MH Since 1981
INSTRUMENTS

Auto Lighter

Since 1981
INSTRUMENTS

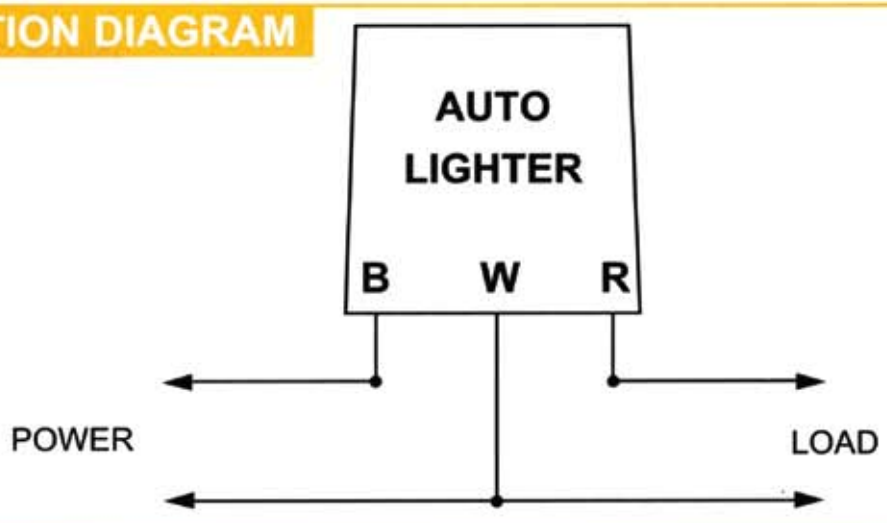
CHARACTERISTICS

- Standard turn on light level : ≤10 Lux (Under conditions at rated voltage and surroundings temperature 20°C)
- Standard turn off light level : ≥100 Lux (Under conditions at rated voltage and surroundings temperature 20°C)
- Suitable surroundings temperature range: -10°C~+40°C
- Sevice life time: more than 2,000 times. (Operational conditon: rated voltage, surroundings temperature 20°C) Maximum operational frequency: 6 Time/Hour.
- Rated frequency: 50Hz/60Hz

SPECIFICATIONS

ORDER CODE NO	RATING
CA-22003	AC 220V 3A
CA-22006	AC 220V 6A
CA-22010N	AC 220V 10A
CA-22015N	AC 220V 15A
CA-11003	AC 110V 3A
CA-11006	AC 110V 6A
CA-11010N	AC 110V 10A
CA-11015N	AC 110V 15A

CONNECTION DIAGRAM



PHS-06A-1
PHOTO ELECTRIC
CONTROLLER

PHS-06A-2
SOCKET

REMARK:

- **PHS-06A (PHOTO ELECTRIC CONTROLLER WITH SOCKET)**
- **PHS-06A-1 (PHOTO ELECTRIC CONTROLLER ONLY)**
- **PHS-06A-2 (SOCKET ONLY)**

Introduction:

PHS-06A is designed for automatic light control. It can be used to turn on streetlights at night and turn off at dawn.

Safety Precaution:

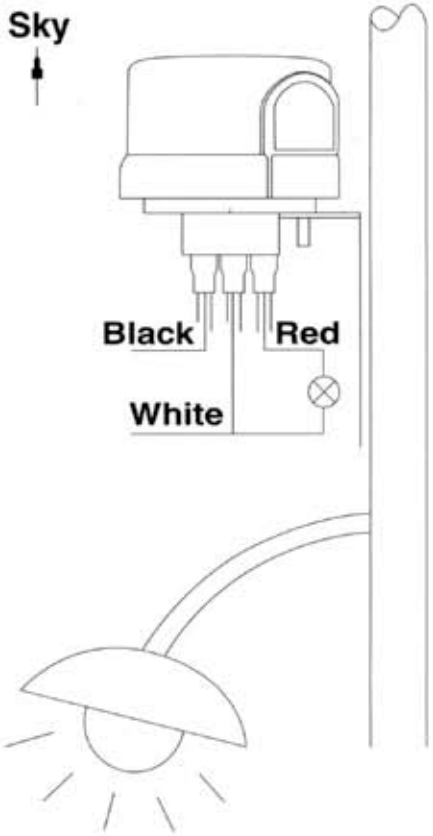
Any improper use of this product can cause short circuit, which can damage product itself or even cause fire.
Please read instruction carefully and make sure:
1.Wiring and mounting position are correct according to instruction.
2.Auto lighter must work within rated current and voltage.

Technical Data:

1) Rated voltage: 105-305VAC
2) Rated frequency 50-60Hz
3) Rated current : 10A
4) Max Load: 1000W, 1800VA
5) Working Environment: 32-122˚F(0˚C~50˚C)
6) Acting time:
   Turn on in 30 seconds when light level ≤ 10Lux
   Turn off in 2 minutes when light level ≥ 70Lux
7) Specification:
   Weight: 220g
   Size: 110mm x 90mm x 85mm

Installation:

1) Install with sensor face up to the sky as show in picture
2) Window on the sensor should not face potential light sources
3) Connect wires to circuit as following:
   Load: Red wire
   Common: White wire
   Source: Black wire
4) Mount light sensor to supporting structure with metal support.



MH-ATS

Automatic Transfer Switch

Automatic Switching for Dual Power Source Network

The MH-ATS is a compact solenoid actuated dual power source automatic transfer switch.
Compliance to IEC 60947-6-1 & GB/T 14048.11 Standard.
Designed to operate with high switching speed and support large load current capacity up to 5,000A.

Product Overview

MH-ATS is available in two series, the "S2" and "S3".

The "**S2 series**" is a two-stage transfer design with capacity available from 20A to 500A. When a switching signal is received, the switch will transfer power immediately.

The "**S3 series**" is a three-stage transfer design with capacity available from 20A to 5,000A. An OFF position allows for motor loads to spin down before reconnection to a power source. Alternatively, the switch may also be configured to transfer power source immediately after a switching signal is Received.

The MH-ATS may be interfaced with an optional ATS Controller "**MH-SCT**" to configure for delay time between switching, voltage limit setting, phase lost protection, generator start-up and remote management control.

Key Features

Mechanical interlock
Special selection switch mechanism to ensure only one power source is connected.

Multi-leaf contact clapper
Extinguished electrical arcing during switching and minimize arc damage to contact head.

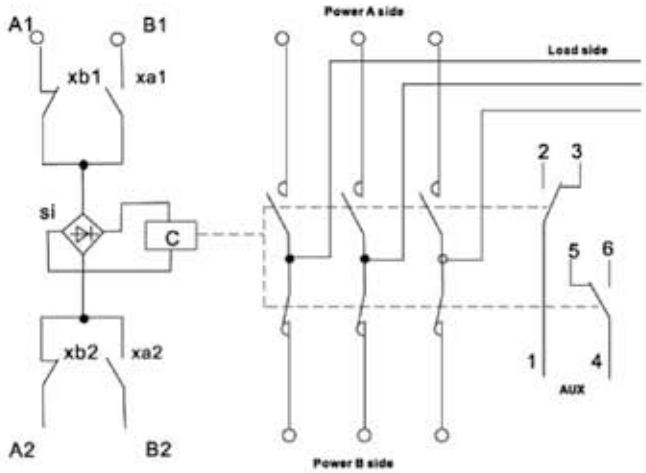
Silver alloy contact head
Higher load handling capability, minimizing overheating and provide long service lifespan.

Solenoid driven switching
Rapid transfer between the active power and standby power. Option to customize transfer delay with an external ATS controller.

Compact size
Provide ease of handling, installation in tight space and simplify maintenance effort.

MH-ATS Product Range (S2 series)

MH-ATS Models	Rated Current (A) I_{th} at 40°C & 400VAC	Switching Mode	Short-time Withstand Current	Short Circuit Current with fuse	Number of Poles
S2-63	20A 40A 63A	2-Stage automatic transfer switch. After a switching signal is received the switch transfer power immediately from one source to the other.	10kA	100kA	2 poles, 3 poles, 4 poles (Note: 2-Poles are available up to 125A models)
S2-125	80A 100A 125A				
S2-250	160A 200A 225A 250A		15kA	120kA	
S2-500	350A 400A 500A		20kA		

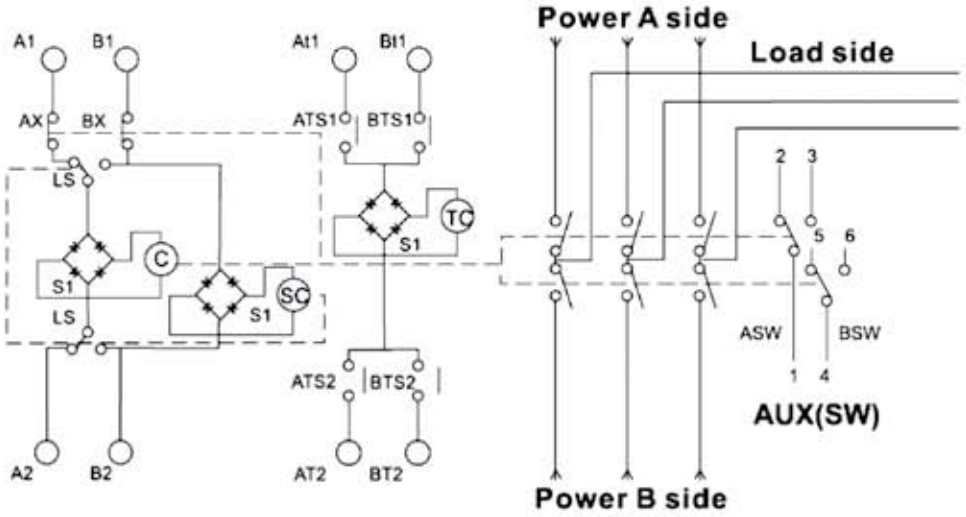


xb1, xb2 = Internal Control Switch
xa1, xa2 = Internal Control Switch
C = Making coil
S1 = Rectifier
AUX = Auxiliary switch
A1- A2 = Power A side making terminal
B1- B2 = Power B side making terminal

Wiring Circuit Diagram of MH-ATS (S2 Series)

MH-ATS Product Range (S3 series)

MH-ATS Models	Rated Current (A) I_{th} at 40°C & 400VAC	Switching Mode	Short-time Withstand Current	Short Circuit Current with fuse	Number of Poles
S3-63	20A 40A 63A	3-Stage automatic transfer switch. After a switching signal is received the switch may transfer from one source to the other immediately or stop at the OFF position.	10kA	100kA	2 poles, 3 poles, 4 poles (Note: 2-Poles are available up to 125A models)
S3-125	80A 100A 125A				
S3-250	160A 200A 225A 250A		15kA	120kA	
S3-500	350A 400A 500A		20kA		
S3-800	630A 800A		25kA		
S3-1250	1000A 1200A 1250A		32kA		
S3-1600	1200A 1500A 1600A		40kA		
S3-2500	1600A 2000A 2500A		50kA		
S3-3200	3200A				
S3-4000	3200A 4000A				
S3-5000	5000A				



C = Making coil
SC = Selection coil TC = Trip coil
S1 = Rectifier
LS = Selection switch
ATS1, ATS2 = Power A breaking terminal
BTS1, BTS2 = Power B breaking terminal

AX, BX = Control switch
AUX = Auxiliary switch
A1- A2 = Power A side making terminal
B1- B2 = Power B side making terminal
AT1- AT2 = Power A side trip terminal
BT1- BT2 = Power B side trip terminal

Wiring Circuit Diagram of MH-ATS (S3 Series)

MH-SCT Controller

The **MH-SCT** are microprocessor based controller for the MH-ATS product range. User configurable settings can be programmed to customize the MH-ATS operation for specific requirements.

The **MH-SCT-6** is a compact design model for local control of ATS up to 500A capacity.

The **MH-SCT-5** carries advance protection features and allows remote operation control via an optional RS-485 interface. This enables the MH-ATS to be managed remotely by an external software.

Model: MH-SCT-6

Model: MH-SCT-5

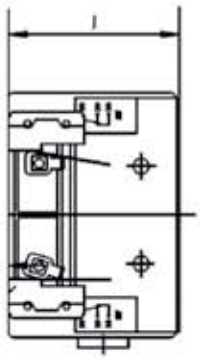
Specification		MH-SCT-6	MH-SCT-5
Type		Panel mounted；LCD multi-line display	Panel mounted；LCD multi-line display
Operating voltage		180-270V	160-270V
Cut Out		131mm(W) X 116mm(H)	152mm(W) X 123mm(H)
Dimension		141mm(W) X 126mm(H) X73mm(D)	162mm(W) X 133mm(H) X67mm(D)
Interface to ATS		4x Relay Output for ATS switch control	4x Relay Output for ATS switch control
Remote Interface		1x Dry contact input point to transfer switch	1x Dry contact input point to transfer switch
Optional Item		RS-485 communiction interface for remote control upon request	RS-485 communiction interface for remote control upon request
ATS Compatibility		MH-ATS-S3 Series MH-ATS-S2 Series	MH-ATS-S3 Series MH-ATS-S2 Series
ATS Capacity		Up to 500A	Up to 5,000A
On relay contact		10A 250V	30A 250V
Off relay contact		5A 250V	10A 250V
Standard Compliance		IEC 60947-6-1:1998 GB 14048. 11-2002	IEC 60947-6-1:1998 GB 14048. 11-2002
Functions			
	Power Indication	■	■
	Time Delay Adjustment Op	■	■
	Open Phase Protection	■	■
	Automatic Generator Startup	■	■
	Direct Over-Ride Switching	■	■
	Line voltage Display	■	■
	RS485 Interface	■	■
	Over Voltage Protection	no	■
	Under Voltage Protection	no	■

MH-ATS Technical Specification

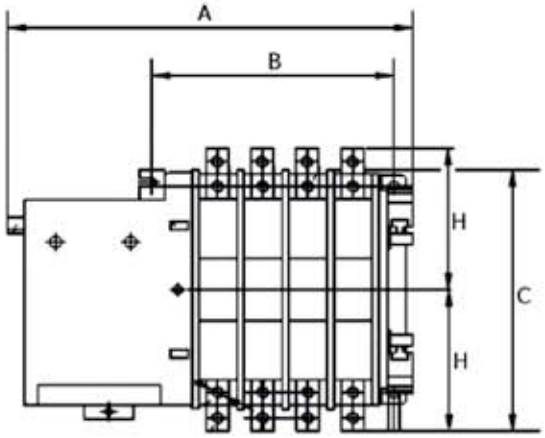
Parameter	Specification
International Standard Compliance	• IEC 60947-6-1 'Low voltage switchgear and control gear – Part 6-1 : Multiple function equipment – Transfer Switch equipment • GB/T 14048.11
Transfer Time	• Less than or equal to 200ms
Rated Operating Voltage	• 400VAC (Standard range) • 660VAC/ 690VAC (Option on request) • 125VDC/ 250VDC (Option on request)
Isolation and Impulse Withstand	• Isolation AC 800V • Impulse surge withstand 8kV
Operating Ambient Conditions	• Ambient air temperature: Maximum 40°C and Minimum -5°C • Average maximum relative humidity: Maximum 90%, non-condensing • The operating altitude of the installation site: Maximum 2000m
Pollution Level	• Pollution level conforms to GB/T 14048.1, Level-3
Installation Category	• ATS Switch Module complies with GB/T 14048.1, Category-III • ATS Controller Module complies with GB/T 14048.1, Category-II
Installation Orientation	• Both ATS Switch Module and Controller can be installed vertically or horizontally in a electrical switch board cabinet
Control Circuit	• Rated Source operating voltage of control (Us) for the control device and the transfer controller is AC 220V / 230V : 50Hz. • Operating Source control voltage is between 85% Us and 110% Us. Factory preset voltage trigger point is Under-voltage 180V, Over-voltage 250V. User may request other setting when placing order.
Application Category	• AC-33B: Infrequent Operation. Motor load or composite load inclusive of resistance load and incandescent lamp load of lower than 30%. • AC-15: Load of controlling alternating electromagnet. • DC-13: Load of controlling electromagnet.
AUX Circuit	• The auxiliary contact circuit has a separate electrical structure of 4 normally open and 4 normally closed contacts. • Rated isolation voltage (Ui) = 300V • Rated operating current (Ie) = 3A for 220VAC • Rated operating current (Ie) = 0.2A for 200VDC
Disconnection Capacity	• AC-33B (10Ie connected, 10Ie disconnected) cosφ =0.35 (When Ie ≤100A, cosφ =0.45) • DC-33B (4Ie connected, 4Ie disconnected) L/R=2.5ms

MH-ATS

Dimensions (mm)



Side View



Front View

Legend
A : Width
B : Mounting hole
C : Height
2H : Bar to Bar
J : Depth

MH-ATS Model		2P			3P			4P				
		A	B	C	A	B	C	A	B	C	H	J
S2/S3	20-63A	185	88	193	227	110	193	229	132	193		112
S2/S3	80-125A	218	103	200	251	133	200	281	163	200		112
S2/S3	160-250A				266	148	197	301	183	197		112
S2/S3	350-500A				355	230	292	415	290	292		132
S3	630-800A				405	375	390	470	440	390	210	160
S3	1000-1200A				450	420	390	530	500	390	250	160
S3	1600A				512	480	390	610	580	390	255	160
S3	2000A				680	595	480	805	748	480	305	170
S3	2500A				680	595	480	805	748	480	335	170
S3	3200A(3P)				915	860	480				335	170
S3	3200A(4P)							1017	956	560	335	215
S3	4000A				915	860	560	1040	940	560	350	215
S3	5000A				1080	1000	560	1160	1040	560	350	215

Note: Picture for illustration only. For detail please refer to Data Sheet.

MH-ATS E2 Series

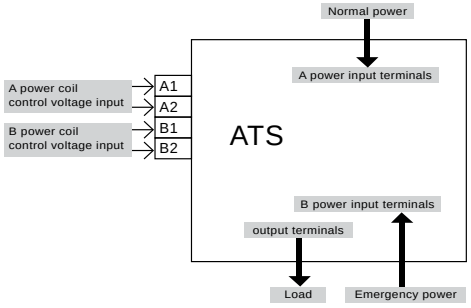
Type		E2L			E2H
Picture					
Number of poles		2P	3P	4P	2P
Frame rated current (A)		63A			125A
Rated working current Ie (A)		16A, 20A, 25A, 32A, 40A, 50A, 63A			16A, 20A, 25A, 32A, 40A, 50A, 63A, 80A, 100A, 125A
Coil control voltage		110V, 220V, 380V, 415V 50Hz or 60Hz			110V, 220V, 380V, 415V 50Hz or 60Hz
Insulation voltage (V)		690V			690V
Impulse withstand voltage Uimp (KV)		6KV			8KV
Conformity to standards		IEC60947-6-1			IEC60947-6-1
Making capacity & breaking capacity		AC33iB, 6.0Ie 5 times			AC33iA, 6.0Ie 60 times
Durability electrical		1.0Ie 1500 times			2.0Ie 6000 times
Rated short-circuit current limit (KA) (Protected by fuse)		50KA			100KA
Change time	From A power to B power	30 msec.- 70 msec.			30 msec.- 70 msec.
	From B power to A power				
Auxiliary contacts		--			A power: 1A1B, 1C
		--			B power: 1A1B, 1C

Characteristics

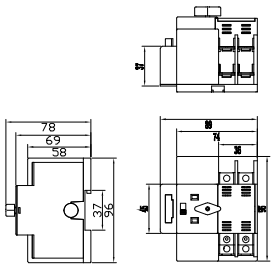
- Two position change over switches of A power (Normal) / B power (Emergency).
- Switch for setting function of Automatic / Manual operation.

