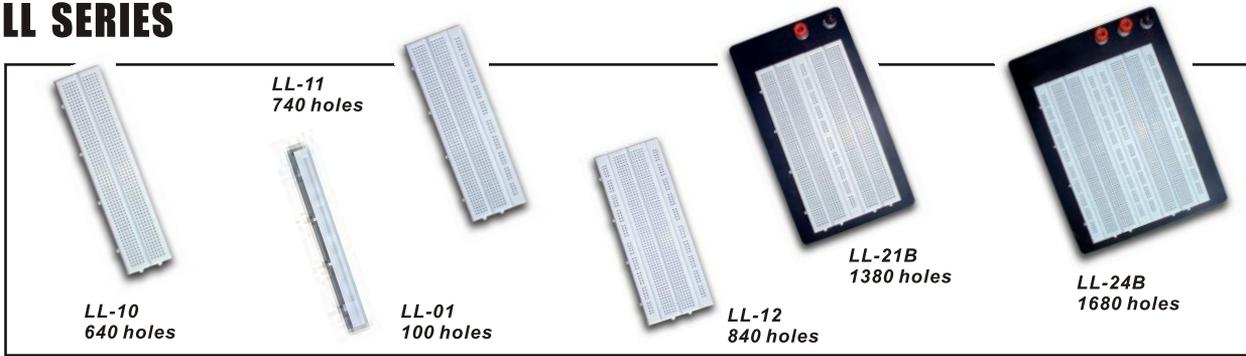


EDUCATION EQUIPMENTS

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

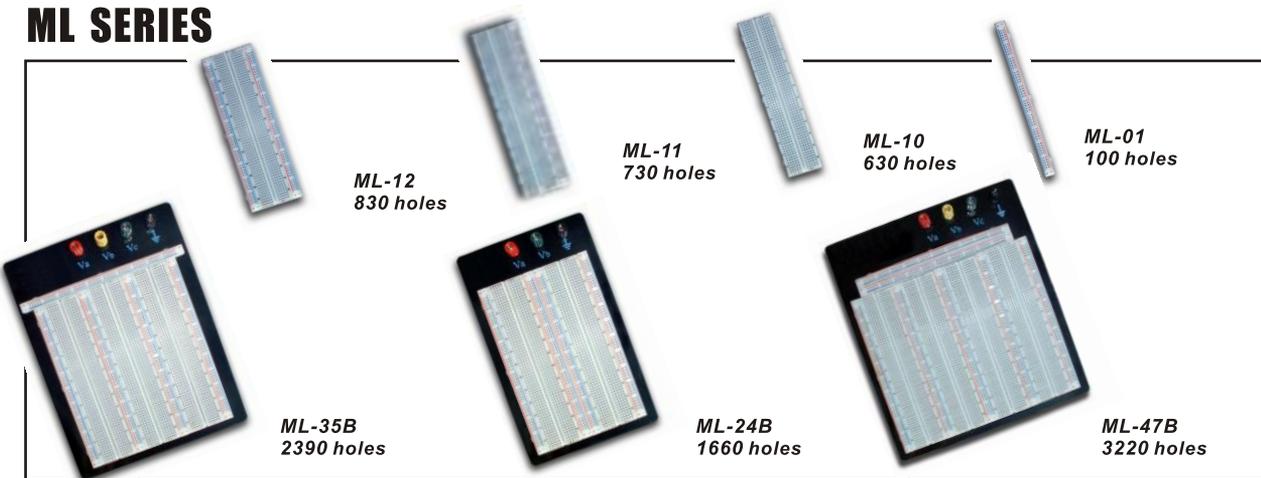
BREAD BOARD

LL SERIES



Model	Dimension(mm)			Holes	Terminal holes	Terminal strips	Distribution holes	Distribution strips	Binding post
	L	W	H						
LL-01	170	12	8	100	—	—	100	1	—
LL-10	170	38	8	640	640	1	—	—	—
LL-11	170	40	8	740	640	1	100	1	—
LL-12	170	62	8	840	640	1	200	2	—
LL-21B	220	120	9	1380	1280	2	100	1	2
LL-24B	220	165	9	1380	1280	2	400	4	3

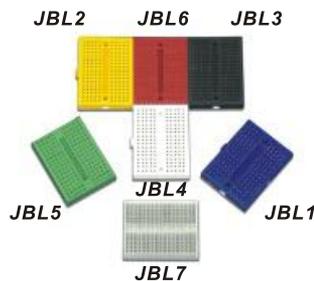
ML SERIES



Model	Dimension(mm)			Holes	Terminal holes	Terminal strips	Distribution holes	Distribution strips	Binding post
	L	W	H						
ML-01	170	12	8	100	—	—	100	1	—
ML-10	170	38	8	630	630	1	—	—	—
ML-11	170	40	8	730	630	1	100	1	—
ML-12	170	62	8	830	630	1	200	2	—
ML-21B	220	120	9	830	630	1	200	2	2
ML-24B	220	165	9	1660	1260	2	400	4	3
ML-35B	220	120	9	2390	1890	3	500	5	4
ML-47B	220	165	9	3220	2520	4	700	7	4

JOINABLE BLOCKS

170 terminal holes, 7 colours, joinable



POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

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
Input Voltage	110~127VAC±10% 60Hz, 220~240±10% 50Hz Switchable
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
Input Voltage	110~127VAC±10% 60Hz, 220~240±10% 50Hz Switchable
Dimensions(W×H×D)	334×95×258mm
Weight	4.5kg

M21-1000 SERIES

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.

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 μ F25Vdc
- 2 Electrolytic capacitors, 500 μ F25Vdc
- 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
- Input Voltage: 110~127VAC±10% 60Hz, 220~240±10% 50Hz
- Switchable
- Dimensions: 258×95×334 mm
- Weight: 4.5kg



M21-1000



M21-1100

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

M21-2000

Feature

- High level, high quality analog trainer
- Combines all essential function of analog experiment
- With analog meters, digital meters, function generator, potentiometers, speaker and DC power supply

Specification

1. ANALOG METERS:

- A. AC ammeter: 0~1A~5A
- B. AC voltmeter: 0~30V
- C. DC ammeter: 0~100mA~1A
- D. DC voltmeter: 0~30V

2. 3 1/2 DIGITS DIGITAL METERS:

- A. DC ammeter: 0~2000 μ A~2000mA
- B. DC voltmeter: 0~2V~200V

3. 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

4. POTENTIOMETERS:

- A. Variable resistor VR1 = 100 Ω
- B. Variable resistor VR2 = 1k Ω
- C. Variable resistor VR3 = 10k Ω
- D. Variable resistor VR4 = 100k Ω

5. SPEAKER:

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

6. POWER SUPPLY:

- A. Fixed DC output: +5V, 500mA
- B. Fixed DC output: -5V, 500mA
- C. Variable DC output: 0 to +15V, 1 A
- D. Variable DC output: 0 to -15V, 1 A
- E. Fixed AC output: 12V-6V-0-6V-12V

7. OTHER STANDARD ACCESSORIES:

- (1) Power cord
- (2) User manual

8. INPUT VOLTAGE: 110~127VAC \pm 10% 60Hz, 220~240 \pm 10% 50Hz Switchable

9. DIMENSIONS(W \times H \times D): 258 \times 95 \times 334mm

10. WEIGHT: 4.5kg



M21-2000

M21-5000

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.

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:

- Fixed DC output: +5V, 1A
- Fixed DC output: -5V, 1A.
- Variable DC output: +3V to +15V, 1 A
- 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:

- Duty cycle: 50%
- 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	$<0.8 \pm 0.2V$	Green
HI	$>2.3 \pm 0.2V$	Red
Open	0.8 ~ 2.3	No display

Set mode selector switch to "CMOS" position

Logic Level	Input level	Display light up
LO	$<30\% + VDC \pm 10\%$	Green
HI	$>70\% + VDC \pm 10\%$	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	$<0.8 \pm 0.2V$	L
HI	$>2.3 \pm 0.2V$	H
Open	0.8 ~ 2.3	O
Transit	LO-->HI	P

Set mode selector switch to "CMOS" position

Logic Level	Input level	Display light up
LO	$<30\% + VDC \pm 10\%$	L
HI	$>70\% + VDC \pm 10\%$	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. OTHER STANDARD ACCESSORIES:

- Power cord
- Pin: 10cm 20pcs/20cm 20pcs
- User manual

11. Input Voltage: 110~127VAC \pm 10% 60Hz, 220~240 \pm 10% 50Hz Switchable

12. DIMENSIONS(W \times H \times D): 258 \times 95 \times 334mm

13. WEIGHT: 4.5kg



M21-5000

M21-7000

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 1/2 inch 8 ohm 0.5W speaker and etc.

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, 1A
- C. Variable DC output: 0V to +15V, 1A.
- D. Variable DC output: 0V to -15V, 1A.

3. POTENTIOMETERS:

- A. Variable resistor VR1 = 1k Ω
- B. Variable resistor VR2 = 100k Ω

4. FUNCTION GENERATOR:

- (A) Frequency range: 1Hz–10Hz
 10Hz–100Hz
 100Hz–1kHz
 1kHz–10kHz
 10kHz–100kHz

(B) Amplitude

- Sine wave output: 0–10 V_{pp} variable
- Triangle wave output: 0–10 V_{pp} variable
- Square wave output: 0–10 V_{pp} variable
- TTL mode output: 4 V_{pp}

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: (A⁻, A⁺, 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.

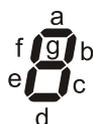
9. TWO DIGITS OF 7 SEGMENT LED DISPLAY:

- (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



M21-7000

(B) Function tables

Decimal Or Function	Inputs				Outputs						
	D	C	B	A	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. OTHER STANDARD ACCESSORIES:

- (1) Power cord
- (2) Pin: 10cm 20pcs/20cm 20pcs
- (3) User manual

12. INPUT VOLTAGE: 110~127VAC \pm 10% 60Hz, 220~240 \pm 10% 50Hz Switchable

13. DIMENSIONS(W \times H \times D): 258 \times 95 \times 334mm

14. WEIGHT: 4.5kg

M21-7000A



NEW

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 1/2 inch 8 ohm 0.5W speaker and etc.
- 100MHz universal counter

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:

- Fixed DC output: +5V, 1A
- Fixed DC output: -5V, 1A
- Variable DC output: 0V to +15V, 1A.
- Variable DC output: 0V to -15V, 1A.

3. POTENTIOMETERS:

- Variable resistor VR1 = 1k Ω
- Variable resistor VR2 = 100k Ω

4. UNIVERSAL COUNTER

- Frequency range: 1Hz~99.999999MHz;
10Hz~100.00000MHz
- Period range TH & TL: 0.01 μ s~999999.99 μ s;
1 μ s~99999999 μ s
- Input signal: TTL or CMOS level or any level
($V_{min} \geq +2.3V_p \pm 10\%$)
- Display: 8-digit 7-segment LED
- Counter switch: External / internal

5. FUNCTION GENERATOR:

- Frequency range: 1Hz—2MHz
- 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

6. 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.

7. TWO PULSE SWITCH:

(WITH 2 SET OF OUTPUT: (A, A \bar , B, B))
2pcs pushbuttons contain switches debouncer for eliminating the bounce caused by switch from "open" to "close" or from "close" to "open" position.

8. SPEAKER:

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

9. 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.

10. TWO DIGITS OF 7 SEGMENT LED DISPLAY:

- 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



M21-7000A

(B) Function tables

Decimal Or Function	Inputs				Outputs							
	D	C	B	A	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	

11. 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".

12. OTHER STANDARD ACCESSORIES:

- Power cord
- Pin: 10cm 20pcs/20cm 20pcs
- User manual

13. INPUT VOLTAGE: 110~127VAC \pm 10% 60Hz, 220~240 \pm 10% 50Hz Switchable

14. DIMENSIONS(W \times H \times D): 258 \times 95 \times 334mm

15. WEIGHT: 4.5kg

POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

ANALOG & DIGITAL TRAINING SYSTEM

M21-7100  

Replaceable 4 pin connector

Feature

- . High level, high quality digital-analog trainer
- . Replaceable 4 pin connector, easy to maintenance
- . Combines all essential function of analog and digital experiment
- . With removable breadboard, DC power supply, function generator, two pulse switches, 2 1/2 inch 8 ohm 0.5W speaker and etc.

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, 1A
- C. Variable DC output: 0V to +15V, 1A.
- D. Variable DC output: 0V to -15V, 1A.

3. POTENTIOMETERS:

- A. Variable resistor VR1 = 1k Ω
- B. Variable resistor VR2 = 100k Ω

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: (A⁻, A⁺, 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.

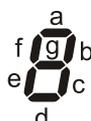
9. TWO DIGITS OF 7 SEGMENT LED DISPLAY:

- (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



M21-7100

(B) Function tables

Decimal Or Function	Inputs				Outputs						
	D	C	B	A	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	L	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. OTHER STANDARD ACCESSORIES:

- (1) Power cord
- (2) Pin: 10cm 20pcs/20cm 20pcs
- (3) User manual

12. INPUT VOLTAGE: 110~127VAC \pm 10% 60Hz, 220~240 \pm 10% 50Hz Switchable

13. DIMENSIONS(W \times H \times D): 258 \times 95 \times 334mm

14. WEIGHT: 4.5kg

POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

ANALOG & DIGITAL TRAINING SYSTEM

M21-7100A



NEW

Replaceable 4 pin connector

Feature

- High level, high quality digital-analog trainer
- Replaceable 4 pin connector, easy to maintenance
- Combines all essential function of analog and digital experiment
- With removable breadboard, DC power supply, function generator, two pulse switches, 2 1/2 inch 8 ohm 0.5W speaker and etc.
- 100MHz universal counter

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:

- Fixed DC output: +5V, 1A
- Fixed DC output: -5V, 1A
- Variable DC output: 0V to +15V, 1A.
- Variable DC output: 0V to -15V, 1A.

3. POTENTIOMETERS:

- Variable resistor VR1 = 1k Ω
- Variable resistor VR2 = 100k Ω

4. UNIVERSAL COUNTER

- Frequency range: 1Hz~99.999999MHz;
10Hz~100.00000MHz
- Period range TH & TL: 0.01 μ s~999999.99 μ s;
1 μ s~99999999 μ s
- Input signal: TTL or CMOS level or any level
(Vmin \geq +2.3Vp \pm 10%)
- Display: 8-digit 7-segment LED
- Counter switch: External / internal

5. FUNCTION GENERATOR:

- Frequency range: 1Hz~2MHz
- 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

6. 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.

7. TWO PULSE SWITCH:

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

8. SPEAKER:

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

9. 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.

10. TWO DIGITS OF 7 SEGMENT LED DISPLAY:

- Output display
- Numerical designs and resultant displays



segment identification



M21-7100A

(B) Function tables

Decimal Or Function	Inputs				Outputs							
	D	C	B	A	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	L	H	H	
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	L	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	

11. 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".

12. OTHER STANDARD ACCESSORIES:

- Power cord
- Pin: 10cm 20pcs/20cm 20pcs
- User manual

13. INPUT VOLTAGE: 110~127VAC \pm 10% 60Hz, 220~240 \pm 10% 50Hz Switchable

14. DIMENSIONS(W \times H \times D): 258 \times 95 \times 334mm

15. WEIGHT: 4.5kg

POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

ACL-7000



NEW

Feature

- .Six circuit boards form 22 experiments.
- .Ideal tool for learning the basics of analog circuits.
- .Step-by-step exercises and application.
- .Integrated training system, with complete <INSTRUCTION>.
- .Combination with M21-7000 digital-analog training system as main unit.
- .Step-by-step exercises and application.
- .Expandability and flexibility of experiments greatly increased by large breadboard.
- .Boards can be changed easily.



The ACL-7000 analog circuit laboratory is a comprehensive and self-contained system suitable for tuition and experimentation with a range of analog electronics circuits. All necessary equipments such as power supply, signal generator, switches and displays are built-in on the main unit. The 6 circuit boards cover a wide variety of essential topics in the field of analog electronics. It is a time and cost saving device for both students experiment and researchers interested in developing and testing circuit prototypes.

Specification

I.MAIN UNIT M21-7000

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:

- Fixed DC output: +5V, 1A
- Fixed DC output: -5V, 1 A
- Variable DC output: 0V to +15V, 1 A.
- Variable DC output: 0V to - 15V, 1 A.

3. POTENTIOMETERS:

- Variable resistor VR1 = 1k Ω
- Variable resistor VR2 = 100k Ω

4. FUNCTION GENERATOR:

- 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: (\bar{A} , A, \bar{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.



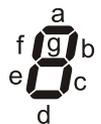
M21-7000

9. TWO DIGITS OF 7 SEGMENT LED DISPLAY:

- Output display
Numerical designs and resultant displays



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

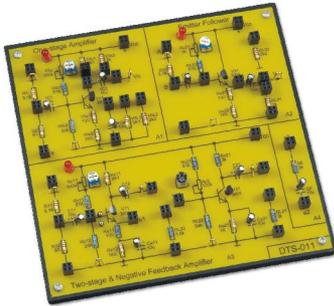


10. SIXTEEN BITS LED DISPLAY:

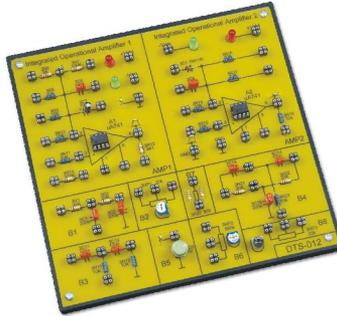
16 red LED's separate input terminals. The LED will be lighted up when input is at "HI level" ,and it will be turned off when it is at no input or at "LO level" .

