solenoid block
- 6) Control panel

SPECIFICATIONS

Distribution Station I (CPE-MPS300B)



Operating Process

- JIG materials will be supplied to the conveyor by a rotational cylinder.
- The work piece will be supplied to the magazine at the selected position by the cylinder.

System Configuration

- 1) Pallet supplier and lift conveyor
- 2) Experimental plate base
- 3) Two-layer conveyor
- 4) Pneumatic supply system
- 5) Worktable
- 6) Solenoid block
- 7) Control panel

Testing Station (CPE-MPS300C)



Operating Process

- The work piece on a stand-by pallet will be carried to the inspection base by the cylinder.
- After passing inspection, the work piece will be transferred to the standby pallet by rotational cylinder.
- The disqualified work piece will be separately sorted and it will repeat the same procedures.

System configuration

- 1) Inspection system
- 2) Rotational cylinder
- 3) 2nd materials supplier and magazine
- 4) Experimental plate base
- 5) Two-layer conveyor
- 6) Pneumatic supply system
- 7) Worktable
- 8) Solenoid block
- 9) Control panel

CPE-MPS300

Drilling Station (CPE-MPS300D)



Operating Process

- The work piece on a stand-by pallet will be carried to the Drill Processing JIG by rotational cylinder.
- After drilling process, the work piece will be transferred to the standby palette by rotational cylinder.

System Configuration

- 1) 180° rotational cylinder
- 2) Clamping device
- 3) Drilling machine
- 4) Transfer slider
- 5) Two-layer conveyor
- 6) Experimental plate base
- 7) Pneumatic supply system
- 8) Worktable
- 9) Solenoid Block
- 10) Control Panel

Distribution Station II (CPE-MPS300E)



Operating Process

- The work piece on a stand-by pallet will be transferred to the sensor position for quality inspection.
- The work piece will be supplied to the assembly JIG according the values of sensor. Then, it will determine component supply elements (aluminum, white plastic and blue plastic)

System configuration

- 1) Materials classification device
- 2) Components supplier: 3 sets
- 3) Experimental plate base
- 4) Transfer slider
- 5) Two-layer conveyor
- 6) Experimental plate base
- 7) Pneumatic supply system
- 8) Worktable
- 9) Solenoid block
- 10) Control panel

Robot Station (CPE-MPS300F)



System configuration

- 1) Robot (VP-6242FM)
- 2) Robot controller
- 3) Operational controller
- 4) Gripper
- 5) Robot base
- 6) Worktable
- 7) Two-layer conveyor
- 8) Relay
- 9) Valve block
- 10) Control panel

Assembly Station (CPE-MPS300G)



Operating Process

- The assembly robot will carry the work piece to the position of assembly, and the screw feeder will supply the screws.
- When the screws are supplied, the work piece will be transferred and completely assembled by an electrical driver.

System configuration

- 1) Electric driver & supply system
- 2) Rotational cylinder
- 3) Clamping device
- 4) Two-layer conveyor
- 5) Experimental plate base
- 6) Pneumatic supply system
- 7) Solenoid block
- 8) Control panel

CPE-MPS300

Sorting Station (CPE-MPS300H)



Operating Process

- The completely assembled work piece will be transferred to the sensor position by the cartesian coordinate robot.
- The work piece, based on detected sensor values, will be supplied to the classification slider. Then, it will be classified automatically according to the quality of work piece (aluminum, white plastic and blue plastic).

System configuration

- 1) Classification system & rotational cylinder
- 2) Experimental plate base
- 3) Two-layer conveyor
- 4) Pneumatic supply system
- 5) Worktable
- 6) Solenoid block
- 7) Classification slide
- 8) Cartesian coordinate robot
- 9) Lift conveyor
- 10) Control panel

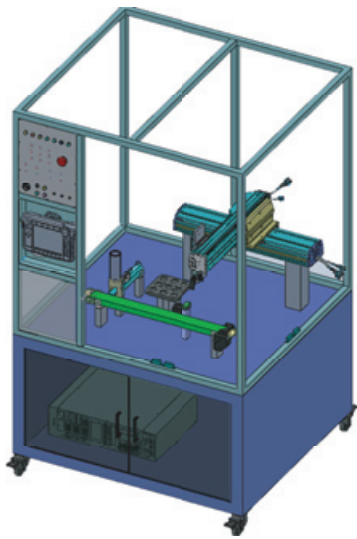
Outlet Lifter (CPE-MPS300I)



System configuration

- 1) Lift conveyor
- 2) Experimental plate base
- 3) Pneumatic supply system
- 4) Worktable
- 5) Solenoid block
- 6) Control panel

2-Axis Cartesian Coordinate Robot Trainer



FEATURES

- Hands-on practices on industrial 2-axis Cartesian coordinate robot
- International standard language command for the industrial robot
- Simulation software and industrial communication network
- Interlocking experiments with various types of automation system

EXPERIMENTAL CONTENTS

- Characteristics of the 2-axis Cartesian coordinate robot
- Command instruction of industrial robot
- Point-to-point transfer program
- Palletizing practices
- Control practices by 3D simulation software
- Interlocking practice with other automated system

SPECIFICATIONS

Cartesian coordinates robot (1set)	- Type of operation: Cartesian multi-joint type	
	- Control axis : 2 axis	
	- Weight: 5kg	
	- Accuracy : $\pm 0.02\text{mm}$	
	- ARM length (max.) : X - 500mm / Y - 400mm	
	- Maximum speed : 800mm/s	
	- Motor (J1, J2) : 200W	
Robot controller (1set)	- LM guide 15.2 rails, 4 blocks	
	- 32bit RISC CPU, built-in Servo AMP	
	- Maximum control axis : 4 axis	
	- Motor control : AC servo	
	- External communication : RS-232C, Ethernet, USB	
	- Robot command languages (built-in)	
	- Monitoring function (I/O, speed, location torque)	
- Various host package (DOS, WINDOWS)		
Cartesian robot system (1set)	1) Assembly robot	
	2) Assembly controller	
	3) Robot GRIPPER	- Type : Pneumatic operation
		- Sensor: Operational detection sensor
		- Operational range : 39mm
		- Weight : 2 kg
	4) Protection device	- Operation : Speed control
		- Basic structure: Aluminum profile structure
		- Door : Transparent acrylic 8T
		- Cover : Transparent acrylic 5T
- Wheel: Lockable casters		
- Door detecting sensor: 1 cell (*emergency stop function)		

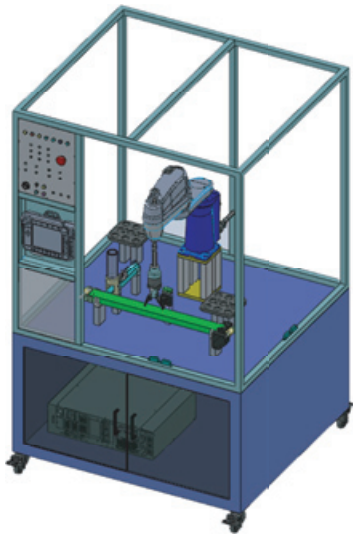
Tray To Tray	- Type of material	MC, 9 trays (3 x 3)
	- Material supply	Actuator: Tube cylinder ($\phi 16$, S/T:75mm)
		Cylinder sensor: Built-in reed sensor (1ea)
		Material detection: Optical sensor
		Material size: $\phi 39 \times 25\text{mm}$
Conveyor	Solenoid valve: 5/2-way valve & DC 24V	
	- Small conveyor	Motor: DC24V geared motor
		Size: 42(W) x 600 (D) mm
	Type: Belt type	

STANDARD ACCESSORIES

- Communication cable (for the robot interface) : 1set
- 3D simulation software CD : 1ea
- User's guide and experimental manual: 1ea

CPE-RO9002

4-Axis SCARA Robot Trainer



FEATURES

- Practical training on the industrial 4-axis SCARA robot
- International standard language command for the industrial robot
- Simulation software and industrial communication network
- Interlocking experiments with various types of automation system

EXPERIMENTAL CONTENTS

- Characteristics of the 4-axis SCARA robot
- Command instruction of industrial robot
- Point-to-point transfer program
- Palletizing practices
- Control practices by 3D simulation software
- Interlocking practice with other automated system

SPECIFICATIONS

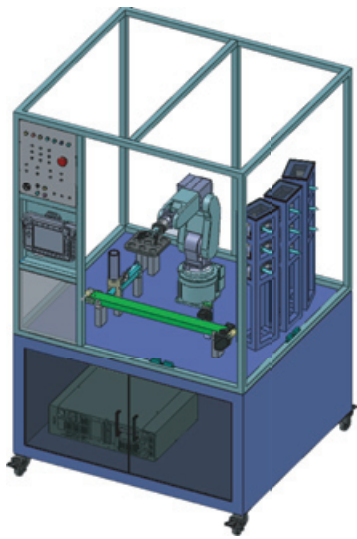
SCARA robot system (1set)	1) Assembly robot	
	2) Assembly controller	
	3) Robot GRIPPER	- Type : Pneumatic operation
		- Sensor: Operational detection sensor
4) Protection device	- Operational range : 39mm	
	- Weight : 2 kg	
	- Operation : Speed control	
	- Basic structure: Aluminum profile structure	
Tray To Tray	- Door : Transparent acrylic 8T	
	- Cover : Transparent acrylic 5T	
	- Wheel: Lockable casters	
	- Door detecting sensor: 1 cell (*emergency stop function)	
Conveyor	- Type of material	MC, 9 trays (3 x 3)
	- Material supply	Actuator: Tube cylinder (ø16, S/T:75mm)
		Cylinder sensor: Built-in reed sensor (1ea)
		Material detection: Optical sensor
- Small conveyor	Material size: ø39 x 25mm	
	Solenoid valve: 5/2-way valve & DC 24V	
	Motor: DC24V geared motor	
- Inspection device	Size: 42(W) x 600 (D) mm	
	Type: Belt type	
		Color sensor and proximity sensor

STANDARD ACCESSORIES

- Communication cable (for the robot interface) : 1set
- 3D simulation software CD : 1ea
- User's guide and experimental manual: 1ea

CPE-RO9003

6-Axis Multi Joint Robot Trainer



FEATURES

- Hands-on practices on industrial 6-axis multi joint robot
- International standard language command for the industrial robot
- Simulation software and industrial communication network
- Interlocking experiments with various types of automation system

EXPERIMENTAL CONTENTS

- Characteristics of the 6-axis multi joint robot
- Command instruction of industrial robot
- Point-to-point transfer program
- Palletizing practices
- Control practices by 3D simulation software
- Interlocking practice with other automated system

SPECIFICATIONS

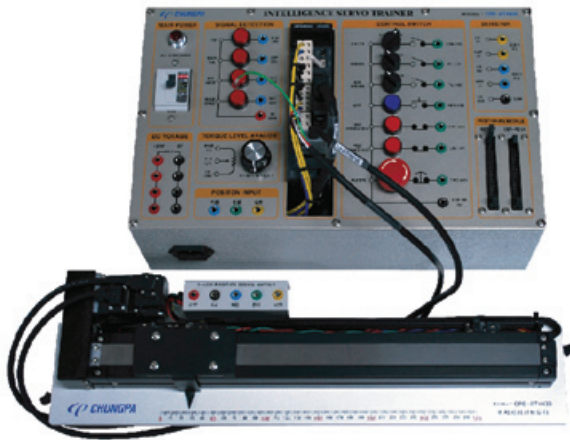
6-axis vertical multi-joint robot system (1set)	1) Assembly robot	
	2) Assembly controller	
	3) Robot GRIPPER	- Type : Pneumatic operation
		- Sensor: Operational detection sensor
		- Operational range : 39mm
4) Protection device	- Weight : 2 kg	
	- Operation : Speed control	
	- Basic structure: Aluminum profile structure	
	- Door : Transparent acrylic 8T	
	- Cover : Transparent acrylic 5T	
	- Wheel: Lockable casters	
	- Door detecting sensor: 1 cell (*emergency stop function)	
Tray To Tray	- Type of material	MC, 9 trays (3 x 3)
	- Material supply	Actuator: Tube cylinder (ø16, S/T:75mm)
		Cylinder sensor: Built-in reed sensor (1ea)
		Material detection: Optical sensor
		Material size: ø39 x 25mm
	Solenoid valve: 5/2-way valve & DC 24V	
Conveyor	- Small conveyor	Motor: DC24V geared motor
		Size: 42(W) x 600 (D)mm
		Type: Belt type
Warehouse	- Inspection device	Color sensor and proximity sensor
	- Type	3 x 3 cells, acrylic hybrid type
	- Sensor	Inductive sensor (9ea)

STANDARD ACCESSORIES

- Communication cable (for the robot interface) : 1set
- 3D simulation software CD : 1ea
- User's guide and experimental manual: 1ea

CPE-AT4430

Smart Servo Control Trainer



FEATURES

- Hands-on control practices on the AC servo and servo drive which are essential elements for automation
- Equipped with 1-axis Smart Actuator for high speed control with high precision (ball screw and LM guide system)
- Various servo control practices through the motor control mechanism (jog, return to the starting point, upper/lower limit control and repetitive operation)
- Perfectly compatible with a programmable logic controller for interlocking PLC experiments

EXPERIMENTAL CONTENTS

- Basic principles of servo motor control
- Functions and operation of encoder
- Functions of the servo driver
- Control of speed, torque and current
- Parameter setting for servo motor
- JOG control and position control

STANDARD ACCESSORIES

- AC cord : 1ea
- 4mm plug : 1ea
- Servo drive program CD: 1ea
- User's guide and experimental manual: 1ea

SPECIFICATIONS

Servo drive	Voltage / Frequency	1-phase AC 200V ~ 230V 50/60Hz or 3-phase AC 200V ~ 230V 50/60Hz
	Control Method	Sine wave PWM control and current control
	Position control mode	Input pulse frequency : 1Mpps (max.)
	Speed control mode	Analog speed command : 1: 2000 Internal speed command : 1: 5000
	Torque control	Analog torque command input : DC 0 ~ ±8V (input impedance 10 ~ 12kΩ)
Servo motor	Rated output	50W
	Revolution speed	3000 RPM
Smart servo actuator unit	Maximum input speed	3000 RPM
	Travel speed	250 mm/s
Control panel	Main power	AC 220V 60Hz / 20A (with a circuit breaker)
	DC voltage input	+ pole (4ea) / - pole (4ea)
	Signal detection	4-step indicator lamp 4 terminals 1COM
	Torque level analog	Maximum torque: +10V
	Position input	3 terminals (lower limit, starting point, upper limit)
	Control switch	7 steps (7 terminal 1COM) - Selector switch: 3ea - Push button: 3ea - Emergency switch : 1ea
	Detector	Detector A-phase : 2ea Detector B-phase : 2ea
	Positioning Terminal	2ea (supports combined use of the LS and Mitsubishi models)

CPE-AT4440

2-Axis Servo Control Trainer



FEATURES

- Best suited for position control through the high-precision servo motor and servo drive
- Front panel with essential I/O functions to run the control system
- Various servo control practices through the motor control mechanism (jog, return to the starting point, upper/lower limit control and repetitive operation)
- Designed to connect a programmable logic controller and support interlocking PLC experiments

EXPERIMENTAL CONTENTS

- Basic principles of 2-axis servo motor control
- Various servo control practices through the motor control mechanism
- Servo drive setting and control
- Signal detection / torque level / positioning
- Parameter control of X-Y-Z axis
- PLC control practices

STANDARD ACCESSORIES

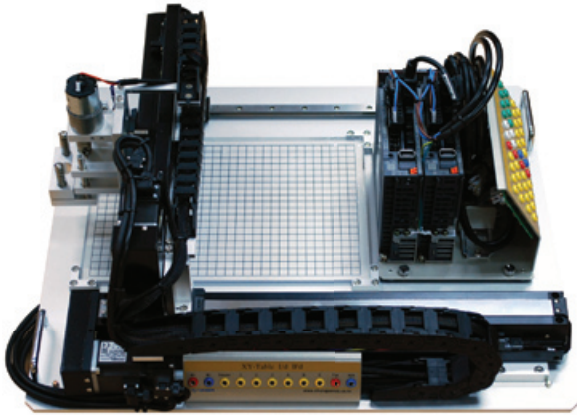
- AC cord : 1ea
- Connection cable : 1set
- Work piece (round-shape magnet): 1set
- User's guide manual: 1ea

SPECIFICATIONS

Mechanism section	X-Y axis robot
	Z-axis robot : Z-axis cylinder, LM guide, slide bush, shaft
	Drawings-fixation base panel
	Aluminum base panel (700 x 500 mm)
Actuator section	Servo motor : 100W
	Speed of revolution : 3000 RPM
	Equipped with cylinder and valve
Controller section	Main power : 220V 50/60Hz
	DC voltage (+24V, GND) : 4 sets
	X-axis signal detection
	X-axis torque level analog
	Z-axis solenoid valve
	Y-axis torque level analog
	Y-axis signal detection
	Y-axis position input
	Y-axis control switch
	Positioning module
Z-axis sensor	

CPE-AT4460

2-Axis Servo Motor Trainer



FEATURES

- Position control system in use of high-precision servo motor and servo drive
- X-Y axis transfer function through servo drive
- Z axis transfer function through DC motor
- Effective experiments by the placement of I/O functions in the front part
- Board marker fixation and up/down movement using DC 24V motor
- Can separate and replace the transparent acrylic board
- Operable by various types of programmable logic controller

EXPERIMENTAL CONTENTS

- Return to the starting point using sensors
- Top/down limit control and continuous operation
- Servo drive setup and control techniques
- Servo motor control in use of the servo motor drive
- Electrical sequence circuit (PLC/PC control)

STANDARD ACCESSORIES

- Power cord: 1ea
- Connection cable (4mm): 1set
- User's guide manual: 1ea

PRODUCT COMPOSITION

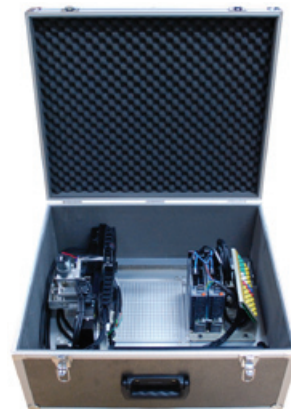
- Servo motor
- DC motor
- Servo drive
- Base frame

OPTIONS

- Programmable Logic Controller Trainer (*Suggestions: CPS-3500UA/B, CPS-3520U, CPS-3530S, CPS-3750M)
- Portable storage box

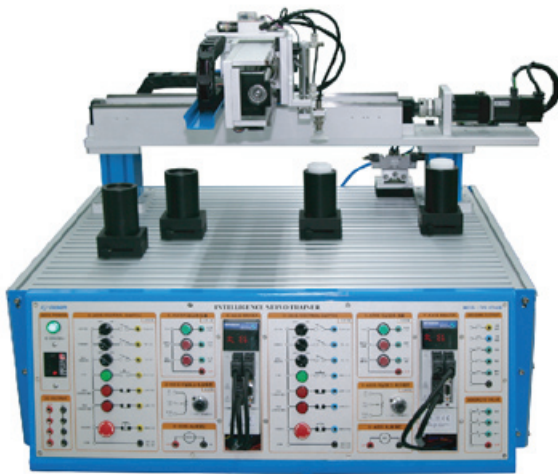
SPECIFICATIONS

Servo motor	150mm/sec
Servo drive	MR-J4-10B
X axis	Ball screw + round bar
Y axis	Ball screw + LM
Photo sensor	Slot-sensor: 6ea
DC motor	DC 24V, with return detection sensor
X-Y axis range	300mm x 200mm
Base Frame	Material: aluminum
Transparent acrylic board	Gradations printed (with intervals of 10mm)
Operating power	X-Y axis AC servo motor: AC220V Z-axis DC motor: DC24V



CPE-AT4400

Intelligent 2-Axis Servo Control Trainer



SPECIFICATIONS

X-axis robot, Y-axis robot

1) Servo drive

- Main circuit power
 - Voltage/frequency: 1-phase or 3-phase AC 200V ~ 230V 50/60Hz
 - Permissible frequency change: Within $\pm 5\%$
- Power protection
 - Overcurrent prevention, overload prevention, overheat protection (servo motor), overspeed protection, instantaneous interruption protection and detector error protection
- Control method
 - Sine wave PWM control
 - Current control
- Position control mode
 - Max. input pulse frequency: 1Mpps (differential receiver)
- Speed control mode
 - Analog speed command: 1:2000
 - Internal speed command: 1:5000
- Torque control
 - Analog torque command input: DC 0 ~ $\pm 8V$
 - Structure: Natural cooling, open type (IP00)
- Environment
 - Ambient temperature: 0 ~ 55°C
 - Storage temperature: -20 ~ 65°C
 - Vibration: Below 5.9%

FEATURES

- Compatible with Universal PLC Trainer (Siemens PLC / Mitsubishi PLC / LS XGT PLC)
- Comprises 2-axis robot and Z-axis using AC Servo Motor and Servo Drive
- Capable of high speed and accurate control through the use of Ball Screw and LM Guide System
- Designed to learn motor control mechanism that covers jog, return to starting point, up/down limit control and continuous operation

EXPERIMENTAL CONTENTS

- Basic concept and operation of Servo Drive
- Position control with AC Servo Motor
- Speed control, torque level control and positioning control
- Control mechanism: Jog, starting point and step-by-step mode
- High speed and accurate control by Ball Screw and LM Guide System

2) Servo motor

- Rated output: 50W
- Rated speed of revolution: 3000RPM
- Maximum speed of revolution: 5000 RPM
- Rated torque: 0.16 N·m
- Power rate: 4.87kW/S
- Rated current: 0.9A
- Maximum current: 2.7A
- Speed & location detector: 262144P/rev (resolution per rotation of the encoder and servo motor)

3) Transfer distance

- X-axis: 300mm
- Y-axis: 200mm

4) Transfer speed: 0 ~ 100mm/s (adjustable speed)

5) Operational method: Ball screw & LM guide

6) Limit switch

- Top/bottom detection: 1ea
- Starting point detection: 1ea

Z-axis robot

- 1) Control method: Forward/backward absorption by pneumatic control
- 2) Absorption weight: 0.5Kg
- 3) 3/2-way solenoid valve: 1ea
- 4) 5/2-way solenoid valve: 1ea
- 5) Vacuum generator: 1ea
- 6) Absorption cup: 1ea

Control panel

- 1) Panel structure: Aluminum profile (25mm slot interval)
- 2) Servo drive unit: Protruding type (upper part) on the front panel
- 3) Power control ELCB: AC 220V (1ea)
- 4) Power indicator lamp: Green (1ea)
- 5) DC power output: DC 24V (red color and black color)
- 6) 4mm input terminal (automatic control)
 - Yellow color: 7ea
 - Blue color: 7ea
 - Black color: 2ea
- 7) Selector switch (manual control)
 - 2-position type: 6ea
- 8) Push button switch (manual control)
 - 1a contact: 2ea
 - 1b contact: 4ea
- 9) Emergency switch (manual control)
 - Red color: 2ea
- 10) Signal detection of axis error
 - 4mm output terminal: 8ea
 - 16mm indicator lamp: Green color (2ea), red color (2ea)
- 11) Axis analogue
 - 10-turn variable resistor (torque control): 2ea
- 12) Axis-alarm MC output terminal: 2ea
- 13) Axis-position sensor output terminal: 6ea
- 14) Z-axis starting input terminal: 4ea
- 15) AC 220V power inlet: 1ea

STANDARD ACCESSORIES

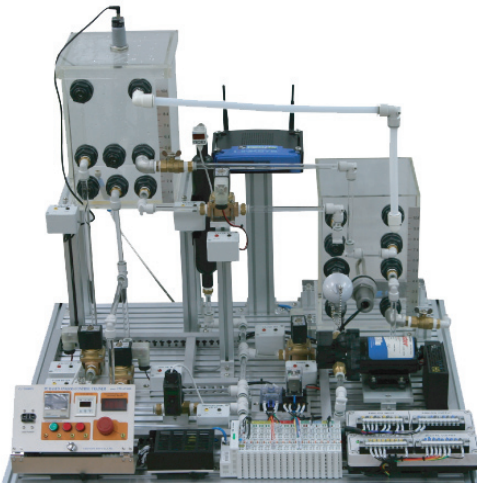
- Power cord: 1set
- Connection cable: 1set
- Interface cable: 1set
- Software program CD (Positioning Module & Servo Amp Drive): 1set
- Dummy work piece (white color, circular type): 4ea
- User's guide manual: 1ea

OPTIONS

- Multifunctional Digital Electric Meter (CEM-2200)
- PC-Based Servo Control Software (Automation Studio)
- PC-Based Servo Control I/O Unit (Automation Studio I/O Interface Unit)

CPE-AT3620

PC-based Analog Control Trainer

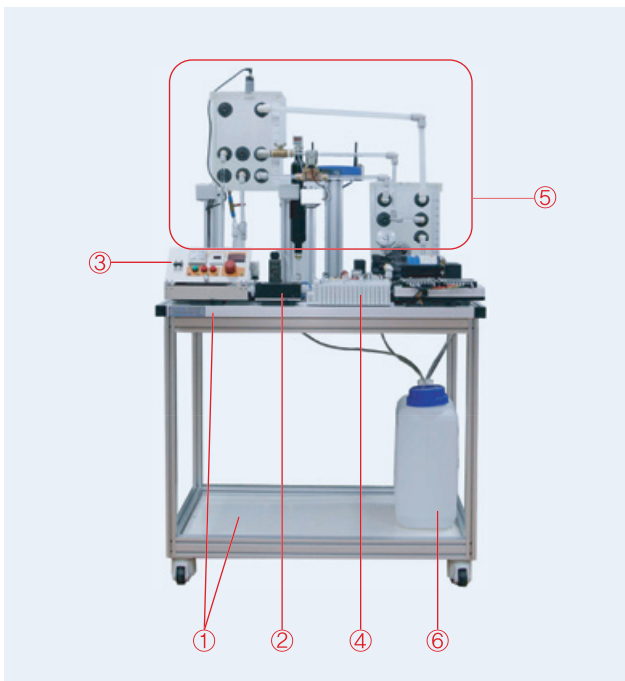


FEATURES

- Simulates various types of analog control for hands-on practices
- PID Control System in use of the analog control method
- Designed to teach the principles of flow, pressure, temperature, sensor and electrical control
- Supports real-time control through a programmable logic controller

EXPERIMENTAL CONTENTS

- Basic understanding of control mechanism and technologies
- Principles of fluid control, electric control, motor control and sensor control
- Principles of fluid process control
- Digital control and application practices
- Analog input and analog output
- PID control system by the analog control
- PLC programming practices



SPECIFICATIONS

Worktable and Experimental Panel

- Worktable
 - Material: Aluminum profile (30 × 30mm)
 - Lockable caster: 4ea
 - Dimension: 900(W) × 609(D) × 834(H) mm
- Experiment panel
 - Material: Aluminum profile (150 × 30mm)
 - Slot interval: 25mm × 24ea
 - Dimension: 900(W) × 609(D) × 30(H) mm

Power Supply

- Main power unit (DC24V 2.1A): 1 ea
- Clamp device with three gears: 1 ea

Main Control Panel

- Material: Aluminum 2T
- Control bracket: AC Inlet x 1 ea, Terminal 20P x 1 ea
- Fixing bolt: Aluminum 6061 x 1 ea
- Fixed block: Black acetyl x 1 ea
- 2-pole circuit protector: 3A x 1 ea
- Push button: 1C, Ø16 (Red x 2ea, Green x 1 ea)
- EMG Switch: 1a1b, Ø22 (Red x 1 ea)
- 4mm I/O banana jack: 5ea (Green x 4ea, Black x 1 ea)
- Proportional valve control meter: 3 1/2 digit digital (F.S. DC10V)
- Temperature control meter
- Flow meter

PRODUCT COMPOSITION

- 1) Worktable and Experiment panel
- 2) Power supply
- 3) Main Control panel
- 4) PLC Control Unit (LS XGB Series)
- 5) Analogue control system
- 6) Fluid container

SPECIFICATIONS

PLC Control Unit (LS XGB Series)

1) CPU (XEC-DN(P)32H)

- Number of command
 - Operator: 18ea
 - Basic function: 136 types + floating-point computation function
 - Basic function block: 43ea
 - Special function block
- Computing speed (basic command): 83ns/step
- Program memory: 200KB
- Maximum I/O point: 352 points
- Data Memory
 - Automatic variable (A): 32KB
 - Input variable (I): 2KB
 - Output variable (Q): 2KB
- Flash area: 20KB (2 blocks)
 - Timer: Unlimited point (Time range: 0.001 sec. ~ 4,294,967,295 sec.)
 - Counter: Unlimited point (coefficient range: 64 bit)
 - Operation mode: RUN / STOP / DEBUG
 - Restart mode: Cold / Warm
- Self-diagnosis function: Operation delay, memory error and I/O error
- Internal consumption current: 260mA