  (A power is priority in automatic operation.)

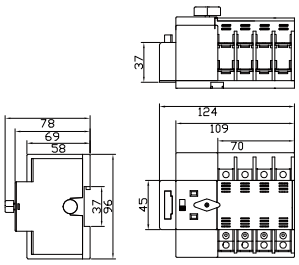
■ Connection Diagram



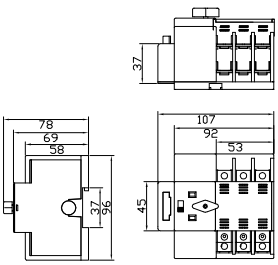
Dimensions (mm)



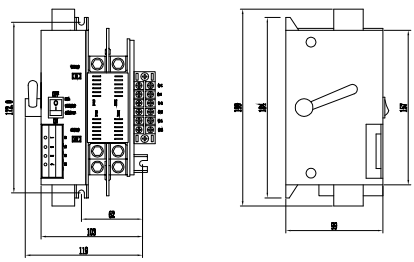
E2L-63A 2P



E2L-63A 4P



E2H-63A 3P

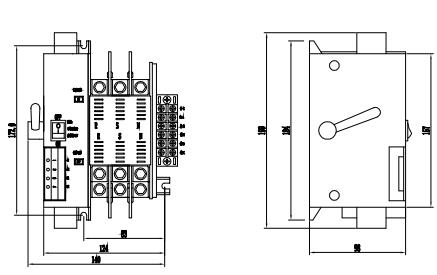


E2H-125A 2P

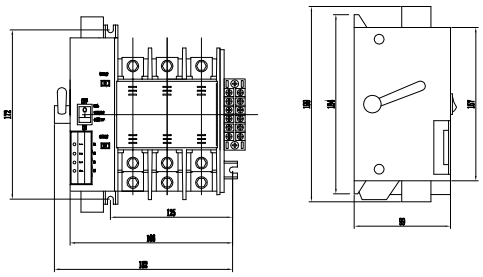
MH-ATS E2 Series

Type		E2H		E2H	
Picture					
Number of poles		3P	4P	3P	4P
Frame rated current (A)		125A		250A	
Rated working current Ie (A)		16A, 20A, 25A, 32A, 40A, 50A, 63A, 80A, 100A, 125A		140A, 160A, 200A, 225A, 250A	
Coil control voltage		110V, 220V, 380V, 415V 50Hz or 60Hz		110V, 220V, 380V, 415V 50Hz or 60Hz	
Insulation voltage (V)		690V		690V	
Impulse withstand voltage Uimp (KV)		8KV		8KV	
Conformity to standards		IEC60947-6-1		IEC60947-6-1	
Making capacity & breaking capacity		AC33iA, 6.0Ie 60 times		AC33iA, 6.0Ie 60 times	
Durability electrical		2.0Ie 6000 times		2.0Ie 6000 times	
Rated short-circuit current limit (KA) (Protected by fuse)		100KA		100KA	
Change time	From A power to B power	30 msec.- 70 msec.		30 msec.- 70 msec.	
	From B power to A power				
Auxiliary contacts		A power: 1A1B, 1C		A power: 1A1B, 1C	
		B power: 1A1B, 1C		B power: 1A1B, 1C	

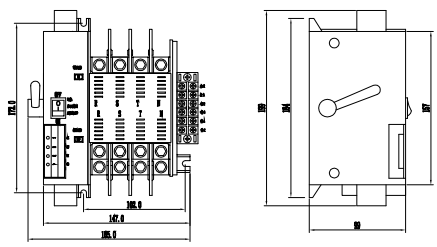
Dimensions (mm)



E2H-125A 3P



E2H-250A 3P



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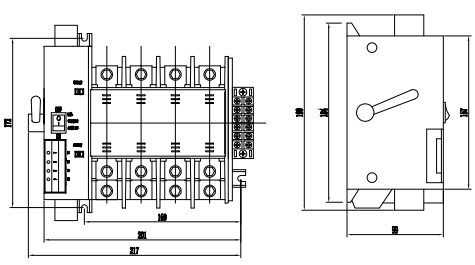
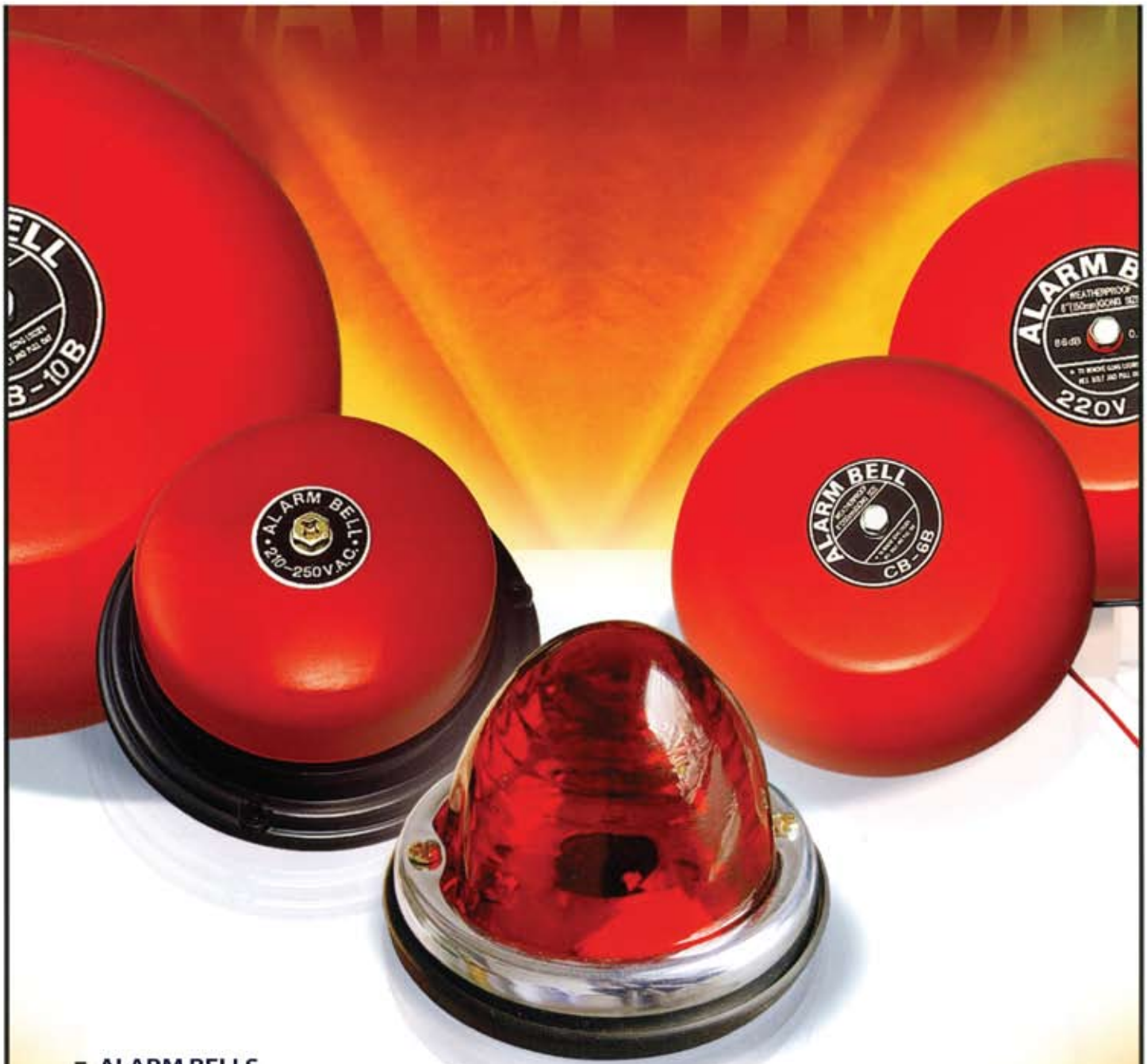


E2H-250A 4P

Alarm Bells



■ ALARM BELLS

■ SPECIFICATIONS

Item No.	Rating	Size
CB-4B	AC 110V • 220V • 380V	4" (100mm)
CB-6B	AC 12V • 24V • 48V • 110V • 220V • 380V DC • 12V • 24V • 48V	6" (150mm)
CB-8B	AC 12V • 24V • 48V • 110V • 220V • 380V DC • 12V • 24V • 48V	8" (200mm)
CB-10B	AC 12V • 24V • 48V • 110V • 220V • 380V DC • 12V • 24V • 48V	10" (250mm)

■ PILOT LIGHT

Item No.	RATING
PL-E	AC: 110V, 220V DC: 12V, 24V

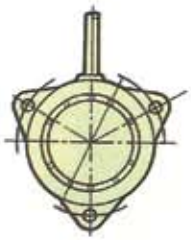
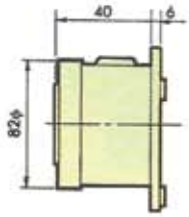
● ALARM BELL

- Comply with UL standard
- Other voltages upon request

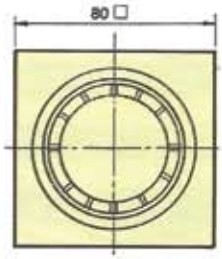
Buzzer
& Siren

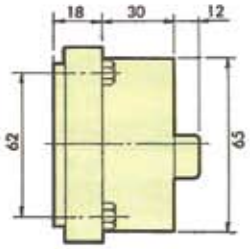
unit: mm

CBZ-10

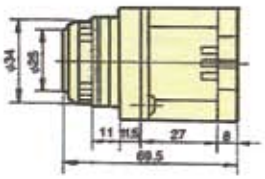




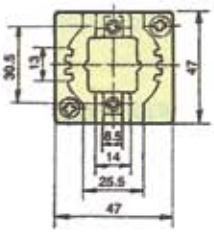
CBZ-20



CBZ-30



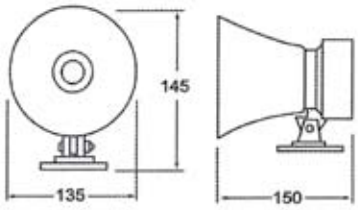
SPECIFICATIONS

TYPE	RATING	MOUNTING-STYLE	VOLUME(D.B)	WEIGHT
CBZ-10	AC 110 ● 220V ● 380V DV 12V ● 24V	SURFACE MOUNTING	85	160g
CBZ-20	AC 110 ● 220V ● 380V DV 12V ● 24V	FLUSH MOUNTING	85	160g
CBZ-30	AC 110 ● 220V DV 12V ● 24V	FLUSH MOUNTING	80	120g

TCZ-220

ISO 9001: 2000

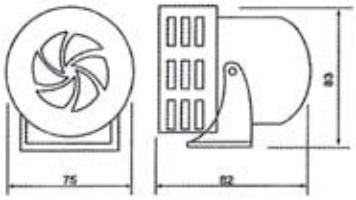
Electronic Siren



RATED VOLTAGE:
AC:110V,220V
DC:12V,24V

TCZ-230

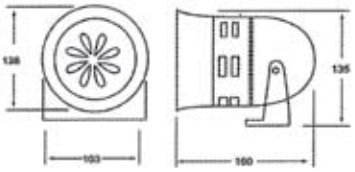
Mini Motor Siren



RATED VOLTAGE:
AC:110V,220V
DC:12V,24V

MS-290

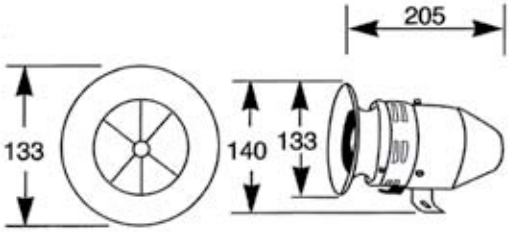
Motor Siren



RATED VOLTAGE:
AC:110V,220V
DC:12V,24V

MS-390

Motor Siren

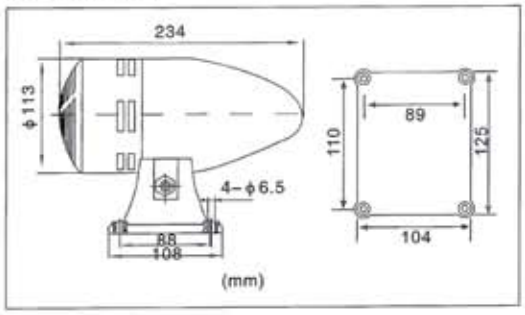


RATED VOLTAGE:
AC:110V,220V
DC:12V,24V

MS-395 Motor SIren

IP44

OUTER SIZE

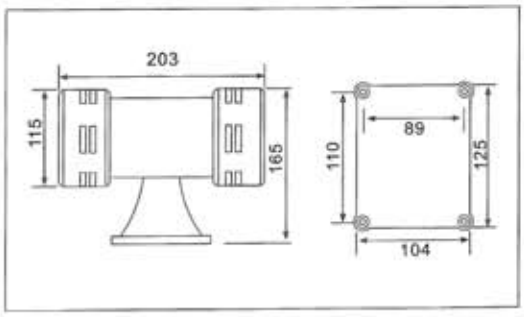


VOLTAGE:AC110、230V
DECIBEL:125DB

MS-490 *Double Motor siren*

IP44

OUTER SIZE

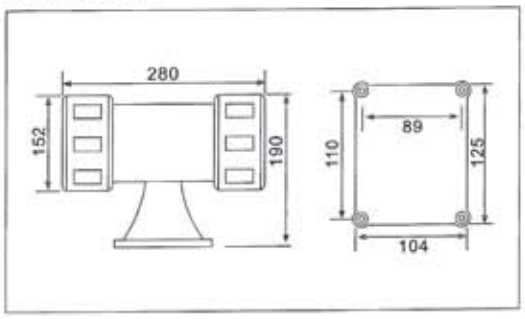


VOLTAGE:AC110、230V
DECIBEL:150DB

MS-395 Double Motor siren

IP44

OUTER SIZE

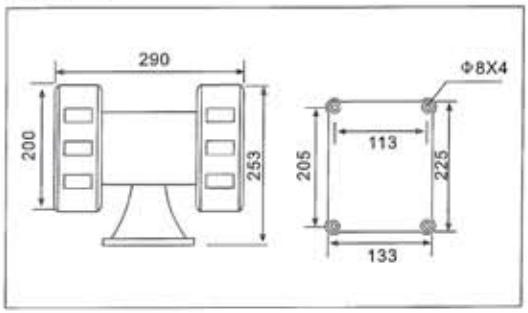


VOLTAGE:AC110、230V
DECIBEL:160DB

MS-690 Double Motor Siren

IP44

OUTER SIZE



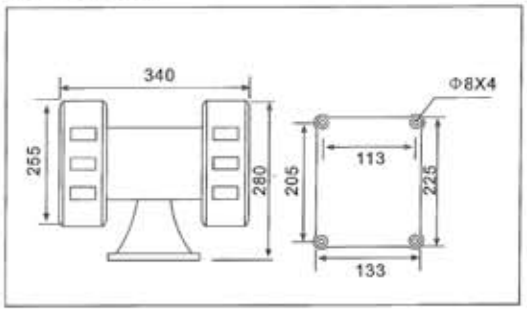
VOLTAGE:AC110、230V

DECIBEL:170DB

MS-790 *Double Motor siren*

IP44

OUTER SIZE



VOLTAGE:AC110、230V

DECIBEL:180DB

Bus Bar Insulators

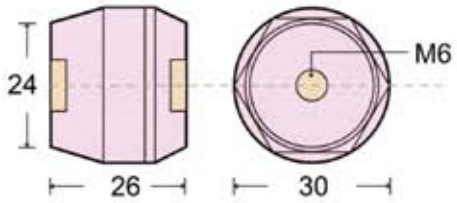

IISO 9001:2000
SM-55
SM-50
SM-70
SM-40
SM-401
SM-30
SM-402
SM-20
SM-76
SM-51
SM-35
SM-25
Bus Bar Insulators mainly
made from Bulk Molding Compound,
unsaturated polymer with fiber glass.
Product itself are with good properties
such as electrical resistance, heat resistance,
fire resistance, low shrinkage, water resistance.