II.DTS CIRCUIT BOARD

Six circuit boards form 22 experiments detailed in <INSTRUCTION OF DIGITAL CIRCUIT EXPERIMENTATIONS> Each circuit board contains the experiment circuits which are clearly illustrated by a circuit diagram on its top panel. The circuit boards are as follow :



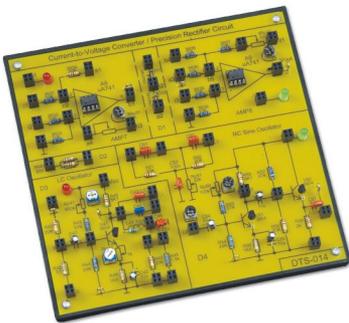
DTS-011 basic amplifier circuit



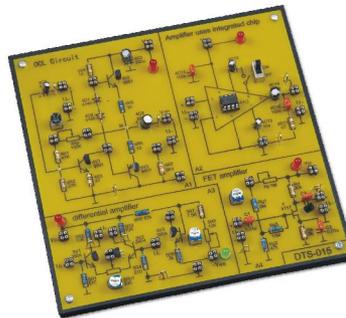
DTS-012 operational amplifier circuit



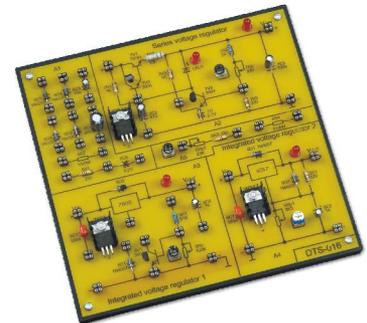
DTS-013 oscillator circuit



DTS-014 various circuit 1



DTS-015 various circuit 2



DTS-016 regulator circuit

III.THE FULL LIST OF EXPERIMENTS PERFORMED USING THE ABOVE CIRCUIT BOARDS

- | | |
|---------------|--|
| Experiment 1 | Monopole Amplifying Circuit |
| Experiment 2 | Two Stage Amplifier Circuit |
| Experiment 3 | Negative Feedback Amplifier Circuit |
| Experiment 4 | Emitter Follower |
| Experiment 5 | Differential Amplifier |
| Experiment 6 | Scaling Summing Amplifier |
| Experiment 7 | Integrator and Differentiator Amplifier |
| Experiment 8 | Waveform Generator Circuit |
| Experiment 9 | Active Filter |
| Experiment 10 | Voltage Comparator |
| Experiment 11 | Wien Bridge Oscillator |
| Experiment 12 | Integrated Power Amplifier |
| Experiment 13 | Rectifier Filter and Parallel Regulation Circuit |
| Experiment 14 | Series Regulation Circuit |
| Experiment 15 | Integrated Voltage Regulator |
| Experiment 16 | RC Oscillator |
| Experiment 17 | LC Oscillator and Frequency-selective Amplifier |
| Experiment 18 | Current/voltage Conversion Circuit |
| Experiment 19 | Voltage/frequency Conversion Circuit |
| Experiment 20 | Complementary Symmetry Power Amplifier |
| Experiment 21 | Waveform Conversion Circuit |
| Experiment 22 | FET Amplifier |

IV.GENERAL

1. Accessories
 - (1) Power cord
 - (2) Pin leads: 10cm 20pcs, 20cm 20pcs
 - (3) User manual+ instruction of analog circuit experimentations
2. INPUT VOLTAGE: 110~127VAC±10% 60Hz, 220~240VAC±10% 50Hz Switchable
3. DIMENSIONS:
 - (1) Main unit (W×H×D):258×95×334mm
 - (2) Circuit board:165×170mm
4. WEIGHT:
 - (1) Main unit:4.5kg
 - (2) Circuit board:0.4kg×6

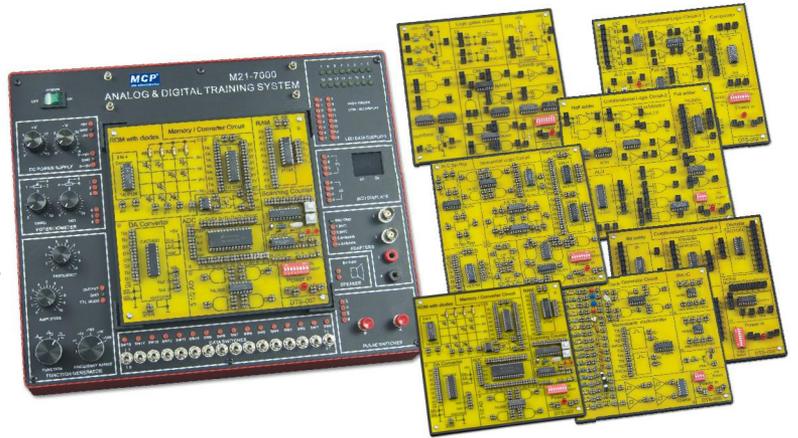
DCL-7000



NEW

Feature

- .Seven circuit boards form 19 experiments.
- .Suitable for combinational logic, sequential logic, and microprocessor circuit experimentation and design.
- .Ideal tool for learning the basics of digital logic circuits.
- .Step-by-step exercises and application.
- .Integrated training system, with complete<INSTRUCTION>.
- .Combination with M21-7000 digital-analog training system as main unit.
- .Step-by-step exercises and application .
- .Expandability and flexibility of experiments greatly increased by large breadboard.
- .Board can be changed easily.



The DCL-7000 digital circuit laboratory is a comprehensive and self-contained system suitable for tuition and experimentation with a range of digital electronics circuits. All necessary equipments for digital logic experiments such as power supply, signal generator, switches and displays are built-in on the main unit. The 7 circuit boards cover a wide variety of essential topics in the field of digital logic. It is a time and cost saving device for both students experiment and researchers interested in developing and testing circuit prototypes.

Specification

I.MAIN UNIT M21-7000

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, 1A
- C. Variable DC output: 0V to +15V, 1 A.
- D. Variable DC output: 0V to -15V, 1 A.

3. POTENTIOMETERS:

- A. Variable resistor VR1 = 1k Ω
- B. Variable resistor VR2 = 100k Ω

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: (\bar{A} , A, \bar{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.



M21-7000

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

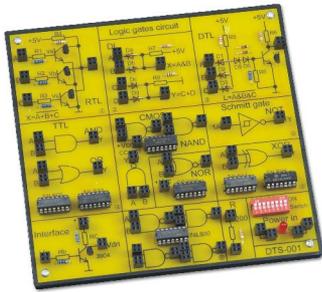


10. SIXTEEN BITS LED DISPLAY:

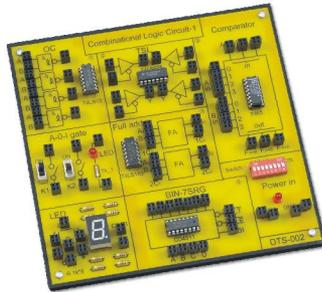
16 red LED's separate input terminals. The LED will be lighted up when input is at “HI level” ,and it will be turned off when it is at no input or at “LO level” .

II. DTS CIRCUIT BOARD

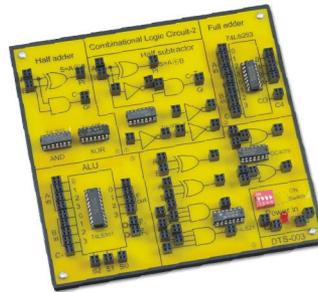
Seven circuit boards form 19 experiments detailed in <INSTRUCTION OF DIGITAL CIRCUIT EXPERIMENTATIONS> Each circuit board contains the experiment circuits which are clearly illustrated by a circuit diagram on its top panel. The circuit boards are as follow :



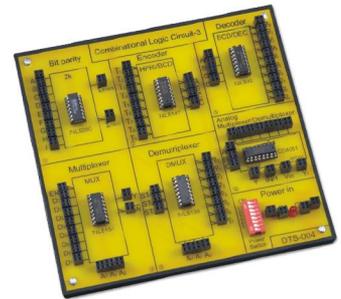
DTS-001 logic gates circuit



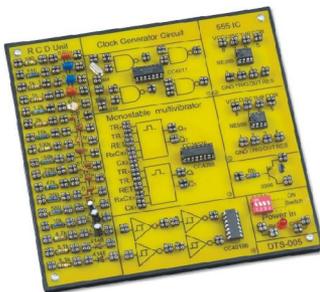
DTS-002 combinational logic circuit-1



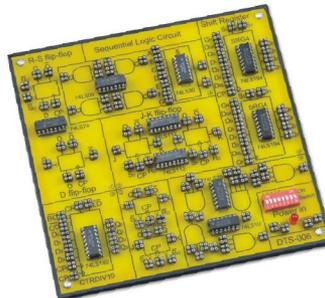
DTS-003 combinational logic circuit-2



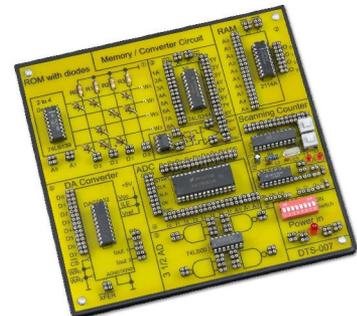
DTS-004 combinational logic circuit-3



DTS-005 clock generator circuit



DTS-006 sequential logic circuit



DTS-007 memory / converter circuit

III. THE FULL LIST OF EXPERIMENTS PERFORMED USING THE ABOVE CIRCUIT BOARDS

Experiment 1	Transistor Switching Characteristics
Experiment 2	Logic Function and Parameter test of TTL Integrated Logic Gate
Experiment 3	Logic Functions and Parameter Test of CMOS Logic Gate
Experiment 4	Verify Function of Logic Gate
Experiment 5	Integration Logic Circuit Connection and Drive
Experiment 6	Applications of TTL Gates with Open-collector Outputs and Tri-state Outputs
Experiment 7	Digital Comparator Circuit
Experiment 8	Arithmetic Operation Circuit
Experiment 9	Parity Generator
Experiment 10	Encoder and Decoder
Experiment 11	Data Selector and Distributor
Experiment 12	Use Gate to Produce Pulse Signal (Multivibrator)
Experiment 13	Monostable Trigger and Schmitt Trigger (Pulse Delay and Waveform Shaping Circuit)
Experiment 14	555 Timer and Its Application
Experiment 15	Trigger (flip-flop) and Its Application
Experiment 16	Shift Register IC and Its Application
Experiment 17	IC Counter and Its Application
Experiment 18	Random Access Memory 2114A and Its Application
Experiment 19	D/A and A/D converter

IV. GENERAL

1. Accessories
 - (1) Power cord
 - (2) Pin leads: 10cm 20pcs, 20cm 20pcs
 - (3) User manual+ instruction of analog circuit experimentations
2. INPUT VOLTAGE: 110~127VAC \pm 10% 60Hz, 220~240VAC \pm 10% 50Hz Switchable
3. DIMENSIONS:
 - (1) Main unit (W \times H \times D):258 \times 95 \times 334mm
 - (2) Circuit board:165 \times 170mm
4. WEIGHT:
 - (1) Main unit:4.5kg
 - (2) Circuit board:0.4kg \times 7

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: $\pm 10\%$
- . Insulation resistance: $> 3 \times 10^9 \Omega$
- . 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			
BXS 600	640	3300	0.31A	485×160×100mm	64mm	3.2
		10000	0.18A			
		1.6	20A			
		5	11.4A			
		16.5	6.2A			
		50	3.6A			
165	2A					
500	1.1A					
1650	0.63A					
5000	0.36A					

BXD SERIES



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 appearance design

Specifications

- . Max. working voltage: 380VAC, 400VDC
- . Resistance tolerance: $\pm 10\%$
- . Insulation resistance: $> 3 \times 10^9 \Omega$
- . 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			
BXD600	640	10000	0.18A	480×180×100mm	64mm	3.5
		1.6	20A			
		5	11.4A			
		16.5	6.2A			
		50	3.6A			
		165	2A			
		500	1.1A			
1650	0.63A					
5000	0.36A					

SOLENOID & TESLAMETER

POWER SUPPLY

TEST INSTRUMENT

RXG250 SERIES SOLENOID



Features

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

Specifications

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



RXG250

RXG250B

RXG250T

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	✓

EDU. INSTRUMENT

METER

DIDACTIC VARIABLE INDUCTOR RXI-1

Features

- .Inductor equipped with 4mm safety socket and the whole unit is double insulated

Specifications

- Variable inductance: 0.1~1.4H
- No. of turns: 3500 in 16 layers
- Resistance: 18Ω
- Max. current: 2A
- Wire diameter: φ1.0mm
- Core: Soft iron φ40mm x 180mm
- Graduation: Henry and centimeter
- Dimension: 290×160×105mm
- Weight: 4.2kg



RXI-1

TM206 TESLAMETER



Features

- .Measuring BX and BZ at the same time
- .Biaxial probe removable and graduation provided
- .Double sensors protection
- .2 ranges of measure:20 mT or 200mT
- .Analog output

Specifications

- .Range: 20mT
200mT
- .Display: 2000 digits LCD
- .Resolution: 10 μT
- .Accuracy: 2%Rdg ± 3 digits (20mT)
2%Rdg ± 1 digit (100mT)
- .Analog: Sensitivity: 10mV/mT(20mT)
1mV/mT(100mT)
Impedence: 4.7kΩ
Connection: safety socket φ4mm
- .Power supply: 110~127VAC±10% 60Hz, or 220~240VAC±10% 50Hz
- .Dimensions: 230(W)×85(H)×240(D)mm
- .Weight: 1kg



TM206

MACHINE

ACCESSORY

F8 SERIES



Features

- .Plastic box for double insulation
- .Dimensions: 240(W)×90(H)×170(D)mm
- .Easy and safety operation for students
- .Novel design and various types for you

AC power supply

F8-A1202

Specifications

- .Output voltage: 2V, 6.3V, 9V, 12V
- .Output current: 2A
- .Protection: Output short(buzzer), over heat
- .Input voltage: 110~127VAC±10% 60Hz or 220~240VAC±10% 50Hz
- .Weight: 2kg



F8-A1202



F8-5801

Symmetric DC power supply

F8-5801

Specifications

- .Output voltage: +5V, -5V, +8V, -8V
- .Output current: 1A
- .Load regulation: 50mV
- .Line regulation: 50mV
- .Ripple: 10mV
- .Protection: Over current, over heat
- .Input voltage: 110~127VAC±10% 60Hz or 220~240VAC±10% 50Hz
- .Weight: 2.5kg

Symmetric DC power supply

F8-1501

Specifications

- .Output voltage: ±15V
- .Output current: 1A
- .Load regulation: 20mV
- .Line regulation: 20mV
- .Ripple: 10mV
- .Input voltage: 110~127VAC±10% 60Hz or 220~240VAC±10% 50Hz
- .Weight: 2.5kg



F8-1501

F8 SERIES POWER SUPPLY

POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY



F8-1201

Regulated DC power supply

F8-1201

Specifications

- .Output voltage: 3V, 4.5V, 6V, 7.5V, 9V, 12V
- .Output current: 1A
- .Load regulation: 10mV
- .Line regulation: 10mV
- .Ripple: 1mV
- .Protection: Current limit
- .Input voltage: 110~127VAC ± 10% 60Hz or 220~240VAC ± 10% 50Hz
- .Weight: 2kg

AC & DC power supply

F8-1203E

NEW

Specifications

- .DC output voltage: 0~12V
- .DC output current: 3A
- .Load regulation: 10mV
- .Line regulation: 10mV
- .Ripple: 1mV
- .3 digits display for DC voltage
- .AC output voltage: 3V, 6V, 9V, 12V
- .AC output current: 3A
- .AC overload protection
- .Input voltage: 110~127VAC ± 10% 60Hz or 220~240VAC ± 10% 50Hz
- .Weight: 2.5kg



F8-1203E

AC & DC breadboard power supply

F8-1505

Specifications

- .DC output: 0~+15V/500mA
0~-15V/500mA
+5V/1A
-5V/500mA
- .AC output: 12V-6V-0-6V-12V, 300mA
- .Load regulation: 200mV
- .Line regulation: 200mV
- .Ripple: 20mV
- .Input voltage: 110~127VAC ± 10% 60Hz or 220~240VAC ± 10% 50Hz
- .Weight: 3kg



F8-1505

BXR SERIES RESISTOR BOX



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

POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

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	1 μH~10 μH	300mA	170×240×90	1.2kg
2	10 μH~100 μH	200mA		
3	100 μH~1mH	100mA		
4	1mH~10mH	100mA		
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	300V _{DC} /230V _{AC} (50Hz)	170×240×90	0.8kg
2	1nF~10nF			
3	10nF~100nF			
4	100nF~1 μF			
5	1 μF~10 μF			