2) Analog Input Module (XBF-AD04A-4CH)

- Analogue input range: Voltage DC 0 ~ 10V (input resistance: 1M Ω min.)
- Digital output
- Maximum resolution: 2.5mV (1/4000)
- Precision: $\pm 0.5\%$
- Maximum conversion rate: 1.5ms per channel
- Maximum input: DC $\pm 15V$
- Number of output channel: 4 channels
- I/O point: 64 points
- Consumption current
 - Internal (DC 5V): 120mA
 - External (DC 24V): 62mA
- Additional function: Filter processing & average processing (time, frequency)

3) Analogue Output Module (XBF-DV04A)

- Analog output range: DC 0 ~ 10V (load resistance: 2K Ω)
- Digital input
 - 12-bit binary data
 - Unsigned value: 0 ~ 4000
 - Signed value: -2000 ~ 2000
 - Regular value: 0 ~ 1000
 - Percentile value: 0 ~ 1000

4) Temperature Module (XBF-RD01A)

- Number of input: 1 channel
- Digital output
 - PT100: -2000 ~ 6000
 - JPT100: -2000 ~ 6000
 - Scale display: 0 ~ 4000
- Conversion speed: 40ms per channel
- Terminal: 15 points
- I/O point (XBM/XBC): Fixed 64 points
- Sensor wiring: 3 wires
- Current consumption
 - Internal (DC 5V): 100mA
 - External (DC 24V): 100mA

Analogue Control System

- Fluid storage tank (top)
- Fluid storage tank (2nd stand)
- Fluid storage tank (bottom)
- Fitting device
- Solenoid valve module
- Proportional control valve module
- Digital pressure switch module
- Digital flow switch module
- Analog ultrasonic sensor module
- DC motor pump module
- Fluid pressure tank
- Pressure sensor
- I/O distribution unit: 1set
- Cable duct: 1set

STANDARD ACCESSORIES

- Power cord: 1ea
- User's guide manual: 1ea

CPE-AT3620A

PID Flow Control Trainer



SPECIFICATIONS

1st Fluid Storage Tank (in the upper position)

- (1) Material: Acrylic 8t (including the acrylic cover)
- (2) Dimension: 200(W)×200(D)×300(H)mm
- (3) Structure
 - Leak-free structure with temperature sensor attachment
 - Indication of levels on a plate to identify the liquid level of a solution
 - Level detection by the upper cover using ultrasonic sensor
 - Cock valve attachment designed to remove a practice solution easily
 - Equipped with a heater for heating a fluid

Support Fixture for the 1st Fluid Storage Tank

- (1) Material
 - Support fixture: Aluminum profile
 - Supporting guide: 1.2T
- (2) Dimension: 210(W) × 210(D) × 200(H) mm
- (3) Structure
 - Base attachment (structure for easy attachment/detachment)

2nd Fluid Storage Tank (in the lower position)

- (1) Material: Acrylic 8T (including the acrylic cover)
- (2) Dimension: 200(W) × 200(D) × 300(H) mm
- (3) Structure
 - Leak-free structure with rubber feet for the tank's shock absorption
 - Cock valve attachment designed to remove a practice solution easily
 - Indication of levels on a plate to identify the liquid level of a solution
 - Level detection by the upper cover using ultrasonic sensor

Solenoid Valve Module

- (1) Type of valve: Direct-acting type
- (2) Working fluid: Water
- (3) Inner pressure: 5.0MPa
- (4) Material: Main body (SUS) and Seal (FKM)
- (6) Ambient temperature: -2°C ~ +60°C
- (7) Fluid temperature: 1°C ~ 60°C
- (8) Protective structure: Earthquake resistant
- (9) Valve leakage: 0cm³/min
- (10) Vibration withstand/shock withstand: 30 /150m/s²
- (11) Rated voltage: DC 24V
- (12) Structure: Modular type for each attachment/detachment

FEATURES

- PID Control System in use of the analog control method
- Designed to teach the principles of flow, pressure, temperature, sensor and electrical control
- Supports real-time control through a programmable logic controller

Proportional Valve Module

- (1) Type of valve: 2/2-way flow valve, N.C Type, Servo-assisted
- (2) Pressure range: 0.5 ~ 10 bar
- (3) Port connection: 1/2" hole
- (4) Main body: Brass
- (5) Working temperature: -10°C ~ +90°C
- (6) Ambient temperature: +55°C
- (7) Maximum viscosity: 21 cSt
- (8) Operating voltage: DC 24V
- (9) Operating cycle: 100% continuous
- (10) Control specifications:
 - Operating voltage: DC24V (Max. 28V)
 - Ripple: ±10%
 - Input signal: 4~20mA, 0~10V
 - Valve control method: Pulse Width Modulation (PWM)
 - Max. consumption current: 1.1A
 - Power : Max. 0.5W
 - Ramp time: 0 ~ 10s (adjustable)
- (11) Structure: Modular type for each attachment/detachment

Digital Pressure Switch module

- (1) Rated pressure range: 0.000~1.000MPa
- (2) Working pressure range: -0.100~1.000MPa
- (3) Set pressure resolution: 0.001
- (4) Operating voltage: DC12V~24V / Ripple- below 10%
- (5) Power consumption: less than 55mW
- (6) Switch output: NPN / PNP
 - Max. impressed voltage: 30V (NPN)
 - Max. load current: 80mA
- (7) Repeatability: ±0.3%F.S.±1 digit
- (8) Hysteresis mode: Variable (at 0)
- (9) Response time: less than 2.5ms
- (10) Output short circuit protection
- (11) Indicator: 3 1/2digit LED (sampling cycle: 5 times/sec)
- (12) Display range: ± 2%F.S. ± 1digit (at ambient temperature of 25± 3°C)
- (13) Indicator: Green LED, Red LED
- (14) Analog output: Output voltage: 1~5V± 2.5 % F.S.
- (15) Internal environment
 - Ambient temperature: 0~50°C (in operation), -10~60°C (in storage)
 - Ambient humidity: 35~85% RH (in operation and storage)
 - Voltage withstand: AC250V (1 minute)
 - Insulated resistance: 2MΩ (at DC50V)
 - Vibration withstand: 10~500Hz
 - Shock withstand: 980m/s² (3 times per direction of X, Y and Z)
- (16) Structure: Pressure tank attachment type

Digital Flow Switch module

- (1) Working fluid: Water
- (2) Fluid measuring range: 2~16ℓ/min
- (3) Applied fluid temperature: 0~50℃
- (4) Linearity : ± 5%F.S.
- (5) Repeatability : ± 2%F.S.
- (6) Temperature characteristics: ± 2%F.S.(15~35℃) ± 3%F.S.(0~50℃)
- (7) Weight: 470g
- (8) Vibration: 10~500Hz
- (9) Operating voltage: DC24V
- (10) Consumption current: 20mA (at no load)
- (11) Analog output: Voltage output - 1~5V linearity
 - Voltage output: 1 ~ 5V linearity (± 5 F.S., over 100kΩ of allowable load resistance)
- (12) Protective structure: IP65
- (13) Voltage withstand: AC1000V (1 minute between a terminal and a case)
- (14) Insulation resistance: 50MΩ
- (15) Structure: Modular type for each attachment/detachment

Analog Ultrasonic Sensor module

- (1) Operating voltage: 10~30Vdc (threshold)
- (2) Ripple: <2 Vpp
- (3) Consumption current: Maximum 65 mA (40mA at 25Vdc)
- (4) Output type: 0 ~ 10Vdc or 4 ~ 20mA
- (5) Load resistance:
 - Voltage output: Min. 2.5kΩ
 - Current output: Max. 1kΩ
- (6) Response time: 30ms (in wire connection), 2.5ms (without wire connection)
- (7) Switching frequency: 16/200Hz
- (8) Power delay: 300ms
- (9) Indicator: Output display LED (yellow, green) / power display (red)
- (10) Ultrasonic frequency: 300kHz (repeating 2.5ms)
- (11) Repeatability: 0.5mm
- (12) Hysteresis: 0.7mm
- (13) Operating temperature: -25℃ ~ 55℃
- (14) Storage temperature: -25℃ ~ 70℃
- (15) Electrical protection: Class-2
- (16) Operating distance: 30 ~ 300mm
- (17) Connector: M12 5-pole connector
- (18) Weight: 25g
- (19) Standard: EN60068-2-6, EN60068-2-27

DC Motor Pump Module

- (1) Operating voltage: DC 24V
- (2) Maximum current: 5.0A
- (3) Spark protection
- (4) Temperature protection
- (5) Auto reset
- (6) Size of fuse: 10.0A
- (7) Open Flow : 3.2 GPM
- (8) GPM-L/min : 10.6
- (9) Pressure setting: 45 PSI
- (10) PSI bar : 3.1
- (11) Structure: Modular type for each attachment/detachment

Fluid Pressure Tank

- (1) Material: SUS
- (2) Size: Ø 40, 100mm(H)
- (3) Structure
 - Equipped with a guide capable of vertical installation
 - Flexible structure to mount pipes and sensors freely on both ends
 - Complete sealing to prevent leakage (allowable pressure: 10bar)
- (4) Structure: Modular type for each attachment/detachment

Operating Panel

- (1) Material: Aluminum 2t
- (2) Structure: Equipped with various types of operating switches
 - START switch x 1ea
 - STOP switch x 1ea
 - EMG switch x 1ea
 - SPARE switch x 1ea
 - Indication meters for real-time monitoring: Meter, flow meter and voltmeter (built-in)

Experiment Plate

- (1) Material: Aluminum profile (slot interval: 25mm)
- (2) Dimension: 700(W) x 600(D)mm

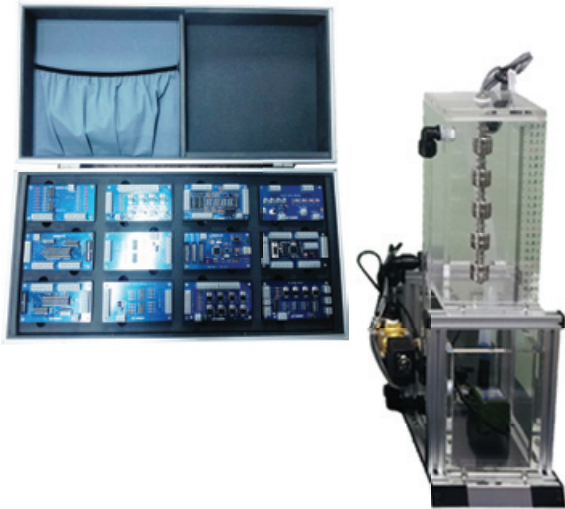
PLC Unit

- (1) Standard: Mitsubishi MELSEC PLC
- (2) Option: Other types of PLC will be supplied upon request.

STANDARD ACCESSORIES

- Power cord: 1set
- User's guide manual: 1ea

Water Level Control Trainer



FEATURES

- Helps the user learn both PC-based control and microprocessor control technologies and study general engineering techniques from circuit design and programming to test operation.
- Designed to facilitate assembly and disassembly. The Control Board supports circuit connection by one-touch connector.
- Equipped with five Level Switches for a metering water tank. Through the operation of Level Switches, the user can open or close a solenoid valve and then control the metering water tank's level.
- Use a microprocessor of MPS training system to set up a control logic. The user can use a solenoid valve for two-position level control and operate a submersible pump by toggle switches.
- D.I.Y installation is encouraged so that the user can directly assemble components and make wire connections. The result of an experiment can be judged, and the user can modify and supplement such result.

EXPERIMENTAL CONTENTS

- Practice using a PC-based control
- Practice using a microprocessor control
- Logic circuit design
- Flow control
- LED control practice
- LCD control practice
- DC motor control
- Manual control practice using a switch
- General engineering techniques including test drive

PRODUCT COMPOSITION

- 1) Level control training kit
- 2) Control Box
- 3) Carrying case

EXPERIMENTAL MODULES

• Flow Control System Power Supply Module



- Easy to practice with the configuration of DC power supply for a microprocessor and a socket supplying AC 22V
- DC voltage: DC 5V, 3A, DC 24V 0.6A
- AC voltage: AC 220V 2A Fuse

• LED Control Module



- LED Control Module consists of eight LEDs that are lit by positive logic and other eight LEDs that are lit by negative logic.

• DC Motor Control Module



- Each control PIN is based on the architecture of one-touch connector for user convenience. The user can control the MCU using a USB port ISP cable.

• Submersible Pump & Electromagnetic Valve Module



- This module is designed to control and supply power to submersible pump and an electromagnetic valve. Through the round connectors, power is supplied to the submersible pump as well as the electromagnetic valve.

• Character LCD Module



- Character LCD Module, as equipped with LCD Controller and Driver Chip, can display simple characters by the built-in LCD controller and character ROM.

• Switch Control Module



- Switch Control Module consists of four toggle switches, four tact switches, a variable resistor and a rotary encoder.

SPECIFICATIONS

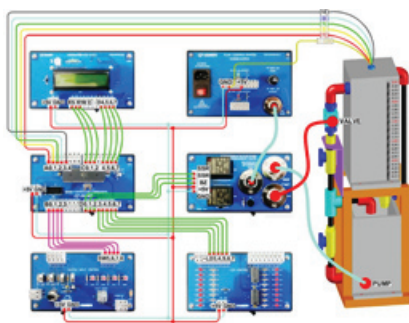
Metering water tank (upper position)	<ul style="list-style-type: none"> • Material: Transparent acrylic (5 mm) • Drain pipe: 15 mm in inner diameter • Piping hole: 7ea • Scale: 0 ~ 250 mm • Equipped with manual valve for drainage • Dimension: 80(W) × 80(D) × 240(H) mm
Storage water tank (lower position)	<ul style="list-style-type: none"> - Material: Transparent acrylic (5 mm) - Piping hole: 1ea - Equipped with manual valve for drainage - Dimension: 200(W) × 105(D) × 140(H)mm
System frame	<ul style="list-style-type: none"> • Material: Aluminum profile • Dimension: 20(W) × 20(D) mm • Designed to fix the transparent acrylic water tank
Piping hose	<ul style="list-style-type: none"> • Drainage pipe - Outer diameter: 12mm - Inner diameter: 10mm • Material: PVC
Solenoid valve	<ul style="list-style-type: none"> • 2/2-way solenoid valve • Differential pressure Zero-acting type • Operating voltage: DC 24V • Inter-tube diameter: 1/2 inches • Max. pressure: 10 Bar • Inner pressure: 30 Bar • Orifice diameter: 10 mm

Underwater pump	<ul style="list-style-type: none"> • Power: 220V • Suction: 3.6m • Consumption current: 20W • Max. discharge output: 25ℓ/min
Level switch	<ul style="list-style-type: none"> • 2-wire type • Operates by the buoyancy force • Equipped with a safety device for short circuit protection
Manual valve	<ul style="list-style-type: none"> • 2/3-way valve • Hand lever type
Valve bracket	<ul style="list-style-type: none"> • Valve fixing bracket • Designed to mount a solenoid valve and a 2/3-way valve
Control box	<ul style="list-style-type: none"> • Power connector and switch (AC 220V) • DC 24V banana plug • Pump toggle switch: 1ea • Solenoid valve toggle switch: 1ea - 1a-1b type - NO type • D/I. D/O. 4mm terminal block: 1set

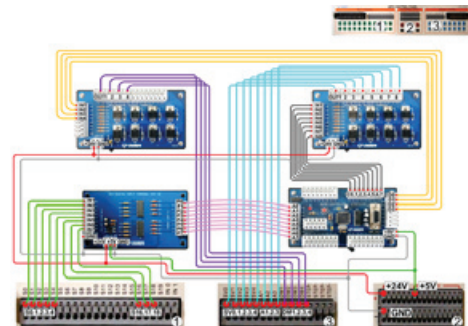
STANDARD ACCESSORIES

- Power cord: 1ea
- Connecting cable: 1set
- User's guide manual: 1ea

OPTIONS



[Flow Control Wiring Diagram]



[MPS Control Wiring Diagram]



[System Installation at Pohang Jaecheol Technical High School]

CPE-AT3500A

Mini-MPS Trainer (Mitsubishi PLC)



FEATURES

- Practical training on automation control technologies using PC and programmable logic controller
- Convenient circuit connection on the control board through one-touch connectors
- Supports various functions such as MPS system related programming, system design, PLC-based control, PC-based control, control by Micom, and pre-operation
- Tailored for easy assembly and disassembly

EXPERIMENTAL CONTENTS

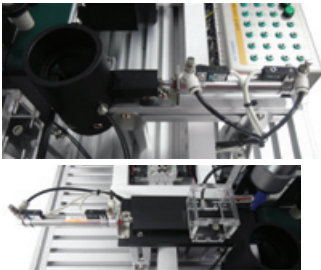
- Understanding the automation control mechanism and installation methods
- Circuit design, programming, pre-operation, production, processing, repair and maintenance using the production line miniature
- PLC-based control, PC-based control, and control by Micom

PRODUCT COMPOSITION

- Main Frame
- PLC Module
- HMI Module
- Servo Amp Module
- Digital I/O Module
- Control Panel

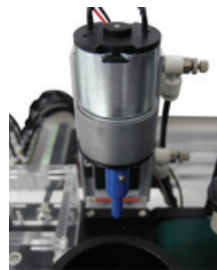
SPECIFICATIONS

Supply & Distribution Module



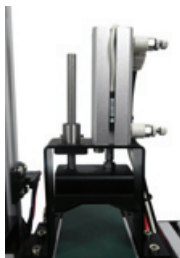
- Feeding tube module: 1ea
- Fiber optic sensor: 1ea
- Feed cylinder: 1ea
- Distribution cylinder: 1ea

Drilling Module



- Electric drill: 1ea
 - RPM: 500 RPM
 - Motor: DC 12 ~ 24V, 3W
- Drilling cylinder: 1ea

Transfer Module



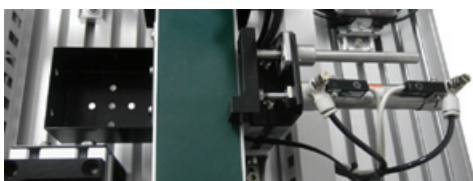
- Transfer conveyor : 1ea
 - RPM: 50 RPM
 - Motor: DC 24V geared motor
- Carrying box (for the passed): 1ea
- Stopper cylinder: 1ea
- Optical fiber sensor: 1ea

Inspection Module



- Inductive sensor: 1ea
- Capacitive sensor: 1ea

Ejection Module



- Eject cylinder: 1ea
- Carrying box (for the rejected): 1ea

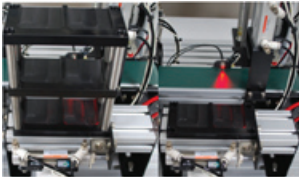
Lift Module



- Lift transfer device: 1ea
- Absorption cylinder: 1ea
- Servo motor: 1ea

CPE-AT3500A

Storage Module



- Classification & storage device: 1ea
- Material: Aluminum
- Configuration: 2-row 3-stage
- Storage racks: Made of a separate detachable structure
- Storage table cylinder: 1ea

Servo Amp Module



- AC servo amp (common type): 1ea
- Structure: Natural cooling or compulsory cooling
- Main circuit power: 3-phase or 1-phase AC170~240V
- Encoder: 100,000 pulses per rotation

HMI Module



- Input voltage: AC 100 ~ 220V
- Screen size: 10.4 inch
- Resolution: 800x600 dots (VGA)
- Type: TFT color LCD (high brightness)
- Internal memory: Flash EPROM 15MB

Digital I/O Module



- 4mm plug terminal
- Digital I/I terminal 32 points
- Provides 25-pin connector

PLC Experimental Module (OPTION: other types of PLC for customization)



- Base: 1ea
- Usage: Attachment of experimental modules
- Capacity of module insertion: 4 modules
- Power supply: 1ea
- Input voltage: AC 220V or DC 24V
- Rated output: DC 5V
- CPU: 1ea
- Processing speed: LD 90ns
- Programming language: LD and SFC
- Connection port: USB / Ethernet
- Operation mode: RUN, STOP

Control Panel



- 4mm plug terminal
- 25V / 5V / 0V output voltage
- One-touch type terminal
- Provides 25-pin connector

- Digital input: 2ea
- Input point: 16 points
- Common method: 16 points / 1 common
- Digital output: 2ea
- Output point: 16 points
- Common method: 16 points / 1 common
- Position unit: 1ea
- Control axis: 1-axis
- Control method: PTP control, speed control
- Control unit: mm, inch, degree, pulse

STANDARD ACCESSORIES

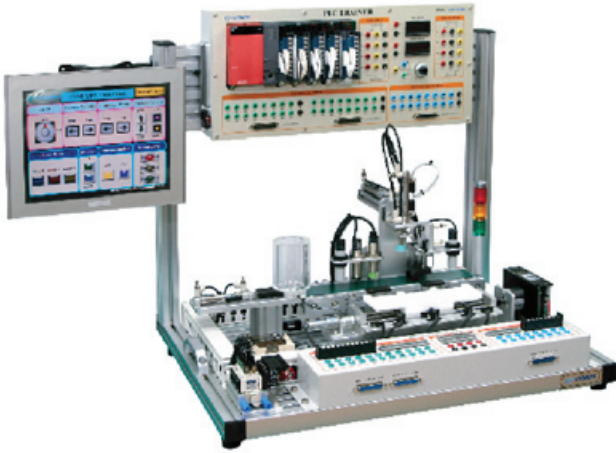
- AC power cord: 1ea
- Connection cable (4mm): 1set
- PLC download cable: 1ea
- Communication cable: 1ea
- User's guide manual: 1ea

OPTIONS

- Integrated automation simulation software [Automation Studio]
- Programmable Logic Controller Trainer

CPS-AT3450U

Mini Automation Multiprogramming Trainer



SPECIFICATIONS

PLC Control Unit

- Composition: Touch panel and PLC trainer on the aluminum profile structure
- Touch panel (XP70-TTA)
 - Realistic expression by 65,636 colors
 - Various graphic formats such as BMP, JPG, GIF, WMF
 - Simple animation effect through animation GIF
 - Equipped with 10/100 Base-T Ethernet
- PLC trainer
 - Type of PLC: LS, Mitsubishi and etc.
 - Digital input: 32 points
 - Digital output: 16 points
 - A/D input: 4 channels
 - D/A output: 4 channels
 - A/D input variable resistance: 10-turn variable resistor (x 1ea)
 - Digital voltmeter: 2ea

Supply Process (Feeding section)

- After the work pieces are loaded in the circular feeding tube, they will be supplied to the conveyor process by the supply cylinder
- Composition: Supply cylinder, feeding tube, and supply block
- Supply button
 - To push forward the work piece by the supply cylinder and return to the starting point
- Optical fiber sensor
 - To check whether there is a work piece inside the feeding tube
- Work piece
 - Plastic: 2ea
 - Aluminum: 3ea

FEATURES

- Miniaturizes the real-life automated production line and enables realistic simulation
- Covers programming, system design, PLC control, PC-based control, MICOM control and test drive
- Comes with PC software for theoretical knowledge and professional technical expertise

EXPERIMENTAL CONTENTS

- Understanding automation process: supply, transfer, inspection, stopper, classification and warehousing
- Principles of PC based control system
- PLC interface and Bus interface
- PLC programming practices

Transfer Process (Conveyor section)

- This process transfers the work piece received from the supply section. The sensor of the inspection section classifies metal, non-metal and colored objects (black & white). In case of detecting a metal object, the stopper will not operate and the work piece will be transferred to the ejection outlet.
- Composition: Conveyor belt, driving motor, round belt and round belt pulley
- DC motor
 - Power source: DC 24V
 - Decelerator: Gear ratio 300
- Ball bearing: 4ea
 - Inner diameter: 6 ϕ
 - Outer diameter: 17 ϕ

Inspection Process (Sensor section)

- The work piece from the supply process will be transferred to the sensor section through the conveyor belt. Inspection of the work piece will be carried out by the high-frequency oscillation proximity sensor and the capacitive proximity sensor.
- Composition
- Proximity sensor
 - Diameter: 18 ϕ
 - Sensing distance: 8mm
 - Detectable objects: Metal and non-metallic objects
 - Power source: DC 12V ~ 24V
 - Response frequency: 200Hz
 - Output type: NPN open collector
- Photo sensor
 - Type: Direct reflection type
 - Diameter: 18 ϕ
 - Sensing distance: 100mm
 - Detectable objects: Opaque, translucent and transparent objects
 - Power source: DC 12V ~ 24V
 - Response frequency: 1000Hz
 - Output type: NPN open collector

Stopper Section

- The work piece, which is being carried on the conveyor, will be tightened by the stopper.
- Composition: High-frequency oscillation proximity sensor, capacitive proximity sensor, stopper bracket, stopper cylinder, linear bush, and guide shaft
- Stopper cylinder
 - Tube inner diameter: 12ø
 - Stroke: above 20mm
 - Load voltage (cylinder sensor): DC 24V
 - Load current: 5mA ~ 40mA
 - Red colored LED: "Non-contact" indicator
 - Speed controller: Mounted for the purpose of flow control
 - Linear bush unit: Spin prevention
- Proximity sensor
 - Diameter: 18ø
 - Detectable distance: 8mm
 - Detectable objects: Metal and non-metallic objects
 - Power source: DC 24V
 - Response frequency: 200Hz
 - Output type: NPN open collector

Classification Process (Absorption transfer section)

- In this process, the work piece which was tightened by the stopper will be transferred to the loading section.
- Composition: X-axis cylinder, Y-axis cylinder, linear bush, cylinder bracket and vacuum pad
- Horizontal transfer cylinder
 - Tube inner diameter: 10ø
 - Stroke: above 100mm
 - Load voltage (cylinder sensor): DC 24V
 - Load current: 5mA ~ 40mA
 - Red colored LED: "Non-contact" indicator
 - Speed controller: Mounted for the purpose of flow control
 - Linear bush unit: spin prevention
- Vertical transfer cylinder
 - Tube inner diameter: 6ø
 - Stroke: above 15mm
 - Load voltage (cylinder sensor): DC 24V
 - Load current: 5mA ~ 40mA
 - Red colored LED: "Non-contact" indicator
 - Speed controller: Mounted for the purpose of flow control
- Vacuum generator
 - Air-ejection type using the Principle of Venturi
 - In use of single solenoid valve for operational control

Warehousing Process (Loading section)

- The loading process will load the carrying box with work pieces
- Composition: Driving motor, TM screw, transfer plate, carrying box, guide shaft, limit switch and encoder
- DC motor
 - Power: DC 24V
 - Revolution: 90 RPM
- TM screw
 - Ball Bearing: 2ea (inner diameter: $\Phi 6$, outer diameter: 17 Φ)
 - Coupling: $\Phi 16 \times 24$ mm
 - Built-in photo sensor and cam (hole: 4ea)
- Limit switch: Micro sensor
- Loading palette: 3ea

Control Terminal Panel

- Type: Three types of control terminal in different colors
- Composition: One-touch type terminal block, spring-type terminal block and 4ø insulated connection cables
- PLC: Connect a port of COM terminal to use a programmable logic controller
 - * 4ø I/O terminal block (black color) = 0V
 - * PLC Input COM = +24V
 - * PLC Output COM = 0V (GND)

Base Plate

- Material: Aluminum profile (slot interval - 25mm)
- Dimension: 580(W) x 360(D) x 30(H) mm
- Built-in SMPS: 24V 1A, 5V 2A

STANDARD ACCESSORIES

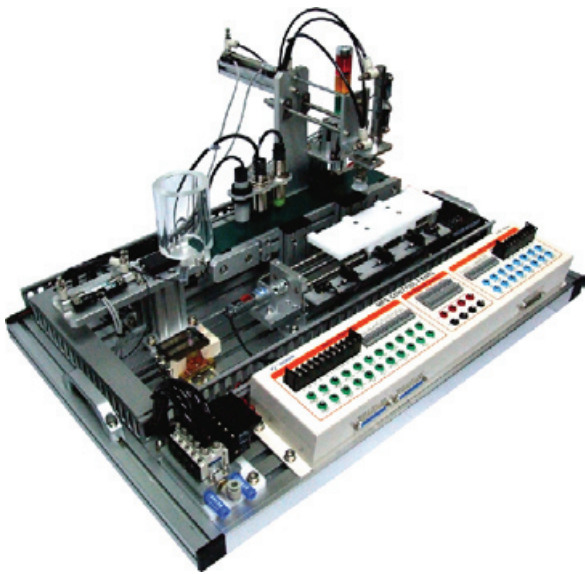
- AC cord: 1ea
- Connection cable: 1set
- PC program software CD: 1ea
- User's guide manual: 1ea

OPTIONS

- MiCOM trainer
- Touch panel

CPS-AT3450

Mini Automation Multiprogramming Trainer



FEATURES

- Miniaturizes the real-life automated production line and enables realistic simulation
- Covers programming, system design, PLC control, PC-based control, MICOM control and test drive
- Comes with PC software for theoretical knowledge and professional technical expertise

