EDUCATION EQUIPMENTS

- ELECTRICAL TRAINING SYSTEM
- RHEOSTAT
- LAB DECADE BOX
- ULTRASONIC WAVES EXPERIMENT SYSTEM
- MECHANICS PRINCIPLE EXPERIMENT SYSTEM

AND MORE...

Content

M21-500

Features

.Low cost but ideal tool for breadboard
.With DC power supply for common use

M21-500

Technical Data		M21-500
DC Output Voltage		0~+15VDC/500mA
		0~-15VDC/500mA
		+5VDC/1A
Solderless Breadboard		2390 tie points
Dimensions(W×H×D)		200×80×250mm
Weight		4.5kg

M21-600

Features

.Low cost but ideal tool for breadboard
.With DC, AC power supply for common use

M21-600

Technical Data		M21-600
DC Output Voltage		0~+15VDC/500mA
		0~-15VDC/500mA
		+5VDC/1A
		-5VDC/500mA
AC Output Voltage		12V-6V-0-6V-12V, 300mA
Solderless Breadboard		2820 tie points
Dimensions(W×H×D)		334×95×258mm
Weight		4.5kg

M21-1000 SERIES CE NEW

Features

.Provide available electrical components and interconnect in different configurations.
.Acquire the basic knowledge on electrical engineering, installations and electrical measurements.
.Study the means to check the main laws and principles.
.Component symbols and electrical diagrams are represented on the front panel.
.The symbols and electrical diagrams of each component are clearly represented on the front panel.
.The connections are eased by 4mm terminals and cables of different colors.
.The power supplies are included with extra low safety voltage.

M21-1000

M21-1100

Specifications

Main installed components:

General switch, fuse and signaling lamp
1 Safety single-phase transformer 115-230V / 6-12-24 VAC-1 A
2 Fuse-holder with fuse type 6x30-1A
1 Moving iron ammeter with range: 0.5-1A
1 Moving iron voltmeter with range: 25 V
10 Resistors of different values (2Ω, 4Ω, 8Ω, 16Ω, 31.5Ω, 63Ω, 250Ω, 500Ω, 1000Ω, 2000Ω)
1 linear rheostat 100 Ω /25W
4 Diodes 6A-100V
2 Lamp-holder with 24-V signaling lamp
1 24-Vac buzzer
1 Electrolytic capacitor, 100 μF25Vdc
2 Electrolytic capacitors, 500 μF25Vdc
2 Inductances 60 mH 0.5 A
2 Pushbuttons for general use
2 Shunters for general use
1 Inverter for general use
1 Relay, 2 exchange contacts, 24 Vac coil
1 Step-by-step relay, 24-Vac coil (M21-1100)
1 Set of 25mm cables with 4-mm plug

Dimensions: 258×95×334 mm

Weight: 4.5kg

The main exercises which can be carried out are:

- AC voltage and current measurements
- Diode insertion with different configurations Half-wave rectifier, Full-wave rectifier, Bridge rectifier, Voltage doublers
- DC voltage and current measurements
- Insertion of resistances with different configurations Resistance measurements, Checking the Ohm's law, Series resistors, voltage divider, Parallel resistors, current divider, series and parallel resistors, max. power transfer, Kirchhoff's principle, superimposition principle, Thevenin's theorem
- Power measurements DC power measurement, Joule's law, AC power
- Insertion of capacitors with different configurations Charge and discharge of a DC capacitor, series DC capacitors, parallel DC capacitors
- Electromagnetic phenomena Inductance of a coil, coils in series, coils in parallel, Ohmic/inductive/capacitive circuits, RC circuit, RL circuit, series resonant circuit, parallel resonant circuit, Q-factor, coupled circuits, attenuators
- The transformer
- Leveling filters Inductive circuit, capacitive input, LC filter
- Lighting of a lamp with switch
- Lighting of more lamps with switch
- Lighting of a lamp with shunters
- Lighting of a lamp with shunters and inverter
- Lighting of a hotel room
- Lighting of a file room
- Lighting of one or more lamps with relay
- Lighting of one or more lamps with step-by-step relay (M21-1100)
- Acoustic signaling
- Light signaling
- Acoustic/light signaling
- Pulse remote control of a user with relay
- Remote control with self-holding circuit

M21-5000 CE

Feature

. High level, high quality digital trainer

. Combines all essential function of digital experiment

. With removable breadboard, DC power supply, pulse generator, two pulse switches, digital probe, TTL/CMOS selector and etc.

M21-5000

Specification

1. SOLDERLESS BREADBOARD:
Interconnected with 2820 tie points nickel plated contact, fitted all DIP sizes and all components with lead and solid wire AWG # 22-30 (0.3-0.8mm). It can be changed and replaced for different purpose and can be connected with demonstration panel. Therefore, it is very convenient for both teachers and students.

2. DC POWER SUPPLY:
A. Fixed DC output: +5V, 1A
B. Fixed DC output: -5V, 1 A.
C. Variable DC output: +3V to +15V, 1 A
D. Variable DC output: -3V to −15V, 1 A.

3. MODE SELECTOR SWITCH:
When the switch is put on "TTL" or "CMOS" position, the input or output of pulse generator, pulser switches, 8 bits data switches digital probe, 8 bit LED display will meet the HI or LO level of "TTL" or "CMOS".

4. TWO DIGITS OF 7 SEGMENT LED DISPLAY

5. PULSE GENERATOR
(A) Duty cycle: 50%
(B) Frequency range: 1Hz ~ 10Hz
10Hz ~ 100Hz
100Hz ~ 1kHz
1kHz ~ 10kHz
10kHz ~ 100kHz
100kHz ~ 1MHz
(C) Amplitude: 0 ~ 10Vpp
(D) TTL/CMOS mode output
TTL: +4V
CMOS: + VDC (depend on the + VDC output)

6. SIXTEEN BITS LED DISPLAY
Set mode selector switch to "TTL" position

Logic Level	Input level	Display light up
LO	＜0.8±0.2V	Green
HI	＞2.3±0.2V	Red
Open	0.8 ~ 2.3	No display

Set mode selector switch to "CMOS" position

Logic Level	Input level	Display light up
LO	＜30%+VDC±10%	Green
HI	＞70%+VDC±10%	Red
Open	30% ~ 70%+VDC	No display

7. TWO PULSE SWITCH:
A,/A,B,/B output
Output level:
TTL: HI=4V LO=0.1V
CMOS: HI=+VDC LO=0.1V

8. SIXTEEN DATA SWITCHES:
TTL: HI=4V LO=0V
CMOS: HI=+VDC LO=0V

9. DIGITAL PROBES:
Set mode selector switch to "TTL" position

Logic Level	Input level	Display light up
LO	＜0.8±0.2V	L
HI	＞2.3±0.2V	H
Open	0.8 ~ 2.3	O
Transit	LO-->HI	P

Optional accessories

Set mode selector switch to "CMOS" position

Logic Level	Input level	Display light up
LO	＜30%+VDC±10%	L
HI	＞70%+VDC±10%	H
Open	30% ~ 70%+VDC	O
Transit	LO-->HI	P

Memory: the two points of LED beside 7 segment LED display will keep lighting when they are in "level transition" (LO-->HI or HI-->LO)

10. UNIVERSAL CONNECTOR FIXED HOLDER:
It reserves universal connector fixed holder on the panel in order to be connected with various universal connectors, which are available as below:
optional accessories:
(1) Straight header 60 pin
(2) Card edge connector 2.54mm 62pin
(3) D sub 25 pin connector, male & female
(4) Card edge connector 3.96mm 56pin
(5) Dip sockets connector 28 pin & 40 pin

11. OTHER STANDARD ACCESSORIES:
(1) Power cord
(2) Pin : 10cm 20pcs/20cm 20pcs
(3). User manual

12. DIMENSIONS(W×H×D): 258×95×334mm

13. WEIGHT: 4.5kg

M21-7000 CE

Feature

. High level, high quality digital-analog trainer

. Combines all essential function of analog and digital experiment

. With removable breadboard, DC power supply, function generator, two pulse switches, 2 1/4 inch 8 ohm 0.25W speaker and etc.

M21-7000

Optional accessories

Specification

1. SOLDERLESS BREADBOARD:
Interconnected with 2820 tie points nickel plated contact, fitted all DIP sizes and all components with lead and solid wire AWG # 22-30 (0.3-0.8mm). It can be changed and replaced for different purpose and can be connected with demonstration panel. Therefore, it is very convenient for both teachers and students.

2. DC POWER SUPPLY:
A. Fixed DC output: +5V, 1A
B. Fixed DC output: -5V, 1 A
C. Variable DC output: 0V to +15V, 1 A.
D. Variable DC output: 0V to －15V, 1 A.

3. POTENTIOMETERS:
A. Variable resistor VR1 = 1kΩ
B. Variable resistor VR2 = 100kΩ

4. FUNCTION GENERATOR:
(A)Frequency range: 1Hz—10Hz
10Hz—100Hz
100Hz—1kHz
1kHz—10kHz
10kHz—100kHz
(B)Amplitude
Sine wave output: 0—10 Vpp variable
Triangle wave output: 0—10 Vpp variable
Square wave output: 0—10 Vpp variable
TTL mode output: 4 Vpp

5. SIXTEEN BITS DATA SWITCHES:
16pcs toggle switches and corresponding output point. When switch is set at "down" position, the output is LO level; contrarily, it is to be HI level while setting at "up" position.

6. TWO PULSE SWITCH
(WITH 2 SET OF OUTPUT: ($\overline{A}$, A , $\overline{B}$, B))
2pcs pushbuttons contain switches debouncer for eliminating the bounce caused by switch from "open" to "close" or from "close" to "open" position.

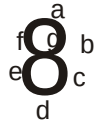
7. SPEAKER:
2-1/2 inch diameter, 8 ohm/0.5W to be used for load.

8. FOUR CHANNEL ADAPTOR:
Both of the two banana sockets' and two BNC jacks' point tips are changeable. It is suitable for M21-7000 to be connected with peripherals.