RM-7 RESISTOR MATRIX



Features

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

Specifications

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



RM-7

CM-5 CAPACITOR MATRIX



Features

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

Specifications

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



CM-5

IM-4 INDUCTOR MATRIX



Features

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

Specifications

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



IM-4

POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

POWER SUPPLY
TEST INSTRUMENT
EDU. INSTRUMENT
METER
MACHINE
ACCESSORY

DBR SERIES RESISTOR BOX



Features

.High accuracy to 1%

DBR-06 Specifications

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



DBR-06

DBR-07 Specifications

Decade	Range	Max. Current	Dimension(mm) (W×H×D)	Weight
1	$0.01\Omega \times 10$	700mA	285×140×215	2.2kg
2	$0.1\Omega \times 10$	700mA		
3	$1\Omega \times 10$	700mA		
4	$10\Omega \times 10$	200mA		
5	$100\Omega \times 10$	70mA		
6	$1000\Omega \times 10$	20mA		
7	$10000\Omega \times 10$	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	$0.1nF \times 10$	$300V_{DC}/230V_{AC}(50Hz)$	285×140×215	2.2kg
2	$1nF \times 10$			
3	$10nF \times 10$			
4	$100nF \times 10$			
5	$1\mu F \times 10$			



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	$0.01mH \times 10$	200mA	285×140×215	2.2kg
2	$0.1mH \times 10$	100mA		
3	$1mH \times 10$	100mA		
4	$10mH \times 10$	70mA		
5	$100mH \times 10$	50mA		
6	$1H \times 10$	40mA		



DBL-06

PORTABLE DC WHEATSTONE BRIDGE

DWB-01 WHEATSTONE BRIDGE



Features

- .Wide measuring range $1\ \Omega$ to $10\text{M}\ \Omega$
- .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: $1\ \Omega \sim 11.11\text{M}\ \Omega$

Measuring arm four decade: $1000\ \Omega \times 10 + 100\ \Omega \times 10 + 10\ \Omega \times 10 + 1\ \Omega \times 10$

Multiplier	Measuring range	Accuracy	Bridge power source
$\times 0.001$	$1 \sim 11.11\ \Omega$	$0.5\%^*/0.5\%^{**}$	Internal battery 3V External power 4.5V
$\times 0.01$	$10 \sim 111.1\ \Omega$	$0.2\%^*/0.2\%^{**}$	
$\times 0.1$	$100 \sim 1111\ \Omega$	$0.1\%^*/0.1\%^{**}$	
$\times 1$	$1\text{k} \sim 5\text{k}\ \Omega$	$0.1\%^*/0.1\%^{**}$	
	$5\text{k} \sim 11.11\text{k}\ \Omega$	$0.2\%^*/0.1\%^{**}$	
$\times 10$	$10\text{k} \sim 50\text{k}\ \Omega$	$0.1\%^*/0.1\%^{**}$	Internal battery 3V External power 15V
	$50\text{k} \sim 111.1\text{k}\ \Omega$	$1\%^*/0.1\%^{**}$	
$\times 100$	$100\text{k} \sim 500\text{k}\ \Omega$	$2\%^*/0.2\%^{**}$	
	$500\text{k} \sim 1111\text{k}\ \Omega$	$5\%^*/0.2\%^{**}$	
$\times 1000$	$1\text{M} \sim 11.11\text{M}\ \Omega$	$20\%^*/0.5\%^{**}$	

*Use internal battery power source

**Use external power source

Galvanometer(built-in)sensitivity: $0.6\ \mu\text{A}/\text{div.}$, battery: 9V 6F22

Operating temperature: $5 \sim 35^\circ\text{C}$

Humidity range: 85%max., relative

Dimensions: $255 \times 140 \times 210\ \text{mm}$

Weight: 2.5kg

POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

DKB-01 KELVIN BRIDGE



Features

- .Wide measuring range 0.0001 Ω to 11 Ω
- .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: 0.0001 Ω to 11 Ω

Measuring dials: one decade: 0.01 × 10
 one linearity dial: 0.001 ~ 0.01

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

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

DPM-01 DC POTENTIOMETER

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



DPM-01

Electrical characteristics:

Measuring dials: one stepper: 0~220mV (22 steps)
one linearity dial: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 DC
 Reference voltage source: 9V 6F22
 Galvanometer(built-in)sensitivity: 0.6 μ A/div., battery: 9V 6F22
 Operating temperature: 5~35°C
 Humidity range: 85%max., relative
 Dimensions: 285×140×215 mm
 Weight: 2.5kg

M20-101 EXPERIMENT OF VOLTAGE TRANSFORMER**Features**

- . Φ 4mm socket for convenience connecting
- . Digital voltage meter for convenience indicating primary and secondary voltage

Specifications:

- . Primary voltage: 0~300V
- . Secondary voltage: 0~30V
- . Display of voltage meter 1: 0~1999V (3 1/2 digits)
- . Display of voltage meter 2: 0~199.9V (3 1/2 digits)
- . Voltage transformer ratio: 10:1
- . Power source: 110~127VAC \pm 10% 60Hz or 220~240VAC \pm 10% 50Hz
- . Dimensions: 250 \times 80 \times 200mm
- . Weight: 2.5kg

**M20-101****M20-201 EXPERIMENT OF CURRENT TRANSFORMER****Features:**

- . Φ 4mm socket for convenience connecting
- . Digital current meter for convenience indicating primary and secondary voltage
- . Three bulbs' socket (W27) for lamp connecting

Specifications:

- . Primary current: 0~2A
- . Secondary current: 0~200mA
- . Display of current meter 1: 0~1.999A (3 1/2 digits)
- . Display of current meter 2: 0~199.9mA (3 1/2 digits)
- . Current transformer ratio: 10:1
- . Power source: 110~127VAC \pm 10% 60Hz or 220~240VAC \pm 10% 50Hz
- . Dimensions: 250 \times 80 \times 200mm
- . Weight: 2.5kg

**M20-201**

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: Φ 4mm
- . C (μ F): 0.5-1-2-2-5-5
- . Dimensions(W×H×D): 90×100×160mm
- . Weight: 0.5kg



F5-001

F20-101 DEMONSTRATION ELECTRIC COUNTER BOX



Features:

- . Double insulation for safety using
- . Terminals for current measuring

Specifications:

- . Working voltage: 220V
- . Working frequency: 50Hz
- . Max. Current: 20A
- . 1kWh:300r/kWh
- . Safety sockets: Φ 4mm
- . Protection: 20A fuse
- . Dimensions(W×H×D): 160×160×130 mm
- . Weight: 0.5kg



F20-101

F4 SERIES EXPERIMENTS BOXES



Features

- . Plastic box can be mounted on other surface
- . Φ 4mm 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

- . 10A/20A input and 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

POWER SUPPLY
TEST INSTRUMENT
EDU. INSTRUMENT
METER
MACHINE
ACCESSORY

SAFETY MODULAR TRANSFORMER MDT

Feature

Both primary coil and secondary coil has safety cover
 Primary circuit has standard power socket, fuse and switch
 Secondary circuit has 4 mm safety socket and double isolation

U/I shape stacking silicon core:

CORE MDT-C

Dimension: H 200mm, L 120mm, 40x50mm section
 Weight: 6kg



PRIMARY COIL MDT-P1

.220V power supply
 .440T, Max.I 4A
 .Power socket, switch, fuse
 .Dimension: 110x90x100mm
 .Weight: 0.85kg



PRIMARY COIL MDT-P2

.110V power supply
 .220T, Max.I 8A
 .Power socket, switch, fuse
 .Dimension: 110x90x100mm
 .Weight: 0.85kg



SECONDARY COIL MDT-S1

.Consists of 5 windings in series
 .6T, 12T, 24T, 48T, 96T
 .Max.I 25A, 25A, 13A, 6.6A, 3.3A
 .4 mm safety socket output
 .Double isolation
 .Dimension: 110x90x100mm
 .Weight: 0.85kg



SECONDARY COIL MDT-S2

.Consists of 2 windings in series
 .1000T, 1000T, Max.I 0.8A
.Warning: w/o load, the coil delivers 1000V
 .4 mm safety socket output
 .Double isolation
 .Dimension: 110x90x100mm
 .Weight: 0.85kg



SECONDARY COIL MDT-S3

.Consists of 2 windings in series
 .220T, 220T, Max.I 3.6A
.Warning: w/o load, the coil delivers 220V
 .4 mm safety socket output
 .Double isolation
 .Dimension: 110x90x100mm
 .Weight: 0.85kg



SECONDARY COIL MDT-S4

.Consists of 2 separate coils and each coil has 2 symmetrically windings
 .12T, 12T, 24T, 24T
 .Max.I 25A, 13A
 .4 mm safety socket output
 .Double isolation
 .Dimension: 110x90x100mm
 .Weight: 0.85kg



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	242 Ω /121 Ω /81 Ω 61 Ω /48 Ω	200×250×425	8	Single
TRL-3000	Resistive	(200W/400W/600W 800W/1000W) X 3	(242 Ω /121 Ω /81 Ω 61 Ω /48 Ω) 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(kg)	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

POWER SUPPLY
TEST INSTRUMENT
EDU. INSTRUMENT
METER
MACHINE
ACCESSORY

P228001



Spectrum lamp holder & power supply

Features

- .8 pins or E27 lamp socket for choice (P228001 & P2281XX series)
- .7 kinds of P2281XX series

Specifications

- .Maximum output current: 1A
- .Lamp housing: 56(W)×190(H)×56(D)mm
- .Tripod rod: 295mm
- .Lamp socket: 8 pins or E27
- .Dimensions(power supply only): 153(W)×115(H)×195(D)mm
- .Weight: 3k



P228001

P2281XX SERIES



Spectral lamps

Specifications

- .Socket: 8 pins or E27

Model	Filling	Current
P228102	He	1A
P228103	Hg	1.2A
P228104	Na	1.2A
P228105	Ne	1.1A
P228106	Zn	1.2A
P228107	Hg-cd	1.1A



P2281XX series

P218001



Spectrum tube power supply

Features

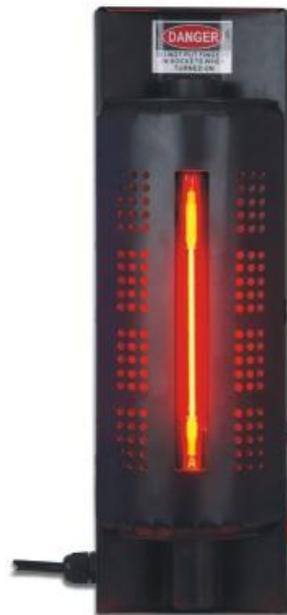
- .Spring-contacts in fully insulated fixtures
- .Protective window guarantee secure mounting and reliable operation
- .With safe lock protection: when the safe door opens, the spectrum tube power supply will stops working even the power is still on.
- .13 kinds of P2181XX series

Specifications

- .Voltage: 5000V
- .Maximum current: 10mA
- .Dimensions: 118(W)×375(H)×120(D)mm
- .Weight: 2.8kg



Safe lock protection



P218001

P2181XX SERIES



Spectrum tubes

Specifications

- .Capillary length: 100mm
- .Total length: Approx. 260mm

Model	Filling
P218101	Air
P218102	Argon
P218103	Carbon dioxide
P218104	Helium
P218105	Hydrogen
P218106	Iodine
P218107	Krypton
P218108	Mercury
P218109	Neon
P218110	Nitrogen
P218111	Oxygen
P218112	Water vapor
P218113	Xenon



P2181XXseries

POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

TM801



Features

- .Multiple function
- .Microprocessor controlled
- .Hand hold and rechargeable battery operation



TM801

Introduction

This microprocessor controlled LCD display universal counter can be used for measurement of time intervals, simple pendulum periods, velocity, acceleration, revolutions per second, frequency, pulses etc. It measures time intervals from 0.1 millisecond and frequencies to 20 KHz. The counter is provided with a five-digit LCD display, and a compact case making the apparatus highly suitable for student lab exercises. RJ45 inputs are provided for connection of photogate. Memory is provided for storing measured values.

Specification

Display	5 digits LCD	
Input	RJ45	
Start / Stop	from 0.01 s to 12000 s, resolution 0.01s/1s	
Collision	A and B passage time from 0.1ms to 19999s, resolution 0.1ms	
Acceleration	passage time and A to B time from 0.1ms to 19999s, resolution 0.1ms	
Period	from 0.1ms to 19999s, resolution 0.1ms	
Frequency / resolution	from 0.1 Hz to 19999Hz / 0.1 Hz	
Counter	from 1 count to 19999 counts	
Memory storage	10 values	
Rechargeable battery	9V/1800mAh	
Accessory	photogate P416001, RJ45 cable, Power adapter	
Dimensions	165 x 95 x 45 mm (timer)	300 x 206 x 60 mm (box)
Weight	1.0 kg (with box)	

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.

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 V_{pp}
Trigger output voltage: >9 V_{pp}
Counter Frequency range:
1 kHz - 150 kHz
Sensitivity: 100 mV
Max. input voltage: 20 V
Connection sockets: 4 mm dia.
Dimensions: 19 cm × 13.5 cm × 7 cm



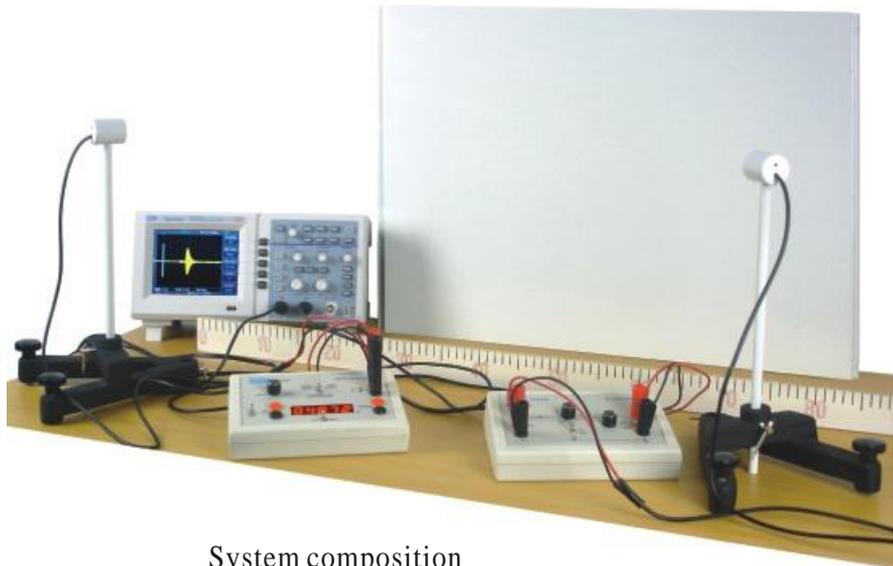
P416000 Ultrasonic transducer 40 kHz

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.



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	



F16-015 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 (100 Hz microphone input) to 50 kHz
Outputs: signal, trigger and level, short-circuit proof
Max. signal output: 4 V_{p-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: 0.5 kg

FINE BEAM TUBE SYSTEM

NEW

Objects

Deflection of electrons in a closed circular path inside a magnetic field
Determination of specific charge of an electron e/m

Principles

The fine beam tube is used for investigating the deflection of cathode rays in a uniform magnetic field produced by a pair of Helmholtz coils (P338001). In addition, it can also be used for quantitative determination of the specific charge of an electron e/m .

Located inside a glass bulb with a helium residual gas atmosphere is an electron gun, which consists of an indirectly heated oxide cathode, a Wehnelt cylinder and a perforated anode. The gas atoms are ionized along the path of the electrons and a narrow, well-defined, luminescent beam is produced. Incorporated measurement marks facilitate a parallax-free determination of the diameter of the circular path of the beam deflected in the magnetic field.