EXPERIMENTAL CONTENTS

- Understanding automation process: supply, transfer, inspection, stopper, classification and warehousing
- Principles of PC based control system
- PLC interface and Bus interface
- PLC programming practices

SPECIFICATIONS

Supply Process (Feeding section)

- After the work pieces are loaded in the circular feeding tube, they will be supplied to the conveyor process by the supply cylinder
- Composition: Supply cylinder, feeding tube, and supply block
- Supply button
 - To push forward the work piece by the supply cylinder and return to the starting point
- Optical fiber sensor
 - To check whether there is a work piece inside the feeding tube
- Work piece
 - Plastic: 2ea
 - Aluminum: 3ea

Transfer Process (Conveyor section)

- This process transfers the work piece received from the supply section. The sensor of the inspection section classifies metal, non-metal and colored objects (black & white). In case of detecting a metal object, the stopper will not operate and the work piece will be transferred to the ejection outlet.
- Composition: Conveyor belt, driving motor, round belt and round belt pulley
- DC motor
 - Power source: DC 24V
 - Decelerator: Gear ratio 300
- Ball bearing: 4ea
 - Inner diameter: 6ø
 - Outer diameter: 17ø

Inspection Process (Sensor section)

- The work piece from the supply process will be transferred to the sensor section through the conveyor belt. Inspection of the work piece will be carried out by the high-frequency oscillation proximity sensor and the capacitive proximity sensor.
- Composition
- Proximity sensor
 - Diameter: 18ø
 - Detectable distance: 8mm
 - Detectable objects: Metal and non-metallic objects
 - Power source: DC 12V ~ 24V
 - Response frequency: 200Hz
 - Output type: NPN open collector
- Photo sensor
 - Type: Direct reflection type
 - Diameter: 18ø
 - Detectable distance: 100mm
 - Detectable objects: Opaque, translucent and transparent objects
 - Power source: DC 12V ~ 24V
 - Response frequency: 1000Hz
 - Output type: NPN open collector

Stopper Section

- The work piece, which is being carried on the conveyor, will be tightened by the stopper.
- Composition: High-frequency oscillation proximity sensor, capacitive proximity sensor, stopper bracket, stopper cylinder, linear bush, and guide shaft
- Stopper cylinder
 - Tube inner diameter: 12 ϕ
 - Stroke: above 20mm
 - Load voltage (cylinder sensor): DC 24V
 - Load current: 5mA ~ 40mA
 - Red colored LED: "Non-contact" indicator
 - Speed controller: Mounted for the purpose of flow control
 - Linear bush unit: Spin prevention
- Proximity sensor
 - Diameter: 18 ϕ
 - Detectable distance: 8mm
 - Detectable objects: Metal and non-metallic objects
 - Power source: DC 24V
 - Response frequency: 200Hz
 - Output type: NPN open collector

Classification Process (Absorption transfer section)

- In this process, the work piece which was tightened by the stopper will be transferred to the loading section.
- Composition: X-axis cylinder, Y-axis cylinder, linear bush, cylinder bracket and vacuum pad
- Horizontal transfer cylinder
 - Tube inner diameter: 10 ϕ
 - Stroke: above 100mm
 - Load voltage (cylinder sensor): DC 24V
 - Load current: 5mA ~ 40mA
 - Red colored LED: "Non-contact" indicator
 - Speed controller: Mounted for the purpose of flow control
 - Linear bush unit: spin prevention
- Vertical transfer cylinder
 - Tube inner diameter: 6 ϕ
 - Stroke: above 15mm
 - Load voltage (cylinder sensor): DC 24V
 - Load current: 5mA ~ 40mA
 - Red colored LED: "Non-contact" indicator
 - Speed controller: Mounted for the purpose of flow control
- Vacuum generator
 - Air-ejection type using the Principle of Venturi
 - In use of single solenoid valve for operational control

Warehousing Process (Loading section)

- The loading process will load the carrying box with work pieces
- Composition: Driving motor, TM screw, transfer plate, carrying box, guide shaft, limit switch and encoder
- DC motor
 - Power: DC 24V
 - Revolution: 90 RPM
- TM screw
 - TMR 10/2
 - Built-in photo sensor and cam (hole: 4ea)
 - Ball Bearing: 2ea (inner diameter: ϕ 6, outer diameter: 17 ϕ)
 - Coupling: ϕ 16*24mm

Control Terminal Panel

- Type: Three types of control terminal in different colors
- Composition: One-touch type terminal block, spring-type terminal block and 4 ϕ insulated connection cables
- PLC: Connect a port of COM terminal to use a programmable logic controller
 - * 4 ϕ I/O terminal block (black color) = 0V
 - * PLC Input COM = +24V
 - * PLC Output COM = 0V (GND)

Base Plate

- Material: Aluminum profile (slot interval - 25mm)
- Dimension: 580(W) x 360(D) x 30(H) mm
- Built-in SMPS: 24V 1A, 5V 2A

STANDARD ACCESSORIES

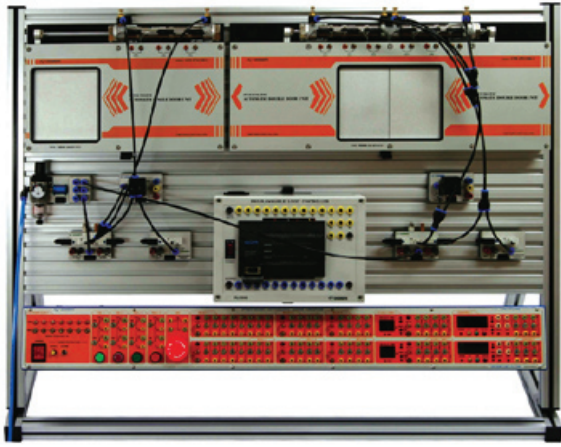
- AC cord: 1ea
- Connection cable: 1set
- PC software CD: 1ea
- User's guide manual: 1ea

OPTIONS

- Programmable Logic Controller Trainer
- MiCOM trainer
- Touch panel

CPE-PN2500, CPE-PN2500A, CPE-PN2500B

Pneumatic Auto Door Trainer



FEATURES

- Designed to perform speed control and position control of electronic relay, PLC and microprocessor
- Helps understand the principles of electro-pneumatic system and the functions of pneumatic components
- Standalone operation and simultaneous operation with a single door and two doors
- DC power supply equipped with overload circuit breaker and alarm function
- One-touch clamp lever mounted on the components

EXPERIMENTAL CONTENTS

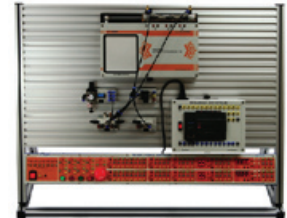
- Principles of electro pneumatic technology
- Basic automatic door control (open & close)
- Speed control for opening and closing doors
- Electronic relay and timer
- PLC programming for automatic door control
- Microprocessor programming

SPECIFICATIONS

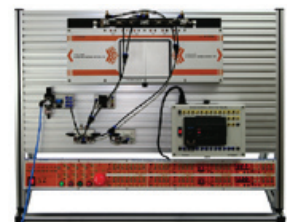
Category	Product Composition			
	CPE-PN2500	CPE-PN2500A	CPE-PN2500B	
Base unit with the experimental board	1ea	1ea	1ea	
Air service unit	1ea	1ea	1ea	
Pneumatic double acting cylinder with one-way flow control valve	1ea	1ea	-	
Pneumatic double acting bi-directional rod cylinder with one-way flow control valve	1ea	-	1ea	
3/2-way single way solenoid valve	2ea	1ea	1ea	
5/2-way double way solenoid valve	2ea	1ea	1ea	
Input sensor switch	2ea	1ea	1ea	
Automatic single door set	1ea	1ea	-	
Automatic double door set	1ea	-	1ea	
Modular PLC unit (attachable to the experiment plate)	1ea	1ea	1ea	
Integrated control panel (1 set)	DC power supply & electrical distributor	1ea	1ea	1ea
	Auto-return push button (manual operation)	2ea	2ea	2ea
	Self-sustaining push button (manual operation)	2ea	2ea	2ea
	Emergency switch	1ea	1ea	1ea
	8-pair electronic relay	2ea	2ea	2ea
	4-pair electronic relay	4ea	4ea	4ea
	Timer (ON delay type)	2ea	2ea	2ea
	Electronic counter	1ea	1ea	1ea

STANDARD ACCESSORIES

- Connection set : 1set
- T-shape connector : 10ea
- Pneumatic hose : 10 meter
- User's guide and experimental manual : 1ea



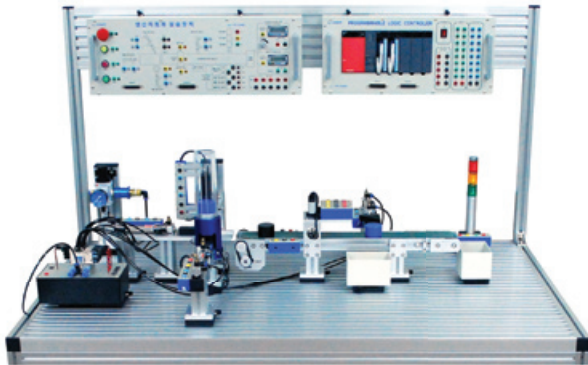
CPE-PN2500A



CPE-PN2500B

CPE-AT3680

Factory Automation Trainer



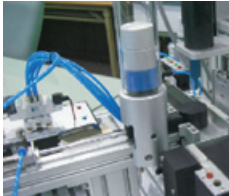
FEATURES

- Hands-on factory automation practices: transfer, fabrication, testing, classification and warehousing
- One-touch clamping device mounted on each component allowing easy assembly and disassembly practices
- Capable of controlling the speed of conveyor
- Relay Module and Time Counter Module

EXPERIMENTAL CONTENTS

- Wiring practices on the operation panel and PLC control panel
- Understanding automation process: transfer, fabrication, testing, classification and warehousing
- System installation practices using modules and components
- Speed control practices on the conveyor
- PLC programming practices

Supply Process



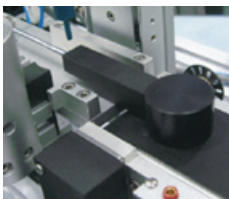
- Composition: Feed cylinder, feeding tube, fiber optic sensor, proximity switch and supply block
- Fiber optic sensor: Detects the presence or absence of work pieces in the feeding tube
- Proximity switch: Forward/backward detection (mounted on the cylinder)
- Work piece: Plastic and aluminum

Drilling Process



- Composition: Drilling cylinder, drilling motor and proximity switch
- Proximity switch: Forward/backward detection (mounted on the cylinder)
- Drilling motor: DC 24V

Transfer Process



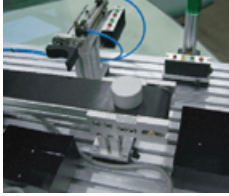
- Composition: Transfer cylinder, proximity switch, supply block, conveyor belt and conveyor driving motor
- Proximity switch: Forward/backward detection (mounted on the cylinder)
- Conveyor driving motor: DC 24V

Inspection Process



- Inductive proximity sensor (18 ϕ)
 - Detectable distance: 8mm (metallic material detection)
- Capacitive proximity sensor (18 ϕ)
 - Detectable distance: 8mm (metallic & non-metallic material detection)
- Optical sensor (18 ϕ)
 - Detectable distance: 100mm (color detection)

Extraction & Warehousing Process



- Composition: Extract cylinder, proximity switch, extract block and carrying boxes (passed & failed)
- Proximity switch: Forward/backward detection (mounted on the cylinder)

SPECIFICATIONS

Worktable (with a control panel rack)

- Material: Aluminum profile (150mm in width)
- Slot interval: 25mm
- Dimension
 - Worktable: 610(W) x 1100(D) x 30(H) mm
 - Vertical frame: 1300(W) x 1100(D) x 750(H) mm

Materials Supply Unit

- Circular magazine: 40Ø
- Dummy work piece: 8ea
- Double acting cylinder: Ø16-100mm
- Reed switch: 2ea
- Optical sensor: 1ea

Fabrication Unit

- Double acting cylinder : Ø16-100mm
- Double rod cylinder (spin prevention type)
- Electric drill for fabrication

Transfer & Loading Unit

- Double acting cylinder: Ø16-100mm
- Conveyor system: 60(W) x 530(D) x 120(H) mm
- Gear motor: DC 24V, 1~ 15m/min speed
- Encoder: Pulse generation
- Material carrying box: 90(D) x 110(W) x 60(H) mm

Test & Classification Unit

- Material detection sensor
 - Capacitive sensor (standard)
 - Inductive sensor (option)
 - Optical sensor (option)
- Double acting cylinder : Ø16-100mm
- Material loading unit: 110(W) x 90(D) x 60(H) mm

Operation Panel

- Status indicator LED (Sensor & Actuator)
 - Cylinder indicator LED: 8ea
 - Motor indicator LED: 2ea
 - Sensor indicator LED: 3ea
- Operational switch: 4ea (start, stop, reset, emergency)
- 25-pin PLC connector: 1ea
- Power supply terminal: + (5ea), - (5ea)
- Dimension: 295(W) x 340(D) x 100(H) mm
- Motor speed control unit
 - Travel speed meter (m/min)
 - Motor connector: 4mm terminal
 - Encoder terminal
- Counter module
 - Setting range: 1 ~ 9999
 - Preset counter
 - Incremental
 - Reset function (MANUAL/AUTO)

PLC Control Unit

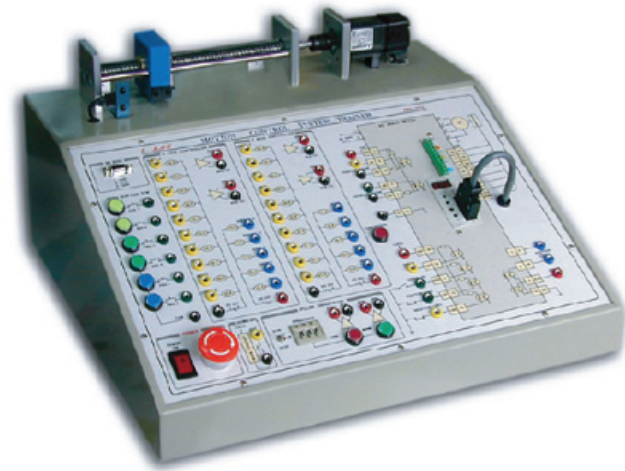
- Programmable logic controller: GM6 (16-point input and 16-point output)
- Power supply: DC 24V 5A
- Power supply connector: + (4ea) and - (4ea)
- 4mm I/O connector: 18ea
- Dimension: 295(W) x 340(D) x 100(H) mm

STANDARD ACCESSORIES

- AC cord: 1ea
- Connection cable: 1set
- 25-pin connector cable: 2ea (input and output)
- Pneumatic hose: 10m
- PLC application software CD: 1ea
- User's guide manual: 1ea

CPE-AT4410

Motion Control Trainer



FEATURES

- Supports accurate manipulation of the motion controller's position through PC-based control
- Starting point control by a sensor
- Manual operation by a manual pulse generator
- Supports servo motor practices
- Capable of writing position control programs through the motion controller software program

EXPERIMENTAL CONTENTS

- Basic concept on position control by the computer
- Position control by adjusting the TM Screw
- How to control a starting point
- PWM control of AC Servo Motor
- Motion control

SPECIFICATIONS

AC servo motor

- 1) Rated output : 100W
- 2) Maximum speed : 3000 RPM

AC servo drive

- 1) Input voltage : Single-phase 220V 50/60Hz
- 2) Control mode : PWM Control (in use of IPM)
- 3) Encoder : Incremental Encoder
- 4) External Input : Servo ON/OFF
CW/CCW rotation protection
Clear
- 5) External output : Completion status and alarm
- 6) Protection : Overcurrent, overload, overvoltage, overspeed, inverter overheat, low voltage, CPU malfunction, encoder malfunction and communication failure

Motion Controller

- 1) Communication mode : RS-232
- 2) Pulse output : Differential Line Drive (2 channels)
- 3) External Encoder input : 2 channels
- 4) External input port : 20 ports (DC 24V)
- 5) External output port : 10 ports (Open Collector)
Max 80mA Sink Current
- 6) MC Program : Maximum 37.5 kByte
- 7) Variables :
 - Position variable (P): 100ea
 - Speed variable (F): 10ea
 - Quiescent variable (D): 10ea
 - L-variable (L): 2000ea
- 8) Software (program) : MSW-MCU2

Input switch

Push button: 6ea

Positioning apparatus unit

- 1) TM screw & Location Control by TM Screw
- 2) Location distance : More than 250mm
- 3) Built-in zero sensor
- 4) LEFT/RIGHT limit switch (built-in)

Pulse generator

- 1) 3-digit digital switch for frequency setup
- 2) Toggle switch (RUN / STOP)
- 3) Selector Switch (Left / Right)
- 4) Pulse output : PPA+, PPA-, PPB+, PPB-

Servo Drive

- 1) Operational manipulation by push button
- 2) LEFT/RIGHT limit switch input terminal
- 3) Pulse input terminal (PP, PG, NP, NG)

Starting point sensor

Open collector output type

DC Power

DC 24V 1.2A

Emergency stop switch

Input Source

AC 220V 60Hz

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- 9-pin communication cable: 1ea
- User's guide manual : 1ea

CPE-AT3805

Conveyor Control Trainer



FEATURES

- Designed to practice automation processes such as supply, inspection and classification
- Two ways of operation: standalone manual operation or automatic operation through the PLC connection
- Various types of experiments by adding or relocating the sensors and cylinders

EXPERIMENTAL CONTENTS

- Principles of the conveyor control system
- Various types of sensor applications
- How to use the programmable logic controller for interlocking practices
- Installation practices by relocating or adding the sensors and cylinders
- Basic automation processes: supply, transport, inspection, transfer and classification
- Manual operation or automatic PLC operation
- PLC Programming

SPECIFICATIONS

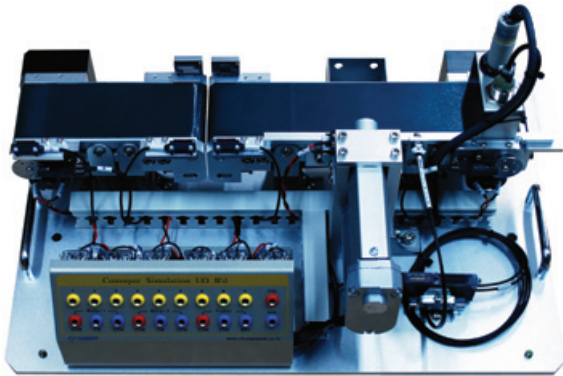
Transport system	Belt type conveyor
Conveyor belt	150(W) × 1000(L) mm
Control mode	Manual (standalone) or Auto (PLC control)
Conveyor speed	Auto : 20 ~ 40mm/s (3-step speed control)
	Manual : 15 ~ 40mm/s (continuous)
Pneumatic cylinder	Number of cylinder: 4ea
Object detection	Photo sensor : 3ea
	Proximity sensor : 1ea
	Micro switch : 2ea
Object selection	Rejection, sorting, pause
Conveyor motor	18 RPM (in use of a deceleration gear)
	Input power: AC220V
Preset counter	0000 ~ 9999 (4 digits)
Preset timer	0.1 sec ~ 100 hours
DC output	DC 24V 2A
Input voltage	AC 220V 50/60Hz
Dimension	1200(W) × 285(D) × 23(H) mm

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- Dummy work piece : 1set
- User's guide manual : 1ea

CPE-AT3810

Conveyor Control Trainer



FEATURES

- Carrying case type structure for the user's convenience and excellent mobility
- Equipped with a rotary disc designed to help understand the principle of the counter
- Automated control practices with the electric cylinder using a programmable logic controller (Option)
- Applied experiments by connecting various sensors
- DC motor interlock circuit in use for the wire connection

EXPERIMENTAL CONTENTS

- Principles of the conveyor system and operation of the sensors and cylinders
- CW / CCW operation practices: conveyor and electric cylinder motor
- DC motor's rotational operation
- Characteristics of various sensors
- How to control the conveyor
- Composition of the relay control circuit

STANDARD ACCESSORIES

- Connection cable (4mm) : 1set
- User's guide manual : 1ea

PRODUCT COMPOSITION

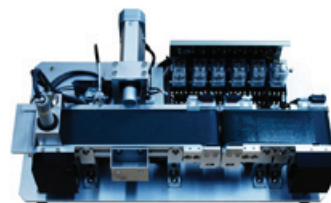
- Conveyor
- Conveyor Simulation I/O Board
- Sensors (object detection and operation check)
- Base Frame

OPTIONS

- PLC Training Kit (CPS-3750M)
- Universal PLC Training System (CPS-3500U)
- Mini Automation Multiprogramming Trainer (CPS-AT3450)
- Portable PLC Trainer (CPS-3710)

SPECIFICATIONS

Proximity sensor	High frequency oscillation sensor: 1ea Capacitive sensor: 1ea Cylinder movement detection sensor: 1ea
Photo sensor	Fiber sensor: 1ea Transmissive photo sensor: 1ea Direct-reflection photo sensor: 1ea Slot sensor: 2ea
Conveyor motor	DC 24V & 15mm/sec
Electric cylinder	STK 50mm/sec, 20mm/sec
Relay	4C (6ea)
Conveyor	250(W) x 50(L) mm 150(W) x 50(L) mm
I/O contact	Input: 9 points, Output: 6 points
Power source	DC24V
Base frame	Material: Aluminum



[back]



CPS-AT3460

Mini Pneumatic Control Trainer



FEATURES

- Hands-on experiments through the production line miniature
- Carrying case design with pneumatic cylinders and solenoid valves
- Overcurrent circuit protection and reverse power circuit protection
- Supports interlocking experiments with optional PLC or MiCOM

EXPERIMENTAL CONTENTS

- Basic concepts of automation using the pneumatic system
- Functions and operating principles of pneumatic control devices
- Functions and operating principles of solenoid valves
- Manual operation or automatic operation with a programmable logic controller

SPECIFICATIONS

Air service unit (1ea)

- 1) Equipped with a pressure regulator & a pressure gage

Double acting cylinder (3ea)

- 1) Type: Double acting one-way rod
- 2) Internal structure: Sensor sensing magnet and rubber cushion
- 3) Pressure : 1.05MPa
- 4) Use pressure : 0.06 ~ 0.07MPa
- 5) Piston speed : 50 ~ 750mm/s

Single acting cylinder (1ea)

- 1) Type: Single acting forward movement
- 2) Internal structure: Sensor sensing magnet and rubber cushion
- 3) Pressure : 1.05MPa
- 4) Working pressure : 0.06 ~ 0.07MPa
- 5) Piston speed : 50 ~ 750mm/s

Bi-directional solenoid valve (3ea)

- 1) Working pressure : 2.0 ~ 7.0 bar
- 2) Effective sectional area (5bar) : 2.3mm²
- 3) Response time : 20ms
- 4) Return type : Spring and internal pilot input
- 5) Manual operation: Push button

One-way solenoid valve (1ea)

- 1) Working pressure : 2.0 ~ 7.0 bar
- 2) Effective sectional area (5bar) : 2.3mm²
- 3) Response time : 20ms
- 4) Return type : Spring and internal pilot input
- 5) Manual operation: Push button

Speed controller (7ea)

- 1) Type: One-touch fitting (built-in)
- 2) Material : Plated with nickel

Limit switch (2ea)

Sensor (7ea)

- 1) High frequency proximity sensor: 4ea
 - Enhanced noise performance by the adoption of the IC (DC 3-wire type)
 - Equipped with reverse power protection circuit (DC)
 - Surge protection circuit (DC/AC)
 - Overcurrent protection circuit
- 2) Capacitive proximity sensor : 1ea
 - To detect dielectric materials such as steel, metal, plastic, water and stone
 - Equipped with reverse power protection circuit (DC)
 - Surge protection circuit (DC/AC)
 - Sensitivity adjustment volume for changing a sensing distance
 - Red indicator lamp for operational status
- 3) Photo sensor : 1ea
 - Cone type photo sensor
 - Response speed: Less than 1ms
- 4) Fiber optic sensor : 1ea
 - Response speed: Less than 1ms
 - Sensitivity adjustment: By coarse volume and fine volume

Aluminum carrying case

- 1) Equipped with a hand grip and locks
- 2) Designed to store the user's guide manual and accessories very easily

STANDARD ACCESSORIES

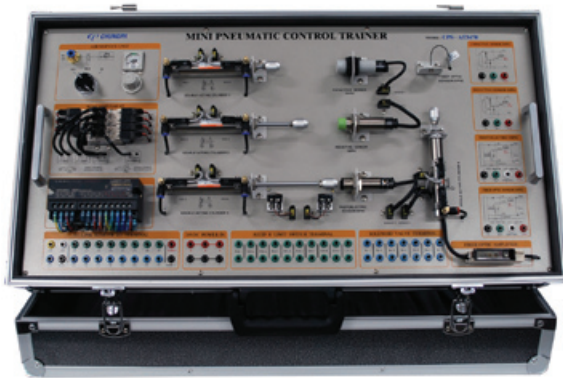
- Power cord : 1ea
- Connection cable : 1set
- User's guide manual : 1ea

OPTIONS

- Programmable Logic Controller Trainer
- Low-noise air compressor

CPS-AT3470

Smart I/O Control Pneumatic Trainer



FEATURES

- Compact-type pneumatic trainer equipped with sensors
- Built-in power supply (fixed/variable) and no separate power source requirement
- Compact carrying case that supports detachment and attachment
- One-touch connectors applied for convenient repair and maintenance
- CC-Link Module and I/O port for communication practices (OPTION)

EXPERIMENTAL CONTENTS

- Solenoid/reed switch control
- Solenoid/limit switch control
- Applied experiments on cylinder control
- Metal/non-metal detection
- Proximity sensor control
- Metallic sensor control
- Photo sensor control
- Fiber optic sensor control
- CC-Link system control

PRODUCT COMPOSITION

- Power supply (fixed/variable)
- 4 types of sensor
- 4 types of cylinder
- 4 types of solenoid valve
- I/O terminals
- CC-Link Module (OPTION)

SPECIFICATIONS

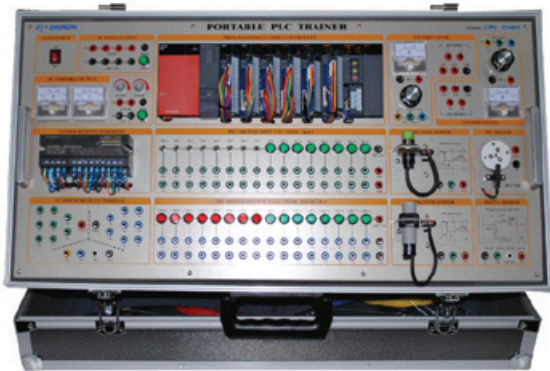
Air Service Unit	<ul style="list-style-type: none"> · Pressure gauge mounted type · Air input port (one-touch type): 1 port · Cast-in place structure
Solenoid Valve	<ul style="list-style-type: none"> · 5/2-way double acting valve: 3ea · 5/2-way single acting valve: 1ea
Cylinder	<ul style="list-style-type: none"> · Double acting cylinder: 3ea · Single acting cylinder: 1ea · One-touch connector for easy repair and maintenance
Sensor	<ul style="list-style-type: none"> · High-frequency oscillator sensor (NPN): 1ea · 4mm banana input terminal: 3ea
	<ul style="list-style-type: none"> · Capacitive proximity sensor (NPN): 1ea · 4mm banana input terminal: 3ea
	<ul style="list-style-type: none"> · Photo sensor (NPN): 1ea · 4mm input terminal: 4ea
Switch	<ul style="list-style-type: none"> · Fiber optic sensor (NPN): 1ea · 4mm banana input terminal: 4ea · Fiber optic amplifier: 3ea
	<ul style="list-style-type: none"> · One-touch connector for easy repair and maintenance
Switch	<ul style="list-style-type: none"> · Limit switch: 2ea · One-touch connector for easy repair and maintenance
Terminal (4mm insulation type)	<ul style="list-style-type: none"> · Terminal input: 14ea · Terminal output: 8ea · 24V power input terminal: 6ea · Reed & Limit switch terminal: 20ea · Solenoid valve terminal: 14ea
CC-Link Module (Option)	<ul style="list-style-type: none"> · CC-Link Remote I/O Module : 1ea · CC-Link Remote I/O Terminal : 22ea
Case	<ul style="list-style-type: none"> · Aluminum carrying case

STANDARD ACCESSORIES

- Power cord : 1ea
- 4mm connection cable: 1set
- PLC download cable: 1ea
- PLC programming software: 1ea
- User's guide manual : 1ea