9. TWO DIGITS OF 7 SEGMENT LED DISPLAY
(A) Output display
Numerical designs and resultant displays

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

segment identification



(B) Function tables

Decimal Or Function	Inputs D	C	B	A	Outputs a	b	c	d	e	f	g
0	L	L	L	L	L	L	L	L	L	L	H
1	L	L	L	H	H	L	L	H	H	H	H
2	L	L	H	L	L	L	H	L	L	H	L
3	L	L	H	H	L	L	L	L	H	H	L
4	L	H	L	L	H	L	L	H	H	L	L
5	L	H	L	H	L	H	L	L	H	L	L
6	L	H	H	L	H	H	L	L	L	L	L
7	L	H	H	H	L	L	L	H	H	H	H
8	H	L	L	L	L	L	L	L	L	L	L
9	H	L	L	H	L	L	L	H	H	L	L
10	H	L	H	L	H	H	H	L	L	H	L
11	H	L	H	H	H	H	L	L	H	H	L
12	H	H	L	L	H	L	H	H	H	L	L
13	H	H	L	H	L	H	H	L	H	L	L
14	H	H	H	L	H	H	H	L	L	L	L
15	H	H	H	H	H	H	H	H	H	H	H

10. SIXTEEN BITS LED DISPLAY:
16 red LED's separate input terminals. The LED will be lighted up when input is at "HI level" ,and it will be turned off when it is at no input or at "LO level" .

11. UNIVERSAL CONNECTOR FIXED HOLDER:
It reserves universal connector fixed holder on the panel in order to be connected with various universal connectors, which are available as below:
optional accessories:
(1) Straight header 60 pin
(2) Card edge connector 2.54mm 62pin
(3) D sub25 pin connector, male & female
(4) Card edge connector 3.96mm 56pin
(5) Dip sockets connector 28 pin & 40 pin

12. OTHER STANDARD ACCESSORIES:
(1) Power cord
(2) Pin : 10cm 20pcs/20cm 20pcs
(3) User manual

13. DIMENSIONS(W×H×D): 258×95×334mm

14. WEIGHT: 4.5kg

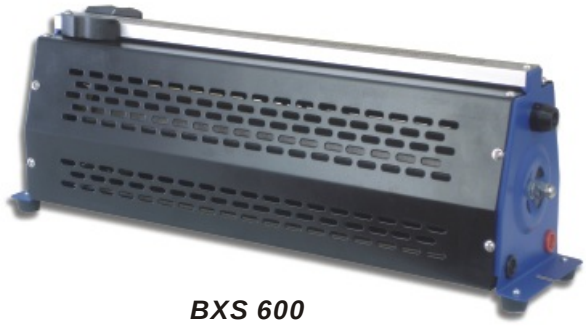
BXS SERIES

Feature

. 100 scale division to show the resistance setting.
. Enclose in robust sheet metal cover
. Good linearity
. Sliding contact of coppers graphite

Specifications

. Max. Working Voltage: 380VAC, 400VDC
. Resistance tolerance: ±10%
. Insulation resistance: $>3\times10^{9}\Omega$
. Earthing resistance: $<0.1\Omega$
. Rated resistance: see table



BXS 600

Model	Power VA	Resistance (Ω)	Max. Current	Dimensions (W×H×D)	Ceramic Pipe diameter	Weight (kg)
BXS 150	160	10	4A	285×140×95mm	47mm	1.8
		33	2.2A			
		100	1.25A			
		330	0.7A			
		1000	0.4A			
		3300	0.22A			
BXS 300	320	3.3	10A	385×140×95mm	47mm	2.4
		10	5.7A			
		33	3.1A			
		100	1.8A			
		330	1.0A			
		1000	0.57A			
		3300	0.31A			
		10000	0.18A			
BXS 600	640	1.6	20A	485×160×100mm	64mm	3.2
		5	11.4A			
		16.5	6.2A			
		50	3.6A			
		165	2A			
		500	1.1A			
		1650	0.63A			
		5000	0.36A			

BXD SERIES CE

Feature

. 100 scale division to show the resistance setting.
. Good linearity
. Fused safety socket of the slide bar
. Enclose in robust sheet metal cover
. Sliding contact of coppers graphite
. More tighter structure
. New apparance design

Specifications

. Max. Working Voltage: 380VAC, 400VDC
. Resistance tolerance: ±10%
. Insulation resistance: $>3\times10^{9}\ \Omega$
. Earthing resistance: $<0.1\ \Omega$
. Rated resistance: see table

BXD160

BXD300

Model	Power VA	Resistance (Ω)	Max. Current	Dimensions (W×H×D)	Ceramic Pipe diameter	Weight kg
BXD160	160	3.3	7A	240×180×195mm	64mm	2.2
		10	4A			
		33	2.2A			
		100	1.25A			
		330	0.7A			
		1000	0.4A			
		3300	0.22A			
BXD300	320	3.3	10A	380×180×100mm	64mm	2.8
		10	5.7A			
		33	3.1A			
		100	1.8A			
		330	1.0A			
		1000	0.57A			
		3300	0.31A			
		10000	0.18A			
BXD600	640	1.6	20A	480×180×100mm	64mm	3.5
		5	11.4A			
		16.5	6.2A			
		50	3.6A			
		165	2A			
		500	1.1A			
		1650	0.63A			
		5000	0.36A			

TM204 TESLAMETER CE

Features

.Switching measures of BX and BZ
.Biaxial probe removable and graduation provided
.Double sensors protection
.2 ranges of measure:20 mT or 100mT
.Analog output

TM204

Specifications

.Range:	20mT	
	200mT	
.Display:	2000 digits LCD	
.Resolution:	10μT	
.Accuracy:	2% Rdg ± 3 digits (20mT)	
	2% Rdg ± 1 digit (100mT)	
.Analog:	Sensitivity:	10mV/mT(20mT)
		1mV/mT(100mT)
	Impendence:	4.7kΩ
	Connection:	safety socket Φ4mm
.Power supply:	220-240V, 50-60Hz	
.Dimensions:	230(W)×85(H)×240(D)mm	
.Weight:	1kg	

RXG250 SERIES SOLENOID CE

Features

.Simple application allows you to perform various manipulations
.Influence of L, I and the number of turns
.Axial guide for teslameter probes

RXG250

RXG250B

RXG250T

Specifications

.Pipe length:	500mm
.Pipe material:	Ceramic
.Pipe diameter:	50mm
.Windings material:	Copper wires
.Dimensions:	620(W)×100(H)×120(D)mm
.Weight:	3kg

Model	Windings	Windings diameter	I_{max}	Intermediary terminals
RXG250	2×250T	0.92mm	7A(parallel)	×
RXG250B	500T	0.92mm	3.5A	×
RXG250T	250T+250T	1.0mm, 0.77mm	3.5A	√

BXR SERIES RESISTOR BOX CE

Features
.High accuracy to 1%
.Economical, high performance high resistance decade for all laboratory
.Plastic cabinet for better insulation

BXR-04 Specifications

Decade	Range	Max. Current	Dimension(mm) (L×W×H)	Weight
1	1Ω~10Ω	700mA	190×140×80	0.5kg
2	10Ω~100Ω	200mA		
3	100Ω~1kΩ	70mA		
4	1kΩ~10kΩ	20mA		

BXR-04

BXR-05 Specifications

Decade	Range	Max. Current	Dimension(mm) (L×W×H)	Weight
1	1Ω~10Ω	700mA	190×140×80	0.5kg
2	10Ω~100Ω	200mA		
3	100Ω~1kΩ	70mA		
4	1kΩ~10kΩ	20mA		
5	10kΩ~100kΩ	7mA		

BXR-05

BXR-06 Specifications

Decade	Range	Max. Current	Dimension(mm) (L×W×H)	Weight
1	1Ω~10Ω	700mA	170×240×90	0.8kg
2	10Ω~100Ω	200mA		
3	100Ω~1kΩ	70mA		
4	1kΩ~10kΩ	20mA		
5	10kΩ~100kΩ	7mA		
6	100kΩ~1MΩ	1mA		

BXR-06

BXR-07 Specifications

Decade	Range	Max. Current	Dimension(mm) LxWxH	Weight
1	1Ω~10Ω	700mA	170x240x90	0.8Kg
2	10Ω~100Ω	200mA		
3	100Ω~1kΩ	70mA		
4	1kΩ~10kΩ	20mA		
5	10kΩ~100kΩ	7mA		
6	100kΩ~1MΩ	1mA		
7	1MΩ~10MΩ	0.11mA		

BXR-07

BXL-07 INDUCTOR BOX

Features
.High accuracy to 5%(decade 1~6); 10%(decade 7)
.Economical, high performance high resistance decade for all laboratory
.Plastic cabinet for better insulation

BXL-07

BXL-07 Specifications

Decade	Range	Max.DC Current	Dimension(mm) (L×W×H)	Weight	
1	1μH~10μH	300mA			
2	10μH~100μH	200mA			
3	100μH~1mH	100mA			
4	1mH~10mH	100mA	170×240×90	1.2kg	
5	10mH~100mH	70mA			
6	100mH~1H	50mA			
7	1H~10H	40mA			

BXC-05 CAPACITOR BOX

Features
.High accuracy to 5%
.Economical, high performance high resistance decade for all laboratory
.Plastic cabinet for better insulation

BXC-05

BXC-05 Specifications

Decade	Range	Max.Voltage	Dimension(mm) (L×W×H)	Weight	
1	0.1nF~1nF				
2	1nF~10nF				
3	10nF~100nF	300V_{DC}/230V_{AC}(50Hz)	170×240×90	0.8kg	
4	100nF~1μF				
5	1μF~10μF				

RM-7 RESISTOR MATRIX

Features

.New design and convenience operation
.High accuracy to 1%
.Plastic cabinet for better insulation

RM-7

Specifications

Range:	0~11.111MΩ (1Ω steps) with seven decades
Accuracy:	1%
Wattage:	0.5W
Internal stray resistor:	0.3Ω
Dimensions:	190×140×80 mm
Weight:	400g

CM-5 CAPACITOR MATRIX

Features

.New design and convenience operation
.High accuracy to 5%
.Plastic cabinet for better insulation

CM-5

Specifications

Range:	0~11.111μF(100pF steps) with five decades
Accuracy:	5%
Voltage limit:	50VDC (non-polarized capacitor)
Internal residual capacitor:	50pF
Dimensions:	190×140×80 mm
Weight:	350g