SYSTEM A BASIC FINE BEAM TUBE SYSTEM



SYSTEM COMPOSITION

1pc fine beam tube	P318001
1pc fine beam tube base	P328001
1pc Helmholtz pair of coils	P338001
1pc DC power supply	M10-QP500E

SYSTEM B COMPLETE FINE BEAM TUBE SYSTEM



SYSTEM COMPOSITION

1pc fine beam tube
 1pc fine beam tube base+ Helmholtz pair of coils
 1pc DC power supply
 1pc DC power supply
 1pc DC power supply

P318001
 P328002
 M10-SPN300-03C
 M10-SPN110-01C
 M10-SPM18-3C

Fine beam tube P318001

Gas filling:	Helium
Gas pressure:	1.3hPa
Filament voltage:	4~10V AC/DC
Filament current:	600mA at 6.3V
Focus voltage:-50V	-50V
Anode voltage:	200~300V
Anode current:	<0.3mA
Circular path diameter:	20~100mm
Division spacing:	10mm
Tube diameter:	160mm
Total length:	255mm
Weight:	0.35kg



THOMSON TUBE SYSTEM

NEW

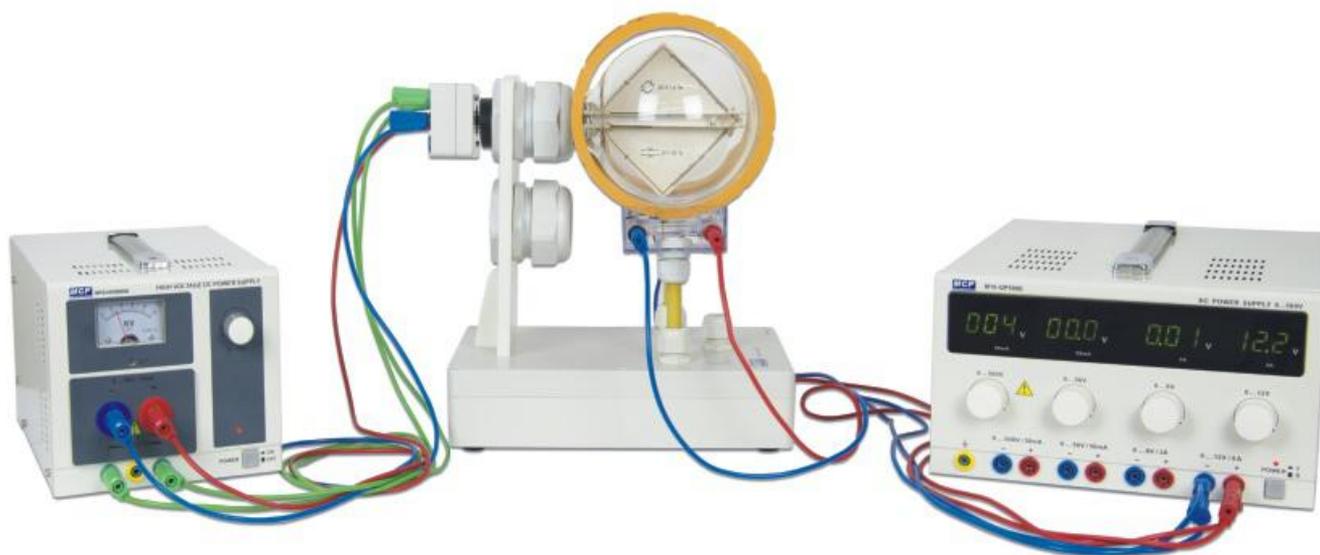
Objects

- Thermionic emission of electrons
- Deflection of electrons in electron and magnetic field
- Estimate of specific charge of an electron e/m

Principles

The Thomson tube is intended for investigating the deflection of electron beams in electrical and magnetic fields. It can be used to estimate the specific charge of an electron e/m and to determine the electron velocity v . The Thomson tube comprises an electron gun which emits a narrow, focused ribbon of cathode rays within an evacuated, clear glass bulb. A tungsten filament hot cathode is heated directly and the anode takes the form of a cylinder. The deflection of rays can be achieved electrostatically by means of a built-in platecapacitor formed by the pair of deflection plates or magnetically with the help of the Helmholtz coils (P338002) magnetically. The cathode rays are intercepted by a flat mica sheet, one side of which is coated with a fluorescent screen and the other side of which is printed with a millimeter graticule so that the path of the electrons can be easily traced. The mica sheet is held at 10 degree to the axis of the tube by the two deflecting plates.

SYSTEM C1 THOMSON TUBE IN MAGNETIC FIELD



SYSTEM COMPOSITION

1pc Thomson tube	P318002
1pc Helmholtz pair of coils	P338002
1pc tube holder	P348001
1pc tube base	P328003
1pc DC power supply	M10-HV5000A
1pc DC power supply	M10-QP500E

SYSTEM C2 THOMSON TUBE IN ELECTRO STATIC FIELD



SYSTEM COMPOSITION

1pc Thomson tube	P318002
1pc tube holder	P348001
1pc tube base	P328003
1pc DC power supply	M10-HV5000A
1pc DC power supply	M10-QP500E

Thomson tube P318002

Filament voltage:	6.3V AC
Max. anode voltage:	5000V
Anode current:	approx. 0.1mA at 4000V
Max. capacitor voltage:	500V
Tube diameter:	130mm
Total length:	245mm
Weight:	0.3kg



ELECTRON DEFLECTION TUBE SYSTEM **NEW**

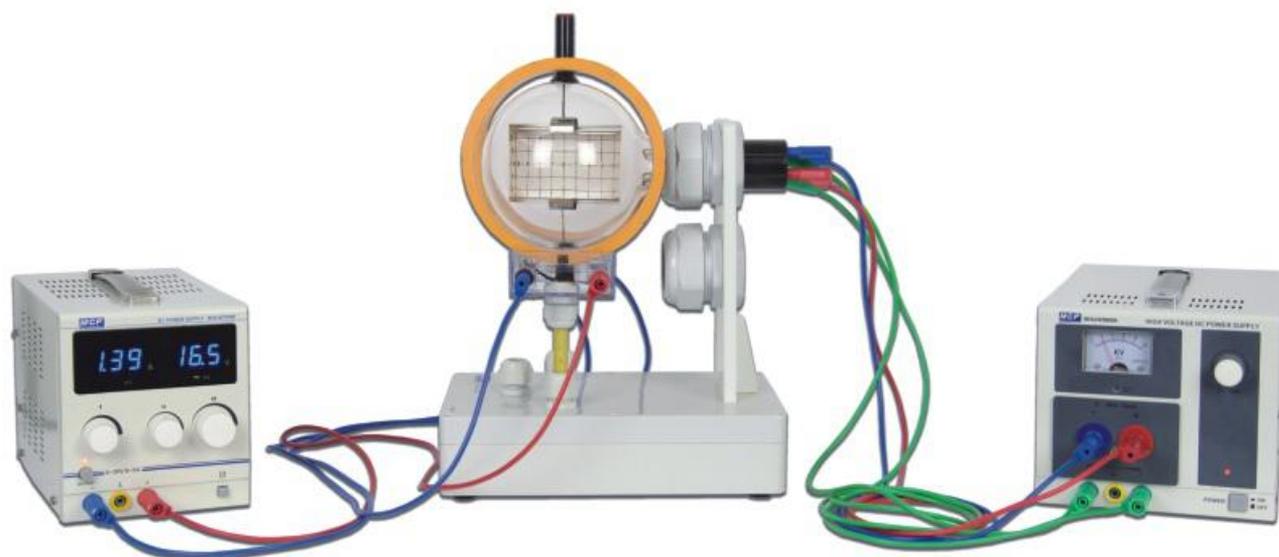
Objects

- Thermionic emission of electrons
- Deflection of electrons in electron and magnetic field
- Estimate of specific charge of an electron e/m

Principles

The electron-beam deflection tube is intended for investigating the deflection of electron beams in electrical and magnetic fields. It can be used to estimate the specific charge of an electron e/m and to determine the electron velocity v . The electron-beam deflection tube comprises an electron gun which emits a narrow, focused ribbon of cathode rays within an evacuated, clear glass bulb. A tungsten filament hot cathode is heated directly and the anode takes the form of a cylinder. The deflection of rays can be achieved electrostatically by means of a built-in plate capacitor formed by the pair of deflection plates or magnetically with the help of the Helmholtz coils (P338002) magnetically. The cathode rays are intercepted by a flat mica sheet, one side of which is coated with a fluorescent screen and the other side of which is printed with a centimeter graticule so that the path of the electrons can be easily traced. The mica sheet is held at 15 degree to the axis of the tube by the two deflecting plates.

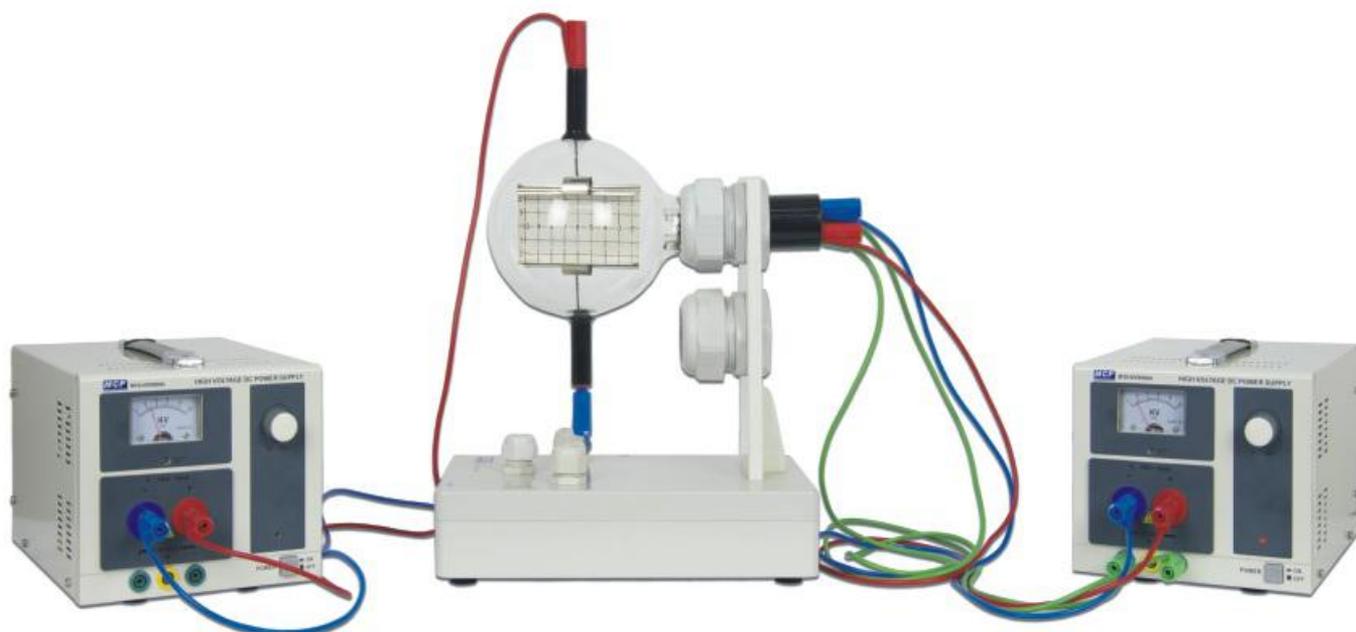
SYSTEM D1 ELECTRON DEFLECTION TUBE IN MAGNETIC FIELD



SYSTEM COMPOSITION

- | | |
|------------------------------|-------------|
| 1pc electron deflection tube | P318003 |
| 1pc Helmholtz pair of coils | P338002 |
| 1pc tube holder | P348001 |
| 1pcs DC power supply | M10-HV5000A |
| 1pc DC power supply | M30-SP303E |

SYSTEM D2 ELECTRON DEFLECTION TUBE IN ELECTRO STATIC FIELD



SYSTEM COMPOSITION

1pc electron deflection tube	P318003
1pc tube holder	P348001
2pcs DC power supply	M10-HV5000A

Electron deflection tube P318003

Filament voltage:	6.3V AC
Max. anode voltage:	5000V
Anode current:	approx. 0.1mA at 4000V
Max. capacitor voltage:	5000V
Tube diameter:	130mm
Total length:	240mm
Weight:	0.3kg



POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

POWER SUPPLY
TEST INSTRUMENT
EDU. INSTRUMENT
METER
MACHINE
ACCESSORY

SYSTEM COMPOSITION UNITS SPECIFICATION

Fine beam tube base P328001

Dimension: 160 x 67 x 41mm
Weight: 150 g



Thomson tube base P328003

Dimension: 83 x 58 x 34mm
Weight: 100 g



Fine beam tube base and Helmholtz pair of coils P328002

Dimension: 300 x 400 x 230mm
Weight: 4.5 kg



Helmholtz pair of coils P338001

Number of turns: 124 each
Max. field: 3.8 mT
Coil diameter: 300mm
Rating current: 5A
Effective resistance: 1.2Ω (2.4Ω in series)
Terminals: 4mm safety sockets
Weight: 4 kg



Helmholtz pair of coils P338002

Number of turns: 320 each
Max. field: 4.5mT
Coil diameter: 136mm
Rating current: 1.5A
Effective resistance: 11Ω
Terminals: 4mm safety sockets
Weight: 1 kg



Tube holder P348001

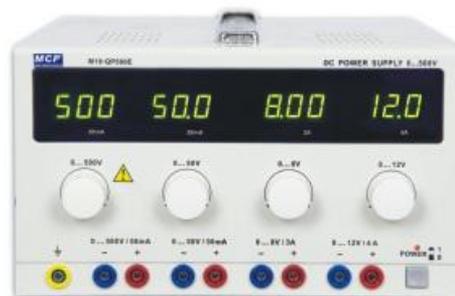
Dimension: 260 x 180 x 290mm
Weight: 1 kg



DC power supply M10-QP500E

Independent four outputs are primarily intended to supply power for electron tube and Helmholtz coils simultaneously.

Output: 0~500VDC/50mA 0~50VDC/50mA
 0~8VDC/3A 0~12VDC/4A



DC power supply M10-HV5000A

5000V high-voltage source and 6.3V for operation of electron tube
 Output: 0~5000VDC/10mA, 6.3VAC/3A

DC power supply M10-SPN300-03C

300V high-voltage source and 6.3V for operation of electron tube

Output: 0~300VDC/300mA, 6.3VAC/3A



DC power supply M10-SPN110-01C

110V voltage source for focus of electron tube
 Output: 0~110VDC/100mA

DC power supply M10-SPM18-3C

3A current source for operation of Helmholtz coils

Output: 0~18VDC/0~3A



DC power supply M30-SP303E

3A current source for operation of Helmholtz coils
 Output: 0~30VDC/0~3A

Objects

The training systems of electronic circuits are designed for educational practice. All components are separated as in transparent plastic boxes with magnetic stand on a grid panel or without magnetic on a rubber matrix. Circuit assemble is made by leads plug. The training systems are used in some certain experiments, it can be completed according to the written experiment manual and also you can design other more experiments with yourself.

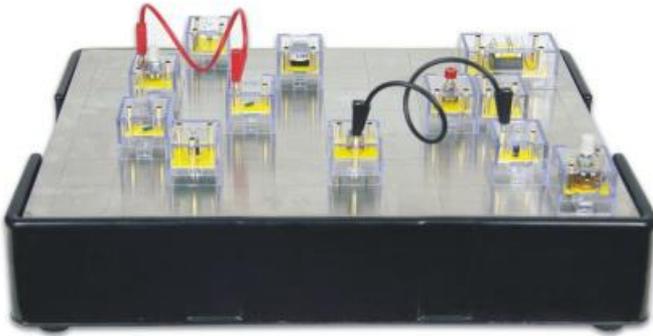
BASIC ELECTRONIC CIRCUIT TRAINING SYSTEM F1-1 **NEW**

Features

The training system is used in the analog electronic circuits, it can be completed according to the F1-1 experiment manual. Totally 33 recommend experiments are contained in this system with the corresponding components and more experiments can be designed to do by yourself.

System contain:

- | | | | |
|------------------------|--------|----------------------|-------|
| 1. Grid panel and tray | 1 pcs | 4. Experiment manual | 2 pcs |
| 2. Components | 49 pcs | | |
| 3. Leads | 40 pcs | | |



EXPERIMENTS CONTENT

- | | |
|---|--|
| 1: Series resistors circuit | 19: Common collector transistor amplifier circuit |
| 2: Parallel resistors circuit | 20: Constant DC voltage control circuit with transistor |
| 3: Compound resistors circuit | 21: Capacitors in series and parallel circuit |
| 4: Ohm's law $I = F(V)$ | 22: Characteristics of PTC resistor |
| 5: Ohm's law $I = F(R)$ | 23: Characteristics of NTC resistor |
| 6: Kirchhoff's Laws on voltage | 24: Characteristics of the transformer on load and no load |
| 7: Kirchhoff's Laws on current | 25: Half-wave rectifier |
| 8: Superposition theorem | 26: Full-wave rectifier |
| 9: Thevenin's theorem | 27: The function of the relay |
| 10: Norton's theorem | 28: Inductors in series and parallel circuit |
| 11: Voltage divider circuit | 29: Magnetic induction circuit transformer |
| 12: Wheatstone bridge circuit | 30: Characteristics of diode in DC circuit |
| 13: R, C series circuit in AC circuit | 31: Characteristics of diode in AC circuit |
| 14: R, L series circuit in AC circuit | 32: Rectifier and filter current circuit |
| 15: R, L, C series circuit in AC circuit | 33: Characteristics of Zener diode |
| 16: Characteristics of transistor | |
| 17: Common base transistor amplifier circuit | |
| 18: Common emitter transistor amplifier circuit | |

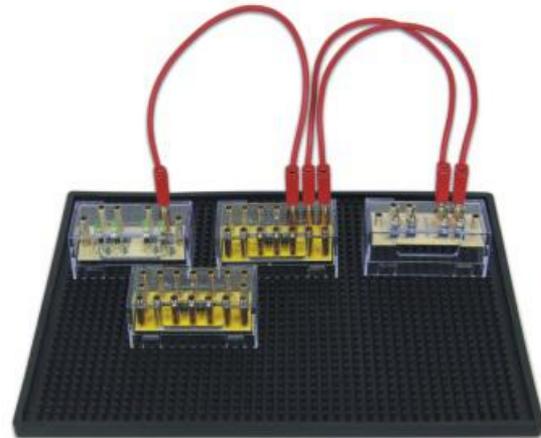
BASIC LOGIC GATE TRAINING SYSTEM F1-2 **NEW**

Features

The training system is used in the digital electronic circuits, it can be completed according to the F1-2 experiment manual. Totally 16 recommend basic logic gate experiments are contained in this system with the corresponding components and more experiments can be designed to do by yourself.