CPS-3470M

Smart I/O Control PLC Trainer



FEATURES

- Compact PLC trainer equipped with sensors and self-simulator function
- Built-in power supply (fixed/variable) and no separate power source requirement
- Compact carrying case that supports detachment and attachment
- One-touch connectors applied for convenient repair and maintenance
- CC-Link Module and I/O port for communication practices (OPTION)

EXPERIMENTAL CONTENTS

- Lamp control
- A/D and D/A conversion
- Metal/non-metal detection
- Proximity sensor control
- Metallic sensor control
- Photo sensor control
- Optical fiber sensor control
- CC-Link system control
- Emergency stop and factory initialization

PRODUCT COMPOSITION

- Power supply (fixed/variable)
- PLC I/O devices
- A/D and D/A simulator
- DC motor control unit
- 4 types of sensor
- I/O terminals
- CC-Link Module (OPTION)

SPECIFICATIONS

PLC Unit	<ul style="list-style-type: none"> · Power Supply Module: 1ea · CPU: 1ea · Digital I/O: Input 32 points Output 32 points · A/D Converter Module: 1ea · D/A Converter Module: 1ea · CC-Link Module: 1ea
A/D and D/A Simulator	<ul style="list-style-type: none"> · Analog input: 2sets · Analog voltmeter: 2sets · Variable resistor (10KΩ): 2sets
Digital Input	<ul style="list-style-type: none"> · Toggle switch: 8ea · Push button: 8ea · Input terminal: 32 points
Digital Output	<ul style="list-style-type: none"> · Lamp (RED): 8ea · Lamp (GREEN): 8ea · Input terminal: 32 points
Sensor	<ul style="list-style-type: none"> · High-frequency oscillator (NPN): 1ea · 4mm banana input terminal: 3ea
	<ul style="list-style-type: none"> · High-frequency oscillator sensor (NPN): 1ea · 4mm banana input terminal: 3ea
	<ul style="list-style-type: none"> · DC motor: 1ea · Photo sensor (NPN): 1ea · 4mm banana input terminal: 2ea
	<ul style="list-style-type: none"> · Photo sensor: 1ea · 4mm banana input terminal: 4ea
CC-Link Module (OPTION)	<ul style="list-style-type: none"> · CC-Link Remote I/O Module · Remote I/O terminal
Case	<ul style="list-style-type: none"> · Aluminum carrying case

STANDARD ACCESSORIES

- Power cord : 1ea
- 4mm connection cable: 1set
- PLC download cable: 1ea
- PLC programming software: 1ea
- User's guide manual : 1ea

CPE-PN7520

Portable Electro-Pneumatic Training Kit



FEATURES

- Schematized circuit diagrams and symbols to help understand the electrical circuits as well as pneumatic operations
- Modularized structure capable of expansion and associated operations
- With graphical display on the main panel that shows the pneumatic circuit of each component and I/O terminals
- Equipped with built-in sensor protective circuits for safety
- Use output current-protective circuits and power-protective circuits
- Easy to carry, move and store with a carrying case design

SPECIFICATIONS

1. Main Frame: 1set
 - Dimension: 500(W) x 420(D) x 150(H)mm
 - Covered by Aluminum carrying case
2. Air Service unit: 1ea
 - Pressure range: 0.05 ~ 1MPa
 - Air filter, lubricating device, regulator valve, shut-off valve
 - Size of connector: G1/4
3. Pneumatic distributor: 1ea
 - Pressure range: 0 ~ 1MPa
 - Input x 1ea, output (one-touch fitting) x 3ea
4. Single acting cylinder: 1ea
 - Pressure range: 0.05 ~ 0.85MPa
 - Inner diameter/stroke: 16mm/50mm
 - Equipped with proximity sensor
5. Double acting cylinder (pressure regulator type): 2ea
 - Inner diameter/stroke: 16mm/80mm
 - Equipped with proximity sensor
 - Fitting equipped with speed controller: 2ea
6. 3/2-way single solenoid valve (N/C): 1ea
 - Response time: 5ms (ON), 19ms (OFF)
 - Pressure range: 0.25 ~ 0.8MPa
 - Return: Spring type
 - Equipped with a protective circuit and LED
7. 3/2-way single solenoid valve (N/O): 1ea
 - Response time: 5ms (ON), 9ms (OFF)
 - Pressure range: 0.25 ~ 0.8MPa
 - Return: Spring type
 - Equipped with a protective circuit and LED
8. 5/2-way single solenoid valve: 2ea
 - Response time: 20ms (ON), 30ms (OFF)
 - Pressure range: 0.25 ~ 0.8MPa
 - Return: Spring, pilot type
 - Equipped with a protective circuit and LED
9. 5/2-way double solenoid valve: 2ea
 - Pressure range: 0.25 ~ 0.8MPa
 - Response time: 10ms
 - Equipped with a protective circuit and LED
10. Pressure switch: 1ea
11. Electrical proximity switch: 2ea
12. Electrical limit switch (left): 2ea
13. Electrical limit switch (right): 2ea
14. Relay (DC24V, 4C): 6ea
15. Digital ON relay timer (0.1 ~ 99 sec., 4C): 1ea
16. Digital OFF relay timer (0.1 ~ 99 sec., 4C): 1ea
17. Digital Up/Down Counter (0000 ~ 9999, 3C): 2ea
18. Push button (2C): 2ea
19. Emergency switch (1a1b): 1ea
20. Lamp (DC 24V): 3ea
 - Color: Red (1ea), Yellow (1ea), Green (1ea)
21. Buzzer (DC 24V): 1ea
22. Power supply (DC 24V 2A, output terminal +/-12 pairs): 1ea
23. AC inlet (with power signal lamp): 1ea

STANDARD ACCESSORIES

- AC cord: 1ea
- Connection cable: 1set
- Pneumatic hose: 1set
- User's guide and experimental manual: 1ea

CPE-PN7530

Portable Pneumatic Training Kit



FEATURES

- Schematized circuit diagrams and symbols to help understand the principles of pneumatic operations
- Modularized structure capable of expansion and associated operations
- With graphical display on the main panel that shows the pneumatic circuit of each component and I/O terminals
- Easy to carry, move and store with a carrying case design

SPECIFICATIONS

1. Main Frame: 1set
 - Dimension: 500(W) x 420(D) x 150(H)mm
 - Covered by Aluminum carrying case
2. Air Service unit: 1ea
 - Pressure range: 0.05 ~ 1MPa
 - Air filter, lubricating device, regulator valve, shut-off valve
 - Size of connector: G1/4
3. Pneumatic distributor: 1ea
 - Pressure range: 0 ~ 1MPa
 - Input x 1ea, output (one-touch fitting) x 3ea
4. Single acting cylinder: 1ea
 - Pressure range: 0.05 ~ 0.85MPa
 - Inner diameter/stroke: 16mm/50mm
 - Equipped with proximity sensor
5. Double acting cylinder with cushion: 2ea
 - Inner diameter/stroke: 16mm/80mm
 - Equipped with proximity sensor
6. Pressure sequence valve: 1ea
 - Pressure range: 0.15 ~ 0.8MPa
 - Control pressure: 0.15 ~ 0.8MPa
7. Time delay valve (N.C): 1ea
 - Pressure range: 0 ~ 0.85MPa
 - Delay time: 1 ~ 30sec
 - Rating flux: 90ℓ/min
 - Response time: 50ms
8. 3/2-way push button valve (N.C) : 2ea
 - Normally close type
 - Working pressure: 0 ~ 0.8MPa
9. 3/2-way push button valve (N.O) : 1ea
 - Normally open type
 - Working pressure: 0 ~ 0.8MPa
10. 5/2-way selector switch valve: 2ea
 - Pilot acting spring return
 - Working pressure: 0 ~ 0.8MPa
11. 3/2-way roller lever valve (N.C): 4ea
12. 3/2-way one-way roller lever valve (N.C): 2ea
13. One-way flow control valve (0 ~ 0.98MPa): 4ea
14. Quick exhaust valve (0.05 ~ 1MPa): 1ea
15. Pressure gauge (0 ~ 1MPa): 1ea
16. 3/2-way pneumatic spring return valve (N.C): 1ea
17. 5/2-way pneumatic spring return valve: 2ea
18. 5/2-way pneumatic air check valve: 4ea
19. Dual-pressure valve (AND): 2ea
20. Shuttle valve (OR): 2ea

STANDARD ACCESSORIES

- Pneumatic hose (1 meter): 1set
- T-connector: 1set
- User's guide and experimental manual: 1ea

CPE-PMAP

Pneumatic Components Set



FEATURES

- Equipped with electro-pneumatic components with the international safety standard such as UL (USA) and CSA (Canada)
- Consists of pneumatic circuit components that are applied in real industry
- Helps the user learn various types of pneumatic circuit related techniques and incubate advanced technology

LIST OF EXPERIMENTS

- Basic principles of pneumatic technology
- Basic principles of vacuum technology
- Characteristics and principles of pneumatic valves
- Characteristics and principles of pneumatic cylinders
- General engineering techniques focusing on pneumatic control

SPECIFICATIONS

Main base panel	<ul style="list-style-type: none"> - Main panel: Black color bakelite 8T, 1200(W) x 890(D) mm - Panel guide : 90° angle support, 900(W) x 815(D) mm
Main section	<ul style="list-style-type: none"> • Air combination unit (air filter + regulator): 1ea
Loading ARM vacuum section	<ul style="list-style-type: none"> • Regulator: 1ea • Vacuum ejector: 2ea • Digital pressure switch: 2ea
Unloading ARM vacuum section	<ul style="list-style-type: none"> • Regulator: 1ea • Vacuum ejector: 2ea • Digital pressure switch: 2ea
Picker-1 section	<ul style="list-style-type: none"> • Regulator: 1ea • Vacuum ejector: 2ea • Digital pressure switch: 2ea
Picker-1(Up/Down) section	<ul style="list-style-type: none"> • Air slide table: 1ea • Solenoid valve: 1ea
Picker-1(Rotary) section	<ul style="list-style-type: none"> • Rotary table/rack pinion type: 2ea • Solenoid valve: 2ea
Cleaner PA-1 & PA-2 section	<ul style="list-style-type: none"> • Solenoid valve: 2ea • Clean air filter: 2ea
Cleaner Lift & Buffer section	<ul style="list-style-type: none"> • Solenoid valve: 2ea • Clean air filter: 2ea

STANDARD ACCESSORIES

- Pneumatic tube (10 meter): 1ea
- Pneumatic hose cutter: 1ea
- User's guide manual: 1ea

CPS-AT3900

Elevator Trainer



FEATURES

- 3-floor architecture made of aluminum profile
- Strong and elegant exterior based on expandable system structure
- Designed to practice various functions of control circuits
- Interlocking connectivity with a PLC trainer through 4Ø connection cables and I/O connector cables
- Lockable casters for easy relocation of the training system

EXPERIMENTAL CONTENTS

- Manual control of the cabin
- Operation of doors by switches
- Operation of moving lift by floor buttons
- Operation of moving lift by call buttons
- Operation of floor indicator lamps
- System initialization practices
- Interlocking connectivity with a PLC system

STANDARD ACCESSORIES

- Power cord : 1ea
- 4Ø connection cable: 1set
- 25-pin I/O connector cable : 1set
- User's guide manual : 1ea

OPTIONS

- Portable PLC Trainer
 - Suggested model: CPS-3710
 - Other types of PLC system can be provided upon request

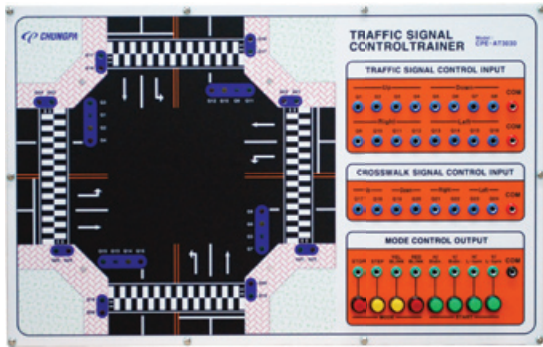
SPECIFICATIONS

• ELEVATOR SYSTEM	
Number of floors	3 floors
Speed of elevator	30 ~ 60mm/sec
Control mode	UP / DOWN / EMERGENCY / RETURN
Control signal	DC 24V
Motor in use	DC 24V geared motor
Elevator door	3ea (aluminum doors)
Elevator cab	120(W) x 12(D) x 150(H)mm
• CONTROL PANEL	
Range of operation	3 floors
Mode of operation	Manual / PLC control (*PLC: optional)
Input	Excessive Over-rising prevention micro switch, positioning proximity switch, micro door switch, call signal push button
Output	Motor' rotation/reverse rotation, position indicator lamp (digital), operational status FND, call status indicator lamp, destination indicator lamp, open/close door indicator lamp
PLC interface terminal	Input: 15 points Output: 15 points
Cable connection terminal	Input: 25 points Output: 25 points
Emergency stop	Push button (red color)
Input voltage	AC 220V 50/60Hz Power switch, no circuit breaker (NFB) and protective fuse



CPE-AT3030

Traffic Signal Control Trainer



FEATURES

- Designed to perform interlocking operations with a programmable logic controller (OPTION)
- Supports programming practices on the traffic light system with a programmable logic controller
- Two operational modes: AUTO and MANUAL (step)

EXPERIMENTAL CONTENTS

- Basic concept on the traffic light system
- How to control intersection traffic light and pedestrian light
- Programming practices with a PLC connection
- AUTO/MANUAL control on actual traffic light system

SPECIFICATIONS

Traffic light system	Traffic light : Green / Red / Turn Left / No entry (yellow)
	Pedestrian signal : Green / Red
Roadway	Four-way intersection
Signal processing mode	Bi-directional straight signal system
	Left-on-straight concurrent signal system
	Flashing yellow and flashing red signals at night
Operational mode	AUTO: Operable by a programmable logic controller
	MANUAL: START, STOP, YEL, BLINK, RED BLINK, H/Bidir, V/Bidir, H/L-turn, V/L-turn
PLC interface	Input: 24 points - Traffic light control: 16 points - Pedestrian light control: 8 points Output: 8 points (Selector switch: MANUAL operation)
Control I/O contact	4mm banana plug
Input power	DC 24V (External)
Dimension	700(W) × 100(H) × 450(D)mm

STANDARD ACCESSORIES

- Connection cable (4Ø): 1set
- PC software program CD: 1ea
- User's guide manual: 1ea

OPTIONS

- Programmable Logic Controller

Temperature Control Trainer



FEATURES

- Hands-on practices using the Temperature Control Trainer
- Interlocking connectivity with a programmable logic controller (option)
- Designed to control temperature using a heater and a fan.
- Digital temperature display (4-digit 7-segment)

EXPERIMENTAL CONTENTS

- Controlling heater and fan by a manual switch
- Controlling heater by a volume knob
- Controlling heater by Temperature Controller
- Auto tuning for Temperature Controller
- Alarm and transfer output
- Controlling digital input

SPECIFICATIONS

Temperature sensor

- Resistance temperature detector: Pt100Ω
- Measurement range : 0℃ ~ 399℃
- Current output : 4 ~ 20mA

Temperature indicator

- 1) 4-digit 7-segment LED display
- 2) Indication of present temperature and setting temperature
- 3) Alteration of the setting temperature by key switch
- 4) Event output
- 5) Current output: 4 ~ 20mA (load: below 600Ω)

Heater

- Power capacity: 200W

Power control unit

- 1) Control input: DC 1 ~ 5V, DC 4 ~ 20mA
- 2) Continuous control by a volume knob and external contact points
- 3) Phase control & cycle control mode
- 4) "Soft start" function

Fan

- Operable by DC 24V

Operational indicator lamp

- Heater and fan

Current indicator lamp

- Heater current indicator analog meter
- FS 2A

STANDARD ACCESSORIES

- Power cord: 1 ea
- Connection cable: 1 set
- Spare fuse: 2ea
- User's guide manual: 1ea

OPTIONS

- Portable PLC Trainer
 - Suggested model: CPS-3710
 - Other types of PLC system can be provided upon request

CPE-AT3710

PLC-based Temperature Control Trainer



FEATURES

- Built-in programmable logic controller unit with the analog I/O module
- Designed to control temperature using a heater and a fan.
- Digital temperature display (4-digit 7-segment)

EXPERIMENTAL CONTENTS

- Controlling heater and fan by a manual switch
- Controlling heater by a volume knob
- Controlling heater by Temperature Controller
- Auto tuning for Temperature Controller
- Manual or automatic operation in connection with PLC
- Alarm and transfer output
- Controlling digital input

SPECIFICATIONS

PLC unit

- 1) Feature: EEPROM, High processing speed, self-diagnosis function, RS-232C interface, IEC61131-3 international standard language
- 2) Programming language: IL (Instruction List), LD (Ladder Diagram), SFC (Sequential Function Chart)
- 3) Control method: Stored program
- 4) Processing speed: 0.5 μ s/step
- 5) Memory capacity: 68kbyte
- 6) Input: 18 points
- 7) Output: 12 points
- 8) Output lamp: DC 24V
- 9) PLC/PC connection: RS-232C cable
- 10) Input switch
- 11) Power output: DC 24V
- 12) Analog I/O module
 - AD input
 - Input range: DC 0~10V
 - Current: DC 0 ~ 20mA / 4 ~ 20mA
 - Digital conversion value: 0~4,000 (12-bit)
 - Input channel: 2 channels
 - DA output
 - Digital conversion value: 0~4,000 (12bit)
 - Analogue output: DC 0 ~ 20V (load impedance: 2k Ω)
 - Current: DC 0 ~ 20mA (load impedance: 560k Ω)
DC 0 ~ 20mA (load impedance: 560k Ω)

Power

- Power source: 1-phase AC 220V, 50/60Hz

Input signal

- Voltage: DC 0 ~ 10V
- Current: DC 4 ~ 20mA

Output signal

- Voltage: DC 0 ~ 10V
- Current: DC 4 ~ 20mA

Temperature sensor

- Resistance temperature detector: Pt 100 Ω
- Measurement range: 0 ~ 399 $^{\circ}$ C
- Current output: 4 ~ 20mA

Temperature indicator

- 1) 4-digit 7-segment LED display
- 2) Indication of present temperature and setting temperature
- 3) Alteration of the setting temperature by key switch
- 4) Event output
- 5) Current output: 4 ~ 20mA (load: 600 Ω)

Heater

- Power capacity: 200W

Power control

- 1) Control input: DC 1 ~ 5V, DC 4 ~ 20mA
- 2) Continuous control by a volume knob and external contact points
- 3) Phase control & cycle control mode
- 4) "Soft start" function

Fan

- Power: DC 24V

Indicator lamp

- Shows the operational status of the heater and the fan

Analog meter

- Analog meter: Indicates the heater's current
- FS 2A

STANDARD ACCESSORIES

- Power cord: 1 ea
- Connection cable: 1 set
- Spare fuse: 2ea
- User's guide manual: 1ea

CPE-AT3720

Auto Pump Trainer



FEATURES

- Hands-on practices using a real-life industrial pump
- See-through water tank for checking the level and flow of water
- Interlocking connectivity with a programmable logic controller (option)
- Circuit diagrams printed on the front panel for better understanding of the automatic pump system

EXPERIMENTAL CONTENTS

1. Operation of pump
2. Control of electric valves
3. Control of the automatic pump system
4. Control of the pump system using a programmable logic controller
5. Control of the automatic pump system by a programmable logic controller

SPECIFICATIONS

Water tank	Number of water tank: 2ea
	Capacity : about 8ℓ
	Type : Transparent acrylic
	Thickness : 10mm
Pump	AC 220V 125W
Relay	DC 24 relay for the pump control
Level detecting sensor	
Power switch	
Lockable casters	
Hard cover case	Aluminum profile

STANDARD ACCESSORIES

- Power cord: 1ea
- Connection cable: 1set
- User's guide manual: 1ea

OPTIONS

- Portable PLC Trainer
 - Suggested model: CPS-3710
 - Other types of PLC system can be provided upon request

CPE-RO8010

Auto Warehouse Robot Trainer



FEATURES

- Capable of performing warehousing and releasing operations
- Variety of movements such as proceeding forward, retreating, ascending, descending and handling by turning to the right
- Electrically stable by DC 24V relay in the output section
- Easily controllable by a programmable logic controller (option)
- Including a conveyor and a PTP robot unit for complete system control

EXPERIMENTAL CONTENTS

1. Basic principles of controlling the warehouse robot
2. Interlocking connectivity with a programmable logic controller
3. Operational control in forward and backward, up and down and left and right directions

STANDARD ACCESSORIES

- Power cord: 1 ea
- Connection cable: 1 set
- Carrying box: 3ea
- Aluminum work piece: 10ea
- User's guide manual: 1 set

OPTIONS

- Programmable Logic Controller Trainer

SPECIFICATIONS

Left turn / right turn	Rotation range: 200° (max.)
	Motor: AC geared motor
	5/2-way solenoid valve & rotary cylinder
Vertical axis	Operating range: 400mm (max.)
	Motor: AC break motor
	Rotation: By the square-shaped screw (3mm pitch) 1 / 8T encoder device
Forward / backward direction	One-way pneumatic rod cylinder: 150mm
	Auto sensor: 2ea Speed control: 50 ~ 500mm/s
	Valve: 5/2-way solenoid valve
Handling	Pneumatic finger stroke range: 6mm Pressure: 1.4 ~ 3.6kgf
	Jig attachment: ø19 jig for working materials Operation: 5/2-way solenoid valve
Top / bottom direction	3 positions: Y1, Y2 and Y3 Travel interval: 80mm
Left / right operation	4 positions: X1, X2, X3 and X4
Input	Micro switch (7ea) and photo sensor (1ea)
Safety device	Limit switch attachment (overpower prevention)
Selector switch	MANUAL / AUTOMATIC operation
Control panel	Manual control switch: 6ea
	Lamp power switch: 1ea
	25-pin I/O connector
	I/O terminal: 15ea

CPE-RO8020

Auto Warehouse Robot Trainer



FEATURES

- Capable of performing warehousing and releasing operations
- Variety of movements such as proceeding forward, retreating, ascending, descending and handling by turning to the right
- Electrically stable by DC 24V relay in the output section
- Easily controllable by a programmable logic controller (option)
- Horizontal movement by the joints of the ball screw system

EXPERIMENTAL CONTENTS

- Basic principles of controlling the warehouse robot
- Interlocking connectivity with a programmable logic controller
- Operational control in forward and backward, up and down and left and right directions

STANDARD ACCESSORIES

- Power cord: 1 ea
- Connection cable: 1 set
- Carrying box: 3ea
- Aluminum work piece: 10ea
- User's guide manual: 1 set

OPTIONS

- Programmable Logic Controller Trainer

SPECIFICATIONS

Left turn / right turn	Rotation range: 200° (max.)
	Motor: AC geared motor
	5/2-way solenoid valve & rotary cylinder
Vertical axis	Structure: Oilless rotational slide unit
	Operating range: 400mm (max.)
	Motor: AC break motor
Forward / backward direction	Rotation: By the square-shaped screw (3mm pitch)
	1 / 8T encoder device
	One-way pneumatic rod cylinder: 150mm
	Auto sensor: 2ea
Handling	Speed control: 50 ~ 500mm/s
	Solenoid valve: 5/2-way solenoid valve
	Pneumatic finger stroke range: 6mm
	Pressure: 1.4 ~ 3.6kgf
Top / bottom direction	Jig attachment: ø19 jig for working materials
	Operation: 5/2-way solenoid valve
Left / right operation	3 positions: Y1, Y2 and Y3 Travel interval: 80mm
Left / right operation	5 positions: X1, X2, X3, X4 and X5
Input	Micro switch (7ea) and photo sensor (1ea)
Safety device	Limit switch attachment (overpower prevention)
Selector switch	MANUAL / AUTOMATIC operation
Control panel	Manual control switch: 6ea
	Lamp power switch: 1ea
	Emergency stop switch
	25-pin I/O connector
	I/O terminal: 15ea

CPE-AT3910

Parking Tower System Trainer



FEATURES

- 5-floor height vertical structure with car detection sensors
- Pallet's horizontal movement enabled by the DC motor installed in a lift
- Interlocking connectivity with a programmable logic controller (option)
- Circuit diagrams printed on the front panel for better understanding of the automatic parking system

EXPERIMENTAL CONTENTS

1. Manual movement of a garage
2. Lamp control by "floor selection" button
3. Lamp control by "entry" button
4. Door control by switch
5. Initialization practices
6. Moving a garage by "floor selection" button
7. Moving a garage by "entry" button

SPECIFICATIONS

Parking	5ea
Structure	5-floor steel-frame structure
Garage	Pallet : 1 set
	Pallet detection sensor : 5ea
	Car detection sensor : 5ea
Lift	Pallet transfer device : 1 set
	DC motor (DC 24V) : 2ea
	Photo sensor
	Bevel gear & screw
	Micro switch
Control unit	Induction motor & decelerator
	Indicator lamp: "No vacancy" / "vehicle entry" / "vehicle departure" / "Standby" / "floor number" / "no entry"
Operation	MANUAL or PLC operation
Input voltage	AC220V 60Hz

STANDARD ACCESSORIES

- Power cord
- Connection cable: 1 set
- Spare fuse: 2ea
- User's guide manual: 1 set

OPTIONS

- Programmable Logic Controller Trainer

CPE-RO8000

PTP Robot Trainer



FEATURES

- Two types of operation: Standalone operation or PLC linked operation
- Interlocking connectivity with a programmable logic controller (option)
- Hands-on practices on assembly and disassembly process, materials handling process and returning to the original position using the pneumatic actuator
- Supports complete system control by connecting to a conveyor and an automatic warehouse robot unit

EXPERIMENTAL CONTENTS

1. Basic principles of controlling the PTP Robot
2. Interlocking connectivity with a programmable logic controller
3. Operational control in horizon or vertical direction

SPECIFICATIONS

Rotation axis	Rotation angle : 180°
	Driving energy : 4.06kg/cm ²
	Reed switch : 2ea
	Structure: Oilless slide unit
Horizontal axis	Travel distance: 150mm
	Speed: 50 ~ 500mm/s (adjustable)
	Auto sensor: 2ea
	Shock absorber: 0.3 ~ 1.5kgf/cm ²
Vertical axis	Travel distance: 75mm
	Speed: 50~500mm/s (adjustable)
	Auto sensor: 2ea
	Cylinder: One-way rod cylinder
Handling	Stroke length: 6mm
	Pressure: 1.4 ~ 3.6kgf
	Jig attachment: ø19 jig for working materials
Pneumatic valve	5/2-way solenoid valve: 5ea
	5-line manifold block: 1ea
Control panel	25-pin I/O connector
	Main power switch: 1ea
	Selector switch (MANUAL / AUTO): 1ea
	Protection fuse
Input voltage	AC 220V

STANDARD ACCESSORIES

- Power cord
- Work piece (ø19) and bracket: 4 sets
- T-shaped connector: 1ea
- Air hose (ø6): 5 meter
- 25-pin connector: 1set
- User's guide manual: 1ea

OPTIONS

- Programmable Logic Controller Trainer

EPOR

Educational Programming Oriented Robot



New Paradigm of Robot based Education, "EPOR"

EDUCATIONAL PROGRAMMING ORIENTED ROBOT

FEATURES

Open Hardware Support

- Arduino UNO 100% compatible
- Educational contents support via online community

Visual Language based Robot Coding Curriculum

- Optimized for coding-oriented education for beginners
- Visualization and control of robot functions via visual coding

Various Detachable Sensors

- Connectors on chest and bottom of EPOR
- Detachable sensor : IR, Touch, VR
- Embedded sensor : MIC, CDS
- Scratch 2.0, S4A, Ardublock

Camera and Color Tracking

- Bluetooth based wireless image transmission
- Easy color tracking using key mapping

SPECIFICATIONS

Main-board		Compatible with Arduino
Servo motor	Stall Torque	1.8 kg/cm (4.8V), 2.5 kg/cm (6V)
	Operating Speed	1.0 sec/60degree (4.8V), 0.08 sec/60degree (6V)
DC motor	Torque	1.0 kg/cm
	Gear Ration	1:120
	Load Speed	50 RPM / 10 cm/s (3v), 15 cm/s (5v)
Operating Voltage		5V
Communication		UART communication, Bluetooth (v2.0 version)
Weight		810g
LCD output and various sensors		1602 Character LCD RGB LED JPEG cameras Illumination sensor (CDS) Mic Sensors Infrared Sensors (IR) Touch sensor Speaker



PRODUCT CONFIGURATION



OPTIONS

- Lithium Ion battery
- Rechargeable adaptor



Autonomous Driving and Line Tracing

Driving with obstacle avoidance and Line Tracing using IR sensors



Motion Control

Servo Motors at Head and Two Arm, Two wheel DC motors



LCD for Text Display

2 Lines, 16 Characters
Letters and Numbers can be displayed



Brightness Measurement

Frontal Brightness sensing using Embedded CDS sensor



Camera Application

Color Object, Face and Hand Gesture Detection, Easy Usage via Key mapping of Result to Visual Language



Sound Detection and Melody Playing

Embedded MIC for Sound Detection and Melody Playing with Detachable SPK





Smart Learning

Contents

271 Smart Learning System | RSL Series



RSL Series

Real Smart Learning System



INTRODUCTION

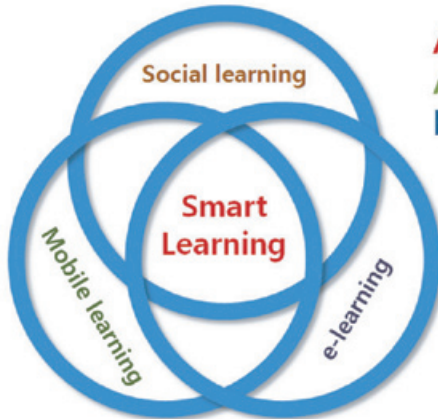
The Real Smart Learning System is a highly effective system for those who need easy and simple contents production at low cost. Daily lecture and speech activities can be recorded and published as contents. Contents can be created by the movable Real Smart Learning System regardless of locations.