IM-4 INDUCTOR MATRIX

Features

.New design and convenience operation
.High accuracy to 5%
.Plastic cabinet for better insulation

IM-4

Specifications

Range:	0~111.1mH (10μH steps) with four decades
Accuracy:	5%
Current limit:	100mA
Internal stray inductor:	0.6μH
Dimensions:	190×140×80 mm
Weight:	450g

DBR SERIES RESISTOR BOX

Features

.High accuracy to 1‰

DBR-06 Specifications

Decade	Range	Max. Current	Dimension(mm) (W × H × D)	Weight
1	0.1Ω ×10	700mA	285×140×215	2.2kg
2	1Ω ×10	700mA		
3	10Ω ×10	200mA		
4	100Ω ×10	70mA		
5	1000Ω ×10	20mA		
6	10000Ω ×10	7mA		

DBR-06

DBR-07 Specifications

Decade	Range	Max. Current	Dimension(mm) (W × H × D)	Weight
1	0.01Ω ×10	700mA	285×140×215	2.2kg
2	0.1Ω ×10	700mA		
3	1Ω ×10	700mA		
4	10Ω ×10	200mA		
5	100Ω ×10	70mA		
6	1000Ω ×10	20mA		
7	10000Ω ×10	7mA		

DBR-07

DBC-05 CAPACITOR BOX

Features

.High accuracy to 2%

DBC-05 Specifications

Decade	Range	Max. Voltage	Dimension(mm) (W × H × D)	Weight
1	0.1nF×10	$300V_{DC}/230V_{AC}$(50Hz)	285×140×215	2.2kg
2	1nF×10			
3	10nF×10			
4	100nF×10			
5	1μF×10			

DBC-05

DBL-06 INDUCTOR BOX

Features

.High accuracy to 2%

DBL-06 Specifications

Decade	Range	Max. Current	Dimension(mm) (W × H × D)	Weight
1	0.01mH×10	200mA	285×140×215	2.2kg
2	0.1mH×10	100mA		
3	1mH×10	100mA		
4	10mH×10	70mA		
5	100mH×10	50mA		
6	1H×10	40mA		

DBL-06

DWB-01 WHEATSTONE BRIDGE CE NEW

Features

.Wide measuring range 1Ω to 10MΩ
.Built in galvanometer and bridge power source
.Null measuring method
.One multiplier and four measuring arms
.Guarding and shielding with a portable metal case

DWB-01

Electrical characteristics:

Measuring range: 1Ω~11.11MΩ
Measuring armfour decade: 1000Ω ×10 + 100Ω ×10 + 10Ω ×10 + 1Ω ×10

Multiplier	Measuring range	Accuracy	Bridge power source
×0.001	1~11.11Ω	0.5%*/0.5%**	Internal battery 3V External power 4.5V
×0.01	10~111.1Ω	0.2%*/0.2%**	
×0.1	100~1111Ω	0.1%*/0.1%**	
×1	1k~5kΩ	0.1%*/0.1%**	
	5k~11.11kΩ	0.2%*/0.1%**	
×10	10k~50kΩ	0.1%*/0.1%**	
	50k~111.1kΩ	1%*/0.1%**	
×100	100k~500kΩ	2%*/0.2%**	Internal battery 3V External power 15V
	500k~1111kΩ	5%*/0.2%**	
×1000	1M~11.11MΩ	20%*/0.5%**	

*Use internal battery power source
**Use external power source

Galvanometer(built-in)sensitivity:	0.6 μA/div., battery: 9V 6F22
Operating temperature:	5~35℃
Humidity range:	85%max., relative
Dimensions:	255×140×210 mm
Weight:	2.5kg

DKB-01 KELVIN BRIDGE

NEW

Features

.Wide measuring range 0.0001Ω to 11Ω
.Built in standard resistors
.Built in galvanometer and bridge power source
.Null measuring method
.One multiplier and two measuring dials
.Guarding and shielding with a portable metal case

DKB-01

Electrical characteristics:

Measuring range: 0.0001Ω to 11Ω
Measuring dials: one decade: 0.01×10
one linearity diad:0.001~0.01

Multiplier	Measuring range	Accuracy	Standard resistor	Bridge power source
×100	1~11Ω	0.2%	10Ω	
×10	0.1~1.1Ω	0.2%	1Ω	
×1	0.01~0.11Ω	0.2%	0.1Ω	1.5V×2
×0.1	0.001~0.011Ω	0.5%	0.01Ω	
×0.01	0.0001~0.0011Ω	1%	0.001Ω	

Galvanometer(built-in)sensitivity: 0.6μA/div., battery: 9V 6F22
Operating temperature: 5~35℃
Humidity range: 85%max., relative
Dimensions: 285×140×215 mm
Weight: 2.5kg

DPM-01 DC POTENTIOMETER CE

NEW

DPM-01

Features

.Precise measure DC potential or voltage
.Standard DC potential output for thermal instrumentation calibration
.Calibrate thermocouple and secondary thermal instrumentation
.Together with standard resistor, it may measure DC current and resistance
.Two measuring ranges 0~230mV, 0~46mV
.Null measuring method with built in galvanometer
.One multiplier and two measuring dials
.Guarding and shielding with a portable metal case

Electrical characteristics:

Measuring dials: one stepper: 0~220mV (22 steps)
one linearity diad:0~10mV

Measure potential or voltage

Multiplier	Measuring range	Resolution	Working current	Accuracy
×1	0~230mV	50uV	5mA	0.1%
×0.2	0~46mV	10uV	1mA	

Potential output

Multiplier	Measuring range	Resolution	Working current	Accuracy
G1	0~230mV	50uV	5mA	0.1%
G0.2	0~46mV	10uV	1mA	

Working power source:	1.5V D
Reference voltage source:	9V 6F22
Galvanometer(built-in)sensitivity:	0.6 μ A/div., battery: 9V 6F22
Operating temperature:	5~35℃
Humidity range:	85%max., relative
Dimensions:	285×140×215 mm
Weight:	2.5kg

F5-001 CAPACITOR BOX

Features:
.Safety moulded piggy-back jumper to make the series and parallel connections easier
.Non-polar capacitor box

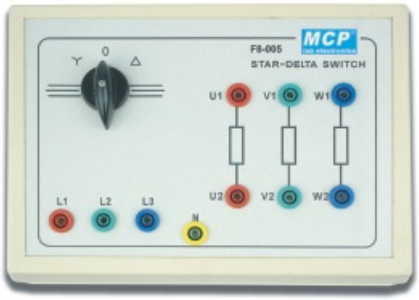
Specifications:
.0 to 15 μ F, supplied with 12 jumpers
.Accuracy: 1%
.U_{MAX}: 400V
.Safety sockets:Φ4mm
.C(μ F): 0.5-1-2-2-5-5
.Dimensions(W×H×D): 90×100×160mm
.Weight: 0.5kg

F5-001

F8-005 STAR-DELTA SWITCH

Features:
.Star/delta starter for the three-phase squirrel-cage induction motors

Specifications:
.Max. Voltage: 400V
.Max. Current: 10A
.Safety sockets: Φ4mm
.Dimensions(W×H×D): 240×90×170
.Weight: 0.5kg



F8-005

F4 SERIES EXPERIMENTS BOXES

NEW

Features
. Plastic box can be mounted on other surface
. Φ4mm safety socket connection
. Dimensions (W×H×D): 115×80×130mm

F4-100 series transformer

. 230VAC input and 0-6VAC-12VAC output
. 50VA rated power (Max.)
. Fuse for over current protection

F4-101

F4-200 series current transformer

. 20A input and 5A, 2.5A output
. 720V operating voltage (Max.)
. Working frequency: 50Hz/60Hz
. Accuracy: 1.0%

F4-201

F4-300 series shunt

. 20A input and 100mV output
. Accuracy: 0.5%

F4-301

SINGLE & THREE-PHASE RESISTIVE, CAPACITIVE AND INDUCTIVE LOAD

Features:
.Steps of 20%
.DC mode or 220V single phase
.Three-phase star 380V and delta 220V

Specifications

Model	Character	Power	Resistor	Dimensions (W × H × D)	Weight(kg)	Phase
SRL-1000	Resistive	200W/400W/600W 800W/1000W	242Ω/121Ω/81Ω 61Ω/48Ω	200×250×425	8	Single
TRL-3000	Resistive	(200W/400W/600W 800W/1000W) X 3	(242Ω/121Ω/81Ω 61Ω/48Ω) X 3	420×250×425	24	Three

SRL-1000

Both SRL-1000 and TRL-3000 have AC cooling fan(s) on back panel

TRL-3000

Model	Character	Power	Capacitor	Dimensions (W × H × D)	Weight(kg)	Phase
SCL-1000	Capacitive	200W/400W/600W 800W/1000W	13uF/26uF/39uF 53uF/66uF	150×130×185	1.5	Single
TCL-3000	Capacitive	(200W/400W/600W 800W/1000W) X 3	(13uF/26uF/39uF 53uF/66uF) X 3	300×130×185	3	Three

SCL-1000

TCL-3000

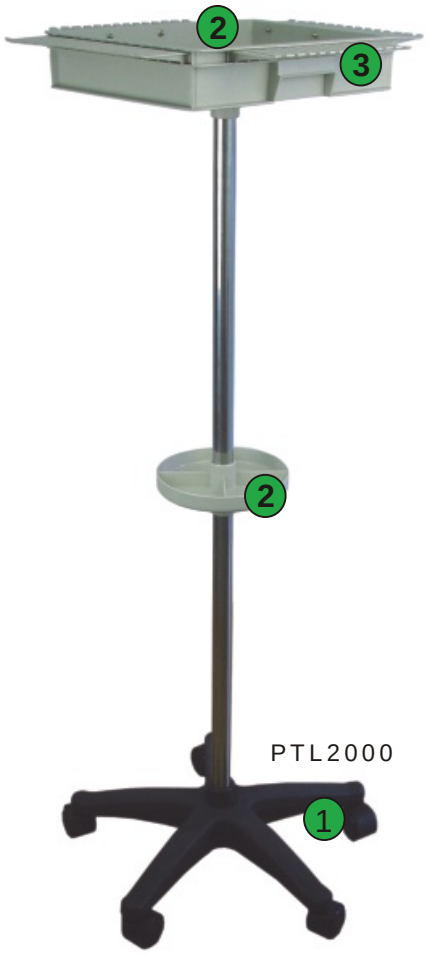
Model	Character	Power	Inductor	Dimensions (W × H × D)	Weight	Phase
SIL-1000	Inductive	200W/400W/600W 800W/1000W	770mH/385mH/257mH 193mH/154mH	190×150×365	10	Single
TIL-3000	Inductive	(200W/400W/600W 800W/1000W) X 3	(770mH/385mH/257mH 193mH/154mH) X 3	380×150×365	30	Three