System contain:

- | | |
|----------------------------------|--------|
| 1. Rubber matrix and plastic box | 1 pcs |
| 2. Components | 15 pcs |
| 3. Leads | 20 pcs |
| 4. Experiment manual | 1 pcs |



EXPERIMENTS CONTENT

I Basic Logic Function

- 1 OR logic gate
- 2 INVERT logic gate
- 3 OR + INVERT = NOR logic gate
- 4 NOR logic gate
- 5 2-input NAND logic gate
- 6 4-input NAND logic gate
- 7 AND - OR - INVERT logic gate

II Boolean Algebra

- 1 $A = \overline{\overline{A}}$
- 2 $A + 1 = 1, A + 0 = A, A + A = A, A + \overline{A} = 1$
- 3 $A \cdot 1 = A, A \cdot 0 = 0, A \cdot A = A, A \cdot \overline{A} = 0$
- 4 Logic equation

III De Morgan's Theorem

$$\overline{A+B} = \overline{A} \cdot \overline{B}, \overline{A \cdot B} = \overline{A} + \overline{B}, \overline{\overline{\overline{A+B}}} = \overline{\overline{A+B}}, \overline{\overline{A+B+C}} = \overline{A \cdot B \cdot C},$$

$$\overline{\overline{A \cdot B \cdot C}} = \overline{A+B+C}, \overline{A \cdot C+B \cdot C} = \overline{(A+B) \cdot C}$$

IV Exclusive-OR and Its Applications

- 1 Exclusive-OR
- 2 Half-Adder, Half-Subtractor
- 3 Binary Comparator
- 4 Parity Generator

BASIC LOGIC CIRCUIT TRAINING SYSTEM F1-3

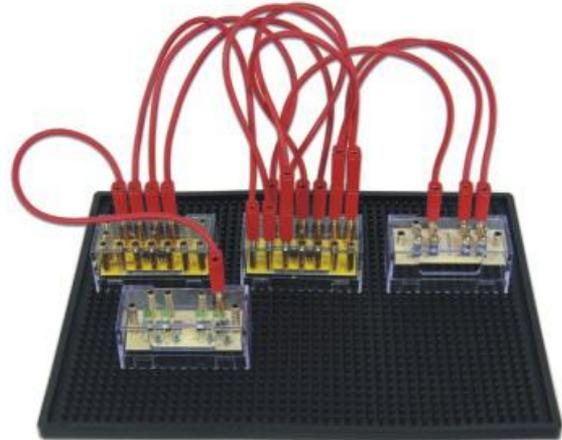
NEW

Features

The training system is used in the digital electronic circuits, it can be completed according to the F1-3 experiment manual. Totally 26 recommend basic logic circuit experiments are contained in this system with the corresponding components and more experiments can be designed to do by yourself.

System contain:

- | | |
|----------------------------------|--------|
| 1. Rubber matrix and plastic box | 1 pcs |
| 2. Components | 39 pcs |
| 3. Leads | 20 pcs |
| 4. Experiment manual | 1 pcs |



EXPERIMENTS CONTENT

I Adder and Subtractor

- 1 Half-Adder, Half-Subtractor
- 2 SUM in Full-Adder and DIFFERENCE in Full-Subtractor
- 3 Co for $X+Y+ C_i$
- 4 Full-Adder with Half-Adders
- 5 2-Bit Parallel Binary Adder
- 6 4-Bit Binary Full-Adder/2's-complement 4-Bit Binary Full-Subtractor

II Bistable or Flip-Flop

- 1 R-S Flip-Flop with NAND Gates
- 2 Gated R-S Flip-Flop
- 3 D Flip-Flop
- 4 AND-Gated J-K Master-Slave Flip-Flop

III Binary Counters

- 1 Binary ripple counter
- 2 Synchronous counter

IV Divide-by-N Counters and Decade Counters

- 1 Modulus 3 Counter
- 2 Modulus 6 Counter
- 3 Decade Counter 2421
- 4 Decade Counter 8421
- 5 IC Decade Counter
- 6 IC Divide-by-10 Counter

V Shift Registers and Ring Counter

- 1 Shift Register
- 2 IC Shift Register
- 3 Quinary ring counter
- 4 Twisted-ring or Johnson Counter

VI Pulse Forming and Shaping/The Schmitt Trigger

- 1 Transistor Astable
- 2 IC Astable
- 3 Pulse Stretchers
- 4 Schmitt Trigger

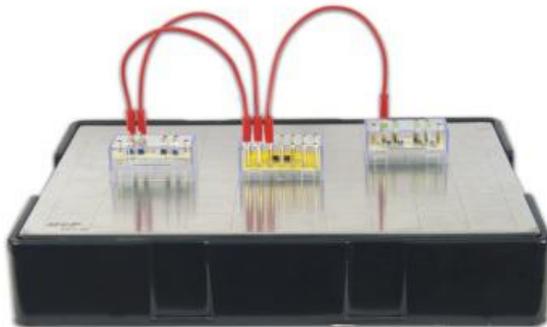
CLASSICAL DIGITAL CIRCUIT TRAINING SYSTEM F1-4 **NEW**

Features

The training system is used in the digital electronic circuits, it can be completed according to the F1-4 experiment manual. Totally 57 recommend classical digital circuit experiments are contained in this system with the corresponding components and more experiments can be designed to do by yourself

System contain:

1. Rubber matrix and plastic box	1 pcs	3. Leads	30 pcs
2. Components	77 pcs	4. Experiment manual	1 pcs



EXPERIMENTS CONTENT

I Basic Logic Function

- 1 OR logic gate
- 2 INVERT logic gate
- 3 OR + INVERT = NOR logic gate
- 4 NOR logic gate
- 5 2-input NAND logic gate
- 6 4-input NAND logic gate
- 7 AND - OR - INVERT logic gate

II Boolean Algebra

- 1 $A = \overline{\overline{A}}$
- 2 $A + 1 = 1, A + 0 = A, A + A = A, A + \overline{A} = 1$
- 3 $A \cdot 1 = A, A \cdot 0 = 0, A \cdot A = A, A \cdot \overline{A} = 0$
- 4 Logic equation

III De Morgan's Theorem

$$\overline{A+B} = \overline{A} \cdot \overline{B}, \overline{A \cdot B} = \overline{A} + \overline{B}, \overline{\overline{\overline{A+B+C}}} = \overline{\overline{A+B+C}}, \overline{\overline{A \cdot B \cdot C}} = \overline{\overline{A \cdot B \cdot C}}$$

$$\overline{\overline{A \cdot B \cdot C}} = \overline{\overline{A+B+C}}, \overline{\overline{A \cdot C+B \cdot C}} = \overline{\overline{(A+B) \cdot C}}$$

IV Exclusive-OR and Its Applications

- 1 Exclusive-OR
- 2 Half-Adder, Half-Subtractor
- 3 Binary Comparator
- 4 Parity Generator

V Adder and Subtractor

- 1 Half-Adder, Half-Subtractor
- 2 SUM in Full-Adder and DIFFERENCE in Full-Subtractor
- 3 Co for $X+Y+Ci$
- 4 Full-Adder with Half-Adders
- 5 2-Bit Parallel Binary Adder
- 6 4-Bit Binary Full-Adder/2's-complement 4-Bit Binary Full-Subtractor

VI Bistable or Flip-Flop

- 1 R-S Flip-Flop with NAND Gates
- 2 Gated R-S Flip-Flop
- 3 D Flip-Flop
- 4 AND-Gated J-K Master-Slave Flip-Flop

POWER SUPPLY
TEST INSTRUMENT
EDU. INSTRUMENT
METER
MACHINE
ACCESSORY

EXPERIMENTS CONTENT

VII Binary Counters

- 1 Binary ripple counter
- 2 Synchronous counter

VIII Divide-by-N Counters and Decade Counters

- 1 Modulus 3 Counter
- 2 Modulus 6 Counter
- 3 Decade Counter 2421
- 4 Decade Counter 8421
- 5 IC Decade Counter
- 6 IC Divide-by-10 Counter

IX Shift Registers and Ring Counter

- 1 Shift Register
- 2 IC Shift Register
- 3 Quinary ring counter
- 4 Twisted-ring or Johnson Counter

X Pulse Forming and Shaping/The Schmitt Trigger

- 1 Transistor Astable
- 2 IC Astable
- 3 Pulse Stretchers
- 4 Schmitt Trigger

XI IC Timer-74122, 74121 and 555

- 1 74122
- 2 74121
- 3 555 Timer

XII Decoding and Encoding

- 1 Decoding
- 2 Encoding-decimal to excess 3
- 3 BCD counter with seven-segment LED display

XIII Random-Access Memories (RAM)

- 1 2-bit random-access memory
- 2 64-bit IC RAM 7489

XIV Operational Amplifier

- 1 Op-Amp as an analog voltage multiplier
- 2 Op-Amp as a summer-multiplier
- 3 Op-Amp as a voltage comparator
- 4 Integrator
- 5 Variable PW generator

XV D/A and A/D Conversion

- 1 D/A conversion
- 2 A/D conversion

F1 series custom model list:

F1-1000 series resistor models



F1-4000 series capacitor models



F1-7000 series switch and relay



F1-2000 series potentiometer models



F1-5000 series zener and diode models



F1-8000 series transistor models



F1-3000 series decade resistor models



F1-6000 series inductor models



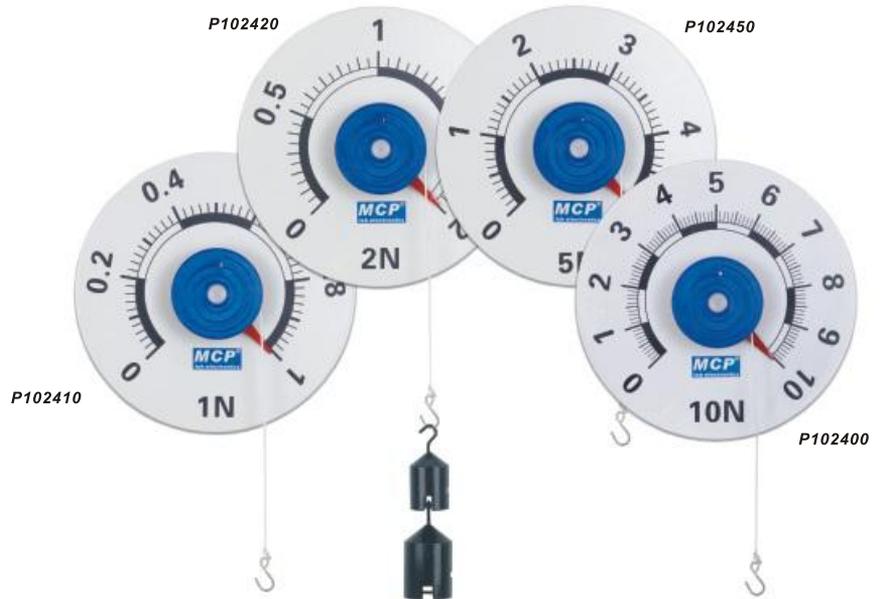
F1-9000 series transformer models



DYNAMOMETER

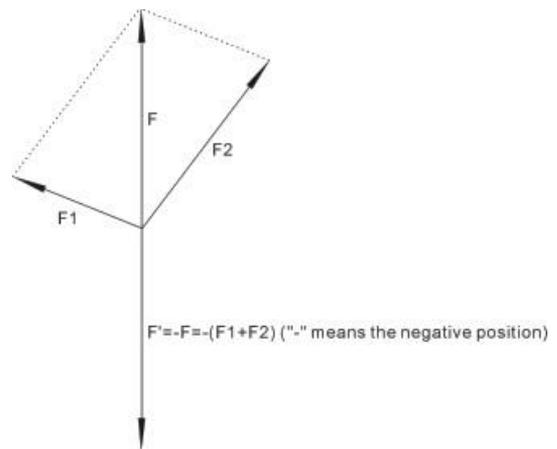
Features:

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



Specifications:

Force	No.	Scale division	Measuring precision	Diameter	Magnetic base
1N	P102410	0.02N	2.5%	200mm	Ferrite
2N	P102420	0.05N	2.5%	200mm	Ferrite
5N	P102450	0.1N	2.5%	200mm	NdFeB
10N	P102400	0.1N	2.5%	200mm	NdFeB

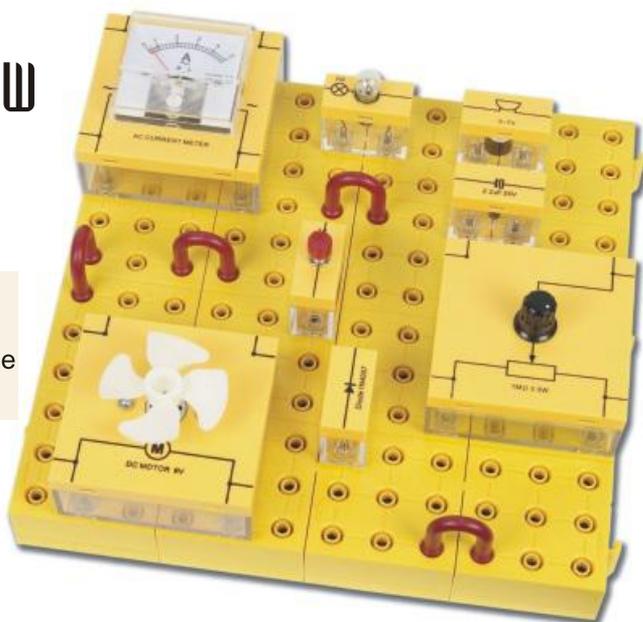


Composition of forces

MODULAR SAFETY CIRCUIT SYSTEM

MSC MODULAR SAFETY CIRCUIT SYSTEM **NEW**

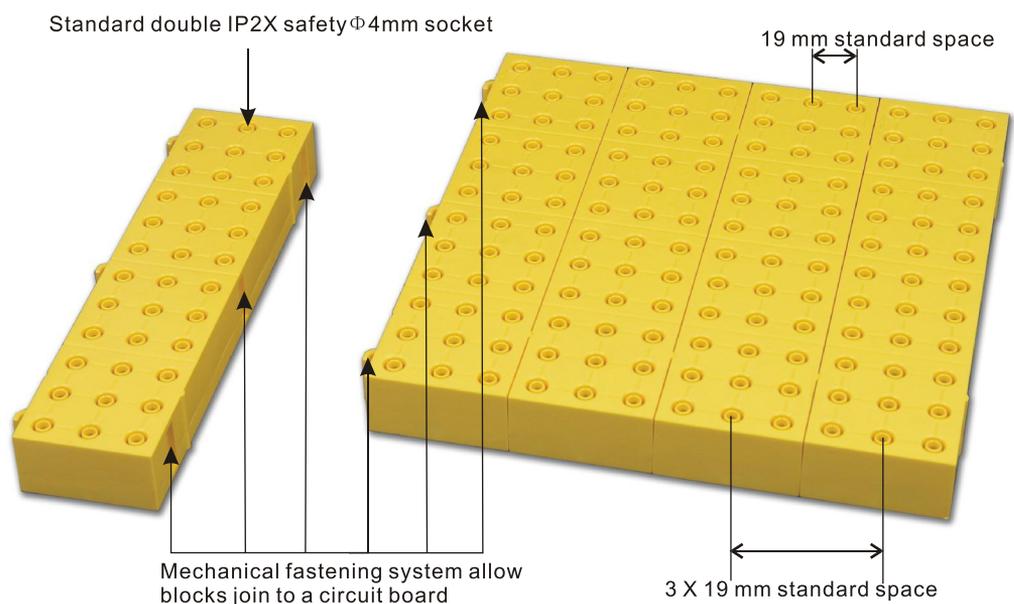
WITH:
SAFETY CIRCUIT BOARD-MSC1
SAFETY VISIBLE COMPONENT MODULE-MSC2
SAFETY SHUNT & LEADS-MSC3



Features

- .Safety and easy to creat your circuit quickly
- .Over 60 preset modules and custom made module is available
- .Standard double IP2X safety Φ 4mm socket connection

SAFETY CIRCUIT BOARD-MSC1



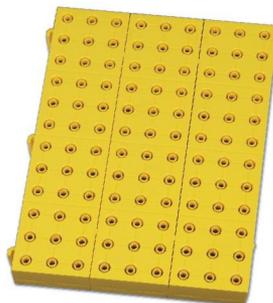
Model	Block	Unit	Socket
MSC1.1	1	4	36
MSC1.2	2	8	72
MSC1.3	3	12	108
MSC1.4	4	16	144



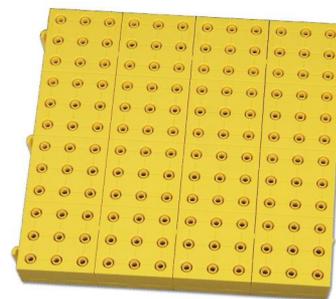
MSC1.1



MSC1.2



MSC1.3



MSC1.4

POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

SAFETY VISIBLE COMPONENT MODULE-MSC2

DIPOLES MODULE-MSC2.2



19 mm standard space
Standard double IP2X safety Φ 4mm plug
Transparent and marked housing