ISO 9001:2000

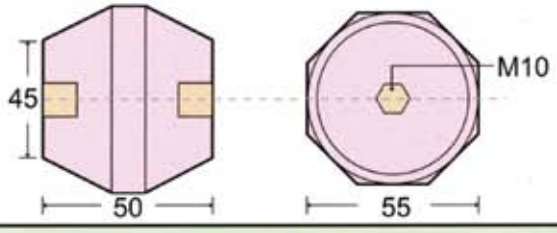
DIMENSIONS

UNIT:mm

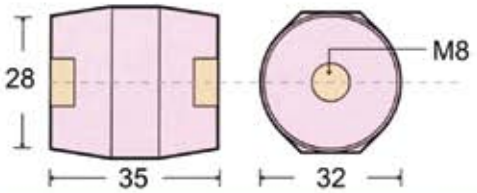
SM-25



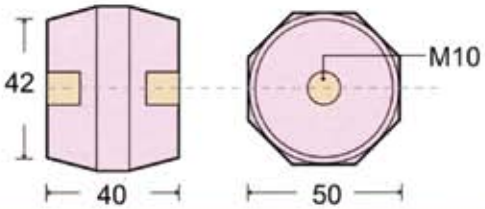
SM-50



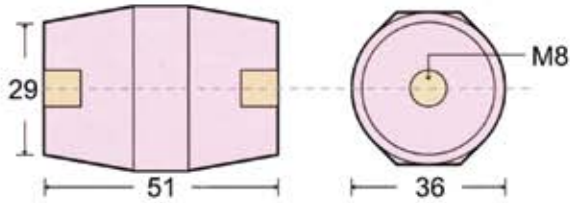
SM-35



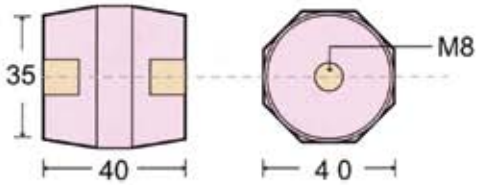
SM-40



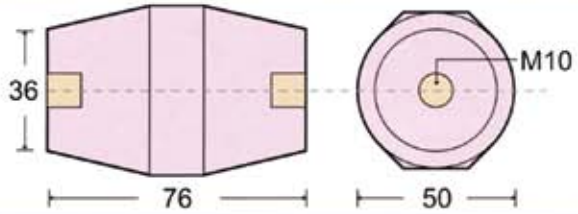
SM-51



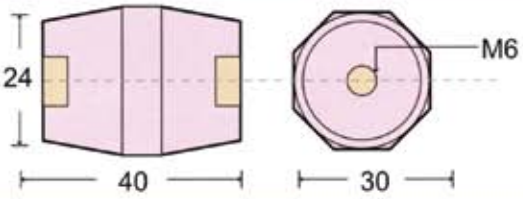
SM-401



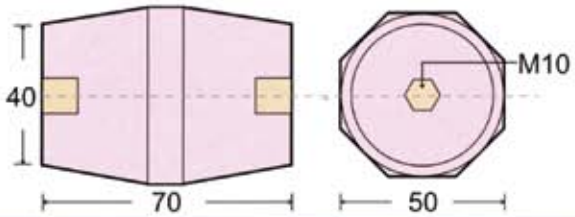
SM-76



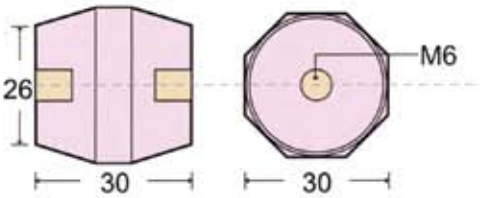
SM-402



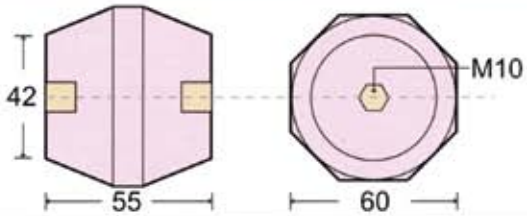
SM-70



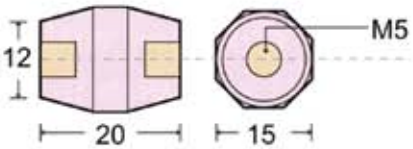
SM-30



SM-55



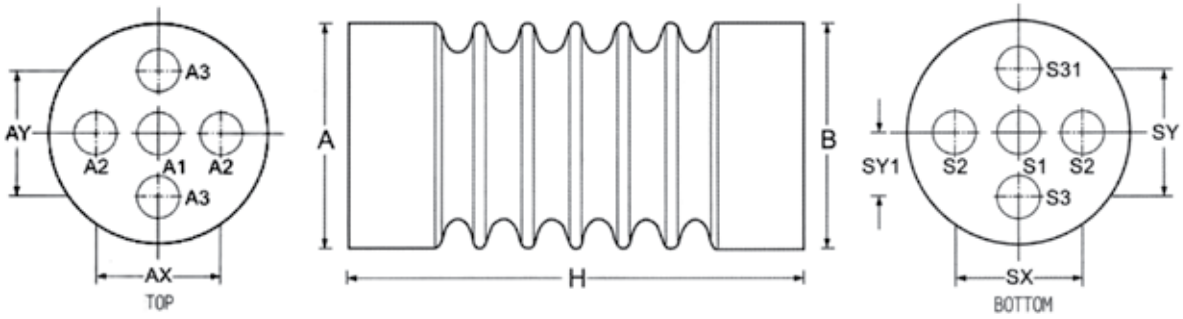
SM-20



HIGH VOLTAGE INSULATOR

BUSBAR SUPPORT

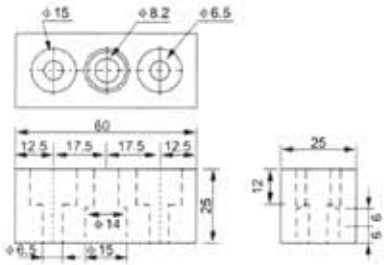
HIGH VOLTAGE INSULATOR DIMENSION AND CHARACTERISTICS



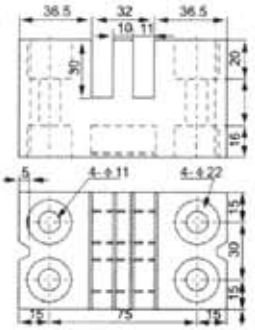
(1) Material : Bulk molding compound, unsaturated polyester resin based or EPOXY based
(2) Nut inserts : Brass, various specifications are available. Arrangement of nut inserts can be designed upon request.
(3) Test specifications : JIS C3801 and JIS C3851
(4) Color : Dark brown or dark red
(5) Dimension and characteristics :

Part. No.			EL-30N	EL-20N	EL-10N	EL-10H	EL-25	EL-24	EL-15	EL-12	EL-6M	EL-3M	EL-6S	EL-3S
End diameters(A/B), mm			100	85/90	75/80	75/80	70	70	70	58	70	70	55	50
Height(H), mm			310	210	145	115	230	210	142	130	90	60	90	50
Surface leakage distance,mm			630	330	240	190	375	356	210	172	125	88	130	65
Rated voltage, kV			36	22	16.5	12	25	24	15	12	7.2	3.6	7.2	3.6
Low frequency dielectric strength, kV			75	50	36	28	60	60	50	36	22	16	22	16
Impulse voltage resistance, kV			200	125	95	75	150	125	110	95	75	60	60	45
Persistent bending strength, 1 min, kg			500	600	600	600	300	300	400	300	400	400	250	150
Tensile strength, kg			>3000	>2000	>2000	>2000	>2000	>1500	>1500	>2000	>1200	>1200	>1800	>1000
Torque strength kg-m			>25	>25	>25	>25	>25	>25	>25	>25	>25	>25	>25	>20
INSERTS ARRANGEMENT	TOP	A1	M16	M10	M10	—	—	M10	M10	M10	M10	M10	—	—
		A2	M8	M8	M8	M8	M10	—	—	M8	M8	M8	—	M6
		A3	—	M10	M10	M10	M10	M8	M8	—	—	—	M8	—
		AX	40	34	34	34	40	—	—	36	40	40	—	32
		AY	—	40	40	40	40	40	40	—	—	—	32	—
	BOTTOM	S1	M16	—	—	—	—	M16	M16	M10	M10	M10	M10	M8
		S2	—	M10	M10	M10	—	—	—	—	—	—	—	—
		S3	M4	M10	M10	—	M10	M4	M4	—	—	—	—	—
		S31	—	M10	M10	—	M10	—	—	—	—	—	—	—
		SX	—	40	40	40	—	—	—	—	—	—	—	—
		SY	—	40	40	40	40	—	—	—	—	—	—	—
		SY1	30	—	—	—	—	—	—	—	—	—	—	—

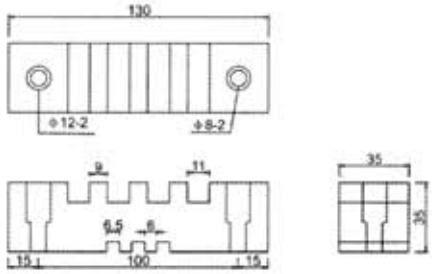
EL-60



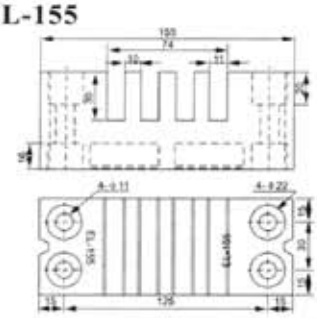
EL-105



EL-130

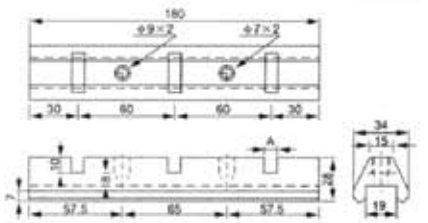


EL-155



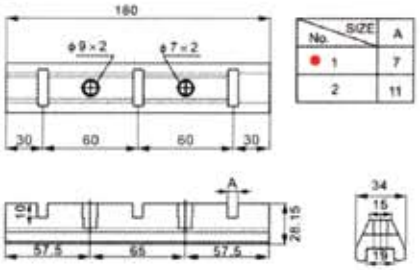
EL-170

Dimension / Number	A
1	6
2	7



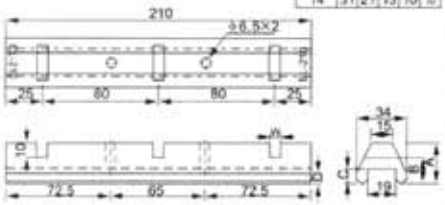
EL-180

No. / SIZE	A
1	7
2	11



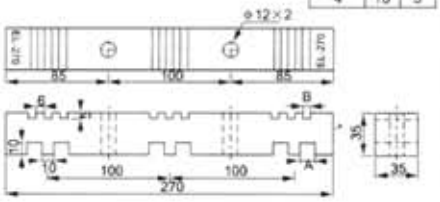
EL-210

Number	A	B	C	D	W
2	28	18	10	7	7.5
3	28	18	10	7	11.5
4	28	18	10	7	10
12	31	21	13	10	7.5
13	31	21	13	10	11.5
14	31	21	13	10	10



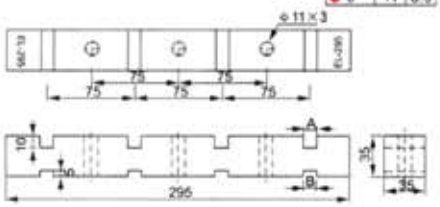
EL-270

Number	A	D
1	12	7
2	12	0
3	11	6
4	10	5



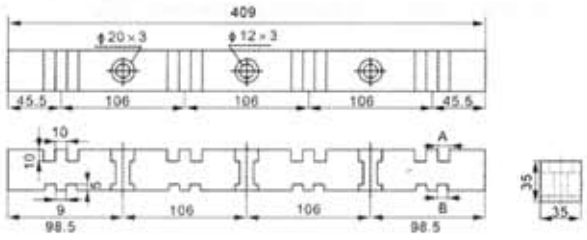
EL-295

Number	A	B
1	11	-
2	22	-
3	5	-
4	6.3	-
5	11	6.3

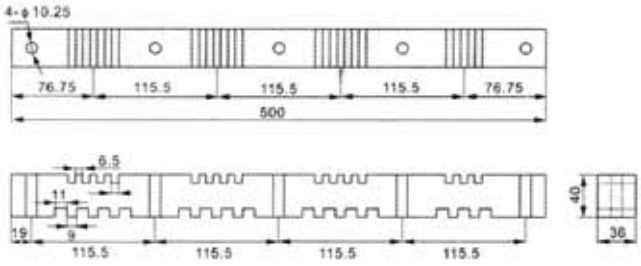


EL-409

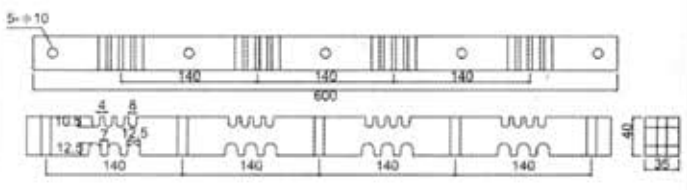
No. / SIZE	A	B
1	11	0
2	11	6.3
3	15	0
4	10	0



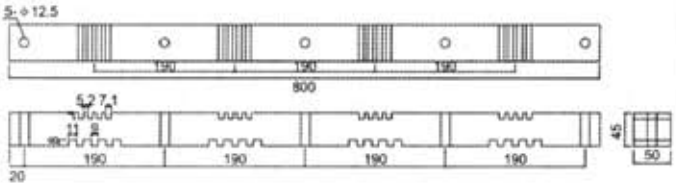
EL-500



EL-600



EL-800



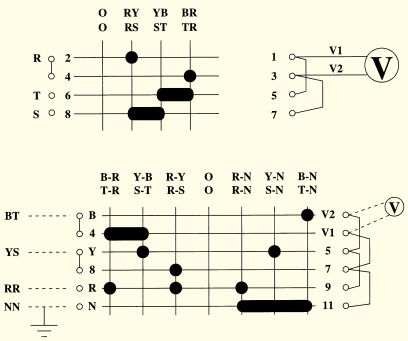
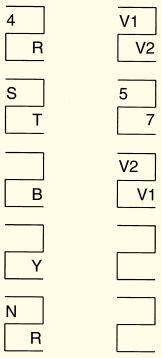
● This product is being generally sold on the market.

Cam Switch

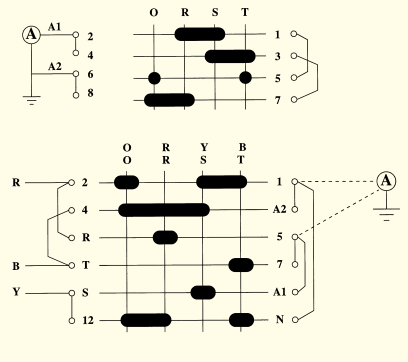
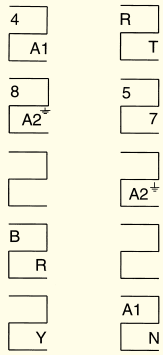
●CONTACT RATING : 16A 300VAC

ISO 9001: 2000

VOLTMETER SWITCHES

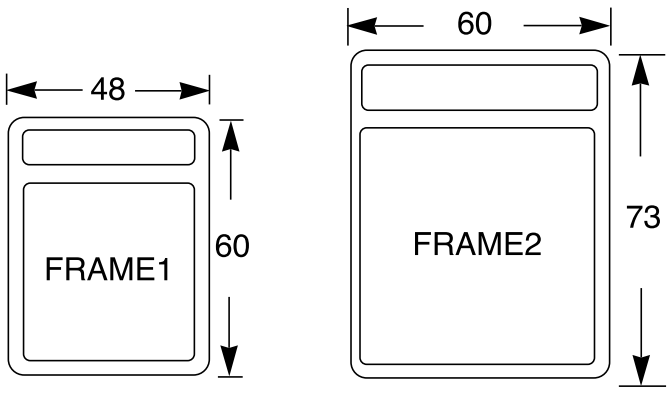
Code No. Function	Stages	Name Plate	Connection diagram	IN/OUT PUT
CV 33 3 phase 3 wire	2	Voltmeter ST RS TR — plate 1 Voltmeter YB RY BR — plate 2		
CV 34 3 phase 4 wire	3	Voltmeter RY YB BR RN YN BN — plate 1 Voltmeter RS ST TR RN SN TN — plate 2		

AMMETER SWITCHES

Code No. Function	Stages	Name Plate	Connection diagram	IN/OUT PUT
CA 33 3 phase 3 wire 2 current transformer	2	Ammeter S R T — plate 1 Ammeter Y R B — plate 2		
CA 34 3 phase 4 wire 3 current transformer	3	Ammeter B R Y — plate 1 Ammeter T R S — plate 2		

NAME PLATE FRAME : 2 SIZES AS FRAME 1 , FRAME2 FOR CHOICE.

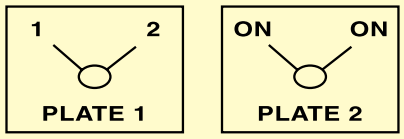
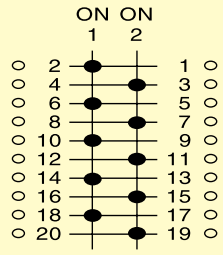
UNIT:mm



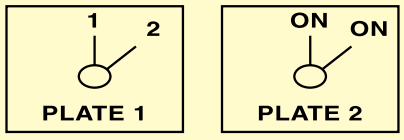
●CONTACT RATING : 16A 300VAC

ISO 9001: 2000

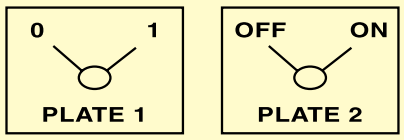
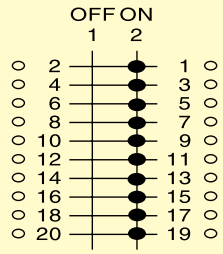
CHANGE-OVER SWITCHES WITHOUT "OFF" 90° SWITCHING

Code No.	Function	Stages	Name plate	Connection diagram
CA-001	1 pole	1		
CA-002	2 pole	2		
CA-003	3 pole	3		
CA-004	4 pole	4		
CA-005	5 pole	5		

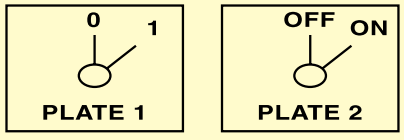
CHANGE-OVER SWITCHES WITHOUT "OFF" 45° SWITCHING

CA-013	1 pole	1		
CA-014	2 pole	2		
CA-015	3 pole	3		
CA-016	4 pole	4		
CA-017	5 pole	5		

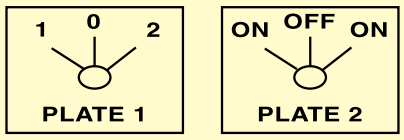
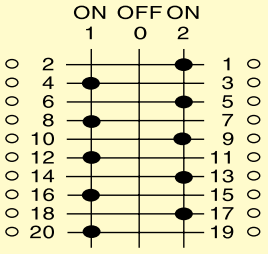
ON/OFF SWITCHES WITH 90° SWITCHING

CA-026	2 pole	1		
CA-027	3 pole	2		
CA-028	4 pole	2		
CA-029	5 pole	3		
CA-030	6 pole	3		
CA-031	7 pole	4		
CA-032	8 pole	4		
CA-033	9 pole	5		
CA-034	10 pole	5		

CHANGE-OVER SWITCHES WITHOUT "OFF" 45° SWITCHING

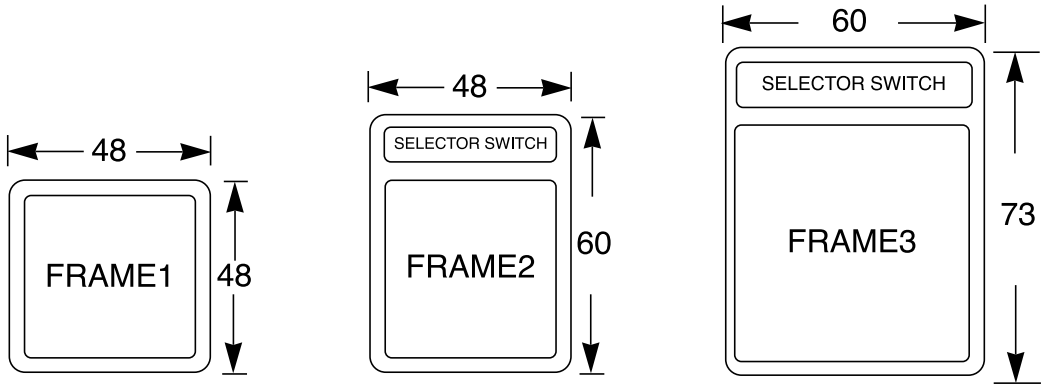
CA-098	2 pole	1		
CA-099	3 pole	2		
CA-100	4 pole	2		
CA-101	5 pole	3		
CA-102	6 pole	3		
CA-103	7 pole	4		
CA-104	8 pole	4		
CA-105	9 pole	5		
CA-106	10 pole	5		

CHANGE-OVER SWITCHES WITH CENTER "OFF" 45° SWITCHING

CA-109	1 pole	1		
CA-110	2 pole	2		
CA-111	3 pole	3		
CA-112	4 pole	4		
CA-113	5 pole	5		

NAME PLATE FRAME : 3 SIZES AS FRAME 1 , FRAME 2 , FRAME 3 FOR CHOICE.