SIL-1000

TIL-3000

Note: all the three phase load can be used independently as three single phase loads

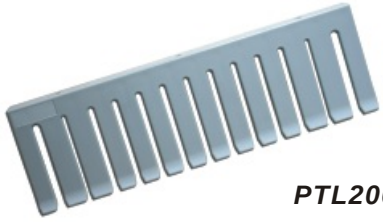
TEST MATER



PTL2000

HOLDER + CONTAINER
This original product is a probe-leads stand that can be moved in all directions because of its mulity-direction castors.
Suitable for laboratories and classrooms.
Composed of:
1. 5 multi-direction castors
2. Plastic storage containers (PTL2001) for accessories or measuring equipment
3. Holders

HOLDER



PTL2001

Mounted on the wall or suitable places for holding test leads and probes.
50 leads minimum
Mixed plastical holder composed of :
- 2 rows for large leads (BNC type)
- 2 rows for small leads (2mm type)
- 9 rows for standard leads (4mm type)

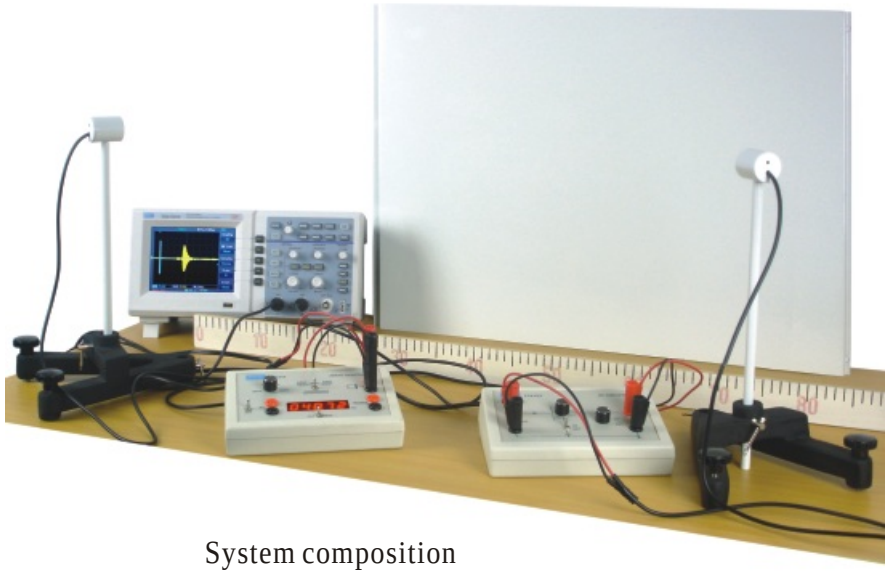
Ultrasonic waves experiment system of reflexion

Objects
Demonstrating the principle of an echo sounder.
Determining the velocity of sound in air from the transit time of a sound pulse and the distance to the reflecting object.
Determining distance by measuring the transit time of the sound pulse.

Principles
Ultrasonic waves are reflected at the boundary surfaces between media with differing resistances to sound waves. An echo sounder (or sonar) device emits pulsed ultrasonic signals and measures the time in which a signal is reflected from such a boundary surface to the receiver. To simplify the configuration, the transmitter and receiver are in the same location.

The time between transmission and reception can be used to determine the distance to the reflecting object (if the velocity of sound is known), or to determine the velocity of sound over a known distance. This method is commonly used e.g. to determine water depths at sea.
In the experiment, the echo-sounder principle is used to determine the velocity of sound in air, and to determine distances.

Two ultrasonic transducers serve as the transmitter and receiver, depending on their connection.
A piezoelectric body converts electrical to mechanical energy. When the AC voltage is applied to the piezoelectric body, the transducer configured as a transmitter supplies a sufficiently high sound amplitude at a resonance frequencies (approx. 40 kHz). Conversely, sound waves generate mechanical oscillations in the transducer when configured as a receiver. The amplitude of the resulting piezoelectric AC voltage is proportional to the sonic amplitude.



System composition

2 pcs	Ultrasonic transducers 40 kHz	P416000
1 pc	AC amplifier	F16-015
1 pc	Generator 40 kHz	F16-014
1 pc	Digital storage oscilloscope	DQ7202CA
2 pcs	Test leads	PTL927
2 pcs	Stand base, V-shape	P101413
1 pc	Metal scale, 1 m	
1 pc	Reflection plate	

F16-014 Generator 40 kHz

Features
With continuance and spacing square wave generator for operating source, for ultrasonic transducer 40 kHz (P416000) as an emitter. Inner and external frequency counter

Technical Data
Generator
Frequency range: 40 kHz, can be set from 35 kHz to 50 kHz
Pulse operation:
pulse duration approx. 0.2 ms
pulse spacing approx. 80 ms
Transducer output voltage: >18 Vpp
Trigger output voltage: >9 Vpp
Counter Frequency range: 1KHz~50MHz
Sensitivity: 100mV
Max. input voltage: 20V
Connection sockets: 4 mm dia.
Dimensions: 19 cm × 13.5 cm × 7 cm

F16-015 AC-amplifier

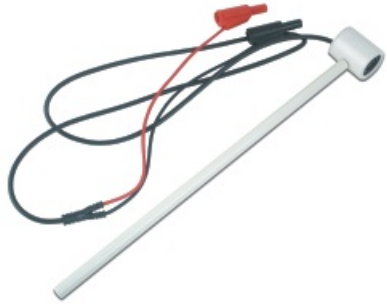
Features
Sensitive amplifier with microphone input for verifying ultrasonic waves in conjunction with an ultrasonic transducer (P416000) as a receiver, and sound amplification

Technical Data
Gain: 10× to 1000×, continuously adjustable
Frequency range: 10 kHz (100Hz microphone input) to 50 kHz
Outputs: signal, trigger and level, short-circuit proof
Max. signal output: 4 Vp-p
Trigger output: TTL compatible
Max. DC level output: 4 V
Connection sockets: 4 mm dia.
Dimensions: 19 cm × 13.5 cm × 7 cm
Weight: 0.5kg

P416000 Ultrasonic transducer 40 kHz

Features
Piezoelectric air ultrasonic transducer for experiments in the areas of geometric and wave-mechanical acoustics. The transducer is used as transmitter and receiver. In housing, on stand rod, with coax. connection cable.

Technical Data
Resonance frequency: 40 kHz
Bandwidth: approx. 6 kHz
Capacitance: 2000 pF
Connection: 1 m coax. cable with 4 mm sockets
Housing: 48 mm × 27 mm dia.
Stand rod: 20 cm × 10 mm dia.



TBF-100 SERIES

Features

.Vertical assembly facility, allows versatile combinations

1
Model No. TBF-100
Description: Multi function demonstration frame
Dimensions: 97×85×34 cm

2
Model No. TBF-101
Description: Shelf
Dimensions: 93×32 cm

3
Model No. TBF-102
Description: Shelf
Dimensions: 46.5×32 cm

4
Model No. TBF-103
Description: Metal board
Dimensions: 93×62 cm

5
Model No. TBF-104
Description: Metal board
Dimensions: 93×28 cm

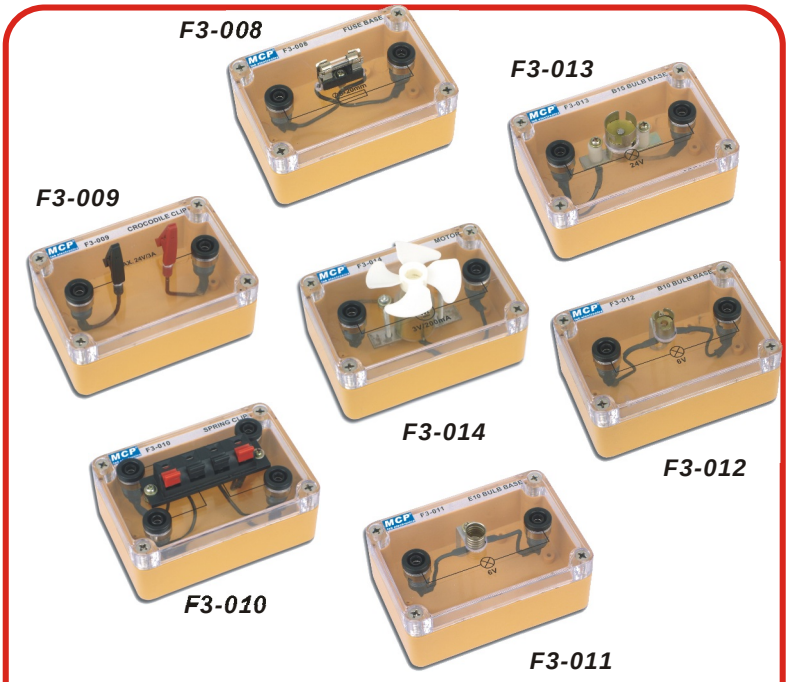
6
Model No. TBF-105
Description: Metal board
Dimensions: 46.5×28 cm

7
Model No. TBF-106
Description: Metal board
Dimensions: 46.5×62 cm

F3 SERIES NEW

Features

. Light and magnetic fixture
. Visible components
. Φ4mm safety socket connection
. Customization allows
. Dimensions (W × H × D):100 × 68 × 40mm