QUADRIPOLES MODULE-MSC2.4



3 X 19 mm standard space
Standard double IP2X safety Φ 4mm plug
Transparent and marked housing

MSC2.2 Series preset modules

Resistor



PTC, NTC, LDR



Capacitor



Push-button switch 1x1



Variable resistor



Toggle switch 1x1



Diode



Universal stand



Inductor



Buzzer



E10 base bulb



Micro USB socket



MODULAR SAFETY CIRCUIT SYSTEM

SC2.4 Series preset modules

Variable resistor



Voltage meter



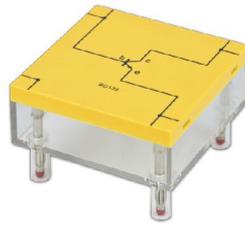
Variable resistor (decade model)



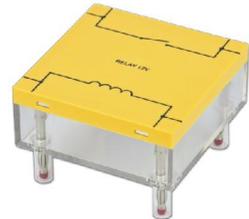
DC motor



Transistor



Relay



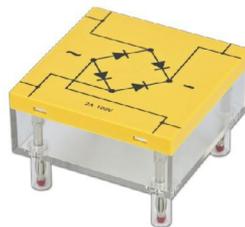
Thyristor



Push-button switch 1x2



Diode bridge



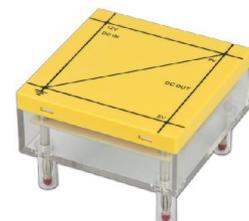
Toggle switch 1x2



Current meter



DC power supply



POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

SC2.7 Series preset modules

4-bit data switches



7 seg led display



4-bit led level display



Pulse generator
0.1Hz~10kHz



SC2.8 Series preset modules

IC module



SAFETY SHUNT & LEADS-MSC3

Safety shunt MSC3.1

Standard double IP2X safety Φ 4mm plug and 19mm plug space



MSC3.1

Safety leads MSC3.25

Standard double IP2X safety Φ 4mm plug
Length: 250mm



MSC DEMONSTRATION TRAINING SET MSC-01

NEW

SET CONTAIN

1. Safety circuit board MSC1

MSC1.1 6pcs

2. Safety visible component module MSC2

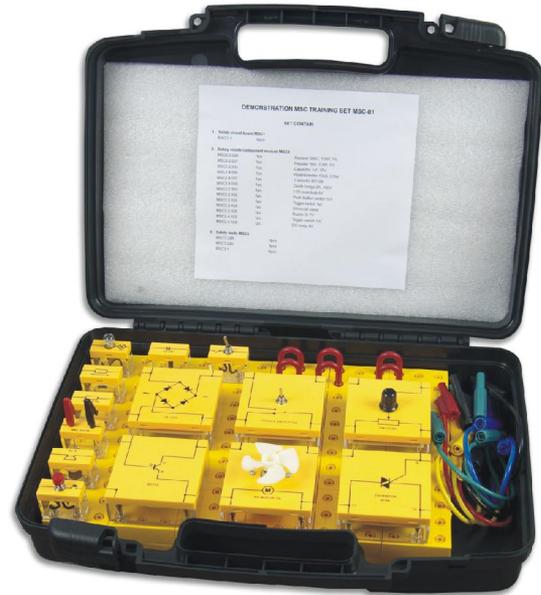
MSC2.2.006	1pc	Resistor 680 Ω , 1/2W, 1%
MSC2.2.007	1pc	Resistor 1k Ω , 1/2W, 1%
MSC2.2.033	1pc	Capacitor 1 μ F, 25V
MSC2.4.004	1pc	Potentiometer 10k Ω , 0.5W
MSC2.4.031	1pc	Transistor BC108
MSC2.4.049	1pc	Diode bridge 2A, 100V
MSC2.2.101	1pc	E10 base bulb 6V
MSC2.2.102	1pc	Push-button switch 1x1
MSC2.2.103	1pc	Toggle switch 1x1
MSC2.2.104	1pc	Universal stand
MSC2.2.105	1pc	Buzzer 3~7V
MSC2.4.102	1pc	Toggle switch 1x2
MSC2.4.104	1pc	DC motor 6V

3. Safety leads MSC3

MSC3.5R	3pc
MSC3.5K	3pc
MSC3.1	3pc

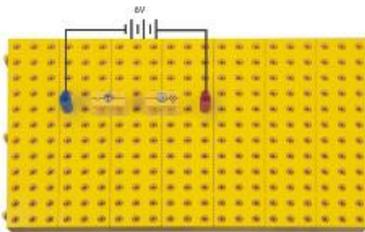
4. Plastic case

TPC005 1pc

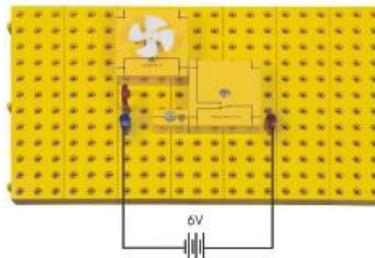


EXPERIMENT CONTAIN

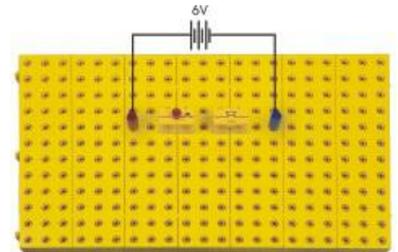
Single lamp control



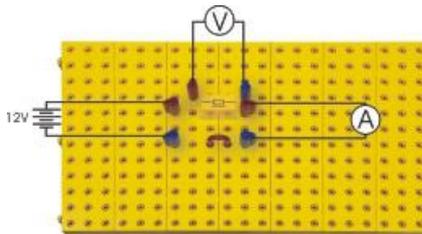
Lamp and fan select



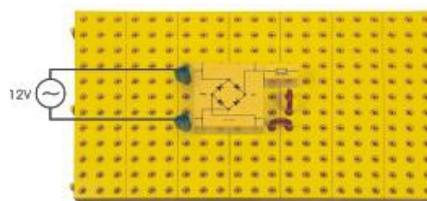
Buzzer control



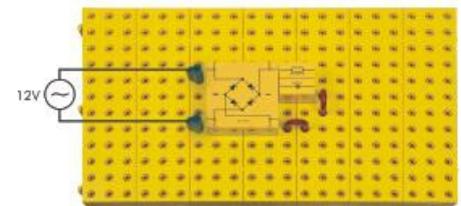
Ohm's law



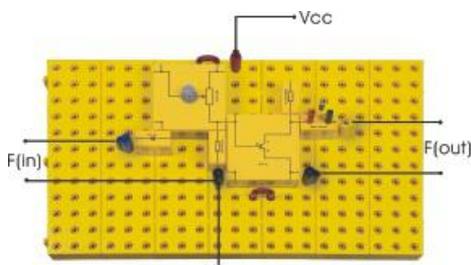
Full-wave rectifier



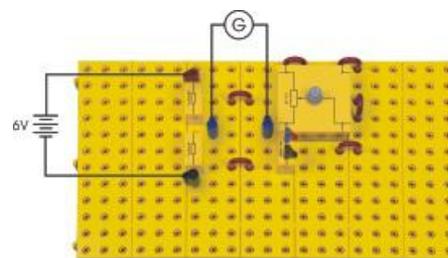
Rectify and filter



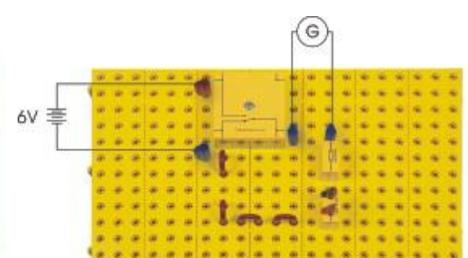
Basic transistor amplifier circuit



Bridge



Capacitor charge and discharge



MSC BASIC LOGIC GATE TRAINING SET MSC-02 **NEW**

SET CONTAIN

1. Safety circuit board MSC1

MSC1.1 6pcs

2. Safety visible component module MSC2

MSC2.8.001	1pc	Quad 2-input NAND gates 7400
MSC2.8.002	1pc	Quad 2-input NOR gates 7402
MSC2.8.003	1pc	Quad NOT gates 7404
MSC2.8.004	1pc	Quad AND gates 7408
MSC2.8.005	1pc	Quad OR gates 7432
MSC2.8.008	1pc	Quad 2-input EXCLUSIVE OR gates 7486
MSC2.8.010	1pc	Quad EXCLUSIVE NOR gates gates CD4077
MSC2.7.001	1pc	4-digit data switch
MSC2.7.002	1pc	4-digit level display

3. Safety leads MSC3

MSC3.25R	1pc
MSC3.25K	1pc
MSC3.25B	2pc
MSC3.25G	2pc
MSC3.25Y	2pc

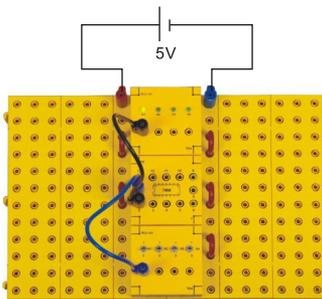
4. Plastic case

TPC005 1pc

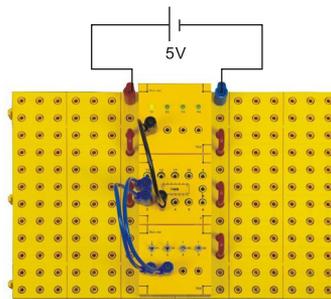


EXPERIMENT CONTAIN

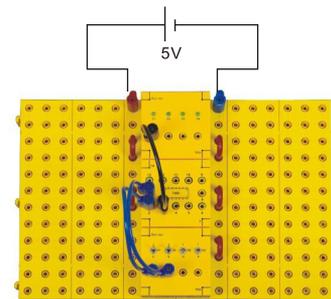
NOT logic gate



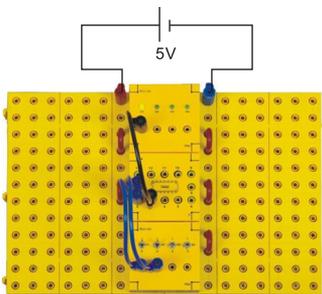
AND logic gate



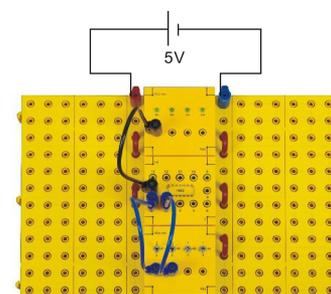
NAND logic gate



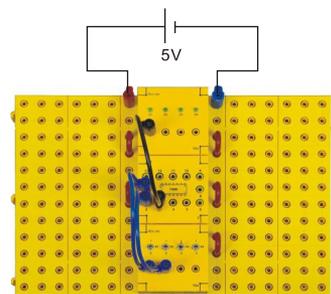
OR logic gate



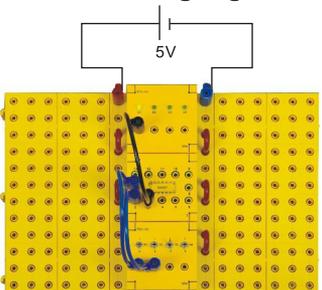
NOR logic gate



XOR logic gate



XNOR logic gate



MSC ADVANCED LOGIC GATE TRAINING SET MSC-03 **NEW**

SET CONTAIN

1. Safety circuit board MSC1

MSC1.1 6pcs

2. Safety visible component module MSC2

Resistor 5.6kΩ, 1/2W, 1% 2pcs

Resistor 1kΩ, 1/2W, 1% 2pcs

Resistor 27kΩ, 1/2W, 1% 2pcs

Resistor 820Ω, 1/2W, 1% 2pcs

Capacitor 0.01μF, 250V 2pcs

Capacitor 0.033μF, 250V 2pcs

Capacitor 0.022μF, 250V 1pc

Diode 1N4007 1pc

Transistor BC108 2pcs

Toggle switch 1 × 2 1pc

4-digit data switch 2pcs

4-digit level display 2pcs

Pulse generator 0.1Hz~10kHz 1pc

4-digit data switch 2pcs

4-digit level display 2pcs

Pulse generator 0.1Hz~10kHz 1pc

Quad 2-input NAND gates 7400 1pc

Quad 2-input NOR gates 7402 1pc

Hex NOT gates 7404 1pc

Quad 2-input AND gates 7408 1pc

Quad 2-input OR gates 7432 1pc

Dual 4-input OR gates 7420 1pc

Quad 2-input EXCLUSIVE OR gates 7486 1pc

Quad 2-input EXCLUSIVE NOR gates CD4077 1pc

Dual AND-OR-INVERT gates 7451 1pc

Hex NOT gates Open-collector 7405 1pc

Dual 4-input NAND gates 7420 1pc

Triple 3-input NAND gates 7410 1pc

4-bit Binary Adder Carry 7483 1pc

AND-gated J-K flip-flop 7472 4pcs

Decade/Binary counter 7490 4pcs

Dual J-K Flip-Flop 7476 3pcs

5-bit S-R Flip-Flop 7496 1pc

Quad 2-input NAND gates Open-collector 7403 1pc

Hex Schmitt trigger inverter 7414 1pc

3. Safety leads MSC3

MSC3.25R 4pcs

MSC3.25K 4pcs

MSC3.25R 6pcs

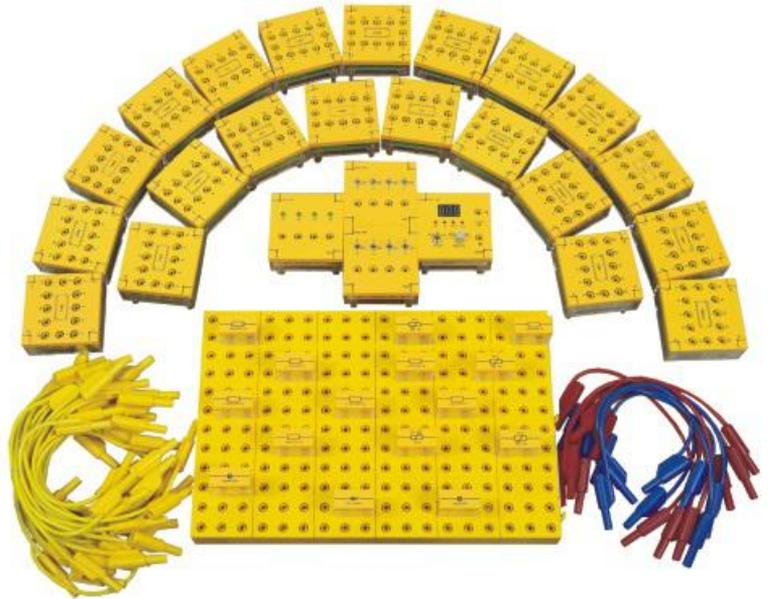
MSC3.25G 6pcs

MSC3.25Y 6pcs

MSC3.1 6pcs

4. Plastic case

TPC006 1pc



POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

EXPERIMENT CONTAIN

I Basic Logic Function

- 1 OR logic gate
- 2 INVERT logic gate
- 3 OR + INVERT = NOR logic gate
- 4 NOR logic gate
- 5 2-input NAND logic gate
- 6 4-input NAND logic gate
- 7 AND - OR - INVERT logic gate

II Boolean Algebra

- 1 $A = \overline{\overline{A}}$
- 2 $A+1=1, A+0=A, A+A=A, A+\overline{A}=1$
- 3 $A \cdot 1=A, A \cdot 0=0, A \cdot A=A, A \cdot \overline{A}=0$
- 4 Logic equation

III De Morgan's Theorem

- $$\overline{A+B} = \overline{A} \cdot \overline{B}, \overline{A+B} = \overline{A} \cdot \overline{B}, A \cdot B = \overline{\overline{A+B}}, \overline{A+B+C} = \overline{A} \cdot \overline{B} \cdot \overline{C},$$
- $$\overline{A \cdot B \cdot C} = \overline{A+B+C}, A \cdot C + B \cdot C = (A+B) \cdot C$$

IV Exclusive-OR and Its Applications

- 1 Exclusive-OR
- 2 Half-Adder, Half-Subtractor
- 3 Binary Comparator
- 4 Parity Generator

V Adder and Subtractor

- 1 Half-Adder, Half-Subtractor
- 2 SUM in Full-Adder and DIFFERENCE in Full-Subtractor
- 3 Co for X+Y+ Ci
- 4 Full-Adder with Half-Adders
- 5 2-Bit Parallel Binary Adder
- 6 4-Bit Binary Full-Adder/2's-complement 4-Bit Binary Full-Subtractor

VI Bistable or Flip-Flop

- 1 R-S Flip-Flop with NAND Gates
- 2 Gated R-S Flip-Flop
- 3 D Flip-Flop
- 4 AND-Gated J-K Master-Slave Flip-Flop