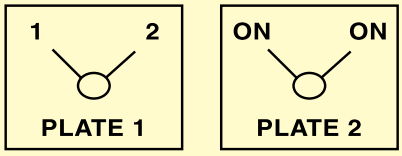
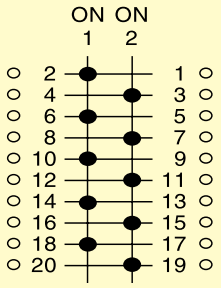
UNIT:mm



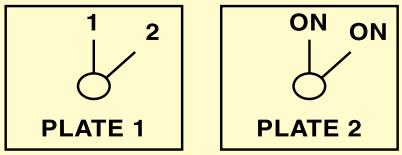
●CONTACT RATING : 32A 600VAC
●NAME PLATE FRAME SIZE: 64 X 64mm

ISO 9001: 2000

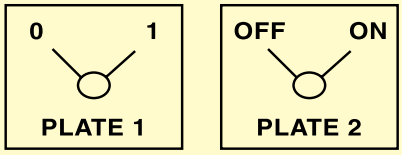
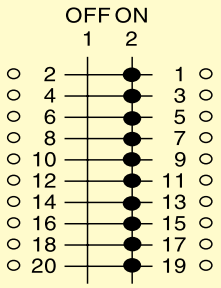
CHANGE-OVER SWITCHES WITHOUT "OFF" 90° SWITCHING

Code No.	Function	Stages	Name plate	Connection diagram
C32-001	1 pole	1		
C32-002	2 pole	2		
C32-003	3 pole	3		
C32-004	4 pole	4		
C32-005	5 pole	5		

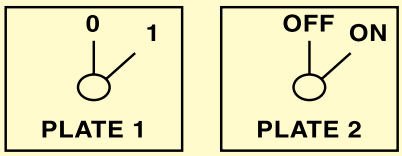
CHANGE-OVER SWITCHES WITHOUT "OFF" 60° SWITCHING

C32-013	1 pole	1		
C32-014	2 pole	2		
C32-015	3 pole	3		
C32-016	4 pole	4		
C32-017	5 pole	5		

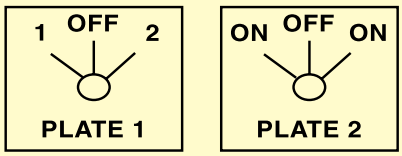
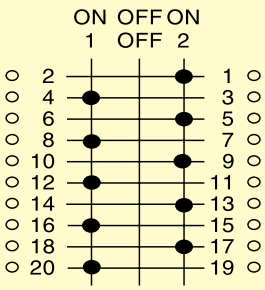
ON/OFF SWITCHES WITH 90° SWITCHING

C32-026	2 pole	1		
C32-027	3 pole	2		
C32-028	4 pole	2		
C32-029	5 pole	3		
C32-030	6 pole	3		
C32-031	7 pole	4		
C32-032	8 pole	4		
C32-033	9 pole	5		
C32-034	10 pole	5		

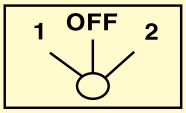
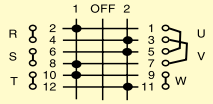
ON/OFF SWITCHES WITH 60° SWITCHING

C32-098	2 pole	1		
C32-099	3 pole	2		
C32-100	4 pole	2		
C32-101	5 pole	3		
C32-102	6 pole	3		
C32-103	7 pole	4		
C32-104	8 pole	4		
C32-105	9 pole	5		
C32-106	10 pole	5		

CHANGE-OVER SWITCHES WITH CENTER "OFF" 60° SWITCHING

C32-109	1 pole	1		
C32-110	2 pole	2		
C32-111	3 pole	3		
C32-112	4 pole	4		
C32-113	5 pole	5		

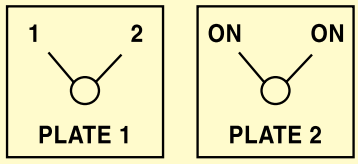
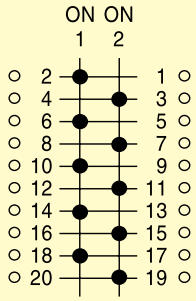
MOTOR REVERSING SWITCHES

C32-117	3 pole	3	NAME PLATE	Connection diagram
				

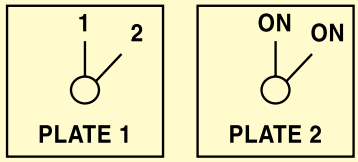
- **CONTACT RATING: 63A 600VAC**
- **NAME PLATE FRAME SIZE: 64x64mm**

ISO 9001: 2000

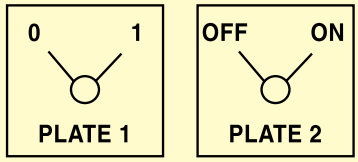
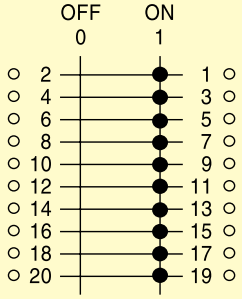
CHANGE-OVER SWITCHES WITHOUT "OFF" 90° SWITCHING

Code No.	Function	Stages	Name plate	Connection diagram
C63-001	1 pole	1		
C63-002	2 pole	2		
C63-003	3 pole	3		
C63-004	4 pole	4		
C63-005	5 pole	5		

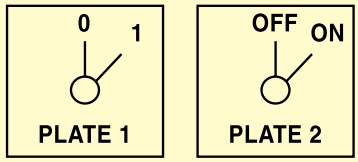
CHANGE-OVER SWITCHES WITHOUT "OFF" 60° SWITCHING

C63-013	1 pole	1		
C63-014	2 pole	2		
C63-015	3 pole	3		
C63-016	4 pole	4		
C63-017	5 pole	5		

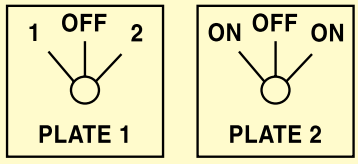
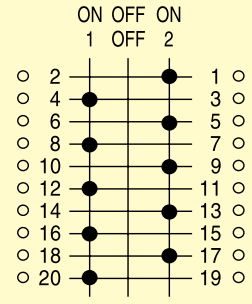
ON/OFF SWITCHES WITHOUT 90° SWITCHING

C63-026	2 pole	1		
C63-027	3 pole	2		
C63-028	4 pole	2		
C63-029	5 pole	3		
C63-030	6 pole	3		
C63-031	7 pole	4		
C63-032	8 pole	4		
C63-033	9 pole	5		
C63-034	10 pole	5		

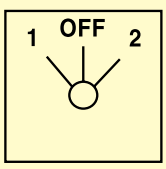
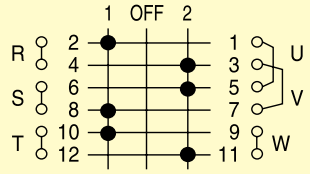
ON/OFF SWITCHES WITHOUT 60° SWITCHING

C63-098	2 pole	1		
C63-099	3 pole	2		
C63-100	4 pole	2		
C63-101	5 pole	3		
C63-102	6 pole	3		
C63-103	7 pole	4		
C63-104	8 pole	4		
C63-105	9 pole	5		
C63-106	10 pole	5		

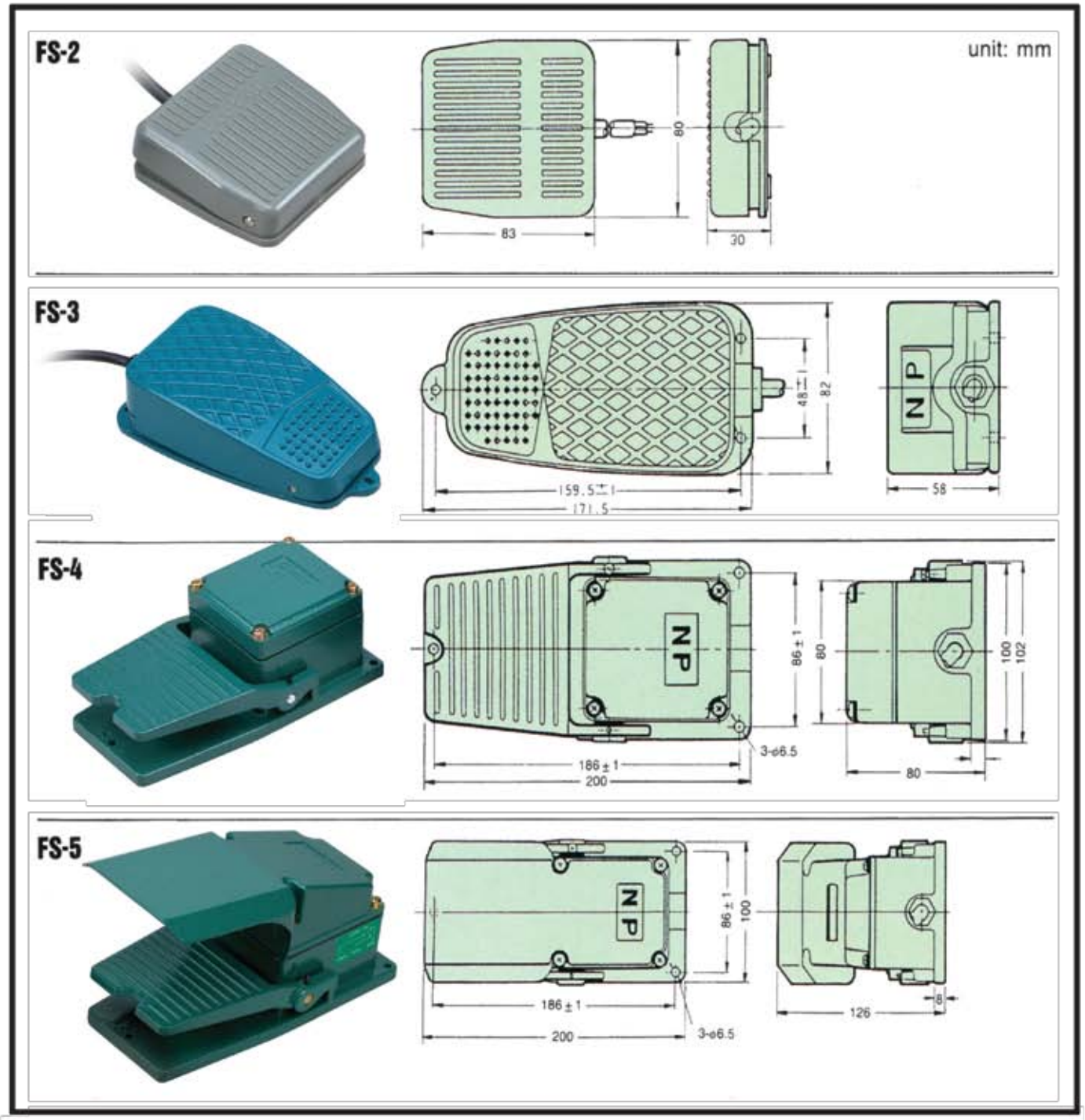
CHANGE-OVER SWITCHES WITH CENTER "OFF" 60° SWITCHING

C63-109	1 pole	1		
C63-110	2 pole	2		
C63-111	3 pole	3		
C63-112	4 pole	4		
C63-113	5 pole	5		

MOTOR REVERSING SWITCHES

C63-117	3 pole	3	NAME PLATE	Connection diadram
				

Foot Switches



TYPE	RATING	CONTACTOR	ENCLOSURE MATERIAL	WEIGHT
FS-2	AC250V 10A	1A 1B	POLY-CARBONATE	240g
FS-3	AC250V 10A	1A 1B	ALUMINUM	470g
FS-4	AC250V 15A	1A 1B	ALUMINUM	820g
FS-5	AC250V 15A	1A 1B	ALUMINUM	1000g

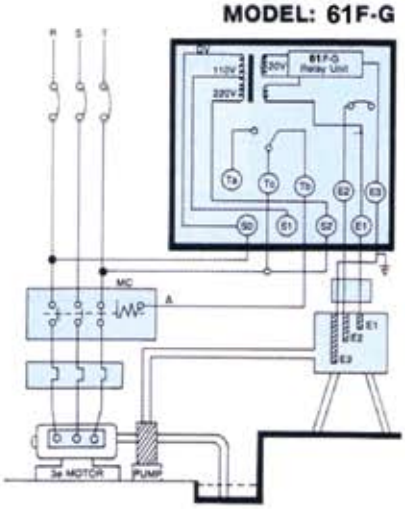
Floatless Level Switches

Since 1981
INSTRUMENTS

FLOATLESS RELAYS

MODEL: 61F-G

MODEL: 61F-G



Function:
Automatic level control.
Features:
(1) Suitable for water supply and drainage.
(2) Plug in assembly, compact volume, easy for installation and replacement.
(3) Probes E1-E3 are live with low voltage (A.C. 8 volts).
(4) LED are provided to indicate operating codition.

Installation:
(1) Inter unit wiring should be done according to the illustrated circuit diagram.
(2) For there phase 220V power source, Connect terminal S2 to feeder T, otherwise connect terminal S1 instead when single phase 110V power source is used.
(3) For water supply, connect electro-magnetic switch coil terminal A to Tb. For drainage, connect terminal A to Ta.

Note:
Probes E1-E3 are live with A.C. 8 volts, do not test them with an MΩ meter.
Be sure to ground terminal E3.

LIQUID LEVEL RELAYS

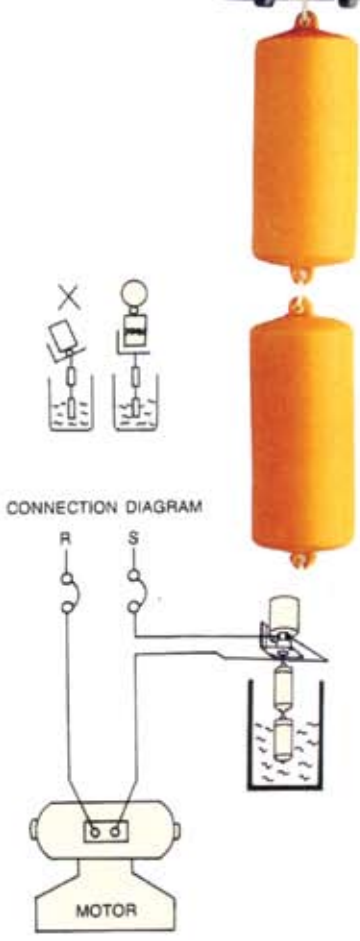
MODEL: PD-76AB

Function:
Automatic level control.
Features:
(1) Applicable to 1 HP and less power rating pumps for water supply and drainage.
(2) Additional magnetic contactor is not required.

Installation:
(1) For water supply, connect A1-A2.
(2) For drainage, connect B1-B2.

Notes:
(1) Do not touch with hand. switch

Notes:
(1) A1 ⊖ —SUPPLY— ⊖ A2
B1 ○—DRAINAGE— ○ B2
(2) Applicable to 1 HP and less power rating pumps.

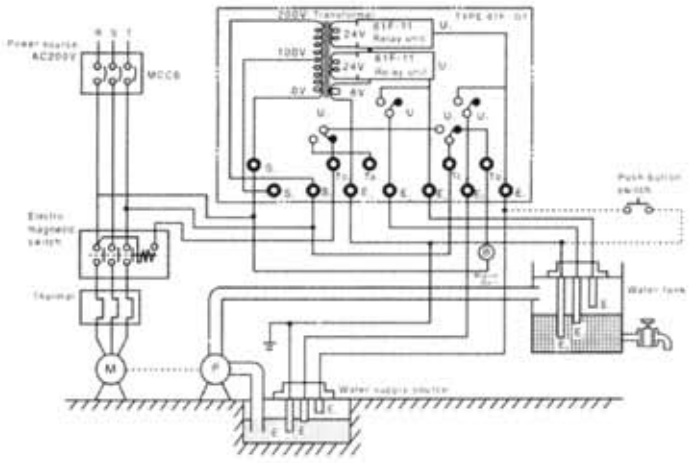


■ **Warning :** Note the difference in the wiring between the automatic water supply control with prevention of pump idling and that with issuance of alarm for abnormal water shortage.

■ OPERATION

① For Prevention of Pump Idling : When the liquid level in the water tank reaches E1(high) the motor is turned off, and when the level drops below E2(medium) it is turned on.
② For Prevention of Pump Idling : The motor is automatically turned off, when the liquid at the water supply source is in shortage and drops below the level of E2 (medium). An alarm is then sounded.
③ Issuance of Alarm for Abnormal Water Shortage : The motor is automatically turned off when for any reason the liquid level in the water tank drops below E2 (low). An alarm is then sounded.
④ Liquid level control is conducted within the range between the tips of E1 (high) and E2 (medium) in the water tank. Therefore, by changing the length of electrodes the range of control can be freely adjusted.
⑤ However, depending on the type of liquid and voltage variation, a slight difference is noted of the level where the pump pesumes operation after the liquid level has reached the tip of the electrode.
⑥ Insert a pushbutton switch (NO contact) between E1'and E3 as shown by the dotted line on the light.
In starting pump or after recovery from power failure, if water supply source level has not yet reached E1', depress the pushbutton switch to start the pump by momentarily short-circuiting E1' and E3.
When the pump stops during normal operation subsequent to an alarm issued for low water level (water level does not reach E2'), do not depress the pushbutton switch.

EXTERNAL CONNECTION EXAMPLE



- With the power supply voltage 100V (110, 120V), the wiring is made between S0-S1 and with 200V (220, 240V) S0-S2.
- Be sure to ground terminal E3

PARTS USED FOR 61F-G1

SUS-S
connecting

PS-3S
Electrode Holder

PS-3S & SUS-A
Electrode Rod
(SUS-A)

■ OPERATION

① When the liquid level in the drainage tank exceeds E_1(high), the motor is turned on and when the level dfops to E_2(medium) it is turned off. When the liquid surface rises to E_4(highest), an alarm is sounded warning the abnormally high level of water.

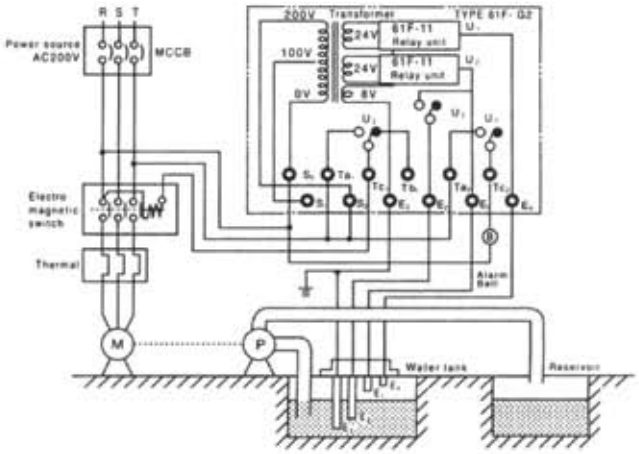
② Thus, the liquid level control is conducted within the range berween the tips of E_1(high), and E_2(medium) in the water tank. Therefore, the range of control can be freely adjusted by changing the length of E1 and E2.

③ However, depending on the type of liquid and voltage variation, a slight difference is noted of the level where the pump resumes operation after the liquid level has reached the tip of the electrode.

■ FUNCTION

Automatic Drainage Control with Issuance of Alarm for Abnormal Water increase

EXTERNAL CONNECTION EXAMPLE



- With the power supply voltage 100V (110, 120V), the wiring is made between S0-S1 and with 200V (220, 240V) S0-S_2.
- Be sure to ground terminal E3

PARTS USED FOR 61F-G2

SUS-S
connecting

PS-3S
Electrode Holder

PS-3S & SUS-A
Electrode Rod
(SUS-A)

FLOATLESS RELAY C-AFR1

■ FEATURES:

- Suitable for water supply and drainage.
- Plug in assembly, compact volume, easy for installation and replacement.
- Probes E1-E3 are live with low voltage (A.C. 8 volts)
- LED are provided to indicate operating codition.