F3-008
Fuse

6×20,250V,3A

F3-009
Crocodile clip

24V,3A

F3-010
Spring clip

24V,3A

F3-011
E10 bulb base

6V

F3-012
B10 bulb base

6V

F3-013
B15 bulb base

24V

F3-014
DC Motor

3V,200mA

F3-001
Resistor

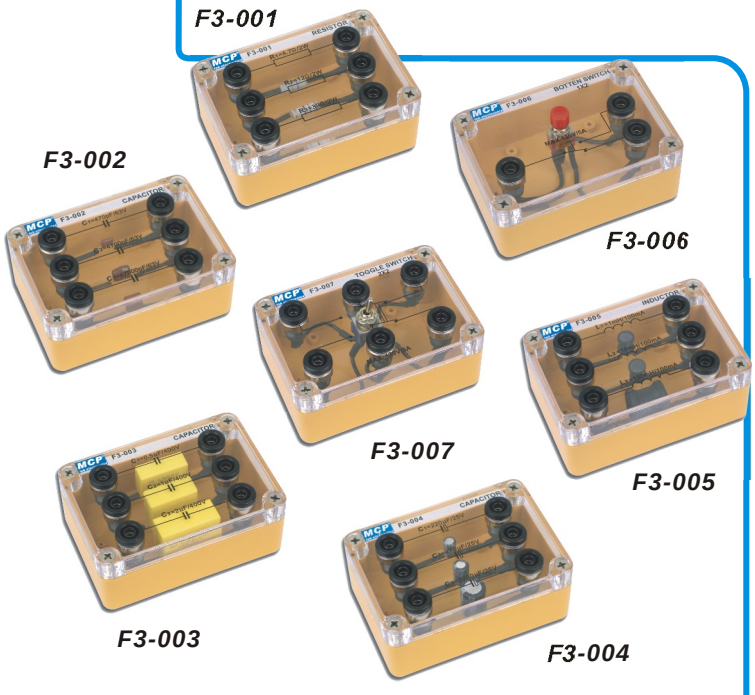
4.7Ω,12Ω,39Ω,2W

F3-002
Capacitor
470pF,4700pF
47000pF,63V

F3-003
Capacitor

0.5μF,1μF,2μF,400V

F3-004
Capacitor
220μF,470μF
2200μF,25V



F3-005
Inductor
1mH,10mH
100mH,100mA

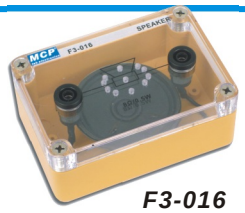
F3-006
Push switch

1×2,120V,5A

F3-007
Toggle switch

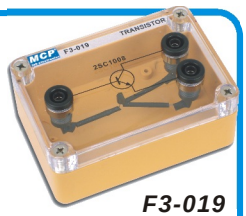
2×2,120V,5A


F3-015


F3-016


F3-017


F3-018


F3-019

F3-015
Buzzer

3~7V

F3-16
Speaker

8Ω,0.3W


F3-020


F3-021


F3-022


F3-023

F3-017
Potentiometer

1KΩ,0.5W

F3-018
Diode

1N4004

F3-019
Transistor

2SC1008

F3-020
Thyristor

97A6

F3-021
LED

6V

F3-022
Rectifier

400V,10A

F3-023
Transformer

220V,6V-0-6V,1A


F3-024


F3-027

F3-024
Toggle switch

2X2

F3-025
Toggle switch

1X2


F3-025


F3-028

F3-026
DC current meter

0~5A
Accuracy: 2.5%


F3-026


F3-029

F3-027
DC voltage meter

0~30V
Accuracy: 2.5%

F3-028
AC current meter

0~5A
Accuracy: 2.5%

F3-029
AC voltage meter

0~30V
Accuracy: 2.5%


F3-160


F3-162

F3-161
Amplifier modulation

A/D conventor AD633


F3-161

F3-160
Operational amplifier

Amplifier TL081

F3-162
Detector

The circuit for demodulation

THE F3 SERIES EXPERIMENT

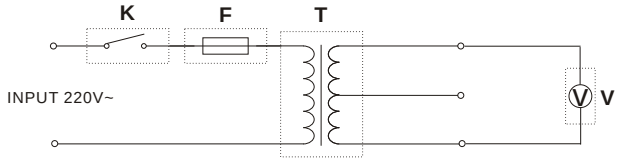
Use F3 series demomstration transparent components to do demonstrative experiment flexible. Choose the components and put them on the table or TBF-100 demonstration frame then connect them.

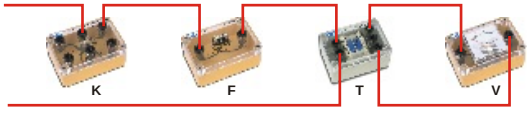
F3 DEMONSTRATION TRANSPARENT COMPONENTS WITH TBF-100

Example

1. Measurement of AC voltage with voltmeter

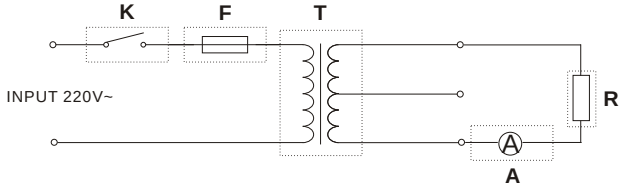
K: F3-007
F: F3-008
T: F3-023
V: F3-029

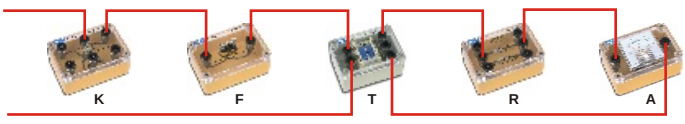




2. Measurement of AC current with ammeter

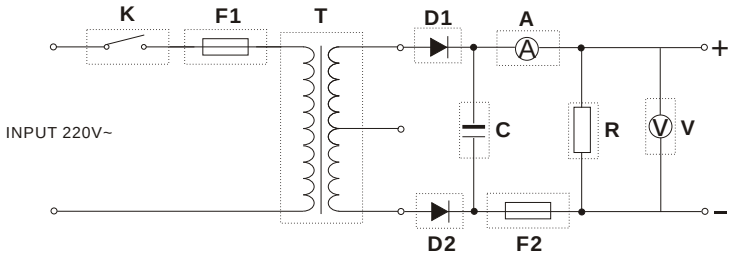
K: F3-007
F: F3-008
T: F3-023
A: F3-028
R: F3-001

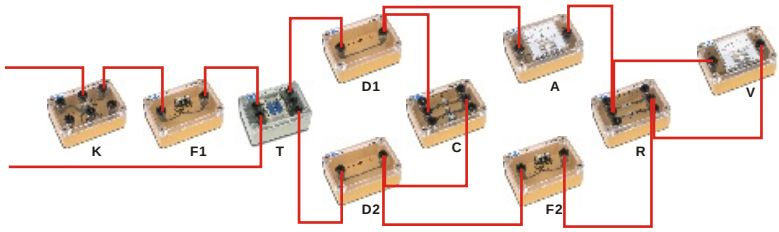




3. Full-wave rectifier

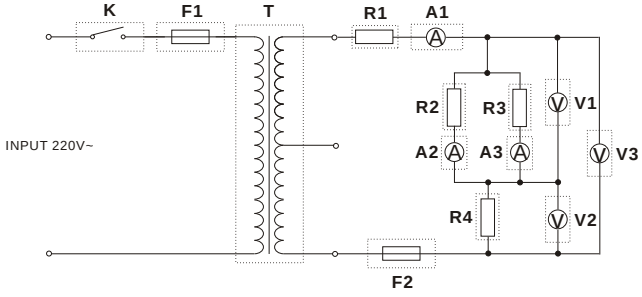
K:	F3-007
F1, F2:	F3-008
T:	F3-023
D1, D2:	F3-018
C:	F3-004
A:	F3-026
R:	F3-001
V:	F3-027

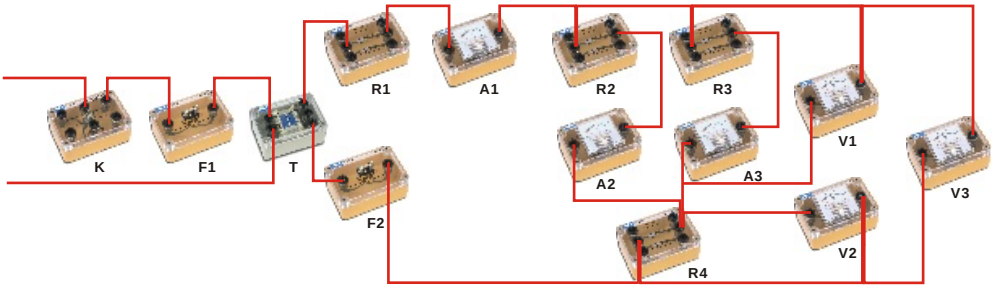




4. Series and parallel of resistors

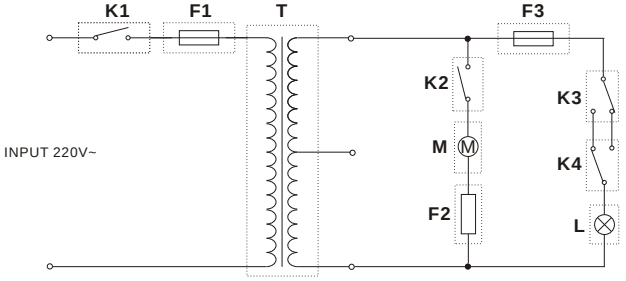
K:	F3-007
F1, F2:	F3-008
T:	F3-023
R1, R2, R3, R4:	F3-001
A1, A2, A3:	F3-028
V1, V2, V3:	F3-029