VII Binary Counters

- 1 Binary ripple counter
- 2 Synchronous counter

VIII Divide-by-N Counters and Decade Counters

- 1 Modulus 3 Counter
- 2 Modulus 6 Counter
- 3 Decade Counter 2421
- 4 Decade Counter 8421
- 5 IC Decade Counter
- 6 IC Divide-by-10 Counter

IX Shift Registers and Ring Counter

- 1 Shift Register
- 2 IC Shift Register
- 3 Quinary ring counter
- 4 Twisted-ring or Johnson Counter

X Pulse Forming and Shaping/ Schmitt Trigger

- 1 Transistor Astable
- 2 IC Astable
- 3 Pulse Stretchers
- 4 Schmitt Trigger

F3 SERIES



Features

- . Light and magnetic fixture
- . Visible components
- . 4mm safety socket connection
- . Customization allows
- . Dimensions (W×H×D):100×68×40mm

F3-001
Resistor

4.7 Ω , 12 Ω , 39 Ω , 2W

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

F3-003
Capacitor
0.5 μ F, 1 μ F, 2 μ F, 400V

F3-004
Capacitor
220 μ F, 470 μ F
2200 μ F, 25V

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

F3-006
Push switch
1×2, 120V, 5A

F3-007
Toggle switch
2×2, 120V, 5A

F3-008

F3-009

F3-014

F3-010

F3-008
Fuse
6×20, 250V, 3A

F3-009
Crocodile clip
24V, 3A

F3-013

F3-012

F3-011

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

F3-002

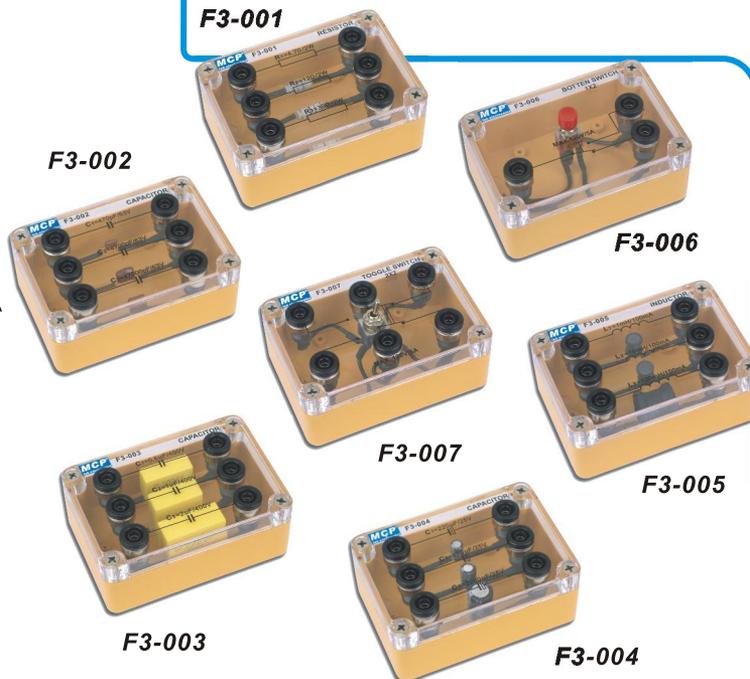
F3-006

F3-007

F3-005

F3-003

F3-004



DEMONSTRATION TRANSPARENT COMPONENTS

POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY



F3-015

F3-015
Buzzer

3~7V



F3-016

F3-016
Speaker

8Ω, 0.3W



F3-017

F3-017
Potentiometer

1KΩ, 0.5W



F3-018

F3-018
Diode

1N4004



F3-019

F3-019
Transistor

2SC1008



F3-020

F3-020
Thyristor

97A6



F3-021

F3-021
LED

6V

F3-022
Rectifier

400V, 10A



F3-022

F3-023
Transformer

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



F3-023



F3-024

F3-024
Toggle switch

2X2



F3-027

F3-025
Toggle switch

1X2



F3-025

F3-026
DC current meter

0~5A
Accuracy: 2.5%



F3-028

F3-027
DC voltage meter

0~30V
Accuracy: 2.5%



F3-026



F3-029

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

Analog multiplier



F3-161

F3-160
Operational amplifier

Amplifier TL081

F3-162
Detector

The circuit for demodulation

ELECTROMAGNETISM EXPERIMENT BOXES



F3-301



F3-302



F3-303



F3-304



F3-305



F3-306

Electromagnetism experiment boxes

*Non-magnetic fixture

F3-301

Circle Circuit

25 turns, $I_{Max}=1A$

F3-305

Straight Circuit

7 turns, $I_{Max}=3A$

F3-302

Solenoid Circuit

10 turns, $I_{Max}=3A$

F3-306

The Oersted Needle

$I_{Max}=1A$

F3-303

Straight ladder

$I_{Max}=3A$

F3-304

Head bow

$I_{Max}=3A$



POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

F3-717 SOLAR POWER GENERATION **NEW**

Objects

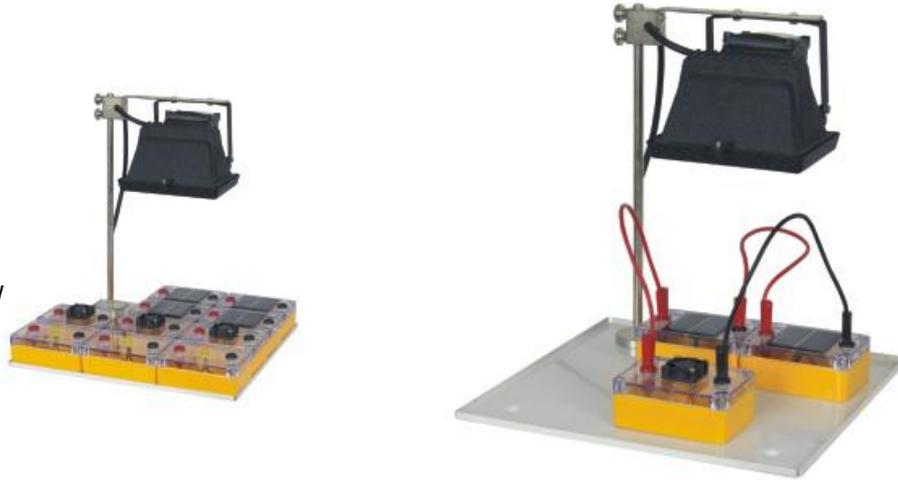
Solar panel, LED lamp and DC fan consist a solar power system

Principles

Solar panel generates the power by illumination and as a source supplies to lamp and fan. The solar panel can be connected in parallel or series to get higher voltage or current.

SYSTEM CONTAIN

- 4 pcs solar panel 3V/150mA
- 3 pcs LED lamp 3V, 6V, 12V
- 3 pcs DC fan 3V, 6V, 12V
- 1 pcs light source 220V/150W
- 1 pcs magnetic base



F3-718 WIND POWER GENERATION **NEW**

Objects

Wind power generator, LED lamp and DC fan consist a wind power system

Principles

Wind power generator which derived by the power of a fan (wind simulation) is a source supply to lamp and fan.

SYSTEM CONTAIN

- 1 pcs wind power generator
- 1 pcs LED lamp/DC fan 3V
- 1 pcs wind source 220V/50W
- 1 pcs magnetic base



TB SERIES

Feature

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



TB 1000

TB 1000 **Training bench**

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



TB 1100

TB1100 **Training bench + Top frame**

.Training bench (TB1000)
.Top frame

TB1200



Feature

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

TB1200

Training bench + instrument housing

1. Training bench (TB1000)
2. Instrument housing
 - .Oscilloscope: DQ6025 ×1
 - .DC power supply: M10-TP3003L ×1
 - .Function generator: SG1638 ×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



TB 1200

Brief technical data of installed instruments

- 2.1 Oscilloscope: DQ6025
 - Bandwidth: 25MHz
 - Sampling rate: 250MSa/s
 - Vertical sensitivity: 1mV/div~20V/div
 - Trigger mode: auto, normal, single
- 2.2 DC power supply: M10-TP3003L
 - Output voltage: 0~30V × 2
 - 5V fixed
 - Output current: 0~3A × 2
 - Max. 3A
 - Output mode: independent, series, parallel
- 2.3 Function generator: SG1638
 - Output frequency: 2MHz
 - Output amplitude: 20Vp-p
 - Output waveforms: sine, square, triangle and TTL
 - Output impedance: 50Ω
- 2.4 RF generator: HG1500
 - Output frequency: 100kHz~150MHz
 - INT. & EXT. modulation: AM, FM
 - Audio signal generator: 1kHz±10%
 - FM stereo signal generator: 88~108MHz
- 2.5 Digital multimeter: MT8145
 - DC voltage: 80mV, 800mV, 8V, 80V, 800V, 1000V
 - AC voltage: 80mV, 800mV, 8V, 80V, 750V
 - DC current: 80mA, 800mA, 8A, 20A
 - AC current: 80mA, 800mA, 8A, 20A
 - Resistance: 800Ω, 8kΩ, 80kΩ, 800kΩ, 8MΩ, 80MΩ
 - Capacitance: 1nF, 10nF, 100nF, 1μF, 10μF, 100μF
 - Frequency: 999099Hz~1000.0MHz
 - hFE: ✓

TB1300



NEW

Feature

.The benches are suitable for the use of training, developing, service, calibration and assembling with two seats

TB1300

Training bench + instrument housing

- 1. Training bench (TB1000)
- 2. Instrument housing
 - . Oscilloscope: DQ6102E x1
 - . Universal measuring center x2
 - . AC power supply: 6V, 12V, 24V/0.5A
 - . Solering station x2
 - . AC outlet x8
 - . Test leads holder: PTL2001 x2



TB 1300

Brief technical data of installed instruments

2.1 Oscilloscope: DQ6120E

- Bandwidth: 100MHz
- Sampling rate: 1GSa/s
- Channels: 2
- Vertical sensitivity: 1mV/div~20V/div
- Horizontal range: 2ns/div~50s/div
- Trigger mode: Auto, Normal, Single
- Math: +, -, x, /, FFT

2.2 Universal measuring center

Function generator

- Output frequency: 0.2Hz~10MHz in 8 ranges
- Output waveforms: sine, square, triangle, ramp, pluse, TTL, CMOS
- Output amplitude: 200mVp-p~20Vp-p (1M Ω), 100mVp-p~10Vp-p (50 Ω)
- VCF input: -5~+5VDC
- Output attenuation: -20dB, -40dB, -60dB
- DC offset: -10V~+10V(1M Ω), -5V~+5V(50 Ω)
- Symmetry: 20%~80%
- Modulation: Sweep, FM, AM, FSK

Counter

- Frequency range: 1Hz~2.4GHz
- Period range: 100ns~1s
- Output sensitivity: 35mV(1~20Hz, CHA), 20mV(20Hz~100MHz, CHA), 30mV (CHB)
- Attenuation: -20dB
- Gate time: 1s, 10s
- Input impedance: 1M Ω
- Couple mode: AC

Power supply

- Output voltage: 0~30V Fixed 5V, $\pm 15V$
- Output current: 0~3A (0~30V), 2A (Fixed 5V), 1A (Fixed $\pm 15V$)
- Ripple and noise: <1mVrms (0~30V), <2mVrms (Fixed 5V, $\pm 15V$)
- Load regulation: 0.1% \pm 40mV(0~30V), 0.1% \pm 70mV(Fixed 5V), 0.1% \pm 50mV(Fixed $\pm 15V$)
- Line regulation: 0.1% \pm 20mV(0~30V), 0.1% \pm 30mV(Fixed 5V, $\pm 15V$)

Digital multimeter

- DC voltage: 200mV/2V/20V/200V/1000V
- AC voltage: 200mV/2V/20V/200V/750V
- DC current: 20mA/200mA/2A/20A
- AC current: 200mA/2A/20A
- Resistance: 200 Ω /2k Ω /20k Ω /200k Ω /2M Ω /20M Ω

POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

TB1400



NEW

Feature

.The benches are suitable for the use of training, developing, service, calibration and assembling with PC program

TB1400

**Training bench + instrument housing
PC controllable with USB interface**

- 1. Training bench (TB1000)
- 2. Instrument housing
 - . Oscilloscope: DQ21005 x1
 - . DC power supply: M10-TP3003D x1
 - . Digital multimeter: MT8145 x1
 - . DDS function generator: SG32020 x1
 - . Solerling station x1
 - . AC outlet x8
 - . Test leads holder: PTL2001 x2



TB 1400

Brief technical data of installed instruments

2.1 Oscilloscope: DQ21005

Bandwidth: 100MHz
 Sampling rate: 500MSa/s
 Channels: 2
 Vertical sensitivity: 2mV/div~50V/div
 Horizontal range: 5ns/div~50s/div
 Trigger mode: Auto, Normal, Single
 Math: +, -, x, /, FFT, DIFF, INT, SFFT
 Panel interface: USB

2.2 DC power supply: M10-TP3003D

Output voltage: 0~30V×2, 2.5V, 3.3V, 5V
 Output current: 0~3A×2, 3A
 Output mode: independent, series, parallel, store & recall
 Panel interface: USB

2.3 Digital multimeter: MT8145

DC voltage: 80mV, 800mV, 8V, 80V, 800V, 1000V
 AC voltage: 80mV, 800mV, 8V, 80V, 750V
 DC current: 80mA, 800mA, 8A, 20A
 AC current: 80mA, 800mA, 8A, 20A
 Resistance: 800Ω, 8kΩ, 80kΩ, 800kΩ, 8MΩ, 80MΩ
 Capacitance: 1nF, 10nF, 100nF, 1μF, 10μF, 100μF
 Frequency: 999099Hz~1000.0MHz
 hFE: √
 Panel interface: USB

2.4 DDS function generator: SG32020

Channels: A, B
 Output frequency: 1uHz~20MHz
 Output waveform: Sine, Square, Ramp, Pulse, Triangle, arbitrary
 Modulation: AM, FM, ASK, FSK, PSK
 Panel interface: USB

POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

TB1600



NEW

Feature

The benches are suitable for the use of training, developing, service, calibration and DIY

TB1600

Training bench + instrument housing

1. Training bench (TB1000)
2. Instrument housing
 - . Oscilloscope: DQ6102E x1
 - . DC power supply: M10-TP3003L x1
 - . Digital multimeter: MT8145 x1
 - . LCR meter: BR4822 x1
 - . Transistor tester: TST294 x1
 - . AC power supply:
 - . Store house x1
 - . AC outlet x4
 - . Test leads holder: PTL2001 x2



TB 1600

Brief technical data of installed instruments

2.1 Oscilloscope: DQ6102E

Bandwidth: 100MHz
 Sampling rate: 1GSa/s
 Channels: 2
 Vertical sensitivity: 1mV/div~20V/div
 Horizontal range: 2ns/div~50s/div
 Trigger mode: Auto, Normal, Single
 Math: +, -, x, /, FFT

2.2 DC power supply: M10-TP3003L
 Output voltage: 0~30V × 2, 5V fixed
 Output current: 0~3A × 2, Max. 3A
 Output mode: independent, series, parallel

2.3 Digital multimeter: MT8145
 DC voltage: 80mV, 800mV, 8V, 80V, 800V, 1000V
 AC voltage: 80mV, 800mV, 8V, 80V, 750V
 DC current: 80mA, 800mA, 8A, 20A
 AC current: 80mA, 800mA, 8A, 20A
 Resistance: 80Ω, 8kΩ, 80kΩ, 800kΩ, 8MΩ, 80MΩ
 Capacitance: 1nF, 10nF, 100nF, 1μF, 10μF, 100μF
 Frequency: 999099Hz~1000.0MHz
 hFE:

2.4 LCR meter: BR4822

L: 0.01~9999H
 C: 0.5pF~200mF
 R: 0.1mΩ~19.99MΩ
 Q: 0.01~999
 D: 0.01%~999%
 Test frequency: 100Hz, 1kHz, 7.8kHz

2.5 Transistor tester: TST294
 VBR range: 0~1000V, 0~200V
 VCE range: 0~6V
 hEF: 0~200, 0~2000
 ICEO: 0~2000uA
 78 & 79 voltage regulator: 78XX / 79XX

2.6 Store house
 Inner dimension (WxHxD): 462 x 86 x 312mm

M21-1800



NEW

Feature

The benches provide a course on the operation and trouble shooting for electrical control circuits. It has unique training capabilities with a fault insertion system which is useful as a teaching aid in fault finding or troubleshooting the electrical control circuits

M21-1800

Training bench + device housing

1. Training bench (TB1000)

2. Device housing

- .Main MCB 3 phase 16A (miniature circuit breaker) x1
 - .Control MCB 1 phase 6A (miniature circuit breaker) x1
 - .ELCB 3phase (earth leakage circuit breaker) x1
 - .Control lamp to indicate "On" x3
 - .Magnetic contactor+auxiliary contacts (2NO+2NC) x3
 - .Push button switch, NO/NC x4
 - .Regulated cam switch, I-O-II x1
 - .Thermal overload relay 1-1.6A x2
 - .Time delay relay 0- 10 sec x1
 - .Push button switch for emergency off "Off" x1
 - .Illuminated power lamp x1
 - .Fault simulator switch x30
3. Test mater x1
4. Cable and test leads
- .Connection test leads x1 set
 - .Power cable x1



M21-1800

POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY

MULTI-PURPOSE WORKSTATION

MULTI-PURPOSE WORKSTATION



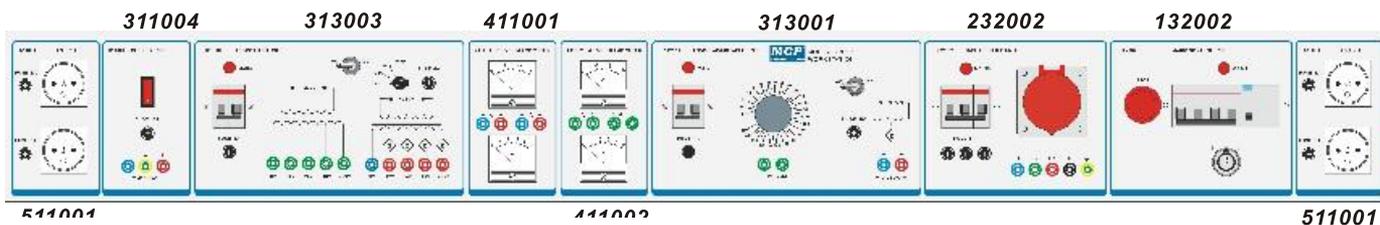
Feature

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.