■ SPECIFICATIONS:

- RATED VOLTAGE : 110 or 220V AC.
- CONTROL OUTPUT : 250V 5A AC.
- OPERATING VOLTAGE RANGE : 85 TO 110% OF RATED VOLTAGE

■ CONNECTIONS

General water-supply or drainage running

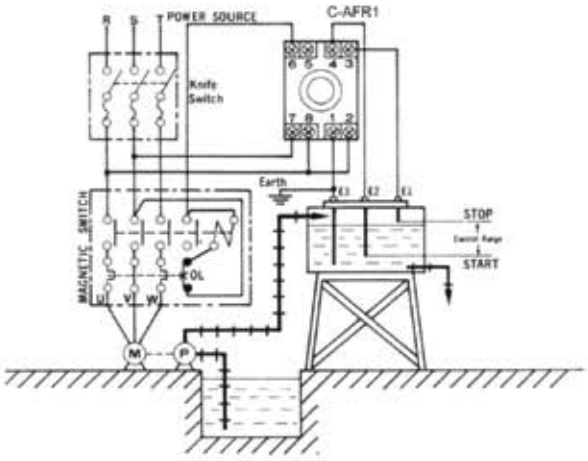
1. WATER SUPPLY

- Connect electromagnetic switch coil terminal MS to 6.
- The pump stops when water level reaches E1 and starts when water level drops below E2.

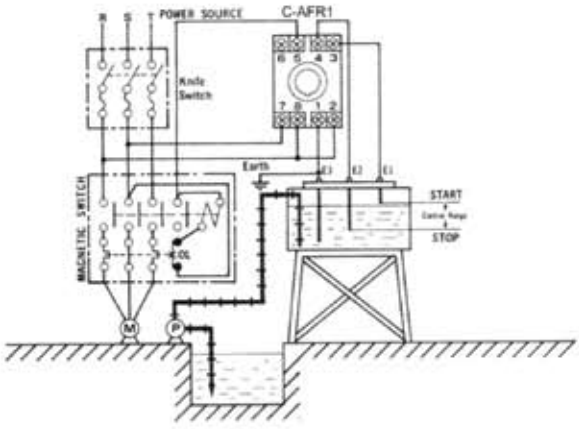
2. DRAINAGE

- Connect electromagnetic switch coil terminal MS to 5.
- Pump starts when water level reaches E1 and stops when water level drops below E2.

General Water-Supply Running



General drainage running



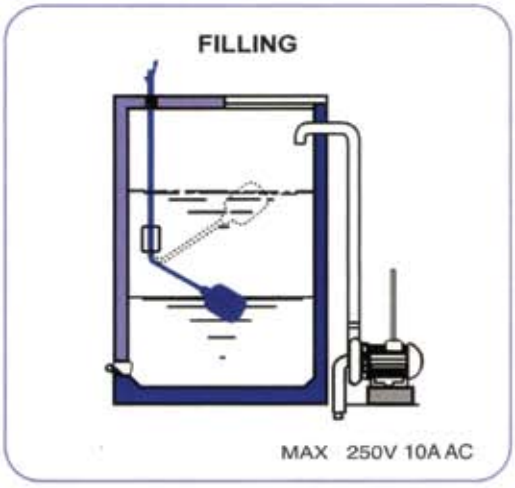
KF-06

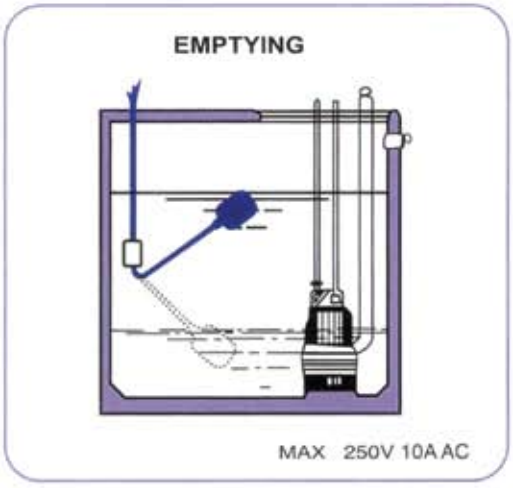
LEVEL REGULATOR

May be used for direct level control, in accordance with product electrical specifications.

In the case of approved products, the ground wire will always be included and the ground wire sheath will always be yellow/green.In this case, this two remaining wires are supplied for "high closure" or,specific request, "low closure".

INSTRUCTIONS FOR INSTALLATION





ELECTRICAL CONNECTIONS

Use wires:
"Black"and"Blue"
With these contacts the regulator
Closes when down
Opens when up

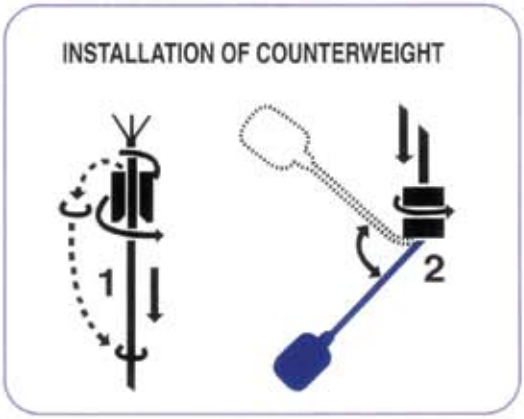
Use wires:
"Black"and"Brown"
With these contacts the regulator
Closes when up
Opens when down

The wire that is not used must be correctly insulated

1. Insert the cable in the counterweight, from the conical part and rotate it, thus causing the plastic ring inserted in the opening to become detached (if necessary this operatiom can be facilitated with the use of a screwdriver). The ring should then be positioned in the point where it is desired to biock the counterweight.
2. Force the counterweight on the ring by ro tating it, using a slight pressure.

THE COUNTERWEIGHT IS FURNISHED ONLY ON REQUEST.

AVOID JOINTS IN THE LEVEL REGULATOR CABLE.
NEVER IMMERGE POSSIBLE CABLE JOINTS IN THE WATER.



Fuse Link & Base

Since 1981
INSTRUMENTS

RT18-32A RT18-32AL RT18-32 RT18-32X

SPECIFICATIONS

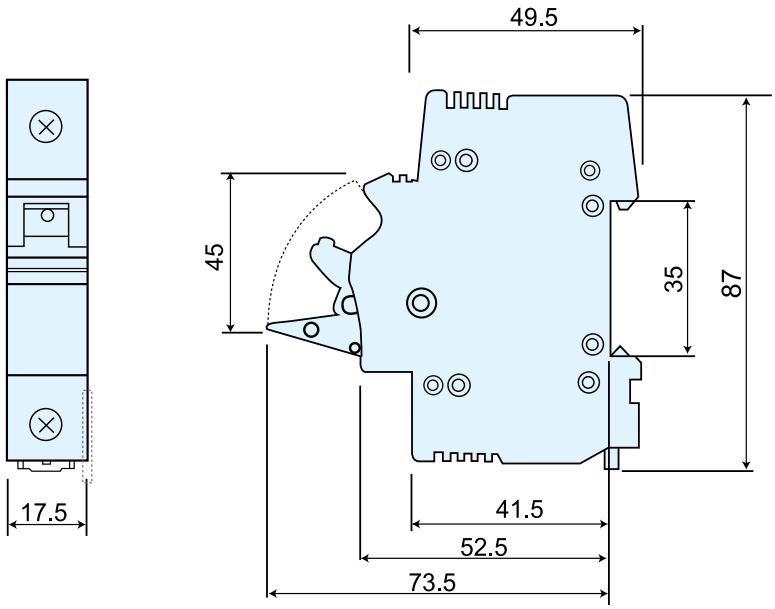
Fuse Base

- Item No.: RT18-32A
  RT18-32AL (with led indicator)
  RT18-32
  RT18-32X (with led indicator)
- Rated voltage: 500V AC
- Rated current: 32A
- Fuse type: RT14-20 (ϕ10 X 38)
- Mounting methods: By din rail (35 mm)

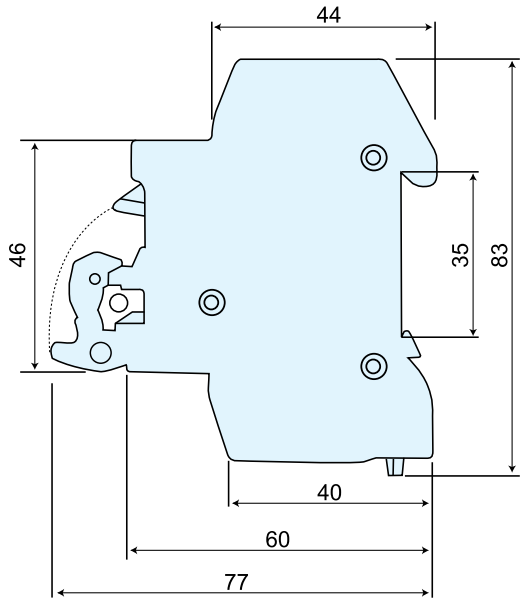
Fuse Link

- Item No.: RT14-20
- Rated voltage: 500V AC
- Rated current: 2A, 4A, 6A, 8A, 10A, 16A, 20A,
- 25A, 32A
- Dimensions: ϕ10 X 38

DIMENSIONS



RT18-32A
RT18-32AL



RT18-32
RT18-32X

Hour Meter
Meters
CT & Shunt

Since 1981
INSTRUMENTS

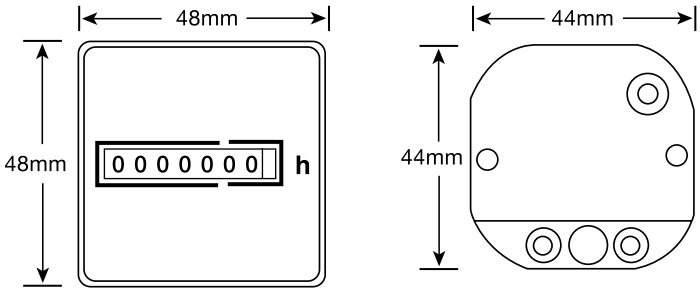
HM-1

HM-2

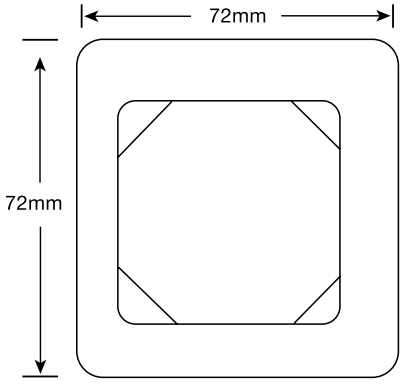
SPECIFICATIONS

- Item No. : HM-1
  HM-2 Rail Type (din rail 35mm)
- Time Range : 0 ~ 99999.99 hours
- Supply voltage. : AC. 110V, 220V 50 or 60Hz
  DC. 10 ~ 50V

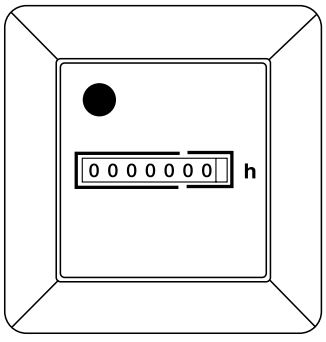
DIMENSIONS (mm)



OPTIONAL ACCESORIES FRAME : HM-C (Used for HM-1 only)



HM-C



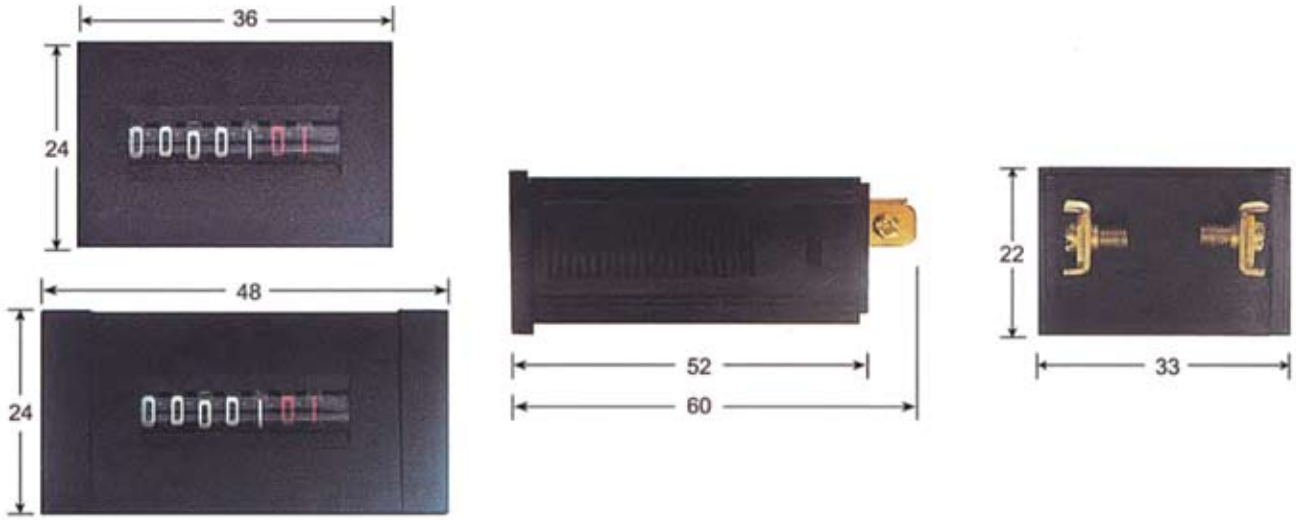
Hour meter HM-1
with HM-C

FEATURES

- ITEM NO. : HM-3
- THIS PRODUCTS IS SUITABLE FOR USAGE OF HOUSE, INDUSTRY. AIR CONDITION, ETC.
- TIME SETTING RANGE AVAILABLE FROM 0 TO 99999.99 HOURS.
- POWER : 110V, 220VAC 50 or 60Hz

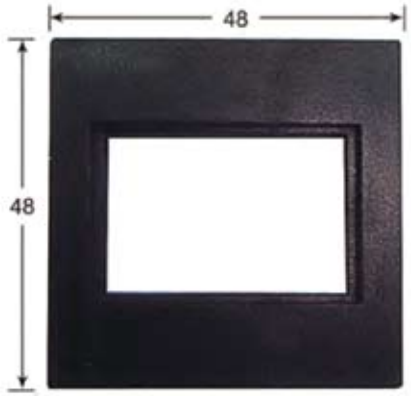
HM-3 HOUR METER.
WITH STANDARD ACCESSORIES FRAME

DIMENSIONS: (mm.)



<WITH STANDARD ACCESSORIES FRAME>

OPTIONAL ACCESSORIES FRAME:



ITEM NO. FR-48

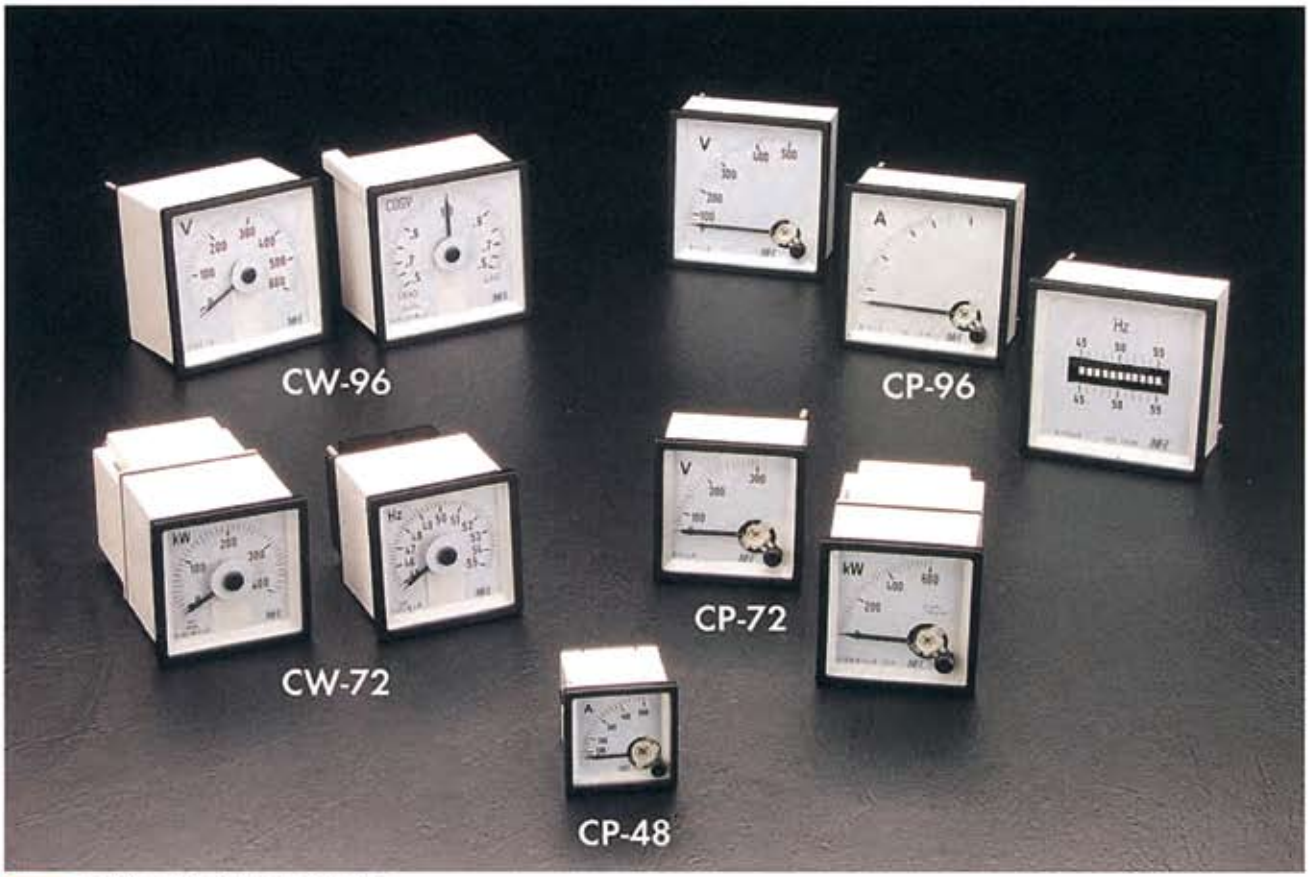
HM-3 WITH FR-48

ISO 9001:2000 CE

TYPE	APPLICATION	SPECIFICATIONS.
Bimetallic Maximum Demand Ammeters  MODEL NO. CP-96B(96•96mm) CP-72B(72•72mm)	For measuring the long time overloads of any electric equipment. The display corresponds to the maximum RMS average value in periods of time of 15 minutes, optionally 8 and 30 minutes.	• Input current:/5A • Accuracy Class:±3% • Temperature Reference temperature:20℃ Rated temperature range: 20±10℃ Limits:-25℃~+40℃ • Test voltage:2KV/1MIN
Bimetallic Maximum Demand Ammeters  MODEL NO. CP-96B2(96•96mm) CP-72B2(72•72mm)	For measuring the long time overloads of any electric equipment. The display corresponds to the maximum RMS average value in periods of time of 15 minutes, optionally 8 and 30 minutes. Also incorporate a moving iron system that shows the instantaneous current.	• Input current:/5A • Accuracy Class Bimetallic system: ±3% Instantaneous system: ±1.5% • Temperature Reference temperature:20℃ Rated temperature range: 20±10℃ Limits:-25℃~+40℃ • Test voltage:2KV/1MIN
Synchronoscopes  MODEL NO. CP-96 (96•96mm) CP-72 (72•72mm)	For the indication of the difference of frequencies and phase angle between two generators, or a generator and a system. When the difference is zero, the instrument pointer remains at the synchronizing mark at the scale center. The pointer starts tuning in the correct sense when the frequency difference is 1.5Hz for three-phase network or 0.5 Hz for single-phase networks.	• Input Voltage:110V, 220V, 380V, 500V • Accuracy Class:±1.35% electrical degrees in the synchronism mark • Temperature Reference temperature: 20℃ Rated temperature range: 20±10℃ Limits:-25℃~+40℃ • Test voltage:2KV/1MIN
Phase-Sequence  MODEL NO. CP-96 (96•96mm) CP-72 (72•72mm)	This indicator is used for testing phase sequence in 3 phase systems with permissible operating voltage up to 500V. If the phase sequence is correct, the disc rotates in the direction of the arrow on the scale. Otherwise, please exchange two wires in the system, the phase sequence will be back to correct. But any test must be under 5 minutes.	• Input Voltage: 150V~500V AC But test must be under 5 minutes. • Test voltage:2KV/1MIN