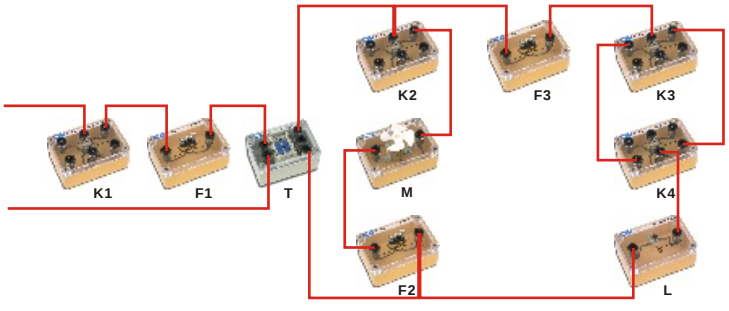




5. A fan by a one-way switch and a lamp by a two-way switch

K1, K2, K3, K4:	F3-007
F1, F2, F3:	F3-008
T:	F3-023
M:	F3-014
L:	F3-011





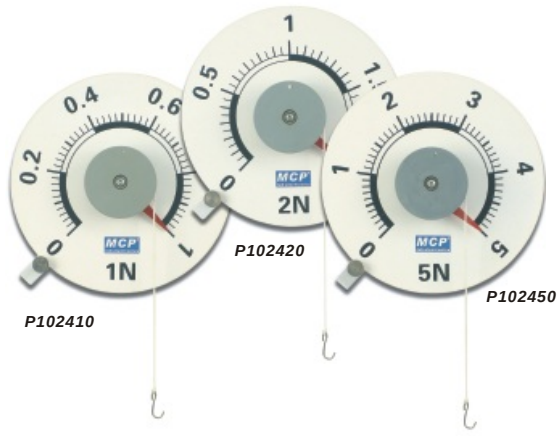
DYNAMOMETERS

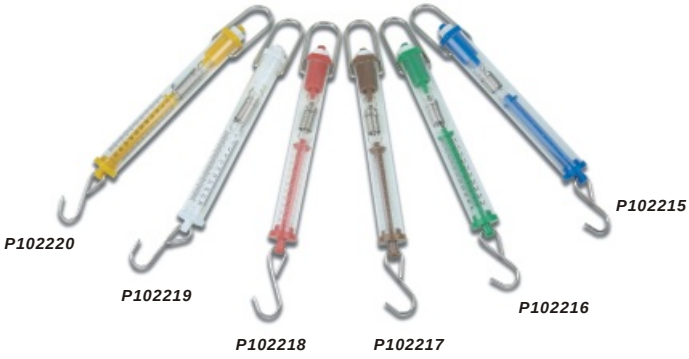
DIAL DYNAMOMETER

The spring-type dynamometer can be mounted on a magnetized board for the purpose of demonstration. Includeds pulley with ball bearing axles and cord groove, cord and hook. Large, easily visible round dial as well as zero-point adjustment using knurled screws

Force	No.
1N	P102410
2N	P102420
5N	P102450
10N	P102400

Diameter 175mm, precision 10% ofmax. measurement





TRANSPRENT DYNAMOMETER

Equipped with a scale on a transparent plastic sleeve. Lucid design, including a spring overstretch protection mechanism. Suitable for projection using the overhead projector

Force	color	No.
2.5N-250g	blue	P102215
5N-500g	green	P102216
10N-1000g	brown	P102217
20N-2000g	red	P102218
30N-3000g	White	P102219
50N-5000g	yellow	P102220

PRECISION DYNAMOMETER

In a strong aluminium alloy, with protection against overloading the spring. The scale is easily readable, as it consists of alternating red and yellow divisions

Force	No.
1N	P102221
2N	P102222
5N	P102223
10N	P102224
20N	P102225
30N	P102226
50N	P102227
100N	P102228

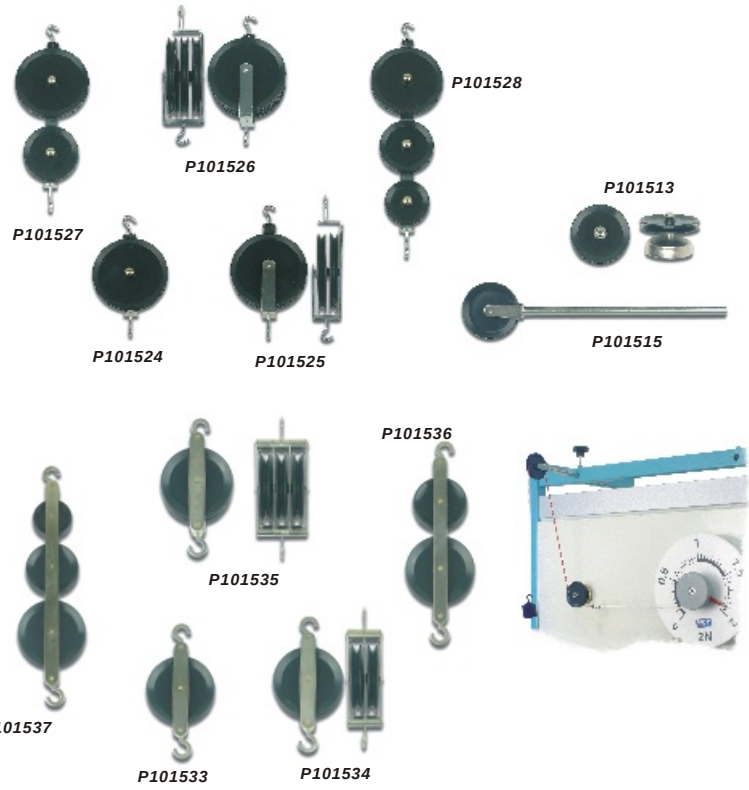
length 250mm,scale length 130mm, diameter 18mm, precision 1% ofmax. measurement

Composition of forces

PULLEIES

Pulley,pulley block,pulley with holder

Diameter	No.
50mm (with magnetic base)	P101513
70mm (with magnetic base)	P101514
50mm (with stand rod)	P101515
70mm	P101524
2 x 70mm	P101525
3 x 70mm	P101526
50mm+70mm	P101527
40mm+50mm+70mm	P101528
50mm	P101533
2 x 50mm	P101534
3 x 50mm	P101535
40mm+50mm	P101536
30mm+40mm+50mm	P101537



WEIGHT SETS

Description	Sets	Weights	No.
Covering a wide rangeof application as loads orweight	slotted weight set 100g	hook 10g x1,weight 10g x 9	P101211
	slotted weight set 200g	hook 20g x1,weight 20g x 9	P101212
	slotted weight set 250g	hook 50g x 1,weight20g x 9/10g x1/5g x 2	P101213
	slotted weight set 500g	hook 50g x1,weight 50g x 9	P101214
	slotted weight set 1000g	hook 100g x 1,weight100g x 9	P101215
Equipped on oneside with ahook and other side adowel pin formutual attachment. Weights onhanger for resolution of forcesapparatus	hook weight set 10g~1000g	10g,20g x 2,50g,100g,200g x 2,500g,1000g	P101111
Equipped on both sides with ahook for mutual attchment.Covering a wide range of applicationas loads orweight	hook weight set 500g	50g x 10	P101112
Equipped on one sidewith a hook and other side adowel pin formutual attachment. Covering awide range of application as small loadsor weight	plastic hook weight set55g	1g x 10,2gx 10,5g x5	P101113

Experiment with pulley and pulley block

UNIVERSAL BOSSHEAD

For connecting two stand tubes or stand rods

Material: Steel
Dimensions: 42 mm long, 28mm dia.
Clamping width: 8 to12 mm

P101612

CLAMP WITH HOOK

For connecting two stand tubes or stand rods

Material: cast iron
Length: 15 cm
Clamping width: 8to 14 mm

P101632

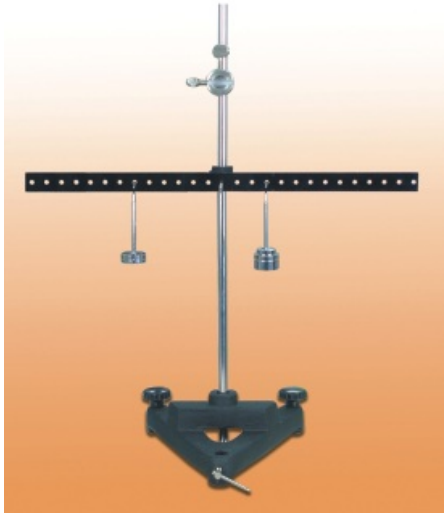
STAND BASE, V-SHAPE

For assemblies which require a high degree of stability, also when subjected to loads on one side.

Two holes with longitudinal slot and tommy screw on the bridge and the vertex. Two thread holes provided for levelling screws.

Jaw width for standrods: 8 to12 mm
Material: castiron
Length of sides: 22cm
Weight: 2.3 kgapprox.
Levelling screws: Adjustment range7 mm

P101413



Moment experiment

STAND ROD

Solid steel for suport any object

Dimensions	No.
Diameter 8mm, Length 25cm	P101013
Diameter 10mm, Length 50cm	P101026
Diameter 10mm, Length 50cm,M10	P101036

P101013

P101026

P101036

MAGNETIC BASE

For mounting experiment instruments and other equipment

	No.
4-mm axis	P101311
4-mm socket	P101312
Clamp	P101313
Hook	P101314
M6 inner screw thread	P101315

P101313

P101311

P101315

P101314

P101312

TB SERIES

Feature
.The benches are designed for the use of training, developing sevices, calibration and assembling benches

TB 1000

TB 1000
Training bench

.Height:81.5cm
.Width: 157cm
.Depth: 90cm
.4 adjustable stands or 4 wheels

TB1100
Training bench + Top frame

.Traning bench (TB1000)
.Top frame

TB 1200

TB1200
Training bench + instrument housing

1. Training bench (TB1000)
2. Instrument housing
  .Oscilloscope: CQ620 ×1
  .DC power supply: M10-TP303E ×1
  .Function generator: SG1639 ×1
  .RF generator: HG1500 ×1
  .Digital multimeter: MT8145 ×1
  . AC power supply: 0~250V, 6V, 12V, 24V
  .Soldering station ×1
  . AC outlet ×6
  . Test leads holder: PTL2001

EH818 NEW

EXPERIMENT SYSTEM OF ELECTRICAL INSTALLATIONS AND TESTING TECHNIQUES

Features

.Represent a small size building for residential use
.Analyze the correct procedures mounting such as:
1. Light and EMF distribution systems with energy counter (kWh)
2. Stair light system
3. Interphone system
4. Protective earth and equipotential system
.Testing of electrical installations according to the international (IEC) standards.
.Measure insulation, fault loop, impedance and voltage drop
.Execute continuity tests and checking of the protection devices on already wired and operative circuits
.Carrying out changes and transformations on already existing installations.