Video clips and PowerPoint slides can be automatically integrated as a same group of contents for publishing in real-time. The user can watch newly or already produced contents at any time through the Internet and mobile devices. Besides, it supports live tagging functions for two-way interactive communications.

FEATURES

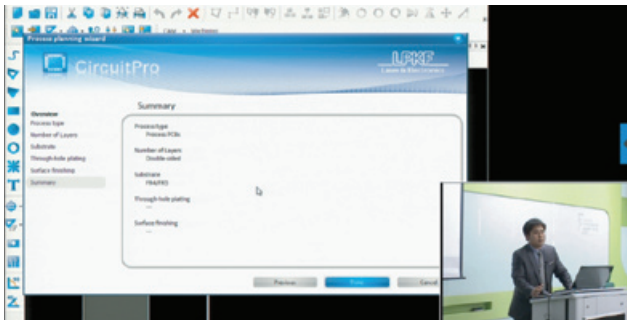
- High-class webcasting function
- Auto Sync. for PowerPoint slides and Audio/video data
- Easy interface and input source selection
- Multiple language support: 14 languages (including English)
- Self-editing software (Rich Media Editor)
- Flexible camera controls (Pan/Tilt/Zoom)
- Microsoft Silverlight based media player
- Auto capture and Webcasting of PowerPoint slides (RSL-500)
- Real-time live tagging on a media player (RSL-500)
- Compatible with AMX/Crestron Controller (RSL-500)

A Real Smart Learning System
with Smart Technology



Always!
Anywhere!
Everything!

Two-in-One Contents



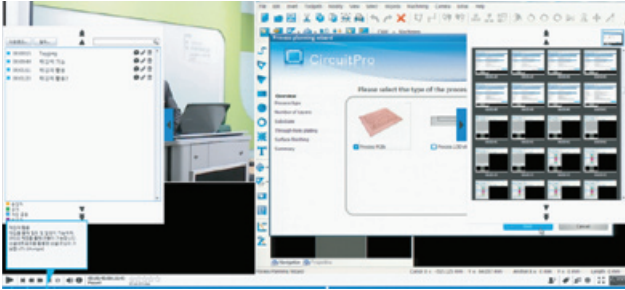
Video clips and PowerPoint slides are distributed as a single set of contents on the RSL System. It also supports editing on the archives of existing Video clips and PowerPoint slides. The position and size of visual contents can be freely adjusted.

Live Streaming



The RSL System permits recording and live streaming simultaneously. The user can watch the recorded contents on the Internet or mobile networks.

Live Tagging Communications



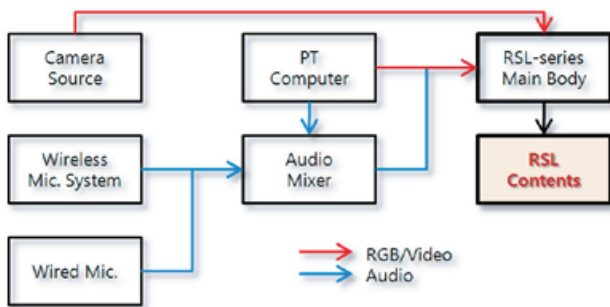
The user can use a “tagging” function for Q&A and also communicate each other with it. The tagged data can be used as a multi-media note and can be linked with social networking service (SNS)

Easy Creation of Premium Contents

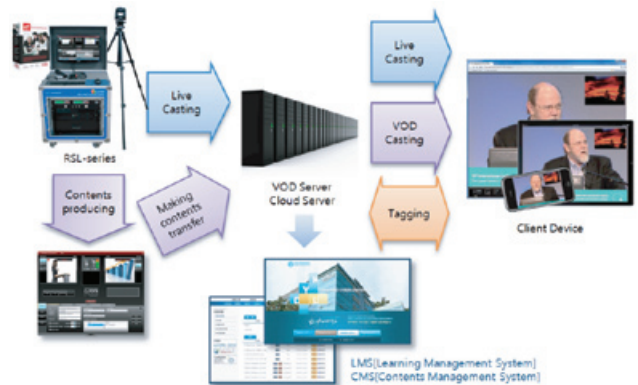


Anyone can easily create premium contents. It is easy to set up an attribute data of contents and easily manageable through simple environment setup and screen configuration.

Hardware Block Diagram



System Configuration



Lecture Capture and Media Management Effect

- Helps improve skills and competence of “smart technologies” such as a smart-phones, tablets, and Web2.0 tool
- Enables building more confidence by increasing interactions - i.e, instant mentoring and coaching - between a lecturer and learners
- Effective monitoring on the capabilities of learners and feedback on their assignments and performing activities
- Supports exchange of ideas as well as social learning coupled with social networking service (SNS)
- Maximizes the learning effect by the combination of formal learning (lecture) and informal (tagging or SNS).
- Capable of saving each of tagged contents and printing it to use as a multi-media note

RSL Series

SPECIFICATIONS

- OS : Windows 7
- CPU : Intel Core i7-3770
- RAM : 4GB DDR3 SDRAM
- HDD : 1TB, SATA
- ODD : SATA Super-Multi DVD
- Power : 500W
- PCIe : x16 (2 slots)
- Monitor : 22", 1920*1080
- Wireless Mouse/Wireless Keyboard/Wireless LAN Card
- A/V Capture Card : Osprey 260e, Y/C (S-Video), composite video inputs, balanced/unbalanced stereo audio inputs
- VGA Capture Card : Datapath Vision RGB-E1S, 170Mpixels/s analog RGB or 165 MHz DVI
- Camera : Sony EVI-D70 PTZ camera (RSL-500), 18x optical zoom, 12x digital, Remote control, Fully operable via RS-232C (VISCA) or RS-422, Tripod (RSL-500)
- Wireless Mic. : 2CH, 925 ~ 932MHz, Pin Mic., Handy Mic.
- UTP VGA & Audio Extender : EXVA-12LR
- Audio Mixer : XENYX 802, Premium 8-Input 2-Bus Mixer
- Software : Presentations 2GO Pro (RSL-500)
Presentations 2GO Lite (RSL-300, RSL-100)
Rich Media Editor
Contents Management Program



Software: Functional Composition

Functions	Presentations 2GO Pro (for RSL-500)	Presentations 2GO Lite (for RSL-300/100)
Offline Recording	○	○
Local Screen Capture	○	○
Webcam Video	○	○
External Audio / Video	○	○
External VGA	○	○
Automatic Capture	○	○
Rich Media Editor	○	○
Local Playback	○	○
Export to VOD cast	○	○
Live Webcast	○	-
AMX / Crestron Controller	○	-
Automatic Webcast & Publishing	○	-
Live Tagging & Live Note Tagging	○	-

Hardware: System Composition

Category	Description	Standard Pro (RSL-500)	Standard Lite (RSL-300)	Electronic Podium (RSL-100)
Main Body	i7-3770, 4GB, 1TB SATA HDD, Super-Multi DVD, Power 500W, PCIe x16(2 slots), Wireless keyboard/mouse, Wireless LAN	0	0	0
Signal encoder	Osprey 260e	0	0	0
	VisionRGB-E1S	0	0	0
Monitor	22" (1920 x 1080)	0	0	-
Audio Mixer	XENYX 802	0	0	-
Wireless Microphone	LRX-902E (rack type), Pin/Handy Microphone: 1set	0	0	-
Hard Case	Portable Type	0	0	-
VGA Extender	EXVA-12LR, Cable 30M	0	0	-
Camera	Sony EVI-D70, Included Tripod	0	-	-
Dimension	Folded: 675(W) x 525(D) x 585 (D)mm Unfolded: 675(W) x 525(D) x 1240 (D)mm			
Software (included)	Presentations 2GO Pro or Lite	Pro ver.	Lite ver.	Lite ver.
	Rich Media Editor	0	0	0
	Contents Management Program	0	0	0

Smart Learning Site Build Project



Contents Management Program Software



Building a smart learning site

We provide one-stop service such as streaming server, website and mobile applications for building a well-established smart learning site. For further information, please contact us at sale@chungpaemt.co.kr



Software

Contents

- 281 Simulation Software for Automation System | Automation Studio™
- 287 Power Electronics & Green Energy CAD Software | CASPOC
- 291 HMI/SCADA Software | AUTOBASE 10



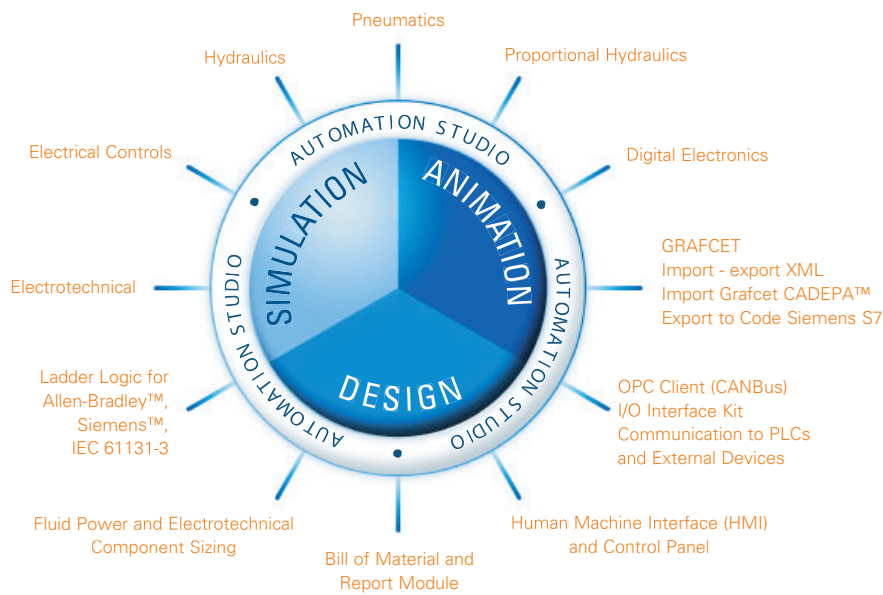
Automation Studio™

Simulation Software for Automation Systems



FEATURES

- Intuitive design, animation, simulation and system analysis features in a versatile and user-friendly environment.
- Allows teachers to present more content in less time, improves students' understanding of concepts and diagnosis capabilities and brings to schools, colleges and universities an optimal return on investment.
- Course content offered by Automation Studio™ is interactive and animated live by the software's simulation. Teachers can modify this content using Automation Studio™ to better fit their needs.



Libraries and modules

- Hydraulics/ Proportional Hydraulics
- Pneumatics/ Proportional Pneumatics
- Electrical Controls
- Digital Electronics
- PLC Ladder Logic, Allen Bradley, Siemens and IEC 61131
- Sequential Function Chart (SFC/ GRAFCET)
- Electrotechnical (AC/DC)
- 2D-3D HMI and Control Panels
- Block Diagram-Math
- Fluid Power Component Sizing
- Electrical Component Sizing
- Troubleshooting and Diagnostics
- Mechanical Links
- Catalogue Manager
- Bill of Material and Report
- OPC Client, OPC Server (CAN Bus)
- SFC Compilers, Export to Siemens and XML format (Automation Studio™ PLC)
- APIs/ Script Language

Suitable for Technological Curriculum

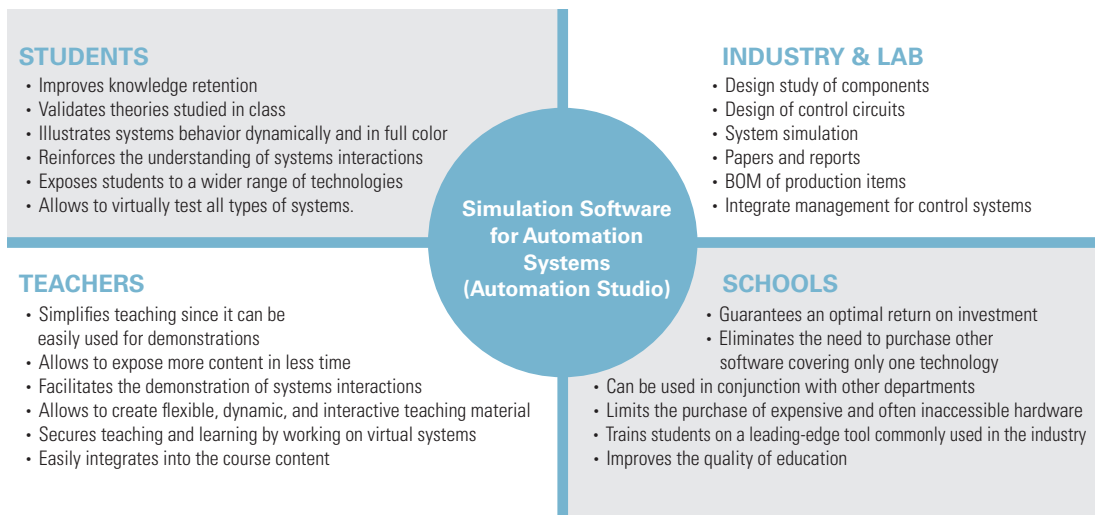
Automation studio™ does not suggest any methods of curriculum management, but it enables a complete education process based on the levels of trainees from various departments by using a number of teaching materials and practical tasks.

The relevant technical curriculums are:

- Automation
- Assembling Machine
- Machine Design
- Industrial Epidemiology
- Agricultural Machine
- Mechatronics
- Industrial Maintenance
- Electronic Device
- Electric and Electronic Engineering

Economical Education Program

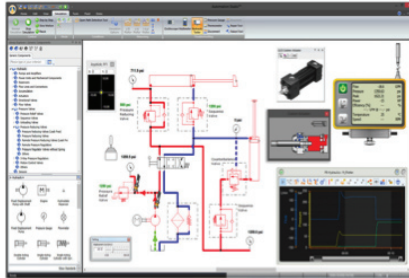
Automation Studio™ is a cost-effective program which provides complete control solutions in various fields such as machineries, designs of machine, electronic devices, automations, mechatronics and electric electronics and it enables to reduce school budget but increase education efficiency.



SOFTWARE CLASSIFICATION

Educational & Industrial Package Elements	Complete	Fluid Power	Pneumatic	Hydraulic	Electrical	Automation Control
Pneumatic Library	○	○	○			
Hydraulic Library	○	○		○		
Proportional Hydraulic Library	○	○		○		
Proportional Pneumatic Library	○	○	○			
Component Sizing Module	○	○	○	○	○	
Electrotechnical Library (Includes IEC and NEMA Standards)	○				○	
Electrical Controls Library (Includes IEC and JIC Standards)	○	○	○	○	○	○
HMI and Control Panel Library	○				○	○
Allen Bradley PLC Ladder Logic Library	○					○
Siemens PLC Ladder Logic Library	○					○
IEC 1131-3 PLC Ladder Logic Library	○					○
Digital Electronic Library	○	○	○	○	○	
SFC - Grafcet IEC 61131 Library	○	○	○	○		
Bill of Material & Report Module	○					

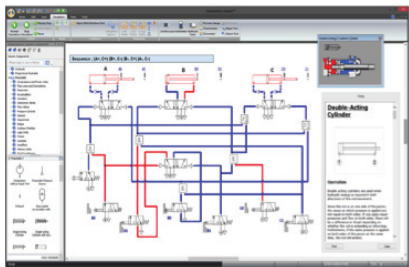
Libraries and Modules



Hydraulics

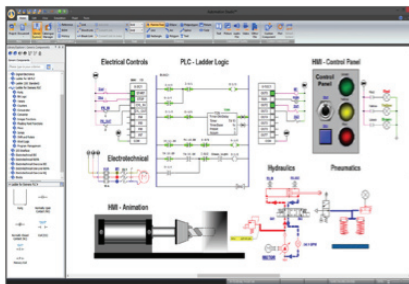
Complying with ISO 1219-1 and 1219-2 standards, the Hydraulic Library (industrial and proportional) offers all the component symbols required to create mobile and industrial hydraulic systems and functions.

Components are preconfigured. Moreover simulation parameters such as performance curves, external loads, leaks, viscosity and thermal characteristics can be configured as needed.



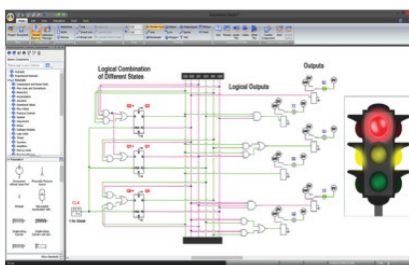
Pneumatics

The Pneumatic Library includes all the symbols necessary to create pneumatic, electro-pneumatic and logic systems. Like in the Hydraulic Library, the parameters of pneumatic components can also be configured.



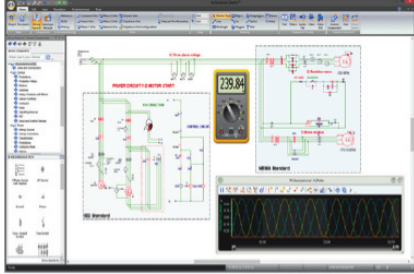
Programmable Logic Controller (PLC)

Automation Studio™ offers three PLC Ladder Logic Libraries: Allen Bradley, Siemens and IEC61131-3. It becomes easy to create and simulate the control part of an automated system.



Digital Electronics

This library includes standard devices such as inverters, logic gates, flipflops, counters, shift registers, comparators, switches, LEDs, 7-bar display, decoders, multiplexers, etc

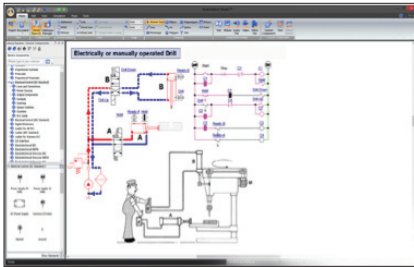


Electrotechnical

The Electrotechnical Library offers a wide array of components to create AC and DC electrical circuits, from basic to advanced uses. It supports IEC and NEMA standards.

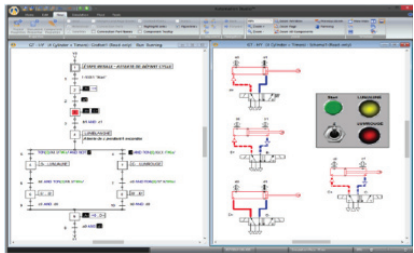
Motor soft starters and variable frequency drives are available. The library's components are built according to the real manufacturers' models such as Siemens, Allen Bradley, etc.

Tools are available to quickly implement and design entire scaled cabinets and junction boxes. A rail mounting for assembly grouping as well as ducting elements for wires are available.



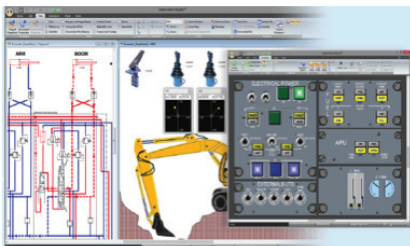
Electrical Controls

The Electrical Controls Library interacts with all components from other libraries so as to create electrically controlled systems. It supports IEC and JIC standards.



Sequential Function Chart (SFC/GRAFNET)

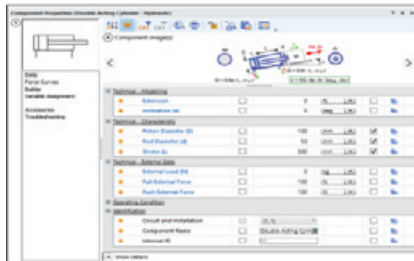
The Sequential Function Chart (SFC) Module is the tool of choice to implement control structures. In addition to macro-steps, Automation Studio™ includes encapsulating steps which enable hierarchical order.



HMI and Control Panels

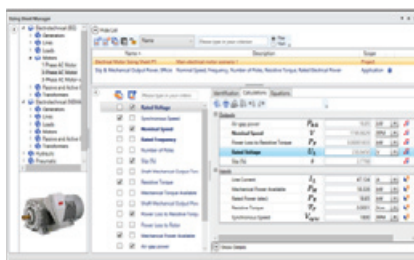
With this module, users can easily create animated shapes that reproduce the behavior of the equipment they represent. It also allows to create control panels and to operate the virtual system or real equipment.

Components Customization and Visual Simulation



Adjustable Component Simulation Parameters

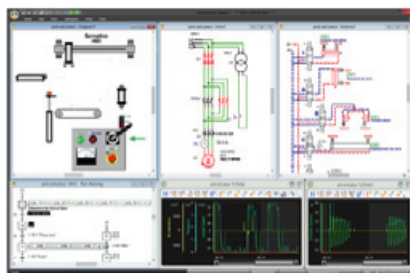
Default simulation parameters are set for each component so that no initial configuration is required. This includes parameters such as applied loads, dimensions, angles, internal leakages, force, torque, etc. Users can also choose to display favourite properties of a selected component.



Component Sizing

Automation Studio™ provides calculation worksheets specific to each category of pneumatic, hydraulic and electrical components which include calculation tools necessary for component sizing.

Input parameters can be defined using curves to generate energy calculations. Users have quick access to applicable equations and parameters' definitions.

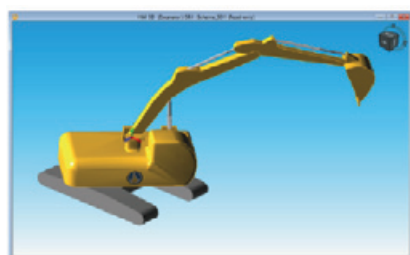


Dynamic, Realistic and Visual Simulation

Automation Studio™ allows to accurately reproduce the system's behavior in a dynamic and visual way. During simulation, components are animated and lines and wires are color-coded according to their state.

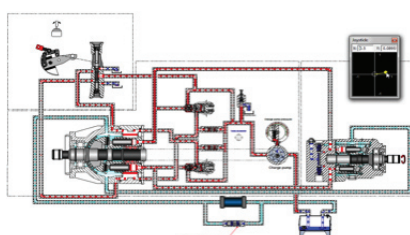
The simulation can then help to explain system operation and to assimilate more quickly theories and concepts studied in class.

You can also monitor variables such as pressure, flow, displacement, current and voltage at any point in a circuit. The simulation paces "Normal", "Slow Motion", "Step by Step" and "Pause" allow controlling the simulation speed.



3D Editing and Animation

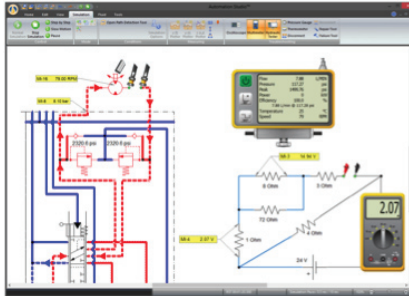
Automation Studio™ includes a 3D editor for creating and importing 3D parts in STEP, STL and IGES. It is possible to visualize, simulate and animate them, simultaneously, with the technologies that drive the system.



Cross-Section Animation

Users can build cross-section animated views and link them to the simulation results in order to produce synchronized animations.

Circuit Analysis and Use of External Hardware



Circuit Modification During Simulation

Automation Studio™ provides tools for disconnecting wires and pipes during simulation to isolate parts of a circuit, perform measurements and repair or replace components to fix suspected failures.

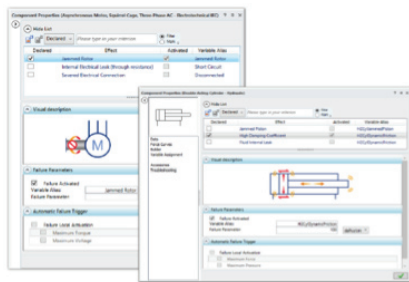
The state of the complete circuit is instantaneously and realistically updated. A repair tool is also provided, allowing you to select and remove any suspected faults.



System Behavior Analysis

You can monitor and visualize simulation variables during simulation.

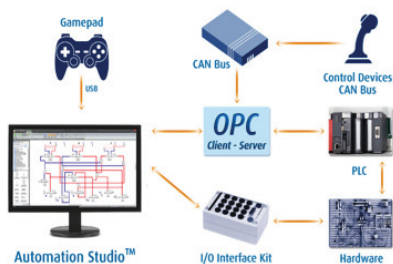
Results can be analyzed after simulation and exported into other applications for further analysis.



Troubleshooting Module

Create or activate pre-defined component failures and analyze the related system behavior.

Students learn to quickly and easily solve “What-if” scenarios of potential problems. Failures can be triggered automatically by preset conditions or manually during simulation.



Interfaces to PLC's and Equipment

In order to connect Automation Studio™ to an external hardware, you can either use an I/O interface kit or an OPC Client/Server.

• I/O Interface Kit

This Interface Kit is a hardware solution that allows connecting 8 digital inputs and 8 digital outputs directly to a PLC or to equipment such as relays, contacts, valves, sensors, etc.

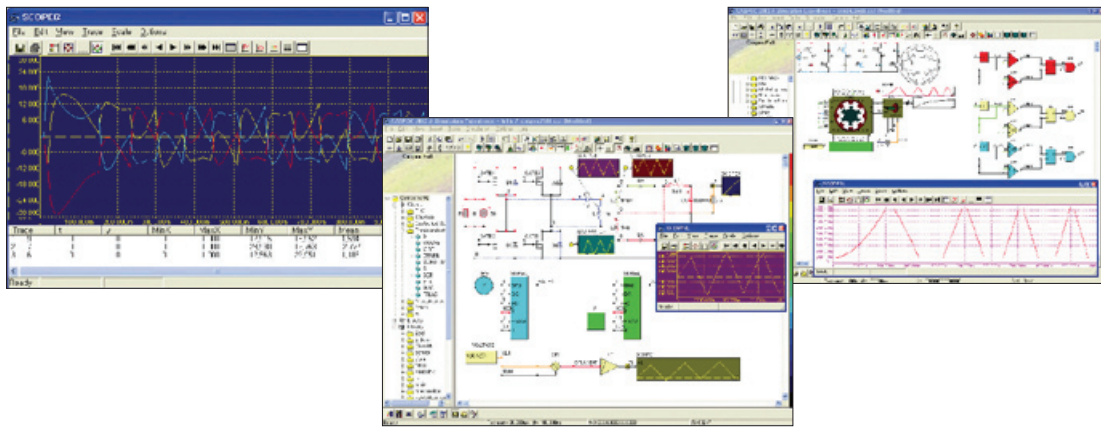
• Complete OPC Client/Server Connectivity

Automation Studio™ offers both OPC Client and OPC Server modules.

The OPC Client is a standard software interface that allows Automation Studio to exchange data with any PLC or other control devices for which an OPC Server is available and vice versa.

CASPOC

Power Electronics & Green Energy CAD Software



World's fastest simulation performance with no convergence problems

CASPOC is a powerful, innovative system simulator designed for the simulation of Power Electronics and Electrical Drives. CASPOC will show excellent simulation performances in designing electrical circuits, electric system, electronic circuits and logic circuits. Using CASPOC, modeling power electronics, electrical machines, load and control in one multilevel model is fast and simple.

Only CASPOC combines the ease of use of visual drag and drop schematic development, the productivity of modeling language, the power to view simulation results in 'real time' during the simulation in auto-scaling windows, and the world's fastest simulation performance with no convergence problems.

Very easy to use

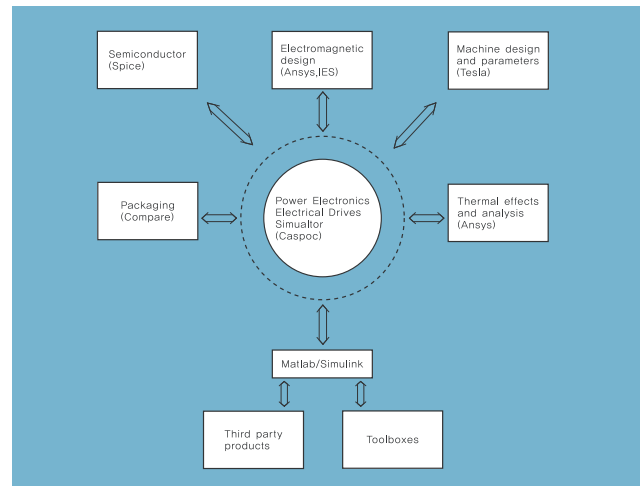
The CASPOC software gives accurate simulation results in a second. The simulation scope of the CASPOC is not limited to a specific channel in a circuit or diverse circuits. It can perform continuous simulation in multiple channels at a high speed. For example, CASPOC supports creation of 10, 100 or 1000 screens of the 20-channel oscilloscope simulator for simultaneous use.