ISO 9001:2000

TYPE	MODEL NO.		SPECIFICATIONS.
Double Voltmeter 	·CP-96V2(96x96mm) ·CP-72V2(72x72mm)		·ACCURACY CLASS: ±1.5% ·MOVEMENT AC:MOVING IRON DC:MOVING COIL ·MEASUREMENT:0~600V
Double Hz Meter 	·CP-96HZ2(96x96mm) ·CP-72HZ2(72x72mm)		·ACCURACY CLASS: ±1.5% ·MOVEMENT :MOVING COIL ·MEASUREMENT:45~55HZ :55~65HZ :45~65HZ LINE SUPPLY:110V,220V,380V 440V AC.
Double Ammeter 	·CP-96A2(96x96mm) ·CP-72A2(72x72mm)		·ACCURACY CLASS: ±1.5% ·MOVEMENT AC:MOVING IRON DC:MOVING COIL ·MEASUREMENT:0~100A AC ABOVE 100A WITH SEPARATE EXTERNAL CURRENT TRANSFORMER,WHICH SECONDARY CURRENT IS 5A, 0~50A DC ABOVE 50A WITH SEPARATE EXTENAL SHUNT 50mv, 60mv OR 75mv
AC Ammeter With Switch 	·CP-96A33 (96x96mm) ·CP-72A33 (72x72mm)	2 POSITIONS USED FOR 3 PHASE 3 WIRES 2 CURRENT TRANSFORMER SYSTEM	·ACCURACY CLASS: ±1.5% ·MOVEMENT :MOVING IRON ·MEASUREMENT:30/5A~5000/5A USED WITH SEPARATE EXTERNAL CURRENT TRANSFORMER,WHICH SECONDARY CURRENT IS 5A A33:2 POSITIONS L1,L2 A34:3 POSITIONS L1,L2,L3
	·CP-96A34 (96x96mm) ·CP-72A34 (72x72mm)	3 POSITIONS USED FOR 3 PHASE 4 WIRES 3 CURRENT TRANSFORMER SYSTEM	
AC Voltmeter With Switch 	·CP-96V33 (96x96mm) ·CP-72V33 (72x72mm)	3 POSITIONS USED FOR 3 PHASE 3 WIRES SYSTEM	·ACCURACY CLASS: ±1.5% ·MOVEMENT :MOVING IRON ·MEASUREMENT:0~600V AC V33:3 POSITIONS L1-L2, L2-L3,L1-L3 A34:6 POSITIONS:L1-L2, L2-L3,L1-L3,L1-N L2-N,L3-N
	·CP-96V34 (96x96mm) ·CP-72V34 (72x72mm)	6 POSITIONS USED FOR 3 PHASE 4 WIRES SYSTEM	



TECHNICAL DATA

- STANDARD SPECIFICATIONS ACCORDING TO IEC 51 4th EDITION
- TEMPERATURE RANGE -10℃~+50℃
- ACCURACY — GENERAL ACCURACY CLASS 1.5%
- TEST VOLTAGE — 45~65Hz 2KV 1 MIN

SPECIFICATIONS

MODEL NO.	MEASUREMENT		MEASUREMENT RANGE	MOVEMENT	SCALES
CP-96 CP-72 CP-48	AMMETERS	AC	Direct : 0.1,0.5,1,1.5,3, 5,7.5, 10,15,20,25,30,50,60,100A ★CP-48 MAX. 50A Above 100A (CP-48 50A) with separate external current transformer, which secondary current is 5A	Moving Iron	90°
		DC	Direct : 100,150,200,300,500μA,1, 3,5,10,15,20,30,50,75, 100,150,200, 250,300,500mA1, 3, 5, 7.5, 10, 20, 30, 50A Above 50A with separate external shunt 50mv, 60mv or 75mv	Moving Coil	

MODEL NO.	MEASUREMENT		MEASUREMENT RANGE	MOVEMENT	SCALES
CP-96 CP-72 CP-48	VOLTMETERS	DC	3, 5, 7.5, 10, 15, 20, 30, 50, 75, 100, 150, 200, 250, 300, 450, 500, 600V	Moving Coil	90°
		AC	30, 50, 75, 100, 120, 150, 200, 250, 300, 400, 450, 500, 600V	Moving Iron	
CP-96 CP-72 ★CP-48 (POINTER TYPE ONLY)	FREQUENCYS METER LINE SUPPLY 110V, 220V, 380V,440V AC	POINTER TYPE	45~55Hz, 55~65Hz 45 - 65Hz	Moving Coil	
		REED TYPE	CP-96 11REED 45-55Hz 55-65Hz CP-72 7REED 47-53Hz 57-63Hz		
CW-96 CW-72	AMMETERS	AC	Direct : 0.1, 0.5, 1, 1.5, 3, 5, 7.5, 10, 15, 20, 30A Above 30A with separate external current transformer which secondary current is 5A	Moving Coil	240°
		DC	Direct : 1,3,5,10,15,20,30,50,75, 100,150,200,250,300,500mA 1,3,5,7.5,10,20,30,50A Above 50A with separate external shunt 50mv, 60mv or 75mv		
	VOLTMETERS	DC	3, 5, 7.5, 10, 15, 20, 30, 50, 75, 100, 150, 200, 250, 300, 450, 500, 600V		
		AC	30, 50, 75, 100, 120, 150 200, 250, 300, 400, 450, 500, 600V		
	FREQUENCYS METERS LINE SUPPLY 110V, 220V, 380V 440V AC	POINTER TYPE	45~65HZ		
CP-96 CP-72	POWER FACTOR METERS		3 PHASE 3 WIRE BALANCED LINE LINE SUPPLY : 5A L-L : AC 220V, 380V,415V, 440V	Moving Coil	CP-96 90° CP-72 90°
CW-96 CW-72	WATTMETERS		3 PHASE 4 WIRE (wattmeter only) UNBALANCED LINE LINE SUPPLY : 5A L-N : AC 120V,220V,240V		CW-96 240° CW-72 240°

★ CP-96 AND CP-72 DOUBLE FREQUENCY METER REED TYPE AVAILABLE.

MULTI-MOUNT CURRENT TRANSFORMER

ISO9001: 2000

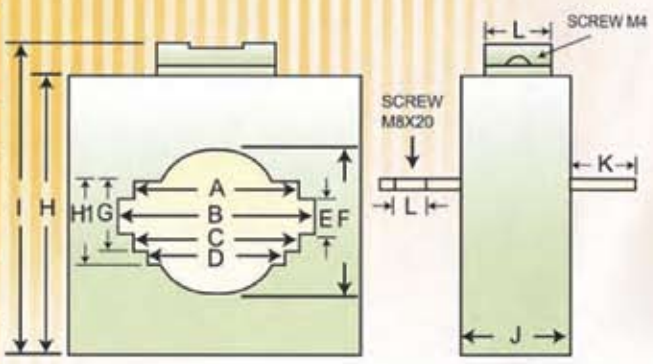
SPECIFICATIONS

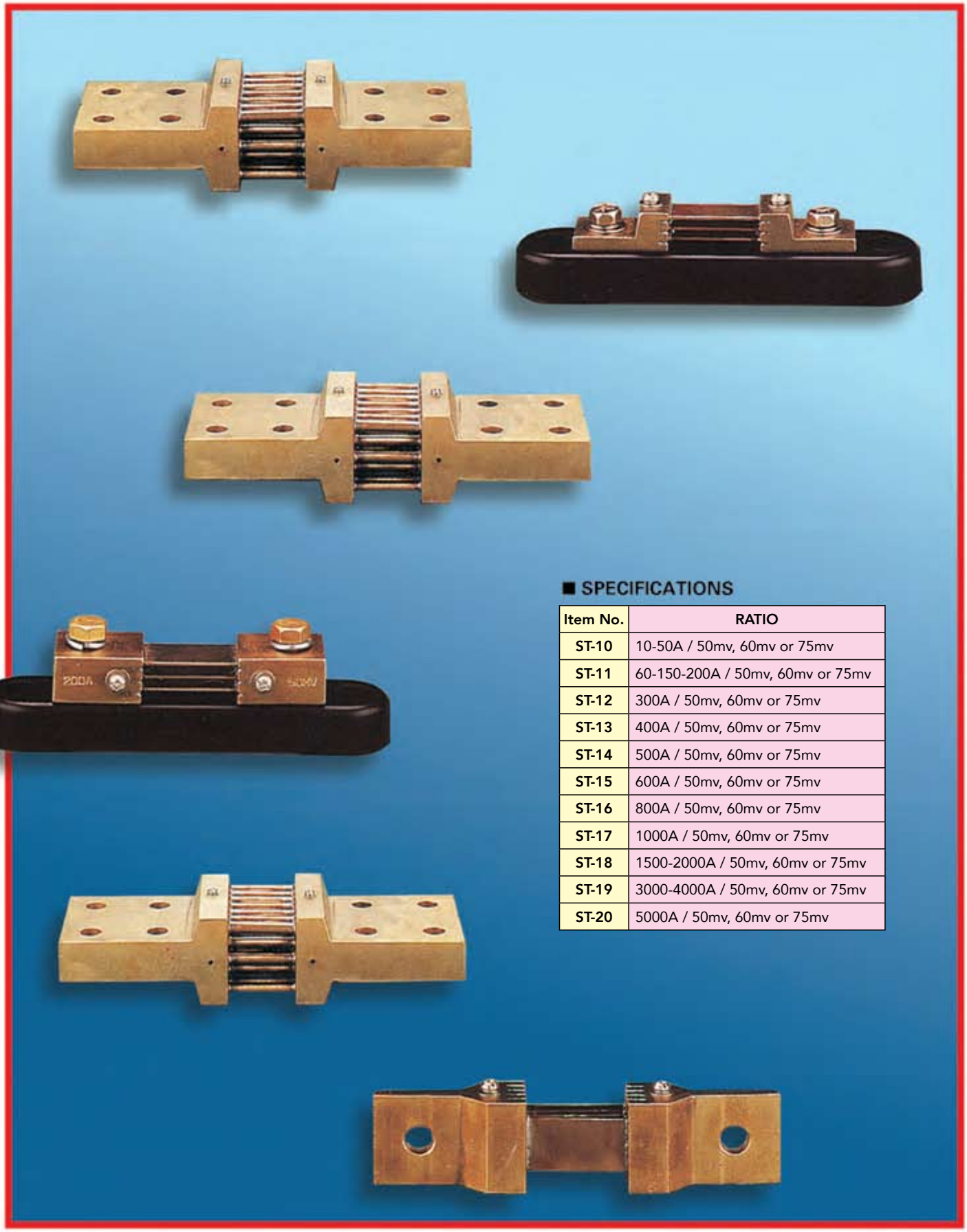
Spec. / Item No.	RATIO	ACCURACY	CAPACITY	VOLTAGE MAX.	FREQUENCY	CONDUCTOR THROUGHT	BAR SIZE MAX.	ROUND CONDUCTOR CROSS SECTION MAX.
MFO-20	30/5A~250/5A	CLASS:0.5	5 VA	AC. 600V	50/60 HZ			
MFO-30	50/5A~300/5A	50/5A~100/5A CLASS:1.0 150/5A~300/5A CLASS:0.5	• 50/5A:2.5 VA • 100/5A:2.5 VA			• 50/5A:2T •100/5A~3000/5A 1T	30X10mm	∅ 20mm
MFO-40	150/5A~600/5A	CLASS:1.0	•150/5A~400/5A 5VA				40X10mm	∅ 30mm
MFO-60	400/5A~1000/5A	CLASS:0.5	•500/5A~800/5A 10VA				60X20mm	∅ 40mm
MFO-100	800/5A~3000/5A	CLASS:0.5	•1000/5A~3000/5A 15VA				100X10mm	∅ 60mm

DIMENSIONS

Unit : mm

Size / Item No.	A	B	C	D	E	F	G	H1	H	I	J	K	L
MFO-20	×	×	×	×	×	×	×	×	86	103	47.5	30	15
MFO-30	21	31	21	×	11.4	×	21	×	82	98	42.4	×	×
MFO-40	×	42	34	21.7	11	×	16	×	82	98	42.4	×	×
MFO-60	×	61	51	×	20.8	46	23	×	111	127	44	×	×
MFO-100	82	101	81.4	62	11	62	32	37	139	150	44.5	×	×





■ SPECIFICATIONS

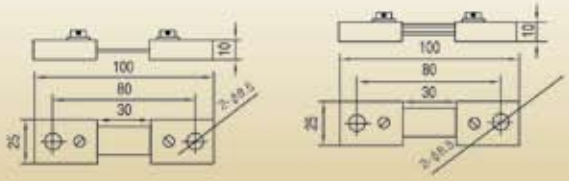
Item No.	RATIO
ST-10	10-50A / 50mv, 60mv or 75mv
ST-11	60-150-200A / 50mv, 60mv or 75mv
ST-12	300A / 50mv, 60mv or 75mv
ST-13	400A / 50mv, 60mv or 75mv
ST-14	500A / 50mv, 60mv or 75mv
ST-15	600A / 50mv, 60mv or 75mv
ST-16	800A / 50mv, 60mv or 75mv
ST-17	1000A / 50mv, 60mv or 75mv
ST-18	1500-2000A / 50mv, 60mv or 75mv
ST-19	3000-4000A / 50mv, 60mv or 75mv
ST-20	5000A / 50mv, 60mv or 75mv

Dimensions are subject to change without prior notice.

ST-10

10-50A/50mv, 60mv or 75mv

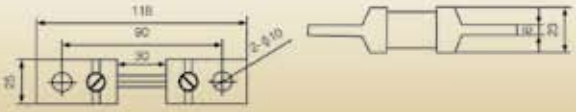
ST-11



60-150A/50mv, 60mv or 75mv

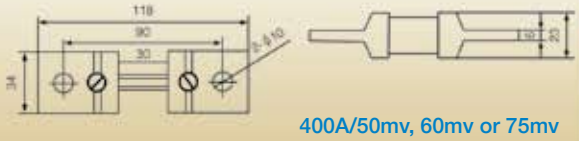
200A/50mv, 60mv or 75mv

ST-12



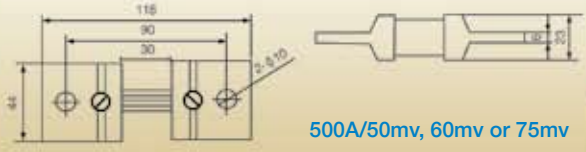
300A/50mv, 60mv or 75mv

ST-13



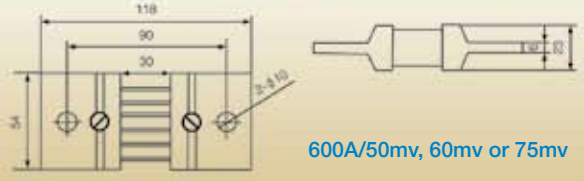
400A/50mv, 60mv or 75mv

ST-14



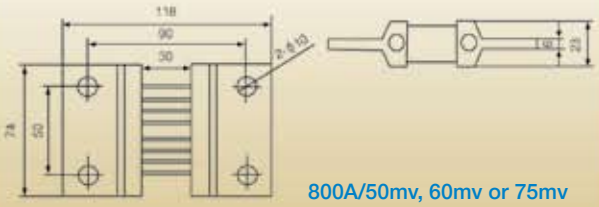
500A/50mv, 60mv or 75mv

ST-15



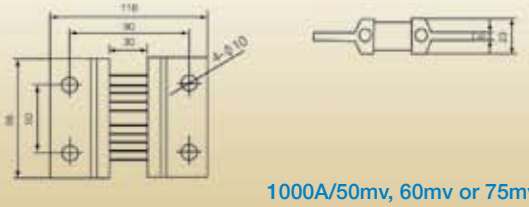
600A/50mv, 60mv or 75mv

ST-16



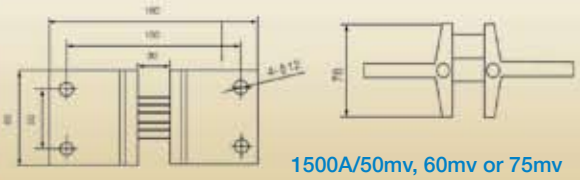
800A/50mv, 60mv or 75mv

ST-17



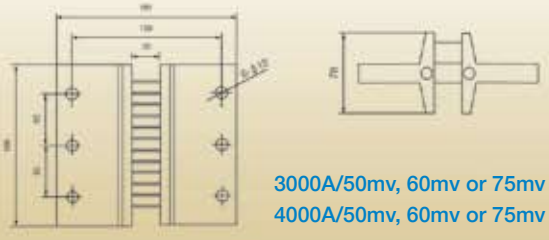
1000A/50mv, 60mv or 75mv

ST-18



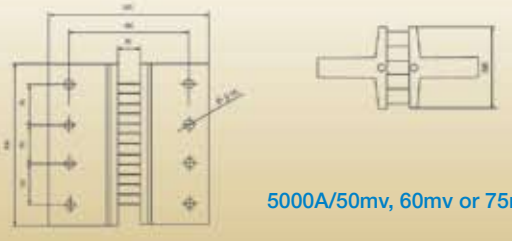
1500A/50mv, 60mv or 75mv
2000A/50mv, 60mv or 75mv

ST-19



3000A/50mv, 60mv or 75mv
4000A/50mv, 60mv or 75mv

ST-20



5000A/50mv, 60mv or 75mv

Industrial Plug & Socket

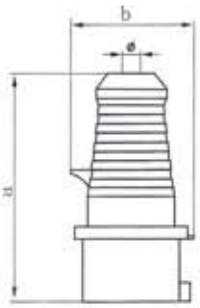
IEC 60309 plugs and socket-outlets for industrial use

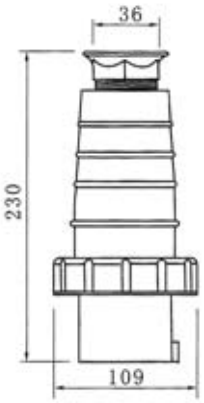
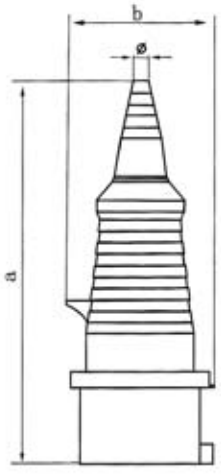
STANDARDS.