Specifications

.Mechanical characteristics
.Build in welded, chemically treated and epoxy painted sheet steel
.Each of the 4 available walls, several electrical and electronic components, embedded into flush-mounted junction boxes, are placed over hinged panels
.Whole structure is set on a wheel mobile base

Dimensions (W×H×D): 880×1300×800 mm
Weight: 100kg

Electrical characteristics

Wall 1 (main entrance)

- 1 Main power supply 230 V 16 A
- 1 Single-phase energy counter 230 V 20 A
- 1 Switchboard with earth leakage circuit brake and 3 thermal-magnetic circuit breakers
- 1 Interphone porter with 2 pushbuttons and 2 illuminated name-plates
- 1 Electric lock
- 1 Equipotential protective earth collector
- 1 Ground connections with 1-ohm resistor and sectioning terminals

Wall 2 (sitting room and kitchen)

- 1 Light installation with incandescent lamps 230V controlled by 2 pushbuttons and step-by-step relay
- 2 Outlets 230V 16A for sitting room users
- 1 Incandescent lamp 230V with dimmer
- 1 Door bell
- 1 Thermostat (day-time area)
- 1 Low energy consumption lamp controlled by two-way switches
- 2 Outlets 230V 16 A for electric household appliances
- 1 Interphone communicating with the gate porter
- 1 Buzzer for calls from bathroom

Wall 3 (bedroom and bathroom)

- 1 Incandescent lamp controlled by 2 two-way switches and 1 intermediate switch
- 1 Outlet 230V 16A for electrical household appliances
- 1 Single-phase outlet 230V 10A for the lights
- 1 Thermostat (night-time area)
- 2 Pushbuttons for service call
- 1 Pushbutton for emergency calls from the bathroom
- 1 Thermostat (bathrooms)
- 1 Outlet 230V 16A for boiler supply.

Wall 4 (office, stairwell, heating plant)

- 2 Lamps with switch
  1 Outlet 230V 16A for electric household appliances
- 1 Single-phase outlet 230V 10A for lights
- 1 Interphone communicating with the gate porter
- 1 Incandescent lamp 230V with two pushbuttons and time relay
- 1 Outlets 230V 16A for heating plant
- 3 Pilot lamps (simulation of water pumps for different heating areas)

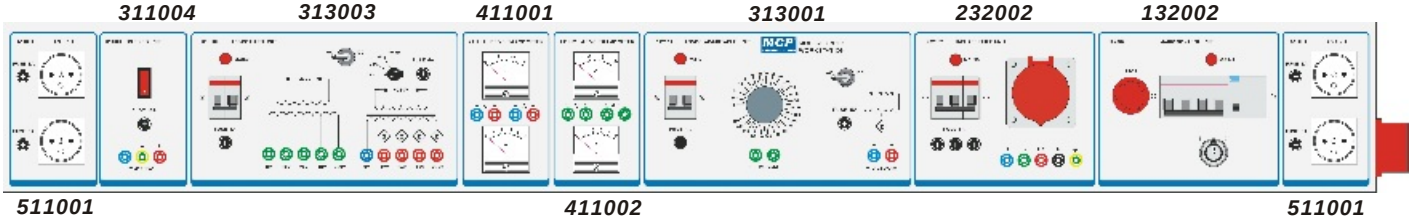
MULTI-PURPOSE WORKSTATION

Feature

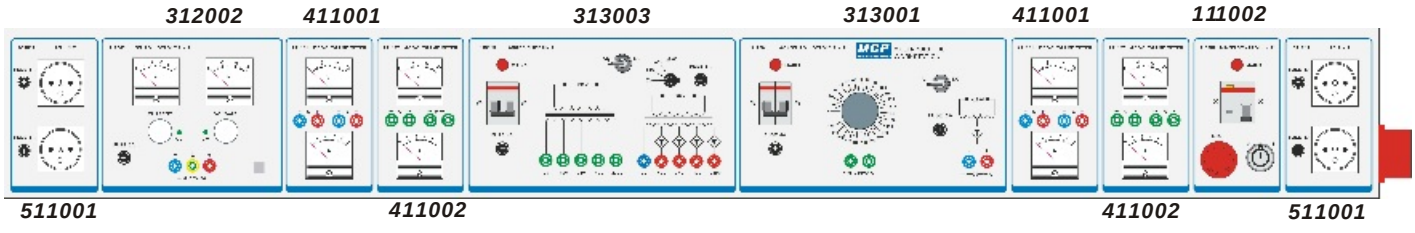
This multi-purpose workstation is worked with TB-1000 series training bench (Page 92). With the various combination of the control units, you can make a customized workstation that meet your requirement. Our control units can also be customized.

Three phase power input socket

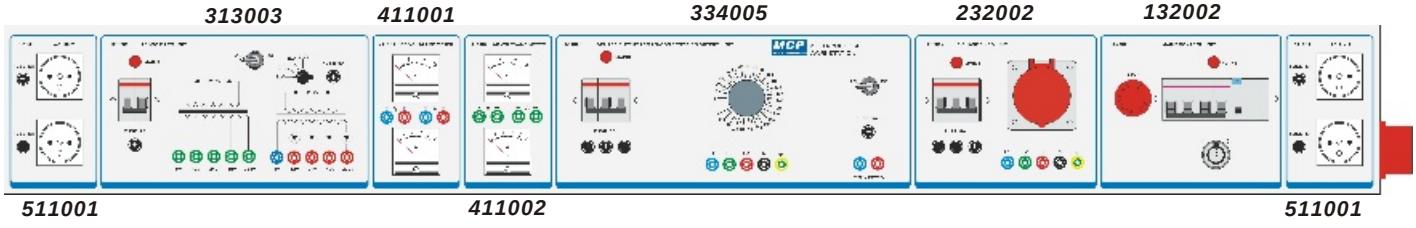
TB150-1



TB150-2



TB150-3

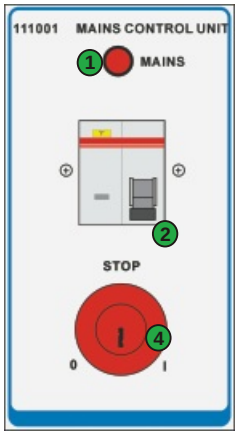


ONE-PHASE AND THREE-PHASE MAINS CONTROL UNIT

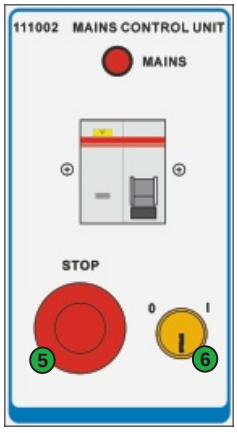
Model	Phase	Block(s)
111001	1	1
111002	1	1
132001	3	2
132002	3	2

*N Block(s) size (W×H×D) = (100×N)×194×231 mm

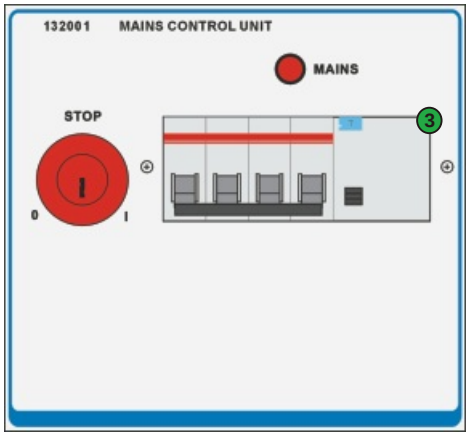
1 : Indicator of On/Off
2 : Single-phase electronic magnetic break switch (400V, 10A) and leakage protection switch (30mA)
3 : Three-phase electronic magnetic break switch (690V, 50A) and leakage protection switch (30mA)
4 : Emergency switch with On/Off key (660V,10A)
5 : Emergency switch (660V,10A)
6 : On/Off key (660V,10A)



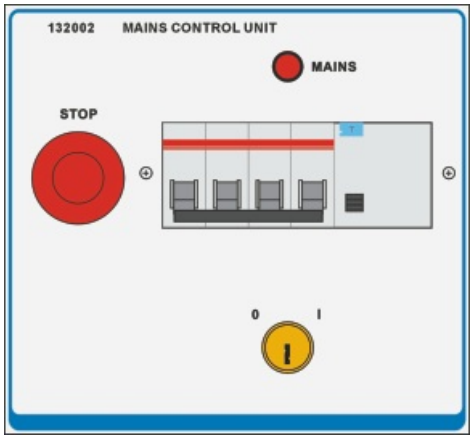
111001



111002



132001



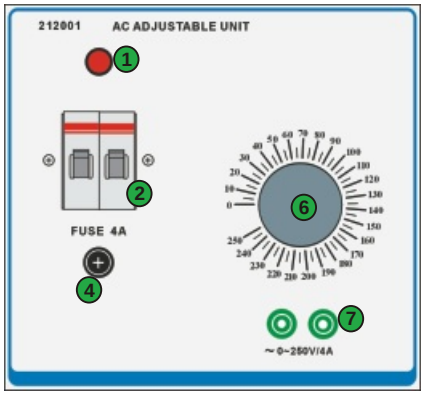
132002

AC POWER SUPPLY UNIT

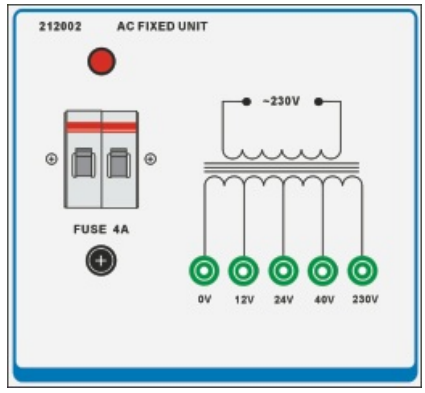
Model	AC output	Phase	Block(s)
212001	0~250V/4A	1	2
212002	12V/24V/40V/250V/4A	1	2
234001	0~250V/4A X 3Phase	3	4
232002	230V/4A X 3Phase	3	2