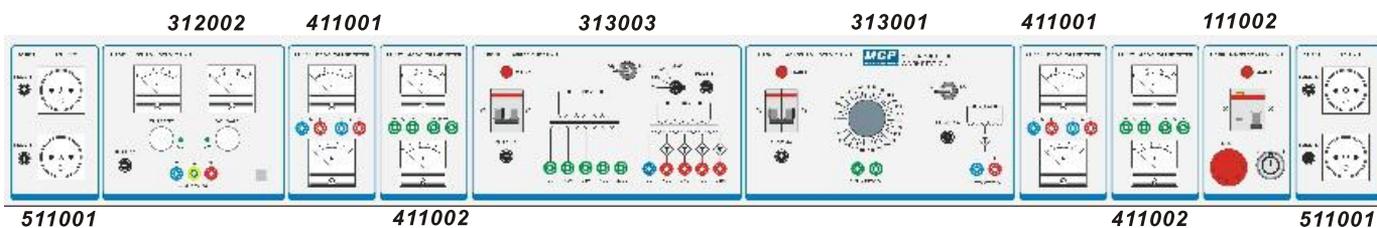


Three phase power input socket

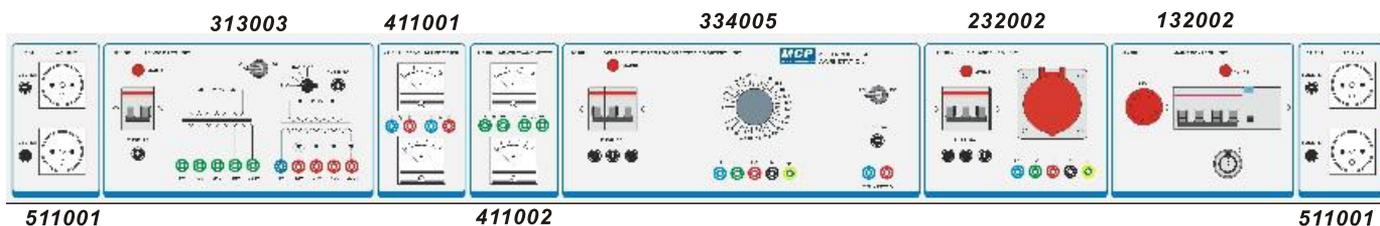
TB150-1



TB150-2



TB150-3



POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

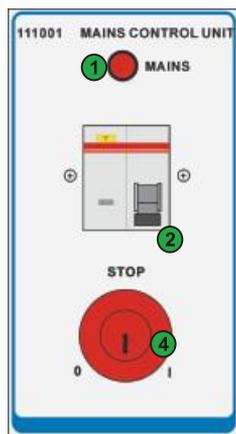
ACCESSORY

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

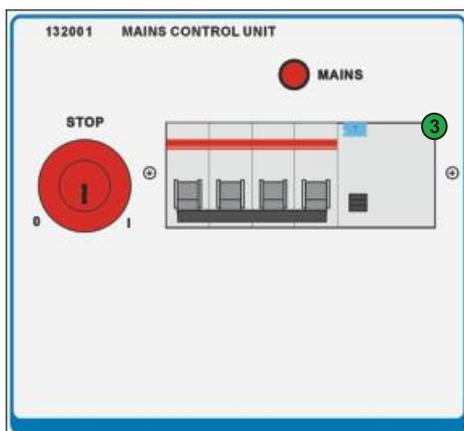
- ① : Indicator of On/Off
- ② : Single-phase electronic magnetic break switch (400V, 10A) and leakage protection switch (30mA)
- ③ : Three-phase electronic magnetic break switch (690V, 50A) and leakage protection switch (30mA)
- ④ : Emergency switch with On/Off key (660V, 10A)
- ⑤ : Emergency switch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



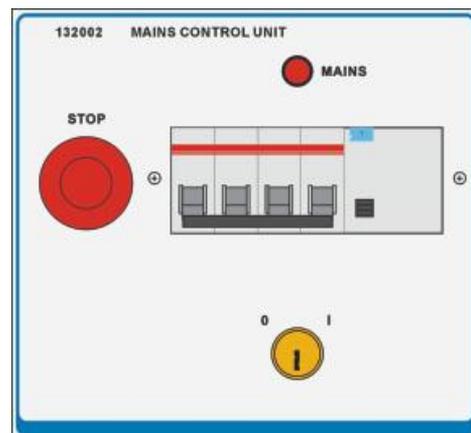
111001



111002



132001



132002

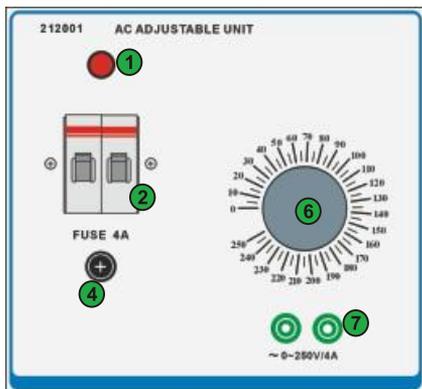
AC POWER SUPPLY UNIT



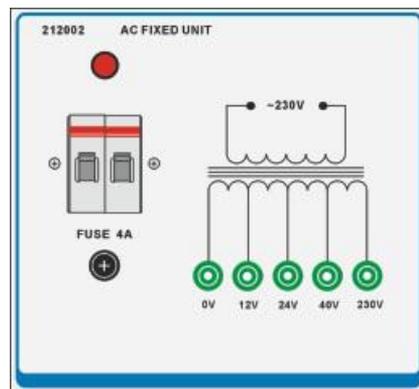
Model	AC output	Phase	Block(s)
212001	0~250V/4A	1	2
212002	12V/24V/40V/250V/4A	1	2
234001	0~250V/4A X 3 Phase	3	4
232002	230V/4A X 3 Phase	3	2

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

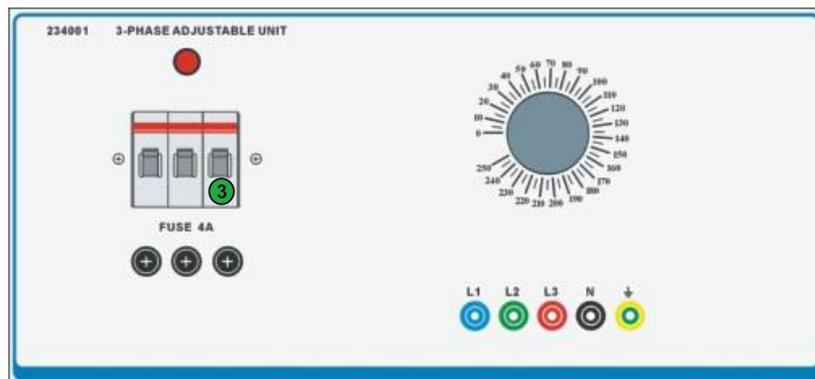
- ①: Indicator of on/off
- ②: Single-phase electronic magnetic break switch (400V, 10A)
- ③: Three-phase electronic magnetic break switch (690V, 50A)
- ④: Output fuse protection
- ⑤: Three-phase output socket
- ⑥: Voltage adjusting knob
- ⑦: Output safety sockets



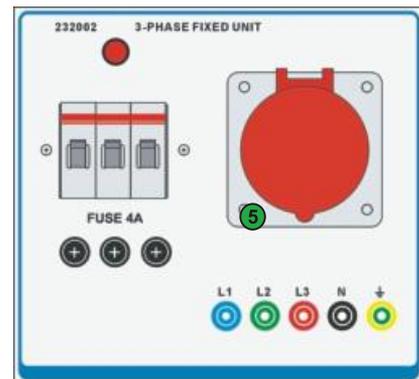
212001



212002



234001



232002

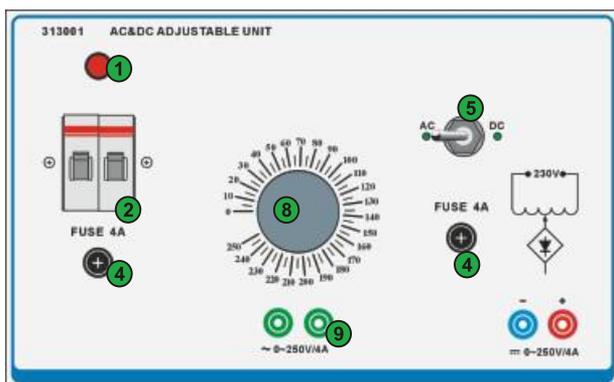
DC & AC POWER SUPPLY UNIT



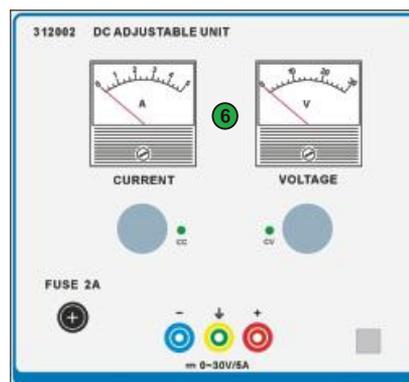
Model	AC output	DC output	Block(s)
313001	0~250V/4A	0~250V/4A(rectified DC)	3
312002	NA	0~30V/0~5A(regulated DC)	2
313003	12V/24V/40V/250V/4A	12V/24V/40V/250V/4A(rectified DC)	3
311004	NA	24V/10A(switching power supply)	1
334005	0~250V/4A X 3 Phase	0~250V/4A(three phase rectified, 4% small ripple)	4

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

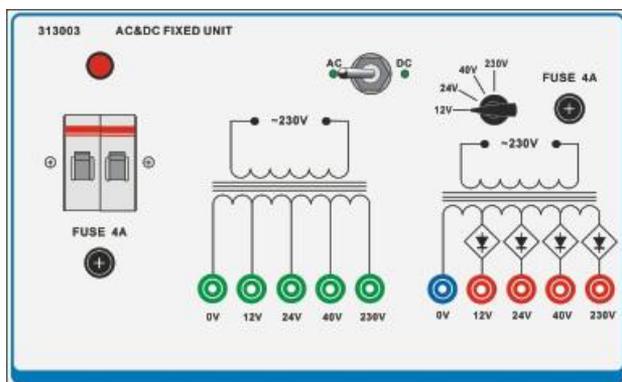
- ① : Indicator of on/off
- ② : Single-phase electronic magnetic break switch (400V, 10A)
- ③ : Three-phase electronic magnetic break switch (690V, 50A)
- ④ : Output fuse protection
- ⑤ : AC/DC output change switch
- ⑥ : Current meter and voltage meter
- ⑦ : On/Off switch with LED indicator
- ⑧ : Voltage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



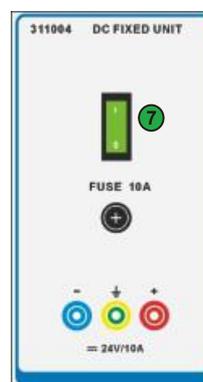
313001



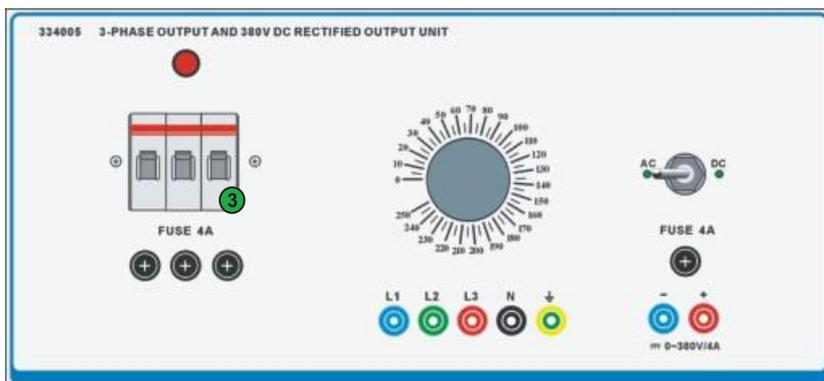
312002



313003



311004

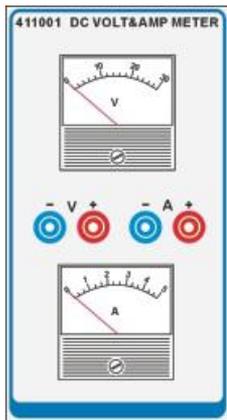


334005

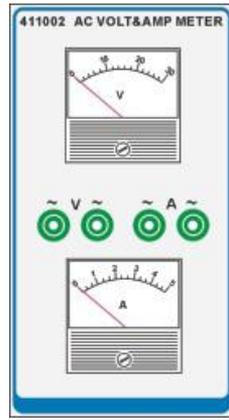
MULTI-PURPOSE WORKSTATION

POWER SUPPLY
TEST INSTRUMENT
EDU. INSTRUMENT
METER
MACHINE
ACCESSORY

METER UNIT



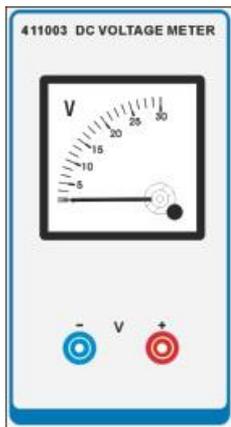
411001



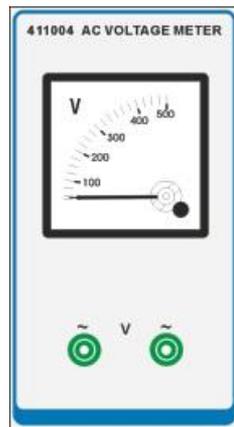
411002

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

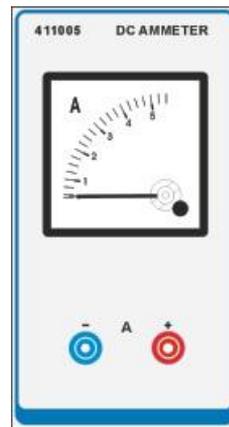
*N Block(s) size (W×H×D) = (100×N)×194×231 mm



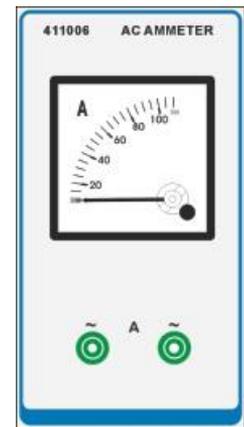
411003



411004



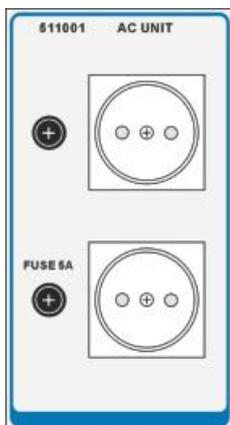
411005



411006

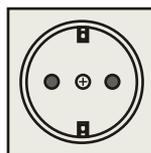
Note: Other measuring range can also be customized

SOCKET UNIT

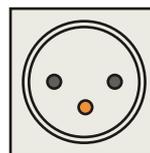


511001

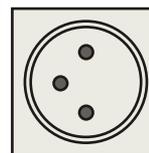
511001 support the following kinds of power socket



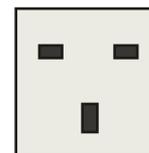
Germany



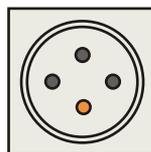
France



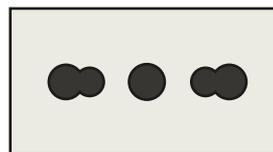
Spain



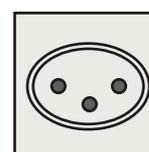
United Kingdom



Greece



Italy



Switzerland

Model	Block
511001	1

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

EH818

EXPERIMENT SYSTEM OF ELECTRICAL INSTALLATIONS AND TESTING TECHNIQUES

Features

- .Represent a small size building for residential use
- .Analyze the correct mounting procedures 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)





POWER SUPPLY

TEST INSTRUMENT

EDU. INSTRUMENT

METER

MACHINE

ACCESSORY