Mechatronics simulation function

Unlike other software, CASPOC can perform powerful simulation by modeling circuits and machine structure together. CASPOC will be an excellent choice if you need to design and simulate a servo motor drive or a stepping motor drive.

CASPOC compatibility

Provides full compatibility with other software



FEATURES

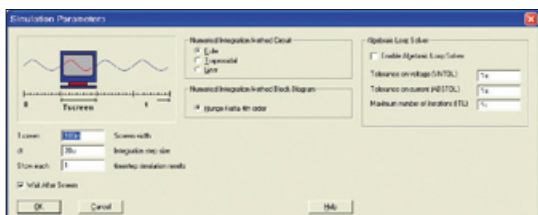
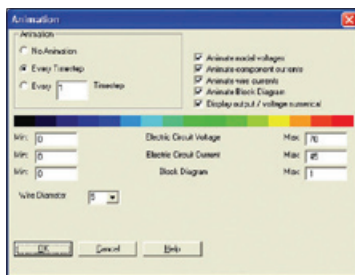
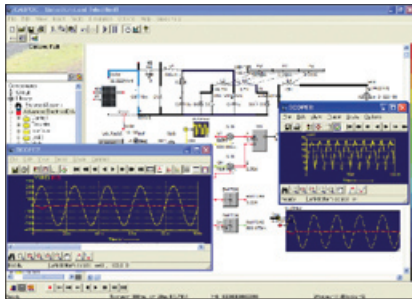
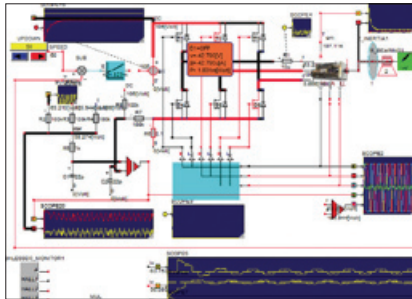
- Powerful simulation and animation
- No convergence problems
- Real-time multiple scope function
- Intuitive user interface
- C code output function
- Diverse libraries and various experiments

CIRCUIT DESIGN & SIMULATION APPLICATIONS

- Power electronic circuits
- Electronic circuits
- Power source or signal source design
- Power system
- Mechanical load
- Renewable energy circuits
- Electrical drive circuits
- Digital logic circuits
- Control circuits
- Electrical system
- Mechatronics system

Using CASPOC, you can utilize the external interface function, which is one of superb functions of the software, and make direct connection to hardware for complete design. For the first time in the world, CASPOC provides a two-track simulation function, which enables direct simulation of an external hardware by connecting to the hardware through the software's own interface as well as virtual simulation of ordinary circuits on the software.

The CASPOC software shows excellent performances in power electronics experiments and virtual measurement at learning institutes offering engineering curriculum. We highly recommend use of the CASPOC Educational Version if you need to cover a curriculum of theory and practice in the field of electric circuits, power electronics and renewable energy.



Quick and accurate simulation results without convergence problems

CASPOC uses multilevel modeling, which is known as the best modeling methods in the world. The software enables performing quick and accurate simulation results. So, you do not have to worry about the convergence problems that would be found in Modified-Nodal Analyzer adopted by SPICE-type simulators.

Intuitive user interface

CASPOC meets the user convenience with fast performances and simple operations. The software can display different types of windows such as circuit design, library, animation and oscilloscope functions at the same time.

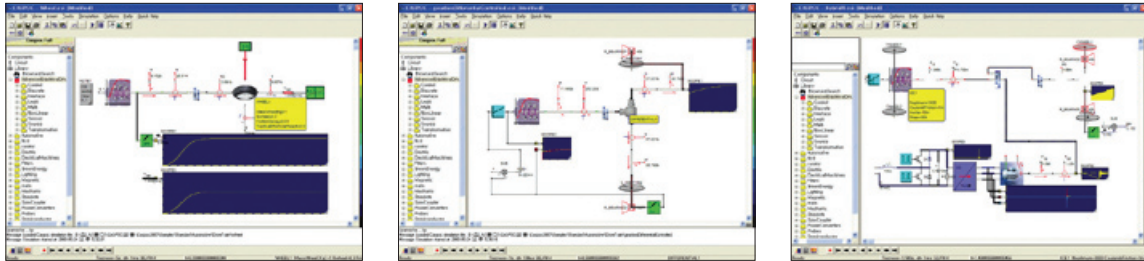
Dynamic video simulation

Various types of vivid animation can be simulated through simple configuration of animation. With the animation simulation, the line and color will change according to the voltage and current. The dynamic of animation also changes according to the current flow in real time.

Optimized simulation parameter

You can easily set up an interval (dt) between total amount of time and specific time of interpretation. Also, you can set up the simulation accuracy on your own since there is no limit for numeric input values. CASPOC supports both continuous simulation and specific frame simulation.

Automotive Design



Interface Control & Measurement Design

CASPOC

- Simulation and design of control & measurement circuits
- C-language design (built-in compiler)
- Real-time control and measurement

Data Acquisition Board

- A/D Converter and D/A Converter
- Data interface

External device

- Application hardware
- Interface



CASPOC Software Package

Classification	Number of User	License Category	Remark
Educational version	1	Education Starter	Self-learning
	1~5	Education Single-User License	Educational
	More than 5	Education Multi-User License	Educational
Industrial version	1	Standard Single-User License	Professional
	1	Professional Single-User License	Professional

STANDARD ACCESSORIES

- User's guide manual: 1ea
- Workbook CD (Power Electronics & Electrical Drives): 1ea
- License Key (USB) : 1ea

AUTOBASE 10

HMI/SCADA Software

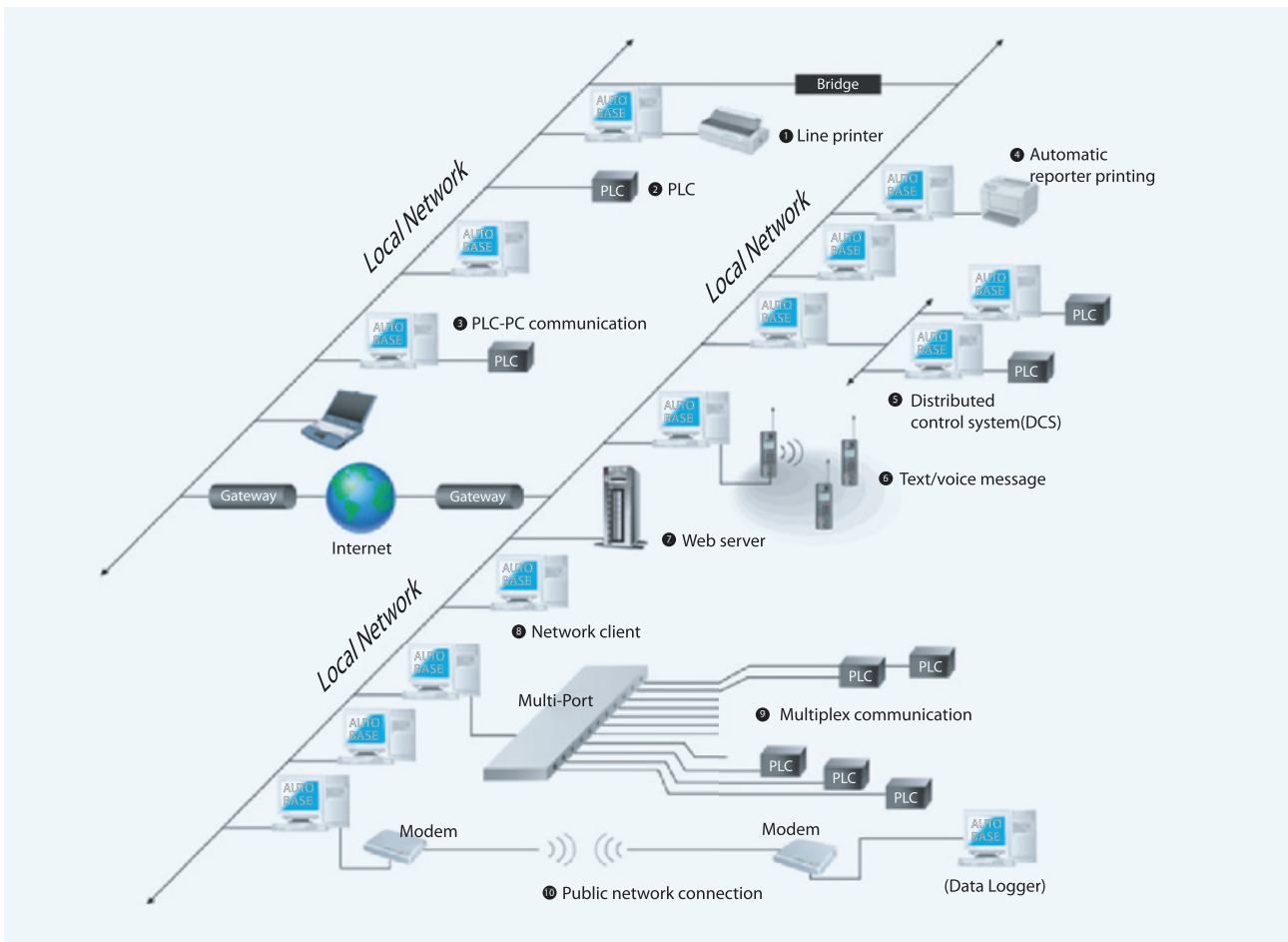


FEATURES

- Windows-based automation development tool capable of monitoring and manipulating the automated system
(Applicable OS: Microsoft Windows 7/Vista/XP/2008)
- Realistic system monitoring by the animated visual objects (animation libraries)
- One software package covers a PC connection with programmable logic controllers up to 256 units
- Reciprocal communication and data sharing among all AUTOBASE programs connected to the Internet
- Easy monitoring and control on the Internet using a Web server
- Various types of communication: RS-232, RS-422, RS-485, USB, TCP/IP, UDP/IP, DDE, OPC, ODBC and OLEDB
- Capable of building a Distributed Control System (DSC) with networking each computer
- Various development tools such as Report Editor, Tag Editor, Communication Editor and Picture Libraries
- Script languages in the format of C or C++
- Supports data sharing with an external database through ODBC or OLEDB

Field Applications

- Water purification
- Waste water disposal
- Electric power control
- Lighting control
- Process monitoring
- Building Automation
- Pollutant burning equipment
- SCADA
- Parking facilities
- Factory automation
- Distributed control system (DCS)
- Gas level monitoring
- Boiler equipment
- Greenhouse control
- Surveillance system
- Liquid level monitor
- Home automation
- Remote surveillance system
- Refrigeration and cold storage equipment
- Water quality measurement
- Automated logistic system
- Automated warehouse system
- Production control system
- HVAC system
- Power plant
- Chemical plant
- Steel plant
- Cement plant

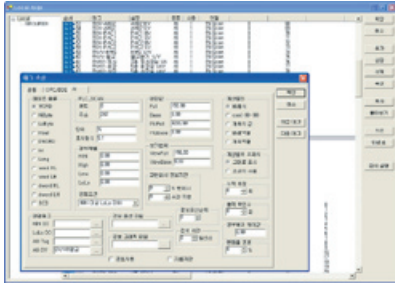


AUTOBASE Network Composition

- ① Line Printer: Prints the alert message detected and sent by the monitoring program. Capable of printing directly by accessing a printer port without the operation of Windows
- ② Programmable Logic Controller (PLC): Connects the PLC to all stations if the Communication Module supports a communication network
- ③ Communication Module for PC: RS-232, RS-422, RS-485, USB, TCP/IP, UDP/IP, DDE, DPC, ODBC and OLEDB
- ④ Automatic print of reports: Can select printing frequently or at a designated time
- ⑤ Distributed Control System: Each local system monitors and controls a required section whereas the server system integrates the data which were monitored and controlled
- ⑥ Text-voice message : Transmission of a text or voice message at the alert outbreak
- ⑦ Web Server: Enables monitoring and control on the PC through the completed local tasks installed on the Web server
- ⑧ Network client: Supports connection to other AUTOBASE system without accessing to the PC
- ⑨ Multiple communication: Simultaneous connection up to 256 different types of PLC's and Communication Modules
- ⑩ Public network connection: Remote distance connection by using a telephone line

AUTOBASE 10

Program Composition: Editor Program



Tag Editor

- To change the configuration of a digital I/O tag
- To change the configuration of an analog I/O tag
- To change the configuration of a string tag
- To change the configuration of a group tag



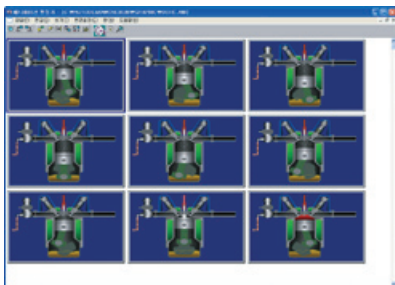
Reporter Editor

- Capable of editing any types of report format
- Instantaneous alert function
- Alarm function for a preset time



Bitmap Editor

- To edit all types of bitmap files
- Support all image files
- PCX, BMP, GIF, LBM, SPT, TGA, TIFF, MMP, JG and etc.
- Various types of drawing tool



Animation Editor

- Designed to create animation files
- Can change the speed of animation and the number of frames
- Use of created files as digital objects or analog objects



Module Editor

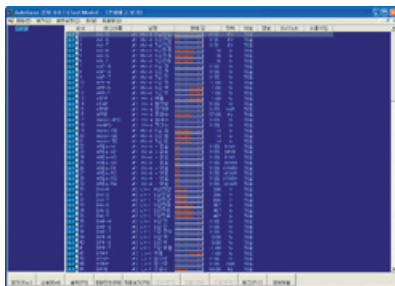
- Capable of editing monitoring screens
- Types of object: Text, line, graph, date, image, rectangle, circle, clock, animation, program button, module buttons and output buttons

Program Composition: Monitoring Program



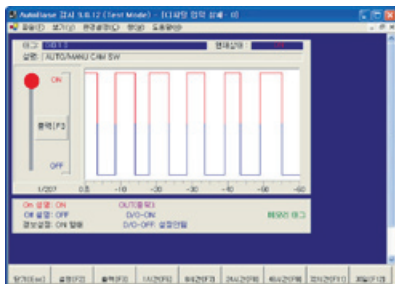
Graphic Monitoring

- Graphical expression of all tags for convenient monitoring
- Types of object: Text, line, polygon, curve, rectangle, circle, animation, window control and various buttons



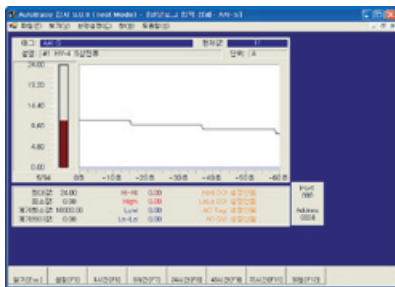
Tag Monitoring

- Entire monitoring of tags that are set in the PC
- Graphic and character expression
- Configuration of a total 120,000 tags (analog and digital)
- Comparison with various tag member values



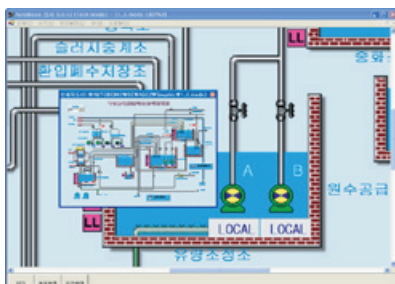
Detailed digital monitoring

- To monitor analog present values and instantaneous values
- Shows all present digital set values
- Can verify the digital output related to the input



Detailed analog monitoring

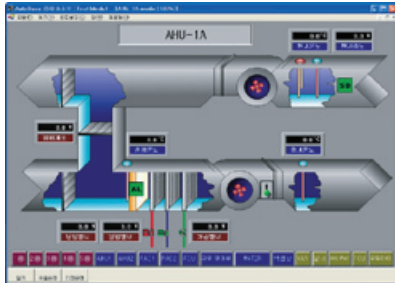
- To monitor analog present values and instantaneous values
- Various types of expression (real time expression, line graphs, bar graphs and numeric values)
- Shows all present analog set values
- Changes the values of HiHi, High, Low and LoLo



Navigation Map

- Allows the user to find a certain location very easily by displaying the large graphic monitoring screen in a small window

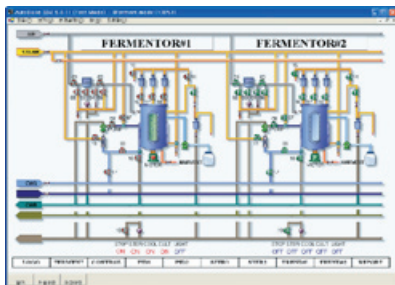
Examples of Field Applications



[HVAC Control]

The purpose of HVAC Control system is to manage temperature and humidity in the entire areas of a building. A programmable logic controller handles operation of each zone, and the PC sets the target temperature and humidity necessary for the operation, and integrates the command information from each zone and determines the status, and then resends instructions to relevant zones.

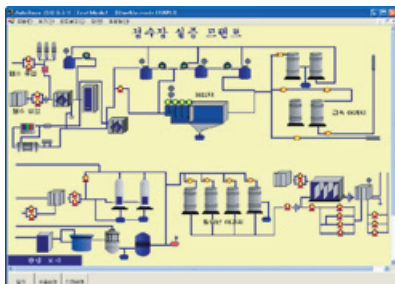
Daily reports are created automatically and printed out. The PLC communication speed was increased using TCP/IP, thereby facilitating a response time.



[Fermentation Control]

The fermentation control system runs repeatedly in a cycle of few hours or several days. Once a certain operation starts, the fermentation control system performs the process of mixture, fermentation, storage automatically in order to ripen raw materials.

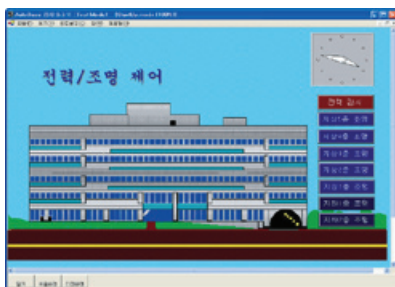
The system is configured in a way that the parameters required for each step, are entered in the PC whereas it performs PID control in each fermentor. Multi-port was arranged to increase the communication speed. Generally, the communication speed of this configuration is faster than the configuration of which is connected to a single port with RS-485.



[Water Purification Process]

The water purification system automatically proceeds sedimentation, filtration, and chemical treatment and monitors each process. The unit control program is designated for each process, and data are automatically printed out hourly, daily or monthly.

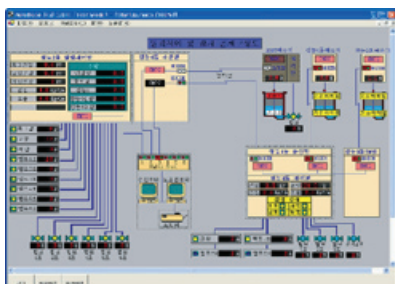
The water purification system performs monitoring on each area whereas the AUTOBASE server PC monitors the data via a communication network or exclusive communication line.



[Lighting Control]

The Lighting Control System is designed to perform lighting control and management of a whole building. The monitoring screen supervises the total of seven floors, and the operation of the lighting control is performed on each floor.

The user can perform integrated lighting control by grouping each office. The 'Reservation Schedule' function enables automatic ON/OFF lighting control according to a pre-selected reservation schedule.

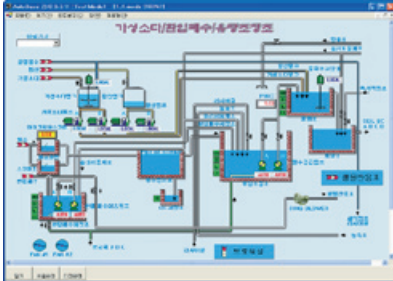


[Remote Monitoring]

Unlike monitoring for a building, the remote monitoring system is designed to monitor and control the scene in a remote distance through the use of a telephone line or other network.

A general phone line can be used in case of an area that does not require a significant change in measured values.

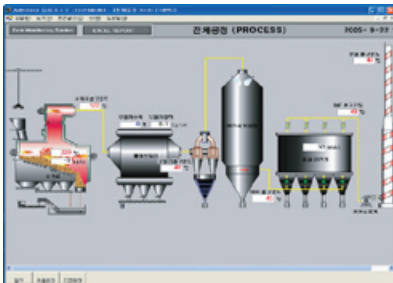
Examples of Field Applications



[Water purification]

The water purification system automatically performs a course of operation such as chemical injection, initial precipitation, aeration, final precipitation, sludge concentration, disinfection and discharge of water.

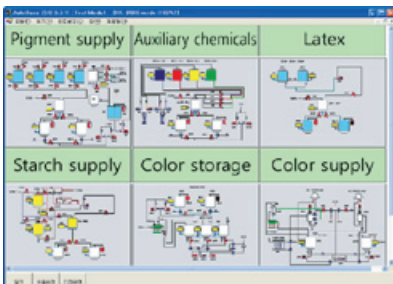
The PC on each section does monitor and control the required system, whereas the PC of the central monitoring section is designed to monitor necessary points through PLCSCAN, a computer program. It can monitor a specific section as well as the central monitoring section simultaneously.



[Waste disposal]

Waste disposal is a general area where HMI/MMI program is applied. The waste disposal facilities are designed to perform the insertion of wastes, incineration, compression and emission. It generates a report on the daily quantity of waste disposal and the amount of toxic gas.

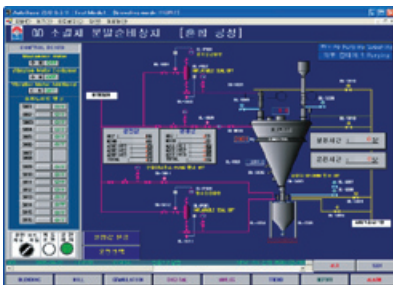
The waste disposal system was installed using an I/O board built in the PC and a programmable logic controller connected through RS-422.



[Paper mill process]

The paper mill process involves the insertion and mixture of pharmacy for surface processing. The PLC runs operation of each section, whereas the PC manipulates system configuration and operation.

It generates a report on the results and sends it to the administrator.



[Process monitoring]

The process monitoring system monitors and controls a production line. The process monitoring can be applied to various types of process system such as semiconductor, conveyor, paper mill, metal plating and fermentation.

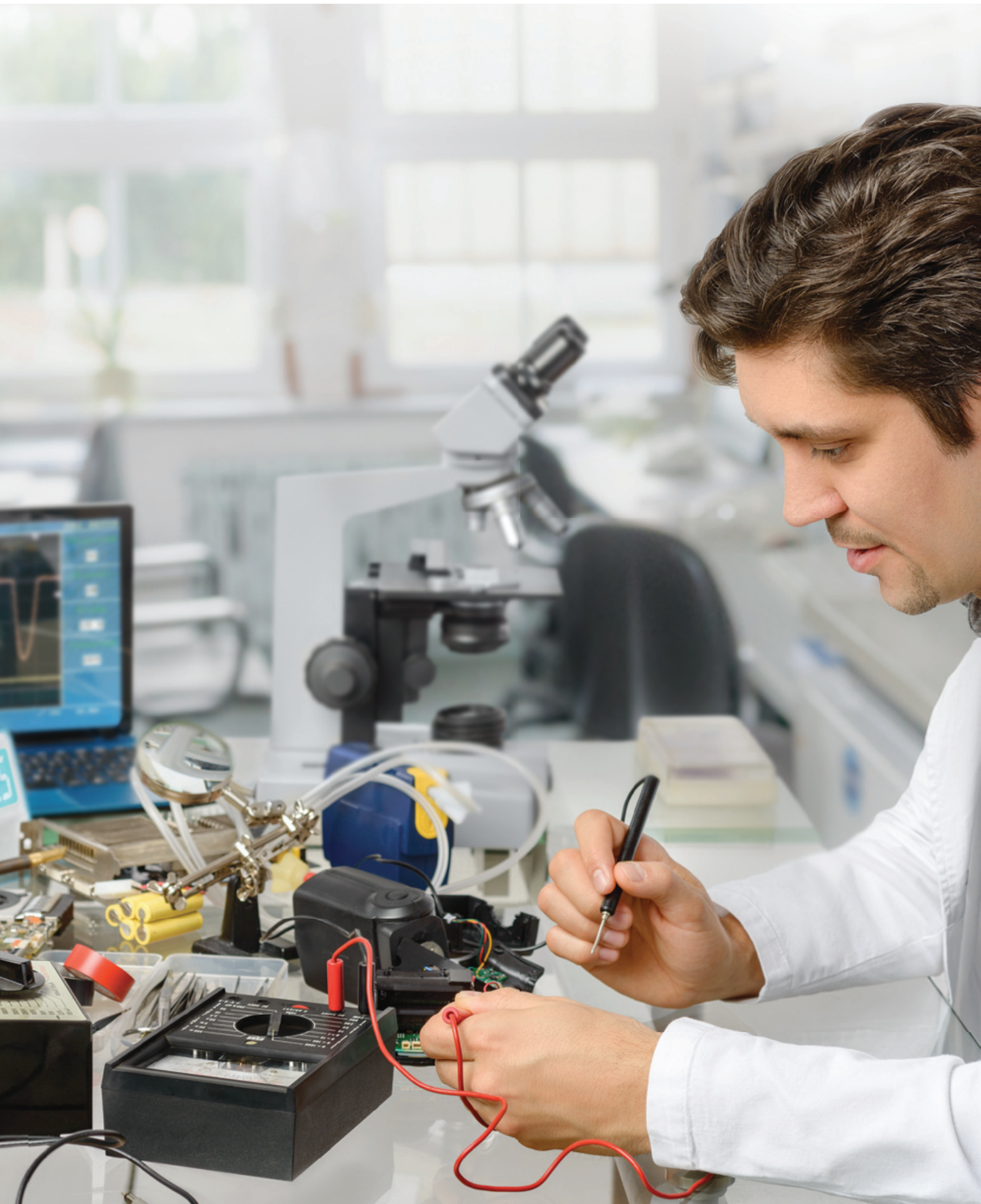
By composing the applications suitable processes, it collects diverse data such as product quality judgment and total production volume, and sends them to the administrator.



[Electric power monitoring]

The electric power monitoring system is designed to obtain accurate data by measuring and controlling the load of electric power, and efficiently manage the energy through the cost analysis.

Through the operation of dual server system, continuous monitoring operation is enabled by a secondary server even if a primary server goes wrong.





Test & Measurement

Contents

- 299 Multifunctional Digital Electric Meter | CEM-2200
- 301 Leakage Current Clamp | CPM-SN300
- 302 Digital Storage Oscilloscope | CPM-1005BE / CPM-2005BE
- 305 Digital Multimeter | CPM-8302A
- 306 Function Generator | CPM-8202 / CPM-8203 / CPM-8205 / CPM-8210
- 308 3GHz Universal/Frequency Counter | CPM-8030 / CPM-8030U
- 310 Universal/Frequency Counter (1.5GHz / 3.7GHz) | CPM-8013 / CPM-8023 / CPM-8037
- 312 Universal Measuring Instrument | MS-9170
- 314 Universal Relay Tester | CPM-2700
- 315 Transistor Checker & Curve Tracer | CPE-2800
- 316 Regulated DC Power Supply
| CPS-251S, CPS-303/305/3010, CPS-503/505, CPS-3032/CPS-3052
- 317 Tracking Regulated DC Power Supply | CPS-201T / CPS-303 / CPS-305T
- 318 AC/DC Variable Power Supply | CPS-2450B
- 319 CV/CF Automation Voltage Regulator | CPS-3001K
- 320 Multifunction Experimental Table | CPE-OT9000 / CPE-OT9010
- 322 Electricity & Electronics Experimental Table | CPE-OT9020 / CPE-OT9030 / CPE-OT9040

CEM-2200

Multifunctional Digital Electric Meter



FEATURES

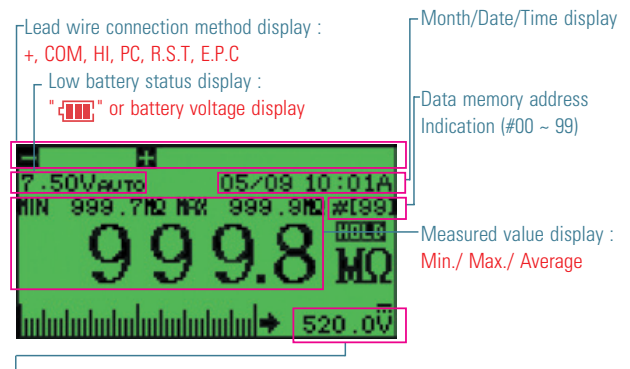
- Showing electrical wiring tips on the LCD screen
- User-defined backlight setting (10/20/30 sec.)
- $\pm 0.2\%$ precision
- Fast and accurate response rate
- Effective measurement of RMS values
- Indication of a measured data in the minimum, maximum and average values
- Earth resistance measurement in two points and three points
- Automatic Power OFF function
- IrDA communication
- Displays the connection of reed wires
- AUTO/MANUAL range selection
- Initiation of calibration by pressing a key button

INTRODUCTION

The CEM-2200 Multifunctional Digital Electric Meter is an excellent test and measuring instrument for electrical safety inspection or telecommunication system inspection. The CEM-2200 is a portable hand-held device with various measurement functions: AC voltage, DC voltage, AC current, leakage current, phase sequence, insulation resistance and earth resistance.