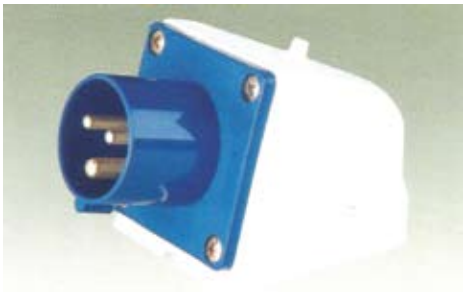
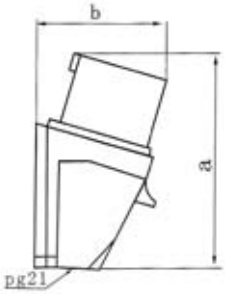
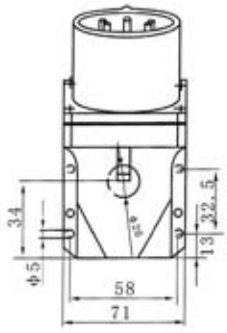
MH series industrial plugs and socket-outlets are in compliance with the following international standards : IEC60309-1 & IEC60309-2, EN60309-1 & EN60309-2
They are also in compliance with the standards : VDE0623, BS4343.

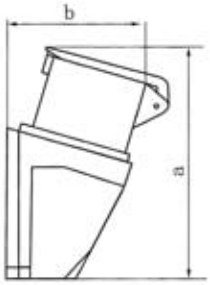
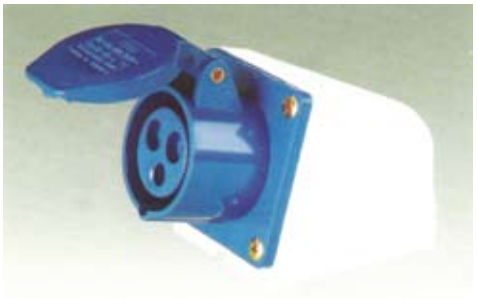
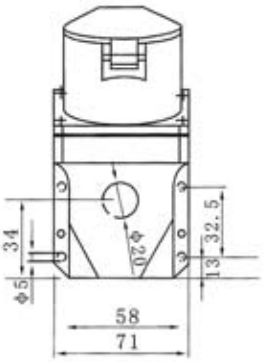
ADVANTAGE.

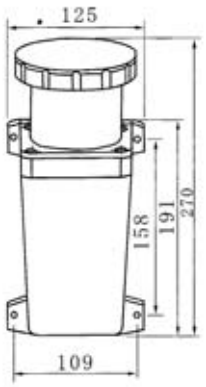
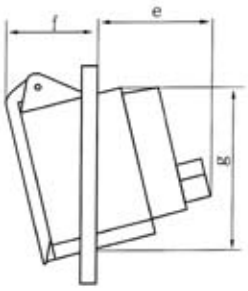
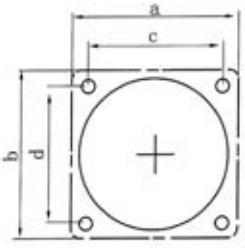
The base materials are NYLON6, which provides good features for the products, such as good insulating, resistant against most chemicals and salt-water, extremely cold-proof and almost unbreakable. For the advanced design they are suitable to be used in special enironment, where IP44 or IP67 protection degree is required.

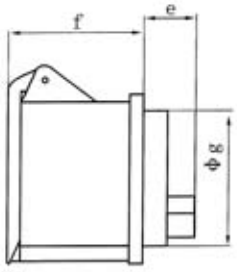
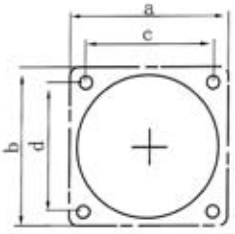
picture	Nominal current (A)	Nominal voltage (V)	No. poles	Code	Protection degree	Dimension
	16A	110-130V~	2P+E	013-4	IP44	Plugs 
	32A			023-4		
	16A	220-240V~	2P+E	013	IP44	
	32A			023		
	16A	380-415V~	3P+E	014	IP44	
	32A			024		
	16A	220-380V~ 240-415V~	3P+N+E	015	IP44	
	32A			025		

picture	Nominal current (A)	Nominal voltage (V)	No. poles	Code	Protection degree	Dimension
	63A	220-240V～	2P+E	033	IP67	Plugs 
	63A	380-415V～	3P+E	034	IP67	
	63A	220-380V～ 240-415V～	3P+N+E	035	IP67	
	16A / 32A	110-130V～	2P+E	013L-4 / 023L-4	IP44	Plugs with long cable seal 
	16A / 32A	220-240V～	2P+E	013L / 023L	IP44	

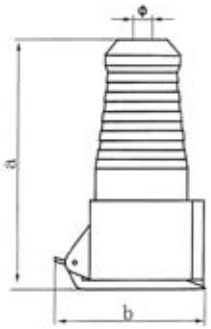
picture	Nominal current (A)	Nominal voltage (V)	No. poles	Code	Protection degree	Dimension
	16A 32A	380-415V~	3P+E	014L 024L	IP44	
	16A 32A	220-380V~ 240-415V~	3P+N+E	015L 025L	IP44	
	16A 32A	220-240V~	2P+E	513 523	IP44	
	16A 32A	380-415V~	3P+E	514 524	IP44	
	16A 32A	220-380V~ 240-415V~	3P+N+E	515 525	IP44	

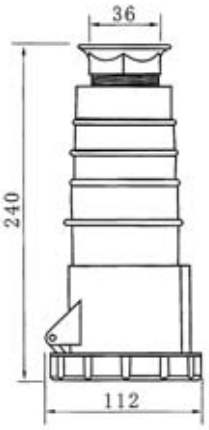
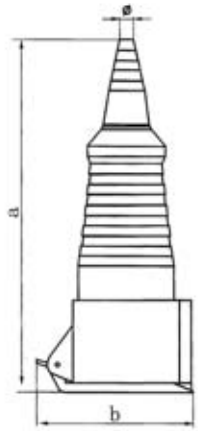
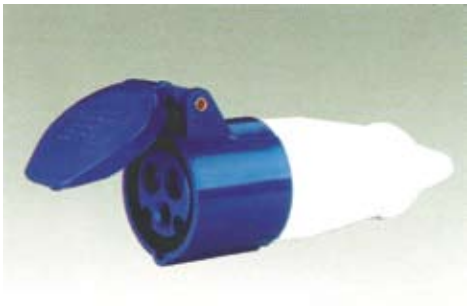
picture	Nominal current (A)	Nominal voltage (V)	No. poles	Code	Protection degree	Dimension
	16A 32A	110-130V~	2P+E	113-4 123-4	IP44	
	16A 32A	220-240V~	2P+E	113 123	IP44	
	16A 32A	380-415V~	3P+E	114 124	IP44	
	16A 32A	220-380V~ 240-415V~	3P+N+E	115 125	IP44	
	63A	220-240V~	3P+E	133	IP67	

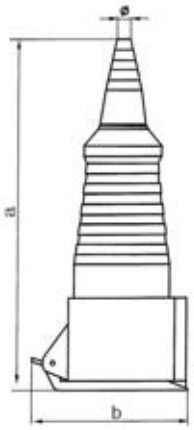
picture	Nominal current (A)	Nominal voltage (V)	No. poles	Code	Protection degree	Dimension
	63A	380-415V~	3P+E	134	IP67	Wall mounted sockets 
	63A	220-380V~ 240-415V~	3P+N+E	135	IP67	
	16A / 32A	110-130V~	2P+E	313-4 / 323-4	IP44	Sloping pannel sockets 
	16A / 32A	220-240V~	2P+E	313 / 323	IP44	
	16A / 32A	380-415V~	3P+E	314 / 324	IP44	

picture	Nominal current (A)	Nominal voltage (V)	No. poles	Code	Protection degree	Dimension
	16A 32A	220-380V~ 240-415V~	3P+N+E	315 325	IP44	
	16A 32A	110-130V~	2P+E	413-4 423-4	IP44	Straight pannel sockets
	16A 32A	220-240V~	2P+E	413 423	IP44	
	16A 32A	380-415V~	3P+E	414 424	IP44	
	16A 32A	220-380V~ 240-415V~	3P+N+E	415 425	IP44	

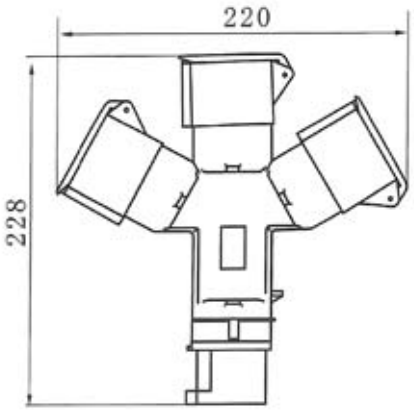
picture	Nominal current (A)	Nominal voltage (V)	No. poles	Code	Protection degree	Dimension
	16A 32A	110-130V～	2P+E	213-4 223-4	IP44	Connectors
	16A 32A	220-240～	2P+E	213 223	IP44	
	16A 32A	380-415V～	3P+E	214 224	IP44	
	16A 32A	220-380V～ 240-415V～	3P+N+E	215 225	IP44	
	63A	220-240V～	2P+E	233	IP67	



picture	Nominal current (A)	Nominal voltage (V)	No. poles	Code	Protection degree	Dimension
	63A	380-415V～	3P+E	234	IP67	Connectors 
	63A	220-380V～ 240-415V～	3P+N+E	235	IP67	
	16A 32A	110-130V～	2P+E	213-L-4 223-L-4	IP44	Connectors with long cable seal 
	16A 32A	220-240V～	2P+E	213L 223L	IP44	

picture	Nominal current (A)	Nominal voltage (V)	No. poles	Code	Protection degree	Dimension
	16A / 32A	380-415V～	 3P+E	214L / 224L	IP44	Connectors with long cable seal 
	16A / 32A	220-380V～ 240-415～	 3P+N+E	215L / 225L	IP44	

Multiple-outlet Sockets For Industrial Use



CODE	a	b	1 Input	1 Plug 16A 250V 2P+E	Protection Degree
1013	220	228	3 Output	3 Sockets 16A 250V 2P+E	IP44

MAIN FITTING PARAMETER SPECIFICATIONS
FOR INDUSTRIAL PLUG SOCKET & CONNECTORS

	Plug					Socket					Connector				
	TYPE	CODE	a	b	Φ	TYPE	CODE	a	b	Pg	TYPE	CODE	a	b	Φ
16A	2P+E	013(-4)	122	59	6	2P+E	113(-4)	131	88	21	2P+E	213(-4)	131	70	6
	3P+E	014	122	65	6	3P+E	114	132	91	21	3P+E	214	130	78	6
	3P+N+E	015	130	72	8	3P+N+E	115	132	98	21	3P+N+E	215	140	92	8
32A	2P+E	023(-4)	139	75	8	2P+E	123(-4)	149	100	21	2P+E	223(-4)	150	92	8
	3P+E	024	139	75	8	3P+E	124	149	100	21	3P+E	224	150	92	8
	3P+N+E	025	143	84	8	3P+N+E	125	151	104	21	3P+N+E	225	154	102	8
16A	2P+E	013L(-4)	141	59	8	TYPE	CODE	a	b	Pg	2P+E	213L(-4)	150	70	8
	3P+E	014L	141	65	8	2P+E	133	270	130	29	3P+E	214L	149	78	8
	3P+N+E	015L	169	72	10	3P+E	134	270	130	29	3P+N+E	215L	179	92	10
32A	2P+E	023L(-4)	178	75	10	3P+N+E	135	270	130	29	2P+E	223L(-4)	189	92	10
	3P+E	024L	178	75	10						3P+E	224L	189	92	10
	3P+N+E	025L	181	84	10						3P+N+E	225L	193	102	10
	TYPE	CODE	a	b	Pg						TYPE	CODE	a	b	Pg
63A	2P+E	033	230	109	36						2P+E	233	240	112	36
	3P+E	034	230	109	36						3P+E	234	240	112	36
	3P+N+E	035	230	109	36						3P+N+E	235	240	112	36

	Wall Mounted Plug				
	TYPE	CODE	a	b	Pg
16A	2P+E	513	121	76	21
	3P+E	514	124	76	21
	3P+N+E	515	126	79	21
32A	2P+E	523	131	83	21
	3P+E	524	131	83	21
	3P+N+E	525	142	88	21

	Sloping Psnnel Socket								
	TYPE	CODE	a	b	c	d	e	f	g
16A	2P+E	313(-4)	62	68	47	48	36	37	55
	3P+E	314	76	86	60	61	47	37	64
	3P+N+E	315	76	86	60	61	47	37	72
32A	2P+E	323(-4)	80	96	60	70	42	43	75
	3P+E	324	80	96	60	70	42	43	75
	3P+N+E	325	80	96	60	70	42	47	81

	Sloping Psnnel Socket								
	TYPE	CODE	a	b	c	d	e	f	Φ g
16A	2P+E	413(-4)	69	69	56	56	30	47	50
	3P+E	414	69	69	56	56	25	51	43
	3P+N+E	415	69	69	56	56	27	50	55
32A	2P+E	423(-4)	71	71	56	56	29	61	55
	3P+E	424	71	71	56	56	29	61	55
	3P+N+E	425	71	71	56	56	29	61	60

Push Buttons

GENERAL CHARACTERISTICS

- NOMINAL THERMAL CURRENT : 10A
- NOMINAL INSULATION VOLTAGE : 600V
- MECHANICAL DURABILITY : 5 million times (selector switch 1 million times)
- ELECTRICAL DURABILITY : 1 million times
- FREQUENCY OF OPERATION : 1800 times/hr
- AMBIENT TEMPERATURE : -5～40℃

RATED VOLTAGE(V)	CURRENT A		
	AC-15 INDUCTIVE LOAD	DC-13 INDUCTIVE LOAD	DC-12 RESISTIVE LOAD
24	10	6	6
48	10	2	3
110	6	0.7	2
220	4	0.3	1

UL RoHS

PICTURE	ITEM NO.	MOUNTING DIA mm	CONTACT CONFIGURATION	COLOR
 FLAT PUSHBUTTON	CK-22P1	φ22	1 N/O	●
	CK-22P2		1 N/C	
	CK-22P12		1 N/O+1 N/C	
	CK-25P1	φ25	1 N/O	●
	CK-25P2		1 N/C	
	CK-25P12		1 N/O+1 N/C	
	CK-30P1	φ30	1 N/O	●
	CK-30P2		1 N/C	
	CK-30P12		1 N/O+1 N/C	
 EXTENDED PUSHBUTTON	CK-22PF1	φ22	1 N/O	●
	CK-22PF2		1 N/C	
	CK-22PF12		1 N/O+1 N/C	
	CK-25PF1	φ25	1 N/O	●
	CK-25PF2		1 N/C	
	CK-25PF12		1 N/O+1 N/C	
	CK-30PF1	φ30	1 N/O	●
	CK-30PF2		1 N/C	
	CK-30PF12		1 N/O+1 N/C	
 MUSHROOM HEAD PUSHBUTTON	CK-22PM1	φ22 HEAD:41mm	1 N/O	●
	CK-22PM2		1 N/C	
	CK-22PM12		1 N/O+1 N/C	
	CK-25PM1	φ25 HEAD:40mm	1 N/O	●
	CK-25PM2		1 N/C	
	CK-25PM12		1 N/O+1 N/C	
	CK-30PM1	φ30 HEAD:41mm	1 N/O	●
	CK-30PM2		1 N/C	
	CK-30PM12		1 N/O+1 N/C	
 PUSH LOCK & PUSH RESET PUSHBUTTON	CK-22PLR1	φ22 HEAD:41mm	1 N/O	●
	CK-22PLR2		1 N/C	
	CK-22PLR12		1 N/O+1 N/C	
	CK-25PLR1	φ25 HEAD:35mm	1 N/O	●
	CK-25PLR2		1 N/C	
	CK-25PLR12		1 N/O+1 N/C	
	CK-30PLR1	φ30 HEAD:41mm	1 N/O	●
	CK-30PLR2		1 N/C	
	CK-30PLR12		1 N/O+1 N/C	
 PUSH LOCK & TURN RESET PUSHBUTTON	CK-22PL1	φ22 HEAD:38mm	1 N/O	●
	CK-22PL2		1 N/C	
	CK-22PL12		1 N/O+1 N/C	
	CK-25PL1	φ25 HEAD:35mm	1 N/O	●
	CK-25PL2		1 N/C	
	CK-25PL12		1 N/O+1 N/C	
	CK-30PL1	φ30 HEAD:38mm	1 N/O	●
	CK-30PL2		1 N/C	
	CK-30PL12		1 N/O+1 N/C	
 KNOB OPERATED SELELTOR SWITCH, 2 POSITION	CK-22SLS21	φ22	1 N/O	●
	CK-22SLS22		1 N/C	
	CK-22SLS212		1 N/O+1 N/C	
	CK-25SLS21	φ25	1 N/O	●
	CK-25SLS22		1 N/C	
	CK-25SLS212		1 N/O+1 N/C	
	CK-30SLS21	φ30	1 N/O	●
	CK-30SLS22		1 N/C	
	CK-30SLS212		1 N/O+1 N/C	

UL RoHS

PICTURE	ITEM NO.	MOUNTING DIA mm	CONTACT CONFIGURATION	COLOR
 LEVER OPERATED SELECTOR SWITCH, 2 POSITION	CK-22SLL21	φ22	1 N/O	●
	CK-22SLL22		1 N/C	
	CK-22SLL212		1 N/O+1 N/C	
	CK-25SLL21	φ25	1 N/O	
	CK-25SLL22		1 N/C	
	CK-25SLL212		1 N/O+1 N/C	
	CK-30SLL21	φ30	1 N/O	
	CK-30SLL22		1 N/C	
	CK-30SLL212		1 N/O+1 N/C	
 KNOB OPERATED SELECTOR SWITCH, 3 POSITION	CK-22SLS312	φ22	1 N/O+1 N/C	●
	CK-22SLS311		2 N/O	
	CK-25SLS312	φ25	1 N/O+1 N/C	
	CK-25SLS311		2 N/O	
	CK-30SLS312	φ30	1 N/O+1 N/C	
	CK-30SLS311		2 N/O	
 LEVER OPERATED SELECTOR SWITCH, 3 POSITION	CK-22SLL312	φ22	1 N/O+1 N/C	●
	CK-22SLL311		2 N/O	
	CK-25SLL312	φ25	1 N/O+1 N/C	
	CK-25SLL311		2 N/O	
	CK-30SLL312	φ30	1 N/O+1 N/C	
	CK-30SLL311		2 N/O	
 ILLUMINATED KNOB OPERATED SELECTOR SWITCH, 2 POSITION ACV: 110V, 220V, 380V VIA INTEGRAL TRANSFORMER BA9S 6.3V FILAMENT BULB	CK-22SLSN21	φ22	1 N/O	● ● ●
	CK-22SLSN22		1 N/C	
	CK-22SLSN212		1 N/O+1 N/C	
	CK-25SLSN21	φ25	1 N/O	
	CK-25SLSN22		1 N/C	
	CK-25SLSN212		1 N/O+1 N/C	
	CK-30SLSN21	φ30	1 N/O	
	CK-30SLSN22		1 N/C	
	CK-30SLSN212		1 N/O+1 N/C	
 ILLUMINATED LEVER OPERATED SELECTOR SWITCH, 2 POSITION ACV: 110V, 220V, 380V VIA INTEGRAL TRANSFORMER BA9S 6.3V FILAMENT BULB	CK-22SLLN21	φ22	1 N/O	● ● ●
	CK-22SLLN22		1 N/C	
	CK-22SLLN212		1 N/O+1 N/C	
	CK-25SLLN21	φ25	1 N/O	
	CK-25SLLN22		1 N/C	
	CK-25SLLN212		1 N/O+1 N/C	
	CK-30SLLN21	φ30	1 N/O	
	CK-30SLLN22		1 N/C	
	CK-30SLLN212		1 N/O+1 N/C	
 ILLUMINATED KNOB OPERATED SELECTOR SWITCH, 3 POSITION ACV: 110V, 220V, 380V VIA INTEGRAL TRANSFORMER BA9S 6.3V FILAMENT BULB	CK-22SLSN312	φ22	1 N/O+1 N/C	● ● ●
	CK-22SLSN311		2 N/O	
	CK-25SLSN312	φ25	1 N/O+1 N/C	
	CK-25SLSN311		2 N/O	
	CK-30SLSN312	φ30	1 N/O+1 N/C	
	CK-30SLSN311		2 N/O	