*N Block(s) size(W×H×D) = (100×N)×194×231 mm

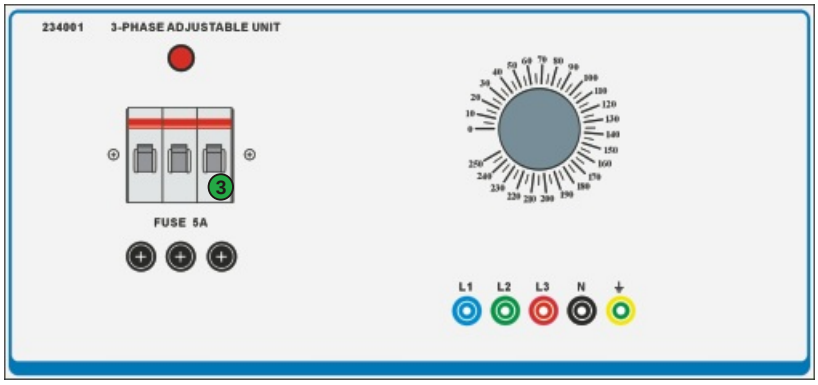
1: Indicator of on/off
2: Single-phase electronic magnetic break switch (400V, 10A)
3: Three-phase electronic magnetic break switch (690V, 50A)
4: Output fuse protection
5: Three-phase output socket
6: Voltage adjusting knob
7: Output safety sockets



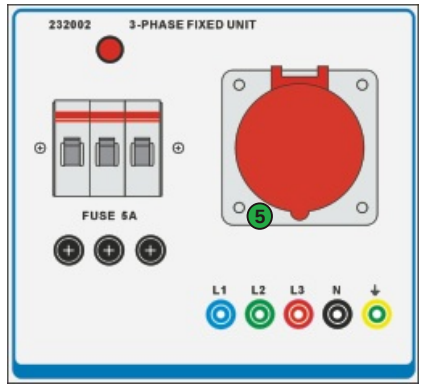
212001



212002



234001



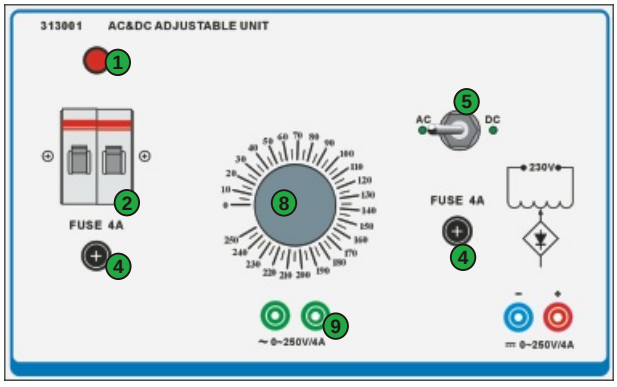
232002

DC & AC POWER SUPPLY UNIT

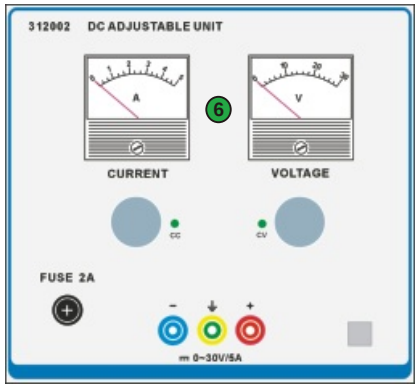
Model	AC output	DC output	Block(s)
313001	0~250V/4A	0~250V/4A(rectified DC)	3
312002	NA	0~30V/0~5A(regulated DC)	2
313003	12V/24V/40V/250V/4A	12V/24V/40V/250V/4A(rectified DC)	3
311004	NA	24V/10A(switching power supply)	1
334005	0~250V/4A X 3Phase	0~250V/4A(three phase rectified, 4% small ripple)	4

*N Block(s) size(W×H×D) = (100×N)×194×231 mm

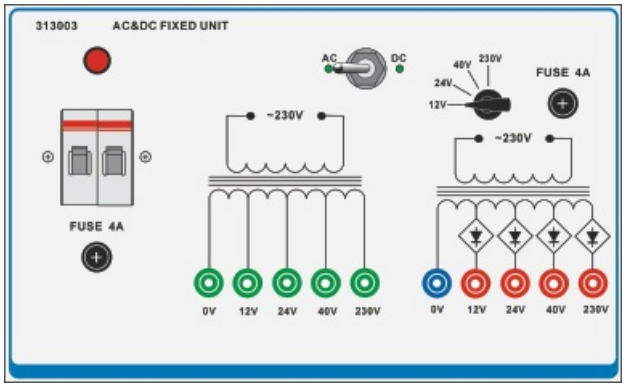
1: Indicator of on/off
2: Single-phase electronic magnetic break switch (400V, 10A)
3: Three-phase electronic magnetic break switch (690V, 50A)
4: Output fuse protection
5: AC/DC output change switch
6: Current meter and voltage meter
7: On/Off switch with LED indicator
8: Voltage adjusting knob
9: Output safety sockets



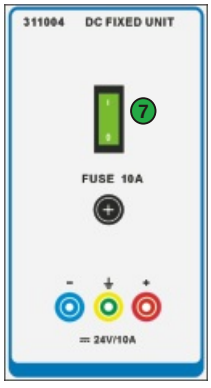
313001



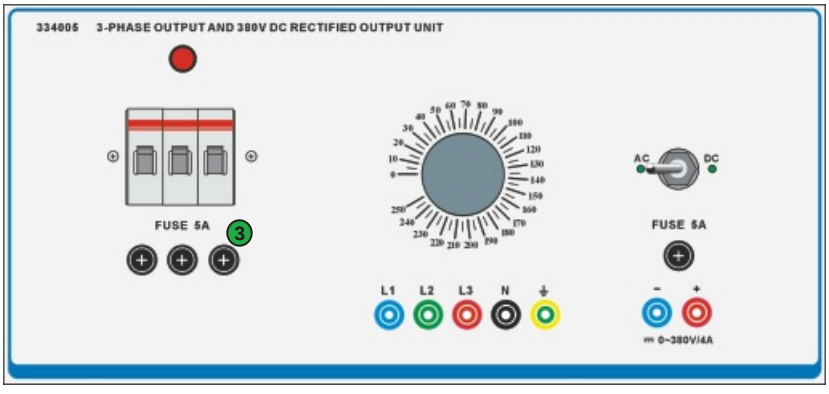
312002



313003

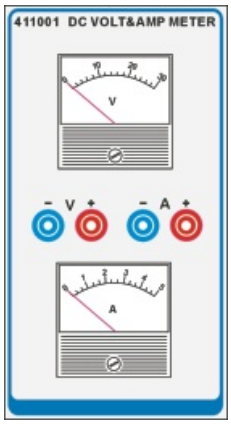


311004

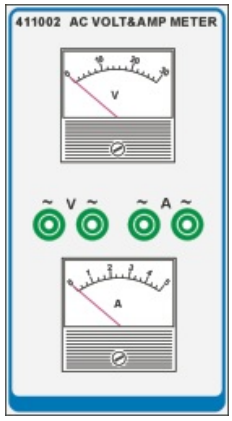


334005

METER UNIT



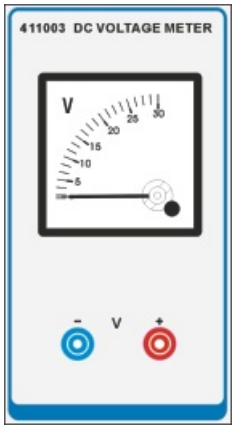
411001



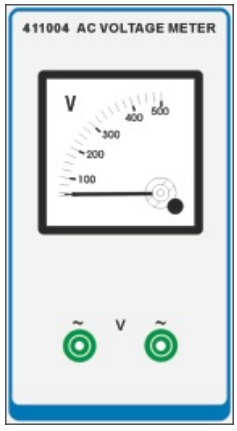
411002

Model	Class	Block
411001	2.5	1
411002	2.5	1
411003	1.5	1
411004	1.5	1
411005	1.5	1
411006	1.5	1

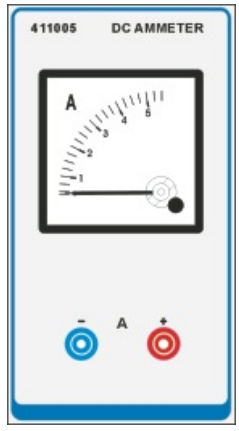
*N Block(s) size (W×H×D) = (100×N)×194×231 mm



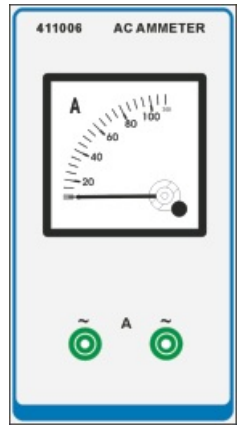
411003



411004



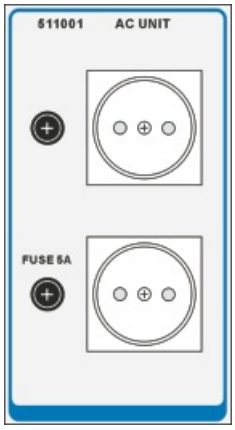
411005



411006

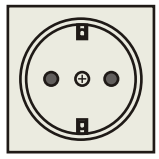
Note: Other measuring range can also be customized

SOCKET UNIT

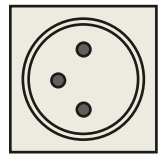


511001

511001 support the following kinds of power socket

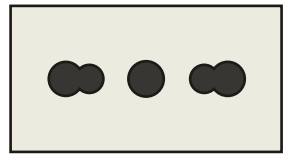

Germany

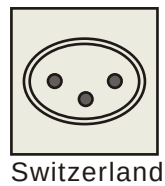

France


Spain


United Kingdom

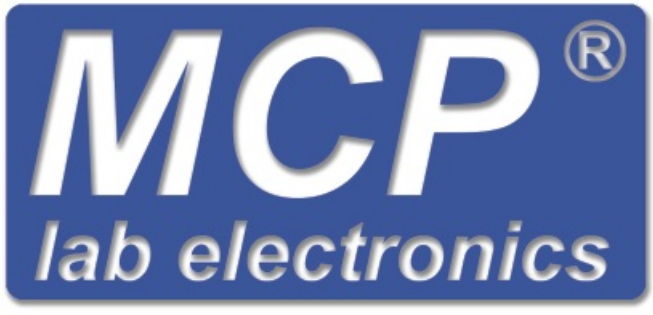

Greece


Italy


Switzerland

Model	Block
511001	1

*N Block(s) size (W×H×D) = (100×N)×194×231 mm


MCP®
lab electronics