The compact-size Multifunctional Digital Electric Meter displays a measured value in the three categories of minimum, maximum and average simultaneously. Especially, you can save a measured data onto the internal memory and send the data to external devices such as the PC using an infrared communication port (IrDA). It is equipped with overvoltage and digital protection circuits preventing from serious damage. For each measurement mode, it shows how to connect lead wires on the LCD screen in advance and you will be safe from wrong wire connections. Also, it comes with a battery status indicator and a calibration key button for user convenience.

We are proud to announce that the CEM-2200 Multifunctional Digital Electric Meter is an official test & measuring device for Korea Electrical Safety Corporation (KESC) and Korean Electric Power Corporation (KEPCO). It can be widely used in various fields including airport, medical, railway and telecommunication facilities.



Measured voltage display :

- Mega Ω mode : Display external voltage(voltage of measure point access with lead wire) before push TEST button, display DC output voltage for measurement after push TEST button.
- Earth Ω mode : Display ground voltage.

SPECIFICATIONS

AC Voltage	0.0V ~ 750.0V, True RMS
DC Voltage	0.0 ~ 999.9V
Insulation resistance	DC 500V / 999.9MΩ
Earth resistance	0 ~ 2000Ω
Earth voltage	0.0V ~ 750V, True RMS
Electroscope	AC 70 ~ 750V LCD display for voltage detection
Phase-sequence indicator	3-phase 110 ~ 750VAC LCD display for phase-sequence values
AC current	0 ~ 9999A, True RMS Supports external clamp connection
Leakage current	0.00 ~ 9.99mA, True RMS Supports external clamp connection
IrDA communication	115,200 bps Supports communication with PC and PDA
Operating environment	-10 ~ +50°C, 20 ~ 80% RH
Storage environment	-40 ~ +70°C, 10 ~ 90% RH (in case of keeping the battery separately)
Dimension	86(W) x 42(D) x 175(H)mm
Weight	375g (without batteries) / 500g(with batteries)
Battery	1.5V Alkaline AA battery: 5ea * Suggested model: DURACELL MN1500

STANDARD ACCESORRIES

Category	Accessories	Code
Basic components	Standard accessories ① User's guide manual ② 1.5V Alkaline AA battery - 5ea ③ Protective rubber cover (orange color) ④ Carrying bag - 1ea	
	Lead wire set for insulation resistance & voltage measurement (Package-I) ⑤ Test lead wire (red color, mega Ω and 1.2m roll length) - 1ea ⑥ Test lead wire (black color, mega Ω and 1.2m roll length) - 1ea ⑦ Test probe (red color, 600V and CAT III) - 1ea ⑧ Test probe (black color, 600V and CAT III) - 1ea ⑨ Crocodile clip (black color, EN61010 and CAT III) - 1ea ⑩ Test lead wire (green color, KSC3325 and 1.2m roll length) - 1ea	TL-01
	Lead wire set for earth-resistance measurement (Package-II) ⑪ Test lead wire (red color, 600V and 20m roll length) - 1ea ⑫ Test reed wire (yellow color, 600V and 10m roll length) - 1ea ⑬ Test reed wire (green color, 600V and 5m roll length) - 1ea ⑭ Ground rod - 2ea	TL-02
Options	Leakage current clamp (CPM-SN300) ⑮ High-precision clamp designed to measure leakage current and AC current	CPM-SN300
	Communication set (UIC-2000) ⑯ IrDA/USB adapter, cable and PC software (CEM-SW2000)	UIC-2000
	Accessories ③ Protective rubber cover (orange color) ④ Carrying bag	HST-2000 SFT-2000



(CEM-SW2000)

CPM-SN300

Leakage Current Clamp



FEATURES

- High-precision clamp designed to measure leakage current and AC current
- Interlocking connectivity with Multifunctional Digital Electric Meter (CEM-2200)
- Minimizes interference of external magnetic field
- CT inner diameter: 40mm
- Wide range of measurement: 0.01mA ~ 300A

SPECIFICATIONS

Measurement function	Leakage current and load current
Measurement technique	True RMS
Measuring range	AC 0 ~ 300mA / AC 0 ~ 300A (50/60Hz)
Output voltage	AC 0 ~ 1V / AC 0 ~ 1V
Accuracy	$\pm 1.5\%$ +0.5mV / $\pm 3\%$ +0.5mV
Frequency characteristics	10 - 500Hz
Diameter of clamp	40mm
Power	1.5V x 2ea (LR44 or SR44)
Battery life	Max. 2000 hours (LR44)
Dimension	64(W) x 23(D) x 162(H)mm
Weight	163g

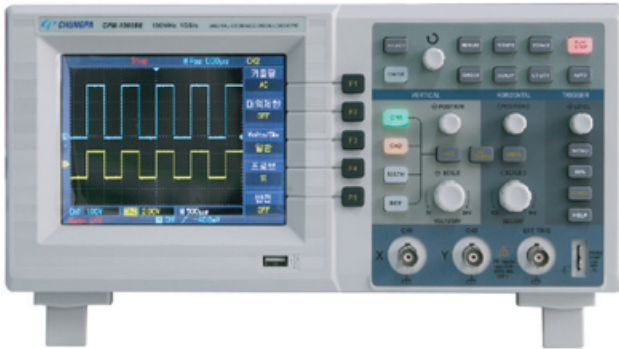
- Battery indicator LED : Low voltage (red color), normal voltage (green color)
- Range switchover : Manual switchover in 2 ranges
- Voltage-in-circuit : Low voltage circuit (below AC 600V)
- Withstanding voltage : AC 2200V (lasting one minute)
- Operating temperature : 0 ~ 60°C < 80% RH (without condensation)
- Storage temperature : -10 ~ 60°C < 70% RH (without condensation)

For example



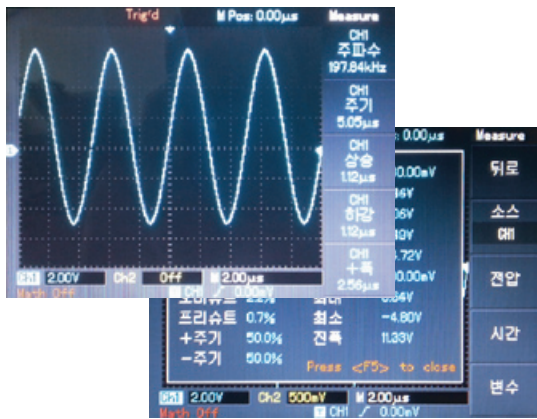
CPM-1005BE / CPM-2005BE

Digital Storage Oscilloscope



FEATURES

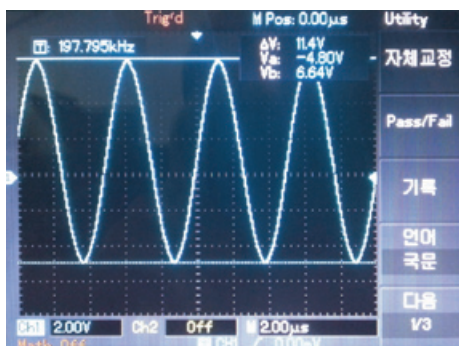
- Frequency bandwidth: 100MHz (CPM-1005BE) and 200MHz (CPM-2005BE)
- Sampling rate: Real-time 1G Sa/s
- 5.7" Full Color TFT LCD screen (320 x 240)
- Built-in FFT Analyzer and AUTO waveform
- RS232C basic communication and USB real-time communication
- Dual analog input measurement function
- Dual display tracking function
- Auto Trigger and Sweep mode
- Supports a USB memory stick in Plug & Play (USB 2.0 Host)



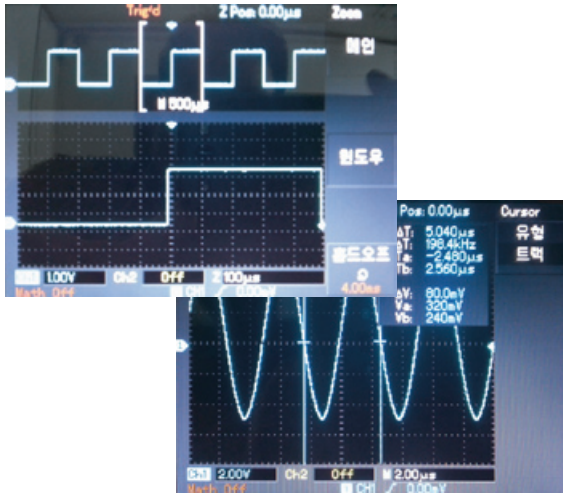
INTRODUCTION

The CPM-1005BE and CPM-2005BE are low-cost digital storage oscilloscopes for schools and industrial fields. The storage function of the digital storage oscilloscopes enable saving data in internal memory as well as USB memory using USB 2.0 Host on the front side. The rear side comes with a trigger output terminal and an USB 2.0 system port. For the USB 2.0 system port, we provide standard accessories such as USB cables and Communication & Control Software (USB/RS-232C).

The CPM-1005BE and CPM-2005BE feature a well-organized display of input sources on the LCD screen. They also feature user-friendly functions such as automatic measurement, calibration and reset so that you can use very easily. The digital storage oscilloscopes do have multilingual capabilities in eight languages.

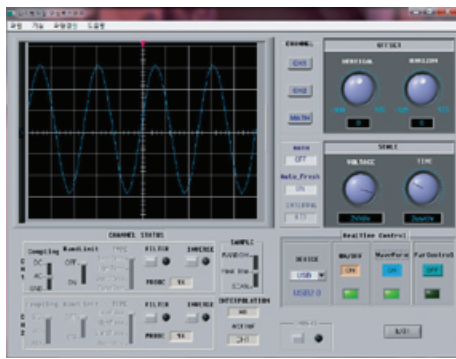


CPM-1005BE / CPM-2005BE



You can use a Cursor function to have a closer look at a selected waveform. For accuracy of your waveform analysis, you can make as many pop-up windows as you want.

The Communications & Control Software can connect the PC through a USB 2.0 system port. With reciprocal communication between the DSO and the PC, you can observe, capture, save and analyze the waveforms on the computer in real time. You can save the obtained data in "pdf" or "bmp" format so that you can make use of it for your report or presentation.



Data collection by Communication & Control Software

The Communication & Control Software can collect and save the measured data using a PC-based data logging function. Also, it displays and analyzes the measured data in real time.

STANDARD ACCESSORIES

- Power cord: 1ea
- Probe: 2ea (1x, 10x)
- DSO Communication & Control Software (USB/RS-232C): 1ea
- User's guide manual: 1ea

SPECIFICATIONS

Model	CPM-1005BE	CPM-2005BE
Technical Indicators		
Bandwidth	100MHz	200MHz
Rise time	≥3.5ns	≥1.8ns
Sampling range	1GS/s	
Vertical sensitivity	2mV~5V/div	
Maximum record length	1M	
Sampling rate	Real-time 1GS/s, Equipment 50GS/s	
Input		
Input coupling	DC, AC, GND	
Input impedance	1±2% MΩ in parallel with 24pF ±3pF	
Probe attenuation	1X, 10X, 100X, 1000X	
Maximum input voltage	400V (DC + AC Peak, 1 MΩ input impedance)	
Time delay between channels	150ps (typical)	
Horizontal		
Waveform interpolation	Sin (x) / x	
Accuracy of sampling rate and delay time	±100ppm (any time interval ≥1ms)	
Time interval (ΔT)	Single: ± (1 sampling time interval + 100ppm x reading + 0.6ns)	
Measurement accuracy (full bandwidth)	>16 average values: ± (1 sampling time interval + 100ppm x reading + 0.4ns)	
Scan time base	5ns ~ 50s/div	2ns ~ 50s/div
Vertical		
A/D converter	8-bit resolution, simultaneous two-channel sampling	
Deflection factor VOLTS/DIV range	2 mV/div ~ 5 V/div at input BNC	
Position range	≥ ± 10 div	
Selectable analog bandwidth limit (typical)	20MHz	
Low frequency response (AC coupling, -3dB)	≥ 10 Hz at BNC	
DC gain accuracy	When vertical sensitivity is 2mV/div, 5mV/div: ±4% (sample or average sampling mode); When vertical sensitivity is 10mV/div~5V/div: ±3% (sample or average sampling mode)	
DC measurement accuracy (Average sampling mode)	When vertical position is zero and N ≥16: ± (4% x reading + 0.1 div + 1mV) and 2mV/div or 5mV/div is selected; ± (3% x reading + 0.1 div + 1mV) and 10mV/div~ 5V/div is selected. When vertical position is not zero and N ≥16: ± (3% x (reading + vertical shift reading) + (1% x vertical shift reading)) + 0.2div. Set from 2mV/div to 200mV/div plus 2mV; Setup value > 200mV/div to 5V/div plus 50mV.	
Voltage difference (ΔV) Measurement accuracy (Average sampling mode)	Under identical setup and environmental conditions, the voltage difference (ΔV) between two points of the waveform after the average of ≥16 waveforms acquired waveforms is taken: ± (3% x reading + 0.05 div)	
Trigger		
Trigger type	Edge, Pulse, Video and Alternate	
Trigger level	Internal ±5 div from the centre of the screen EXT : ± 3V EXT/5 : ± 15V	
General information		
Automatic waveform measurement	28ea	
Communication port	RS-232C port and USB port (Host / System)	
Arithmetic operation	Add / Subtract / Multiply / Divide / Reverse / FFT	
Display	5.7" full color LCD 320 X 240 (64K)	
AC power input (RMS)	100V ~ 240VAC, 45Hz ~ 440Hz, CAT II	
Dimension	320(W) x 130(D) x 150(H) mm	
Field applications	Education, R&D, assembly line and industrial control	

CPM-8302A

Digital Multimeter



FEATURES

- 4 1/2 digits (19999 counter measurement)
- Equipped with 0.56 inch 5-digit FND screen
- DC voltage error range: 0.05%
- Built-in overload protection circuit
- AC/DC voltage and current measurement
- Resistor, diode, frequency and buzzer functions
- Data hold function

SPECIFICATIONS

- Screen: 0.56 inch 5-digit FND display
- Power: AC 115V/230V, 50/60Hz
- Dimension : 240(W) x 260(D) x 95(H) mm
- Weight: 2Kg
- Operating temperature : 0°C ~ 40°C (Standard guaranteed temperature: 25±5°C)
- Accessories : Power cord, test lead, spare fuse and user's guide manual

DC Voltage				
Range	Resolution	Accuracy	Impedance	
2V/20V/200V	100uV/1mV/10mV	±(0.05%+10d)		
1200V	1000V	±(0.1%+5d)	10MΩ	
	1200V	±(0.3%+5d)		

AC Voltage				
Range	Resolution	Frequency	Accuracy	Impedance
2V	100uV	40Hz to 60Hz	±(0.75%+10d)	10MΩ
		60Hz to 1kHz	±(1.5%+10d)	
		1kHz to 5kHz	±(2.5%+10d)	
		5kHz to 10kHz	±(5.0%+10d)	
20V	1mV	40Hz to 60Hz	±(0.75%+10d)	10MΩ
		60Hz to 1kHz	±(2.5%+10d)	
		1kHz to 5kHz	±(5.0%+10d)	
		5kHz to 10kHz	±(10%+10d)	
750V	100mV	40Hz to 50Hz	±(1.0%+10d)	
		50Hz to 60Hz	±(0.75%+10d)	
		60Hz to 400Hz	±(2.5%+10d)	
		400Hz to 1kHz	±(5%+10d)	

Audible Continuity		
Test Voltage	Threshold	Overload Protection
3V	Under 200Ω	600V DC or Peak

Diode Test		
Test Voltage	Test Current (Max.)	Overload Protection
2V	Approx. 1.0mA	600V DC or Peak

DC Current				
Range	Resolution	Accuracy	Overload protection	
2mA/20mA/200mA	100nA/1uA/10uA	±(1.0%+5d)		
2A	100uA	±(1.0%+10d)	2A/250V	
20A	1mA	±(1.0%+10d)	15A/250V	

AC Current				
Range	Resolution	Frequency	Accuracy	Impedance
2mA	100nA	40Hz to 50Hz	±(1.5%+10d)	2A/ 250V
20mA	1uA	50Hz to 60Hz	±(0.75%+10d)	
200mA	10uA	60Hz to 1kHz	±(2.0%+10d)	
		1kHz to 5kHz	±(3.0%+10d)	
2000mA	100uA	40Hz to 50Hz	±(1.5%+10d)	15A/ 250V
20A	1mA	50Hz to 60Hz	±(1.0%+10d)	
		60Hz to 1kHz	±(2.0%+10d)	
		1kHz to 5kHz	±(3.0%+10d)	
		40Hz to 50Hz	±(1.5%+10d)	
		50Hz to 60Hz	±(1.0%+10d)	
		60Hz to 1kHz	±(2.0%+10d)	
		1kHz to 2kHz	±(3.0%+10d)	

Resistance			
Range	Resolution	Accuracy	Overload Protection
2kΩ/20kΩ/200kΩ	0.1Ω/1Ω/10Ω	±(0.2%+5d)	600V DC or AC Peak
/2MΩ	/100Ω		
20MΩ	1kΩ	±(1%+10d)	

Frequency			
Range	Resolution	Accuracy	Overload Protection
20kHz	1Hz	±(1.0%+5d)	600V DC
200kHz	10Hz	±(2.0%+5d)	or AC Peak

CPM-8202 / CPM-8203 / CPM-8205 / CPM-8210

Function Generator



CPM-8202



CPM-8203



CPM-8205



CPM-8210

FEATURES

- Four functions in one : Sweep, Function Generator, Pulse Generator and Frequency Counter
- Output frequency : 10MHz (CPM-8210 model) / 5MHz (CPM-8205 model) / 3MHz (CPM-8203 model) / 2MHz (CPM-8202 model)
- Built-in frequency counter: CPM-8210 (100MHz, 7 digits)
CPM-8205 / CPM-8203 / CPM-8202 (50MHz, 6 digits)
- Various waveforms: Triangle wave, Square wave, Sine wave, Sawtooth wave, Ramp wave, Pulse wave, TTL, etc.
- Linear sweep, DC offset, 20dB attenuation and VCF / SYM control
- TTL leveled square wave output (CPM-8210 / CPM-8205 / CPM-8203 / CPM-8202)
- CMOS level square wave output (CPM-8205 / CPM-8203 / CPM-8202)
- Low distortion of below 1% in 10Hz ~ 100kHz

CPM-8202 / CPM-8203 / CPM-8205 / CPM-8210

SPECIFICATIONS

Model		CPM-8210	CPM-8205	CPM-8203	CPM-8202
Output characteristic	Waveform type	Sine, Square, Triangle, Ramp, Pulse, Sawtooth, TTL/CMOS Leveled Square, DC			
	Frequency range	0.1Hz ~ 10MHz	0.05Hz ~ 5MHz	0.03Hz ~ 3MHz	0.02Hz ~ 2MHz
		in 7 ranges	in 7 ranges	in 7 ranges	in 7 ranges
	Frequency error	±2% of full scale	±2% of full scale	2% of full scale	±2% of full scale
	Output level	20Vp-p in open circuit, 10Vp-p into 50Ω Load			
	Output impedance	50Ω ±5%			
	Attenuator	20dB			
DC offset	±10V (±5V into 50Ω)				
Waveform	Sine wave	Flatness : ±3dB ~ 10MHz Distortion : Less than 1% (10Hz ~ 100kHz)			
	Square wave	Rise and Fall Time : 25nS (CPM-8205), 120nS (CPM-8210/8203/8202) or 140nS (CPM-8203) at 1MHz			
	Triangle wave	Linearity : Above 99% (0.2Hz ~ 100kHz)			
	TTL output	Rise and Fall Time : 30nS (CPM-8205) or 25nS (CPM-8210/8203/8202) at 1MHz Output Level : TTL Level (H ≥ 2.4V, L ≤ 0.4V)			
	CMOS output	Rise and Fall Time : 160nS (CPM-8203/8202) or 180nS (CPM-8205) at 1MHz Output Level : 4V ~ 15V ±1V, Variable			
	Symmetry variation	1:1 ~ 10:1			
Sweep function	Mode	Linear			
	Width	Variable from 1:1 ~ 100:1			
	Rate	0.5Hz ~ 50Hz (20mS ~ 2S)			
	External VCF input	Input Voltage : 0 ~ 10V / Input Impedance : Approx. 1KΩ			
Frequency counter	Display	7-digit green LED	66-digit green LED		
	Frequency range	INT 0.2Hz ~ 110MHz	2Hz ~ 50MHz	INT 0.2Hz ~ 50MHz	0.2Hz ~ 50MHz
	Tolerance	Timebase Error ±1 count			
	Low pass Filter	-3dB, 100kHz			
	Timebase	10MHz X-TAL, 20ppm			
	Input sensitivity	100mVrms			
	Max. input voltage	250Vp-p			
General specification	Power	AC 115V/230V ±10%, 48 ~ 66Hz			
	Operating temperature	0°C ~ 50°C (Accuracy specified at 25 ±5°C)			
	Dimension	240(W) x 260(D) x 95(H)mm			
	Weight	3kg	2kg		

STANDARD ACCESSORIES

- Power cord : 1ea
- BNC Cable : 1ea
- Spare fuse : 1ea
- User's guide manual : 1ea

CPM-8030 / CPM-8030U

3GHz Universal/Frequency Counter



FEATURES

- Measurement range
 CPM-8030 : 0.1Hz ~ 3.0GHz (A/C input)
 CPM-8030U : 0.1Hz ~ 3.0GHz (Universal & A/B/C input)
- Low-pass filter : 100kHz, -3dB
- Display: 9-digit green LED screen (0.56 inches)
- 10 : 1 input attenuator function
- Separate & Common option (Universal Counter only)

SPECIFICATIONS

MODEL		CPM-8030	CPM-8030U
Display		Overflow, Gate Time, mHz, Hz, kHz, MHz, nS, uS, mS, S, Hold	
Frequency measurement	Range	0.1Hz to 100MHz (A input) and 80MHz ~ 3.0GHz (C input) [CPM-8030] 0.1Hz to 3.0GHz (A, B input: 0.1Hz ~ 100MHz, C input: 80MHz ~ 3.0GHz) [CPM-8030U]	
	Gate time	0.01 sec. / 0.1 sec. / 1 sec. / 10 sec.	
	Resolution	1 nHz ~ 10 Hz	
	Error	±Resolution ±Timebase Error ±1 Count	
Input characteristics	Type of input	A and C	A, B and C
	Sensitivity	A input: 20mVrms	A or B input : 30mVrms
		C input : 80MHz ~ 150MHz : 25mV 150MHz ~ 1.5GHz : 10mV 1.5GHz ~ 2.0GHz : 20mV 2.0GHz ~ 3.0GHz : 50mV	C input : 80MHz ~ 150MHz : 25mV 150MHz ~ 1.5GHz : 10mV 1.5GH ~ 2.0GHz : 20mv, 2.0GHz ~ 3.0GHz : 50mV
	Impedance	A input: 1 M < 40pF, C input : 50	A, B input: 1 M < 40pF, C input : 50
	Maximum input voltage	A input: 250Vrms, C input : 3Vrms	A, B input: 250Vrms, C input : 3Vrms
	Attenuation	A input: x1, x10	A, B input: x1, x10
	Slope A, B	—	+, - selectable
	Trigger A	—	Preset or Variable
Low	A input: 100 kHz, -3dB	A, B input: 100 kHz, -3dB	

CPM-8030 / CPM-8030U

Function		CPM-8030	CPM-8030U
Input A mode	Cycle	Range : 10m sec. ~ 10 sec. Resolution : 1ps ~ 1ns Accuracy : Resolution Trigger error 1 count	Range : 10m sec. ~ 10 sec. Resolution : 1ps ~ 1ns Accuracy : Resolution Trigger error 1 count
	Cumulative factor	Range : 5Hz ~ 10MHz Maximum number display : 0 to 99999999 (Max.)	
	Revolution number	6 ~ 900 x 10 ⁶ RPM	—
Compare mode (Input A, B)	Time interval (A->b)	—	Range : 10m sec. ~ 10 sec. 0.1u sec. ~ 0.1sec. L.S.D display : 100m sec. Resolution : L.S.D. Trigger Error Accuracy : Resolution 1count
	Ratio (A/B)	—	Range : A input: 0.1Hz ~ 100MHz B input : 5Hz ~ 100MHz L.S.D. Display : A x N/B, N = 1 ~ 1000 Accuracy : 1 Count of A B Trigger Error A
Time base characteristics	Internal time Base	Frequency : 10MHz TCO (*OPTION :TCXO) Aging Rate : < 5 x 10 ⁻⁶ Temp. Stability : < 5 x 10 ⁻⁶ (0°C ~ +50°C) Line Voltage : < 1 x 10 ⁻⁶ (10% variability)	
	Frequency output	Frequency : 10MHz Amplitude : 1.5Vp-p Impedance : 600 Ω	
	External input	Frequency : 10MHz Amplitude : 1.5Vrms ~ 5Vrms Impedance : 600 Ω	
General information	Power	AC 115V/230V 10%, 48Hz ~ 66Hz	
	Operating temperature	0 ~ 50°C (Standard guaranteed temperature : 25 ±5°C)	
	Dimension	240(W) x 270(D) x 90(H)mm	
	Weight	2.5kg	

STANDARD ACCESSORIES

- Power cord: 1ea
- BNC to BNC cable: 1ea
- Spare fuse: 1ea
- User's guide manual: 1ea

OPTIONS

- PC program software (RS-232C)
- RS-232 cable
- TCXO (2.5ppm)

CPM-8013 / CPM-8023 / CPM-8037

Universal/Frequency Counter (1.5GHz / 3.7GHz)



FEATURES

- Measurement range
 CPM-8013 : 0.1Hz ~ 1.5GHz (A/C input)
 CPM-8023 : 0.1Hz ~ 1.5GHz (A/B/C input)
 CPM-8037 : 0.1Hz ~ 3.7GHz (A/C input)
- Low-pass filter : 100kHz, -3dB
- Display : 0.56 inches & 9 digits (green color)
- 10 : 1 input attenuator function
- Separate & Common option (Universal Counter only)

SPECIFICATIONS

MODEL		CPM-8013	CPM-8037	CPM-8023
Display		Overflow, Gate Time, mHz, Hz, kHz, MHz, nS, uS, mS, S, Hold		
Frequency measurement	Range	0.1Hz to 100MHz (A input) and 80MHz ~ 1.5GHz (C input) [CPM-8013] 0.1Hz to 1.5GHz (A/B input: 0.1Hz ~ 100MHz, C input: 80MHz ~ 1.5GHz) [CPM-8023] 0.1Hz to 100MHz (A input) and 80MHz ~ 3.7GHz (C input) [CPM-8037]		
	Gate time	0.01 sec. / 0.1 sec. / 1 sec. / 10 sec.		
	Resolution	1 nHz ~ 10 Hz		
	Error	±Resolution ±Timebase Error ±1 Count		
Input characteristics	Type of input	A and C		A, B and C
	Sensitivity	A input: 30mVrms	A input: 20mVrms	A or B input : 30mVrms
		C input: 80MHz ~ 1.0GHz : 35mV, 1.1GHz ~ 1.5GHz : 70mV	C input : 80MHz ~ 2.0GHz : 10mV 2.0GHz ~ 3.0GHz : 15mV 3.0GHz ~ 3.2GHz : 20mV 3.2GHz ~ 3.5GHz : 40mV 3.5GHz ~ 3.7GHz : 70mV	A, B input : 30mVrms C input : 80MHz ~ 1.0GHz : 35mV, 1.1 GHz ~ 1.5GHz : 70mV
	Impedance	A input: 1M < 40pF C input : 50 pF		A, B input: 1M < 40pF C input : 50 pF
	Max. input voltage	A input: 250Vrms C input : 3Vrms		A, B input: 250Vrms C input : 3Vrms
	Attenuation	A input: x1, x10		A or B input: x1, x10
	Slope A, B	—		+, - Selectable
Trigger A	—		Preset or Variable	
Low	A input: 100 kHz, -3dB		A, B input: 100 kHz, -3dB	

CPM-8013 / CPM-8023 / CPM-8037

MODEL		CPM-8013	CPM-8037	CPM-8023
Input A mode	Cycle	Range : 10m sec. ~ 10 sec. Resolution : 1ps ~ 1ns Accuracy : Resolution Trigger Error 1 count		Range : 10m sec. ~ 10 sec. Resolution : 1ps ~ 1ns Accuracy : Resolution Trigger Error 1 count
	Cumulative factor	Range : 5Hz ~ 10MHz Maximum number display : 0 to 99999999 (Max.)		
	Revolution number	6 ~ 900 x 10 ⁶ RPM		—
Compare mode (Input A, B)	Time interval (A->b)	—		Range : 0.1u sec. ~ 0.1 sec. (10Hz ~ 10MHz) L.S.D Display : 100mSec Resolution : L.S.D. Trigger Error Accuracy : Resolution 1 count
	Ratio (A/B)	—		Range : 0.1Hz ~ 10MHz (A/B) L.S.D. Display : A x N/B, N = 1 ~ 1000 Accuracy : 1 Count of A B Trigger Error A
Time base Characteristics	Internal time base	Frequency : 10MHz TCO (TCXO : OPTION) Aging rate : < 5 x 10 ⁻⁶ Temp. stability : < 5 x 10 ⁻⁶ (0°C ~ +50°C) Line voltage : < 1 x 10 ⁻⁶ (in case of a change by 10%)		
	Frequency output	Frequency : 10MHz Amplitude : 1.5Vp-p Impedance : 600 Ω		
	External input	Frequency : 10MHz Amplitude : 1.5Vrms ~ 5Vrms Impedance : 600 Ω		
General Information	Power	AC 115V/230V 10%, 48Hz ~ 66Hz		
	Operating temperature	0°C ~ 50°C (Standard guaranteed temperature : 25±5°C)		
	Dimension	240(W) x 270(D) x 90(H)mm		
	Weight	2.5kg		

STANDARD ACCESSORIES

- Power cord : 1ea
- BNC to BNC cable : 1ea
- Spare fuse : 1ea
- User's guide manual : 1ea

OPTIONS

- PC program software (RS-232C)
- RS-232 cable
- TCXO (2.5ppm)
- N type cable (RG-400): available for CPM-8037 only
- N-BNC adapter (UG201/U): available for CPM-8037 only

MS-9170

Universal Measuring Instrument



FEATURES

Digital multimeter

- 3 3/4 digits (4,000 counts)
- 4 3/4 digits (40,000 counts)
- DC Voltage/Current : 1000V/20A
- AC Voltage/Current : 750V/20A
- Resistance : 40MΩ

Frequency counter

- 8-digit high-precision multifunction counter
- 1Hz ~ 20MHz / 20MHz ~ 2.7GHz

Function generator

- Generates various types of waveform
- Frequency : 1Hz to 10MHz

DC power supply

- High-precision & low-noise linear DC power supply
- 0 ~ 30V 3A, 5V 2A, 15V 1A

SPECIFICATIONS

Category		Descriptions	
Frequency counter	Measuring range	Channel A	1Hz to 20MHz
		Channel B	20MHz to 2.7GHz
	Input sensitivity	Channel A	20mV RMS sine wave or 100mVp
		Channel B	40mV RMS sine wave (for 20MHz to 1.3GHz) 70mV RMS sine wave (for 1.3MHz to 2.7GHz)
	Max. input voltage : 3V	Channel A	35mVpp
		Channel B	3mVpp
Input impedance	Channel A	1MΩ	
	Channel B	50Ω	
Selectable time base	Channel A	Selector switch	
	Channel B		
Function generator	Type of Waveform		Sine, square, triangle, skewed sine, ram, pulse, TTL level square
	Frequency		1Hz to 10MHz
	VCF voltage level		0 to 10V DC
	Output impedance		50Ω ±10%, 600Ω ±10% (selectable)
	Output amplitude		2Vpp to 20Vpp (open load) 1Vpp to 10Vpp (50Ω load)
	Attenuator		-20dB
	Sine wave		Distortion: Less than 1% (at 1kHz) Flatness: + 0.3dB
	Square wave		Symmetry: Less than +3% (at 1kHz) Rise & fall time: 150ns (at 1kHz)
	Triangle wave		Linearity: 1% (up to 100kHz), 5% (100kHz to 20MHz)
	TTL output		Rise & Fall time: 30ns (at 1KHz) Output level : Above 3V

MS-9170

Category		Descriptions	
Digital multimeter	Measuring range	DC Voltage	4 (400mV to 400V) $\pm 0.06\%$ + 3dgts
			1(1000V) $\pm 0.2\%$ + 3dgt
		AC Voltage	4 (400mV to 400V) $\pm 0.8\%$ + 10dgts
			1(750V) (40Hz~1kHz) $\pm 1.0\%$ + 10dgts
		DC Current	2 (400 μ A to 4mA) $\pm 0.3\%$ + 3dgts 2 (40mA to 400mA) $\pm 0.3\%$ + 5dgts
			1 (20A) $\pm 0.5\%$ +5dgts
		AC Current	2 (400 μ A to 4mA) (40Hz ~1kHz) $\pm 1.0\%$ + 10dgts 2 (40mA to 400mA) (40Hz ~1kHz) $\pm 1.2\%$ + 10dgts
			1 (20A) (40Hz ~ 1kHz) $\pm 1.5\%$ + 10dgts
		Resistance	1 (400 Ω) $\pm 0.3\%$ + 10dgts 3 (4K Ω to 400K Ω) $\pm 0.2\%$ +5dgts
			2 (4M Ω to 40M Ω) $\pm 0.3\%$ + 10dgts
Diode	Test current: 1mA		
Logic	Three-logic level (Rdy, Hi, --, Lo)		
Continuity	Less than 40 Ω (buzzer at 2kHz)		
Power supply (3 1/2 digit LCD with backlight)	Output voltage	Terminal-1	0 ~ 30V
		Terminal-2	5V (fixed)
		Terminal-3	15V (fixed)
	Output amps	Terminal-1	0 - 3A
		Terminal-2	2A
		Terminal-3	1A
	Ripple	Terminal-1	1mV (max.)
		Terminal-2	2mV (max.)
		Terminal-3	2mV (max.)
	Load regulation	Terminal-1	0.1% + 5mV
		Terminal-2	0.1% + 70mV
		Terminal-3	0.1% + 35mV
	Line regulation	Terminal-1	0.1% + 5mV
		Terminal-2	0.1% + 30mV
		Terminal-3	0.1% + 70mV
	Maximum output Current	Terminal-1	3A
		Terminal-2	2.2A
		Terminal-3	1.2A

CPM-2700

Universal Relay Tester



FEATURES

- Easy operation and convenient conversion to DIGITAL MODE
- Can measure the operation time for protecting a relay
- Supports the adjustment function for voltage and current
- Fast and accurate result

SPECIFICATIONS

Input power line		1-phase 2-wire
Input voltage		AC 220V sine wave
Private frequency		50Hz / 60Hz
Circuit output A	Low current range	0 ~ 0.2A / 0 ~ 0.5A / 0 ~ 1A / 0 ~ 2A / 0 ~ 5A
	High current range	0 ~ 10A / 0 ~ 20A / 0 ~ 50A
Circuit output B	Voltage range	0 ~ 0.2V / 0 ~ 0.5V / 0 ~ 1V / 0 ~ 2V / 0 ~ 5V / 0 ~ 10V / 0 ~ 20V / 0 ~ 50V / 0 ~ 100V / 0 ~ 200V / 0 ~ 500V
Capacity		1KVA
Digital timer (5 digits)		0 ~ 99.999 sec., 0 ~ 9999.9Hz
Digital meter accuracy		±0.5%
Application		OCR, OCGR, UVR, OVGR, SGR, PR, RDR, OVR and etc.

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 1set
- User's guide manual : 1ea



CPE-2800

Transistor Checker & Curve Tracer



FEATURES

- Transistor Curve Tracer and DC parameter measurement
- Automatic polarity distinction on FET(N-ch, P-ch), Transistors (NPN, PNP) and diodes
- Supports comparative measurements and simple operation
- Built-in current protection circuit

SPECIFICATIONS

Checker function	
Selection mode	Diode / Transistor
Indication and distinction	Polarity, Base(or Gate), PNP/NPN, GOOD/BAD
Test current	4.5mA in signal (Low) 60mA in power (High)
Scanning rate	0.1sec / test Judgment scan: 1sec
DC parameter measurement function	
hFE range	0 ~ 100 / 0 ~ 1000 / 0 ~ 10000 (3ranges) Accuracy : $\pm 20\%$ (base current : $\pm 1\mu\text{A}$, collector current : $\pm 30\text{mA}$ Max.)
VBE and VD	0 ~ 3V DC 1 range Accuracy : $\pm 5\%$ Measuring current : $\pm 20\text{mA}$ Max
ICEO and I-Leak	0 ~ 100 / 0 ~ 1000 / 0 ~ 10000 μA (3 ranges) Test voltage: $\pm 5\text{V}$ (max.)
Measuring voltage	Max. $\pm 5\text{V}$
Curve tracer function	
Collector / drain sweep	Selection mode : Transistor / FET Frequency : 120Hz or 100Hz (2x line power frequency) Voltage : 10V ~ 100V in 8 steps (10, 20, 30, 40, 50, 60, 80 and 100V) Current limiter : 1000 Ω for SIGNAL (low level devices) 100 Ω for POWER (high level devices)
Step generator	Number of steps : 7steps Current / Step : 10 / 20 / 50 μA 0.1 / 0.2 / 0.5 / 1 / 2mA (accuracy : $\pm 5\%$) Voltage / Step : 0.1 / 0.2 / 0.5V (accuracy : $\pm 5\%$) External bias : One curve display
General information	
Test mode	CHECKER / CURVE TRACER
Operating temperature	0 $^{\circ}\text{C}$ ~ 40 $^{\circ}\text{C}$, 10 ~ 85% R.H.
Input voltage	AC 220V 50/60Hz
Dimension	343(W) x 180(D) x 212(H) mm
Weight	3.9kg

STANDARD ACCESSORIES

- Power cord : 1ea
- Connection cable : 2ea
- User's guide manual : 1ea

CPS-251S, CPS-303/305/3010, CPS-503/505, CPS-3032/CPS-3052

Regulated DC Power Supply



FEATURES

- Low ripple and stable output characteristics
- 3-digital meter indication
- Overload and overvoltage protection
- Voltage and current limit control
- Constant voltage (CV) and constant current (CC)

SPECIFICATIONS

MODEL	CPS-251S	CPS-3010	CPS-305	CPS-303	CPS-503	CPS-505	CPS-3032	CPS-3052	
Output voltage & current	0~25V 0~1A	0~30V 0~10A	0~30V 0~5A	0~30V 0~3A	0~50V 0~3A	0~50V 0~5A	0~30V Dual 0~3A Dual	0~30V Dual 0~5A Dual	
	—		Fixed output 5V, 2A						
Ripple rejection	≤2mVrms (5Hz~1MHz)								
Regulation	Line	Less than 0.01%+3mV							
	Load	Less than 0.02%+5mV							
Resolution	Voltage	0.1V digital volt meter							
	Current	0.01A digital ammeter							
Instant return time	70μs (50% load change)								
Display	Voltage	3-digital volt meter: 1ea (CPS-251S, CPS-303/305/3010, CPS-503/505) 3-digital volt meter: 2ea (CPS-3032, CPS-3052) CV Indicator LED							
	Current	3-digital ammeter: 1ea (CPS-251S, CPS-303/305/3010, CPS-503/505) 3-digital volt meter: 2ea (CPS-3032, CPS-3052) CC Indicator LED							
Protection	Overvoltage protection and overload protection								
Fixed Output	Voltage / current	—		5V / 2A					
	Line regulation	Below 3mV							
	Load regulation	Below 10mV							
	Ripple noise	≤2mVrms							
	Voltage accuracy	5V±0.25V							
Input voltage	AC 220V 50/60Hz								
Dimension	263(W)x320(D)x150(H)mm		140(W)x270(D)x150(H) mm			263(W)x320(D)x150(H)mm			

STANDARD ACCESSORIES

- Power cord: 1ea
- Output cable: 2ea
- User's guide manual: 1ea

CPS-201T / CPS-303 / CPS-305T

Tracking Regulated DC Power Supply



FEATURES

- Multi-functional mode (Independent, Tracking, Parallel and Series)
- 4-digital meter indication
- Low ripple and stable output characteristics
- Overload and overvoltage protection
- Voltage and current limit control
- Constant voltage (CV) and constant current (CC)

SPECIFICATIONS

Output Mode		Independent / Tracking / Parallel / Series
Output voltage & current		Independent
		0~20V Dual
		0~1A Dual (CPS-201T)
		0~30V Dual
		0~3A Dual (CPS-303T), 0~5A Dual (CPS-305T)
Tracking		0~±20V
		0~±1A (CPS-201T)
Parallel		0~±30V
		0~±3A (CPS-303T), 0~±5A (CPS-305T)
Series		0~20V
		0~2A (CPS-201T)
		0~30V
		0~6A (CPS-303T), 0~10A (CPS-305T)
Fixed Output		0~40V
		0~2A (CPS-201T)
		0~60V
		0~3A (CPS-303T), 0~5A (CPS-305T)
Ripple rejection		≤2mVrms (5Hz~1MHz)
Regulation	Line	Less than 0.01%+3mV
	Load	Less than 0.02%+5mV
Resolution	Voltage	0.1V digital volt meter
	Current	0.01A digital ampere meter
Instant return time		100μs (50% load change)
Display	Voltage	3-digital volt meter CV indicator LED
	Current	3-digital ammeter CC indicator LED
Protection		Overvoltage protection and overload protection
Fixed output		Voltage/Current
		5V / 2A (CPS-303T and CPS-305T)
		Line regulation
		Below 5mV
		Load regulation
Below 10mV		
		Ripple noise
		≤2mVrms
		Voltage accuracy
		5V±0.25V

STANDARD ACCESSORIES

- AC power cord : 1ea
- Output cable : 2ea
- User's guide manual : 1ea

CPS-2450B

AC/DC Variable Power Supply



FEATURES

- Adjustable voltage: AC (0~240V) and DC (0~50V)
- Independent AC/DC control function
- Constant voltage (CV) and constant current (CC)
- Digital AC/DC voltage meter and DC current meter
- Overload protection

INTRODUCTION

Worldwide usage

The CPS-2450B AC/DC Variable Power Supply can be used all over the world as it comes with the international standard outlet.

Highly stable voltage output

The CPS-2450B AC/DC Variable Power Supply has stable voltage : 0.03%+1mV.

Variable output

It can generate variable output : AC 0~240V/2A and DC 0~50V/5A

SPECIFICATIONS

Output voltage	0~50V DC / 0~240V AC, 50/60Hz (same as input frequency)
Output current	0~5A DC / 2A AC Max.
Digital voltmeter	AC 0 ~ 240V / DC 0 ~ 50V
Digital ammeter	DC 0 ~ 5A
Protection	Current limitation (DC) and Overload Protection (AC)
DC regulation	Line: 0.03% + less than 1mV Load: 0.03% + less than 3mV
Ripple	Constant voltage (CV): 0.03% + 2.5mV Constant current (CC): 0.05% + 4.0mV
Input power	AC 220V \pm 10%, 50/60Hz (5A fuse)
Transient recovery time	100 μ s (approx.)
Dimension	300(W) \times 380(D) \times 230(H) mm
Weight	16.3Kg

STANDARD ACCESSORIES

- Power cord: 1ea
- Output cable : 1ea
- User's guide manual : 1ea

CPS-3001K

CV/CF Automation Voltage Regulator



FEATURES

- Low waveform distortion
- High stability voltage and current
- Constant voltage (CV) and constant current (CC)
- Equipped with various protection devices and protection circuits
- Low noise and high efficiency
- Compact size and light weight

SPECIFICATIONS

Input voltage	1-phase AC 220V \pm 10%, 50/60Hz
Output power	1000VA Max.
Output voltage	AC 0 ~ 120V / 0 ~ 240V
Output stability	Less than \pm 1%
Output current	100V range: 10A 120V range: 8.3A 200V range: 5A 240V range: 4.16A
Frequency range	Preset: 50Hz / 60Hz Variable: 45 Hz ~ 65 Hz
Frequency stability	Less than \pm 0.01%
Distortion	Less than \pm 1%
Efficiency	Better than 50%
Protection	Overload protection and over temperature protection
Power factor	1 ~ 0.85
Inrush current control	Slow start or slow stop in output-1
Operating Temperature	-10 ~ 50°C, 10 ~ 90% R.H.
Dimension	266(W) x 556(D) x 434(H) mm
Weight	45kg

STANDARD ACCESSORIES

- Power cord: 1ea
- Output cable : 1ea
- User's guide manual : 1ea



CPE-OT9000 / CPE-OT9010

Multifunction Experimental Table



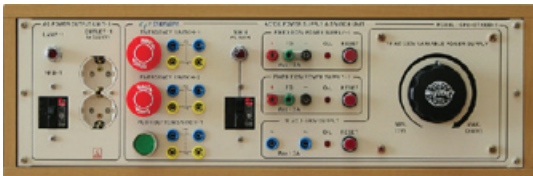
CPE-OT9000



CPE-OT9010

FEATURES

- Multifunction experimental table equipped with AC/DC power system and built-in meters
- Solid top plate and three-layer junction structure (MDF+PB+MDF)
- Professional modularized design and stylish color
- Built-in switch simulator and AC/DC power supply



CPE-OT9000-1



CPE-OT9000-2



CPE-OT9000-3



CPE-OT9010

CPE-OT9000 / CPE-OT9010

SPECIFICATIONS

Model	CPE-OT9000	CPE-OT9010
I. RACK - section		
Composition of Rack	Rack console : 1ea CPE-OT9000-1 module : 1ea CPE-OT9000-2 module : 1ea CPE-OT9000-3 module : 1ea	Rack console : 1ea CPE-OT9010 module : 1ea
AC Power outlet	AC 220V outlet : 4ea NFB Switch (15A) : 2ea Power indicator lamp : 2ea	AC220V outlet : 4ea NFB Switch (15A) : 1ea Power indicator lamp : 1ea
Switch simulator	Push button : 2ea Emergency switch : 4ea 4mm terminal: white (1ea), blue (1ea), red (1ea)	—
DC voltage & ampere meter	DC Volt meter: 25V (1ea), 50V (1ea) DC Ampere meter: 3A (1ea), 10A (1ea)	—
AC voltage & ampere meter	AC Volt meter: 60V(1ea) , 120V (1ea), 220V (1ea) AC Ampere meter: 2.5A (1ea), 5A (1ea), 10A (1ea)	—
Dual fixed DC voltage output	DC 5V/3A(+, GND) : 1set Short trip & reset output switch : 1set	DC +32V/1.5A Short trip & reset output switch : 1set
Variable AC power output	AC 0~220V/3A : 1set Short Trip & Reset output switch : 1set	—
Over load protection	Lamp / LED	Lamp / LED
Dimension	1800(W) x 350(D) x 200(H)mm	1800(W) x 350(D) x 200(H)mm
Material	MDF Thickness: 15mm	MDF Thickness: 15mm
II. TABLE - section		
Dimension	1800(W) x 900(D) x 750(H)mm	
Material	Three-layer junction structure (MDF + PB + MDF)	
Thickness	Top plate : 30mm Each side: 15mm	
Structure	Easy attachment/detachment structure	

STANDARD ACCESSORIES

- Power cord : 4ea
- Connection cable : 10ea
- User's guide manual : 1ea

CPE-OT9020 / CPE-OT9030 / CPE-OT9040

Electricity & Electronics Experimental Table



CPE-OT9020



CPE-OT9030



CPE-OT9040

FEATURES

- Experimental table designed for experiments on electricity or electronics
- Four drawers for convenient storage
- Enhanced durability made of medium-density fireboard (MDF) and particle board (PB)
- HPM film coating (0.8mm)
- With a rack designed for power output and measurement on top of the table (CPE-OT9020/9040)
- AC 220V power outlet and built-in circuit breaker (CPE-OT9020/9040)
- Can customize color and size of the table upon request

SPECIFICATIONS

Model	CPE-OT9020	CPE-OT9030	CPE-OT9040
I. RACK - section			
AC Power outlet	2-socket outlet (AC220V) : 2ea	—	2-socket outlet (AC220V) : 2ea
	3-pin plug outlet (13A) : 2ea	—	3-pin plug outlet 13A : 2ea
NFB Switch	20A : 1set	—	20A : 1set
Dimension	1800(W) x 200(D) x 250(H)mm	—	1800(W) x 200(D) x 450(H)mm
Material	PB (particle board), Thickness: 18 mm (LPM)	—	PB (particle board), Thickness: 18 mm (LPM)
II. TABLE - section			
Dimension	1800(W) x 890(D) x 730(H)mm		
Material	Three-layer junction structure (MDF + PB + MDF)		
Thickness	Top plate : 30mm (HPM) Each side: 18mm (LPM)		
Drawer	Number of drawers: 4ea (each model)		
Structure	Easy attachment/detachment structure		

STANDARD ACCESSORIES

- Chairs : HIPAG (or others)

Training & Education

National Human Resource Upgrade Training Session -
Korea Institute of Technology



PCB Production Training Session –
Korea Polytechnic VI College, Gumi Campus



Microprocessor Training Session –
Gyeonggi-do Provincial Vocational School



Summer Training Courses for Hydrogen Fuel Cells -
Korea University of Technology and Education



Training Course for Automated Design Tool Applications – Korea Polytechnic I College, Gangseo Campus



Summer Training Courses for Renewable Energy - Korea University of Technology and Education



Winter Training Courses for Solar Energy - Korea University of Technology and Education



Winter Training Courses for Hybrid Energy - Korea University of Technology and Education



Training & Education

Technical Training Sessions for Vocational High Schools



Industrial Training Sessions for Technicians



Technical Training Sessions for overseas customers



Training Programs for Business Partners



Exhibition

Indonesia Education Supplies Show



Dubai Education Supplies Show



Kazakhstan Didactic Exhibition



Job Fair Event



Accomplishment of Equipment Supply - Part 1

Renewable Energy Training System



Hyundai Heavy Industries Co., Ltd.



Korea Polytechnic I College, Gangseo Campus



Korea University of Technology and Education



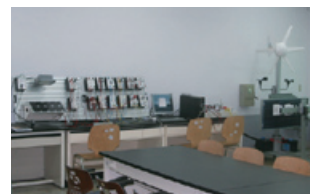
Korea Polytechnic IV College, Hongsung Campus



Korea Polytechnic II College, Incheon Campus



Jeonju Vision College



Chungju National University



Suncheon Chungam College



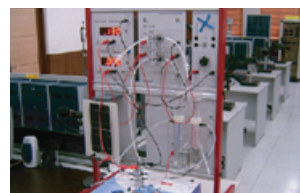
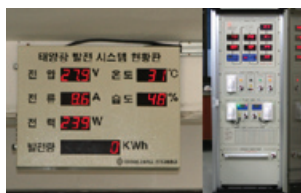
Woosuk University



Cheungbook National University



Iri Technical High School



Gyeongbuk Technical High School



Busan Energy Science High School

Renewable Energy Training System



Korea Institute of Technology



Younnam University



Gwangju University



Mokpo National University



Innovative Technology Training Center



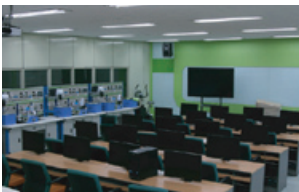
Korea Polytechnic V College, Gwangju Campus



Korea Polytechnic V College, Iksan Campus



Korea Polytechnic V College, Gwangju Campus



Gyeonggi University of Scientific Technology



GwangJu Automation System High School



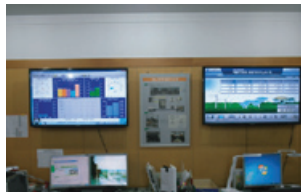
Doowon Technical College



Korea Polytechnic VI College, YoungJu campus



Woosuk University



Chosun University



Chungbuk New & Renewable Energy Association



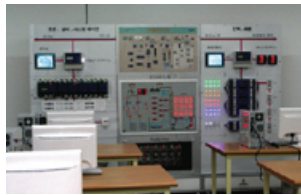
Chilbo High School

Accomplishment of Equipment Supply - Part 2

IBS & Home Network Training System



Korea Polytechnic I College,
Gangseo Campus



Korea Polytechnic IV College,
Chungju Campus



Iri Technical High School



Korea Polytechnic College, New
Technology Training Center

PLC, LED Trainer and Pneumatic & Hydraulic Training System



Korea University of Technology and Education



Korea Polytechnic VI College,
Gwangju Campus



Seokang University



Korea Polytechnic VI College,
Daegu Campus



Korea Polytechnic VII College,
Ulsan Campus



Changsung Vocational High School



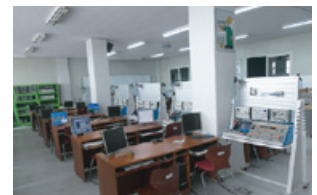
Chonbuk Mechanical Technical High
School



Korea Port Logistics High School



Korea Polytechnic IV College,
Chungju Campus



Korea Polytechnic II College,
Hwasung campus

SMT Training System



Korea Polytechnic VI college Gumi campus



Small & Medium Business Training Institute



Gimhae Medical & Biotechnology Center



Kyoungbuk Technical High School



Daejung Metal-Technical High School



Samrye Technical High School



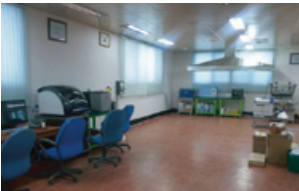
Kyoungbuk Vehicle Embedded Technical Institute



Korea Polytechnic IV college Daejeon campus



New Technology Training Center



AFLC(Air Force Logistic Command)



Incheon Human Resources Development Institute



Chungbuk Techno Park



Haenam Technical High School

Accomplishment of Equipment Supply - Part 3

Electrical & Electronics Training System



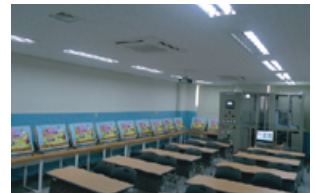
Gyeonggi-Do Vocational Training School



New Technology Training Center



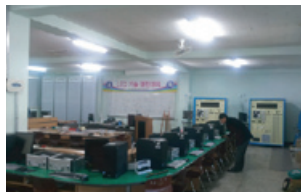
Korea Polytechnic V college Gwangju Campus



Gaesung Technical Training Center



Gyeonggi Scientific Technique University



Damyang Technical High School



Korea Polytechnic IV college ChungJu Campus



Korea Polytechnic VI college Daegu Campus

Overseas Vocational Training Equipment Business (KOICA, EDCF)



Guatemala (KOICA)
Electrical engineering workshop under Department of Electrical Engineering



Libya (KOICA)
Electrical engineering workshop under Department of Electrical Engineering



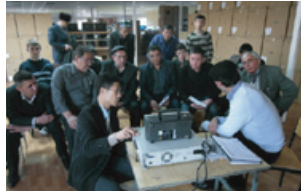
Jordan (KOICA)
Automation workshop and Communication Workshop under Department of Electrical Engineering



Overseas Vocational Training Equipment Business (KOICA, EDCF)



Uzbekistan (EDCF)
Supply of vocational training equipment to vocational schools



Uzbekistan (KOICA)
Electrical Engineering Workshop at Tashkent Vocational Training Center



Sri Lanka (KOICA)
Mechanical Engineering Workshop at Department of Electrical Engineering



Vietnam (EDCF)
Electrical Engineering Workshop at Quang Binh Vocational Training Center



Vietnam (EDCF)
Electrical Engineering Workshop at Pleiku Vocational Training Center



Vietnam (EDCF)
Electrical Engineering Workshop at Pleiku Vocational Training Center



Morocco (KOICA)
Electrical Engineering Workshop at Casablanca IFMIA Vocational Training Center





Basic Electrical & Electronics Module



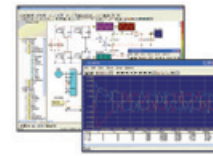
AREs Advanced Embedded Instrument Program



e-book Electronic Principles



Smart Learning Lecture Video



Circuit Design & Simulation S/W

Engineering Platform

Smart Trainer AREs


All-in One Real time Instruments & Educational System

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- Pulse Generator
- Arbitrary Generator
- DC Source Generator
- Oscilloscope
- Volt and Ampere Meter
- Power Meter
- Digital Multi Meter
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- 3-Phase Variable AC Power Supply
- Advanced 3 Phase Power
- Digital Input
- Digital Input/Output
- Relay Output



     
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