UL RoHS

PICTURE	ITEM NO.	MOUNTING DIA mm	CONTACT CONFIGURATION	COLOR
 ILLUMINATED LEVER OPERATED SELECTOR SWITCH, 3 POSITION ACV: 110V, 220V, 380V VIA INTEGRAL TRANSFORMER BA9S 6.3V FILAMENT BULB	CK-22SLLN312	φ 22	1 N/O+1 N/C	
	CK-22SLLN311		2 N/O	
	CK-25SLLN312	φ 25	1 N/O+1 N/C	
	CK-25SLLN311		2 N/O	
	CK-30SLLN312	φ 30	1 N/O+1 N/C	
	CK-30SLLN311		2 N/O	
 EXTENDED ILLUMINATED PUSHBUTTON ACV: 110V, 220V, 380V VIA INTEGRAL TRANSFORMER BA9S 6.3V FILAMENT BULB	CK-22PFN1	φ 22	1 N/O	
	CK-22PFN2		1 N/C	
	CK-22PFN12		1 N/O+1 N/C	
	CK-25PFN1	φ 25	1 N/O	
	CK-25PFN2		1 N/C	
	CK-25PFN12		1 N/O+1 N/C	
	CK-30PFN1	φ 30	1 N/O	
	CK-30PFN2		1 N/C	
	CK-30PFN12		1 N/O+1 N/C	
 MUSHROOM HEAD ILLUMINATED PUSHBUTTON ACV: 110V, 220V, 380V VIA INTEGRAL TRANSFORMER BA9S 6.3V FILAMENT BULB	CK-22PMN1	φ 22 HEAD: 41mm	1 N/O	
	CK-22PMN2		1 N/C	
	CK-22PMN12		1 N/O+1 N/C	
	CK-25PMN1	φ 25 HEAD: 40mm	1 N/O	
	CK-25PMN2		1 N/C	
	CK-25PMN12		1 N/O+1 N/C	
	CK-30PMN1	φ 30 HEAD: 41mm	1 N/O	
	CK-30PMN2		1 N/C	
	CK-30PMN12		1 N/O+1 N/C	
 PUSH LOCK & TURN RESET ILLUMINATED PUSHBUTTON ACV: 110V, 220V, 380V VIA INTEGRAL TRANSFORMER BA9S 6.3V FILAMENT BULB	CK-22PLN1	φ 22 HEAD: 38mm	1 N/O	
	CK-22PLN2		1 N/C	
	CK-22PLN12		1 N/O+1 N/C	
	CK-25PLN1	φ 25 HEAD: 35mm	1 N/O	
	CK-25PLN2		1 N/C	
	CK-25PLN12		1 N/O+1 N/C	
	CK-30PLN1	φ 30 HEAD: 38mm	1 N/O	
	CK-30PLN2		1 N/C	
	CK-30PLN12		1 N/O+1 N/C	
 PUSH LOCK & PUSH RESET ILLUMINATED PUSHBUTTON ACV: 110V, 220V, 380V VIA INTEGRAL TRANSFORMER BA9S 6.3V FILAMENT BULB	CK-22PLRN1	φ 22 HEAD: 41mm	1 N/O	
	CK-22PLRN2		1 N/C	
	CK-22PLRN12		1 N/O+1 N/C	
	CK-25PLRN1	φ 25 HEAD: 35mm	1 N/O	
	CK-25PLRN2		1 N/C	
	CK-25PLRN12		1 N/O+1 N/C	
	CK-30PLRN1	φ 30 HEAD: 41mm	1 N/O	
	CK-30PLRN2		1 N/C	
	CK-30PLRN12		1 N/O+1 N/C	
 PILOT LAMP	CK-25TA	φ 25	DESCRIPTION ACV: 110V, 220V, 380V VIA INTEGRAL TRANSFORMER 6.3V FILAMENT BA9S BULB	
	CK-30TA	φ 30	DESCRIPTION ACV: 110V, 220V, 380V VIA INTEGRAL TRANSFORMER 6.3V FILAMENT BA9S BULB	

UL RoHS

PICTURE	ITEM NO.	MOUNTING DIA mm	DESCRIPTION	COLOR
 PILOT LAMP	CK-25TB	φ25	ACV:110V, 220V BA9S NEON BULB	
	CK-30TB	φ30	ACV:110V, 220V BA9S NEON BULB	
 CONTACT BLOCK	CK-1		CONTACT CONFIGURATION: 1 N/O USED FOR CK TYPE CONTROL COMPONENTS	
 CONTACT BLOCK	CK-2		CONTACT CONFIGURATION: 1 N/C USED FOR CK TYPE CONTROL COMPONENTS	
 OPTIONAL ACCESSORIES PROTECTION COVER	CK-P USED FOR CONTACT BLOCK CK-1&CK-2		DESCRIPTION  CK-P WITH CK-1	
WITHOUT UL APPROVAL  FLAT ILLUMINATED PUSHBUTTON (SNAP ACTION) ACV:110V, 220V, 380V VIA INTEGRAL TRANSFORMER 6.3V FILAMENT E-10 BULB	CK-25PFNBT	φ25	CONTACT CONFIGURATION: 1 N/O+1 N/C	COLOR 
	CK-30PFNBT	φ30		
WITHOUT UL APPROVAL  FLAT ILLUMINATED PUSHBUTTON (SNAP ACTION) ACV:110V, 220V, E-10 NEON BULB	CK-25PFNBD	φ25	CONTACT CONFIGURATION: 1 N/O+1 N/C	COLOR 
	CK-30PFNBD	φ30		

Led
Pilot Light

PICTURE	ITEM NO.	SPECIFICATION	COLOR
Ø30 	AD16-30 D/S	· Rated Voltage: AC/DC: 6V, 12V, 24V, 36V, 48V, 110V AC: 220V, 380V DC: 220V · Mounting Hole: 30mm	
Ø22 	AD16-22 D/S E	· Rated Voltage: AC/DC: 6V, 12V, 24V, 36V, 48V, 110V AC: 220V, 380V DC: 220V · Mounting Hole: 22mm	
Ø16 	AD16-16 D/S	· Rated Voltage: AC/DC: 6V, 12V, 24V, 36V, 48V, 110V AC: 220V, 380V DC: 220V · Mounting Hole: 16mm	
Ø12 	AD212	· Rated Voltage: AC/DC: 6V, 12V, 24V, 110V, 220V · Mounting Hole: 12mm	
Ø10 	AD210	· Rated Voltage: AC/DC: 6V, 12V, 24V, 110V, 220V · Mounting Hole: 10mm	

Timer

CHARACTERISTICS

- Exclusive CMOS IC assures high performance stability, and accuracy.
- 4 Time range can be changed with ease by merely exchanging DIP switch.
- Easy - to - monitor DIP switch positions,time series and operation voltage.
  Five time series with wide timing ranges from 0.1 sec. to 30 hrs.
- Output contact:Time delay contacts 2C(DPDT)10A. (MST)
- Output contact:Time delay contact(SPDT) and instantaneous contact(SPDT)10A.(MSI)

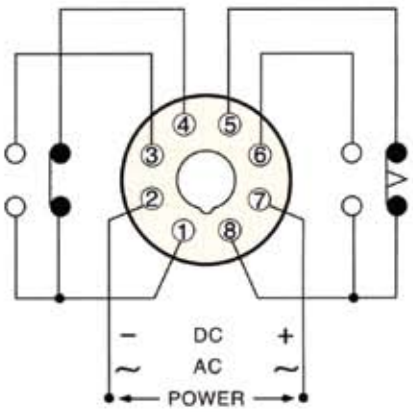
TIME RANGE

Four time are available for each timer by setting the DIP switches to required positions.

Time range / series	Position of time range selector			
	1 S	10 S	1 M	10 M
A	1S (0.05S-1S)	10S (0.1S-10S)	60S (0.5S-60S)	10M (10S-10M)
B	3S (0.05S-3S)	30S (0.5S-30S)	3M (1S-3M)	30M (30S-30M)
C	6S (0.1S-6S)	60S (0.5S-60S)	6M (1S-6M)	60M (30S-60M)
D	60S (0.5S-60S)	10M (10S-10M)	60M (30S-60M)	10H (10M-10H)
E	3M (1S-3M)	30M (30S-30M)	3H (3M-3H)	30H (1H-30H)

CONNECTION DIAGRAM

MSI

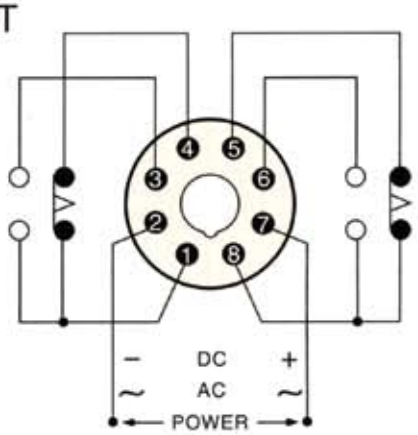


SPECIFICATIONS

RATED VOLTAGE	AC 220V (standard) AC 110V, 380V, 440V, DC 12V, 24V (optional)
Rated frequency	50/60Hz.
ORERATING VOLTAGE	AC 85-110% of rated voltage. DC 80-110% of rated voltage.
CONSUMED POWER	About 2VA FOR AC. About 2W FOR DC.
CONTROL METHOD	Time-limit operation Self-resetting
CONTACT RATING	250V AC 10A(P.F.=1)
AMBIENT TEMP.	-10°C~+55°C
AMBIENT HUMIDITY	45~85% RH

CONNECTION DIAGRAM

MST

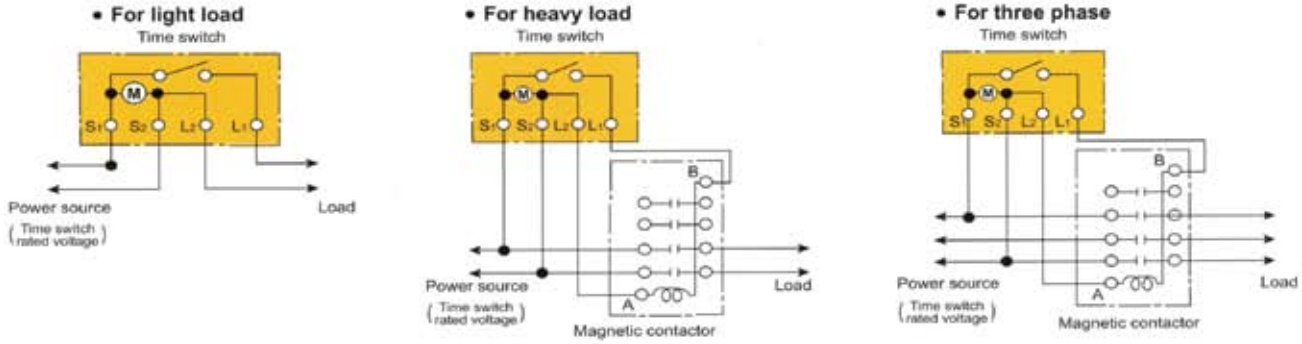


Time Switches

Since 1981
INSTRUMENTS

WIRING CONNECTION DIAGRAM

When the time switch is used for loads exceeding the rated capacity, it is imperative that time switch be used in combination with one or more magnetic contactors according to each load.



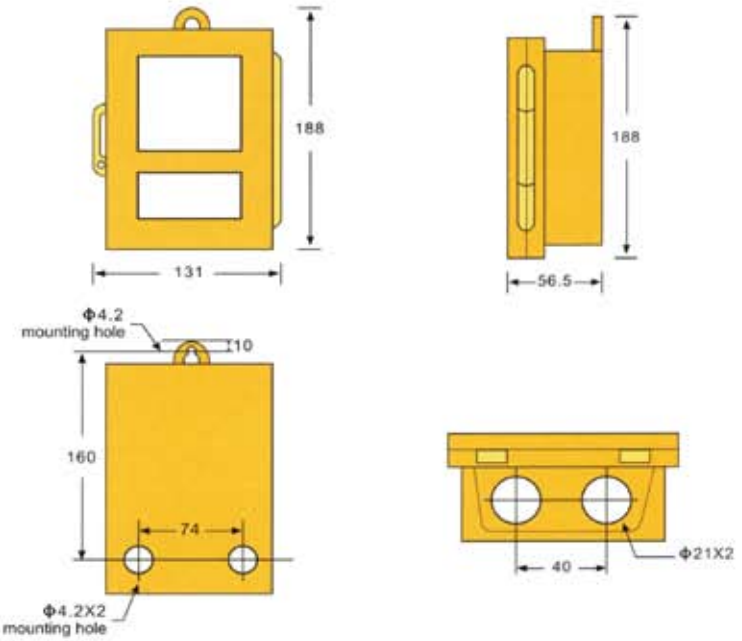
When the time switch is used with a heater, it is imperative that the load circuit be protected by a thermo-switch.

Item No.			TB35-RP		TB35N-RP	TB330-RP
Picture					 Back up battery for 100 hours when power failure.	 Back up battery for 150 hours when power failure.
Rated Voltage			110V/AC	220V/AC	100-240V/AC	100-240V/AC
Voltage tolerance			85-120V	170-240V	85-264/AC	85-264/AC
Frequency			50/60Hz (selectable)		50/60Hz (common use)	50/60Hz (common use)
Driving method			Synchronous motor		Quartz controlled stepping motor	Quartz controlled stepping motor
Cycle			24 hours		24 hours	24 hours
OUTPUT	Circuit Quantity		1 circuit		1 circuit	1 circuit
	Switch construction		SPST (—◇—)		SPST (—◇—)	SPST (—◇—)
	Manual ON/OFF		ON/AUTO/OFF switch		ON/AUTO/OFF switch	ON/OFF switch
	Contact Capacity	Resistive load	250V AC 20A		250V AC 15A	250V AC 30A
		Incandescent lamp	10A		10A	25A
		Inductive (cos ϕ ≥ 0.7)	12A		12A	12A
		Motor(cos ϕ ≥ 0.7)	110V AC 750W, 220V AC 1500W		110V AC 750W, 220V AC 1500W	110V AC 1500W, 220V AC 3000W
Operation time setting	Present time setting		Turn the Minute control knob in the center clock		Turn the Minute control knob in the center clock	Turn the Minute control knob in the center clock
	Minimum unit		15 Minutes / unit		15 Minutes / unit	15 Minutes / unit
	Minimum interval		15 Minutes		15 Minutes	30 Minutes
	No. of ON/OFF operations		96 operations		96 operations	Standard 6 operations Maximum 48 operations are possible
Working reserve time			– –		100 hours	150 hours
Ambient temperature			-10°C ~ +50°C		-10°C ~ +50°C	-10°C ~ +50°C

CAUTIONS

1. Please charge battery before use, and ensure the hear DI DA sound before setting. (Only for TB35N-RP, TB330-RP)
2. To set the correct time, turn the dial in the direction of the arrow (clockwise) and set the present time.
3. Please observe the rated voltage and voltage tolerance of the time switches for adequate use.
4. If the load capacity exceeds the rating, an electromagnetic switch is required.

DIMENSIONS (mm)



TB-35
NON POWER FAILURE 24 HOURS TIME SWITCH

FEATURES

1. Back up battery for 100 hours when power failure
2. Direct Reading Clock Type with Minute Adjust Knob to Set Time Precisely to the Minute
3. Handy ON/AUTO/OFF select switch
4. Improved load capacity
5. Attractive design
6. 15-Minute-Interval, 24-Hour Dial with Built-in (Embedded) Time Set Pins

CE

TB-35N
NON POWER FAILURE 24 HOURS TIME SWITCH

SPECIFICATIONS

Model No.	TB - 35N
Movement type	AC - type
Rated Voltage	100 - 240V
Voltage Tolerance	85 - 264V
Frequency	50/60Hz Common Use
Movement	Quartz
Power Consumption	110VAC 1W, 220VAC 2W
Back up Power	100 Hours
Ambient Temperature	-10°C ~ +50°C
Resistive Load	250V AC 15A
Lamp Load	10A
Inductive Load	12A (cosØ=0.7or more)
Motor Load	110VAC 750W, 220VAC 1500W
Minimum Setting Unit	15 minute units
Minimum Setting Interval	15 minute
No. of ON-OFF Operations	96 operations
Net Weight	250g

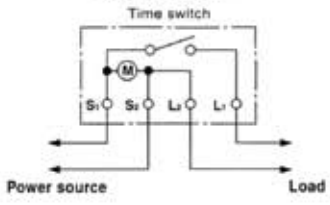
CAUTIONS

1. Please charge battery before use, and ensure the hear DI DA sound before setting
2. To set the correct time, turn the dial in the direction of the arrow (clockwise) and set the present time.
3. Please observe the rated voltage and voltage tolerance of the time switches for adequate use.
4. If the load capacity exceeds the rating, an electromagnetic switch is required.
5. Do not use the time switch where:
   - the ambient temperature goes below -10°C or above +50°C
   - there is much dust
   - there is much moisture
   - outdoors or where it will be exposed to rain or water
   - there is much vibration

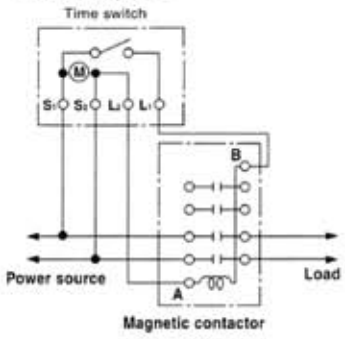
WIRING CONNECTION DIAGRAM

When the time switch is used for loads exceeding the rated capacity, it is imperative that the time switch be used in combination with one or more magnetic contactors according to each load.

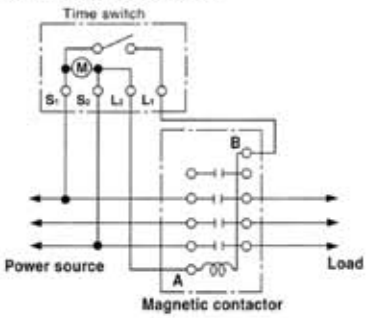
• For light load



• For heavy load



• For three phase 200-240V



When the time switch is used with a heater, it is imperative that the load circuit be protected by a thermo-switch.

24 HOURS TIME SWITCH

FEATURES

- Back up Battery For 150 Hours When Power Failure (just for clock running not for output no/off switching) TB-370 Only
- 15-Minute-Interval,24 Hours Dial With Built In Time Set Pins.
- Direct Reading Clock Type With Minute Adjust Knob To Set Time Precisely To The Minute.

SPECIFICATIONS

Model No.	TB-370	TB-370A
Rated Voltage	100-250V	110,220V
Voltage Tolerance	85-264V	— —
Frequency	50/60Hz Common Use	50Hz OR 60Hz
Movement	Quartz	AC Type
Power Consumption	110VAC 1W,220V AC2W	
Back up Power	150 Hours	
Ambient Temperature	-10℃~+50℃	
Resistive Load	250V AC 16A	
Lamp Load	10A	
Inductive Load	12A(cos ϕ=0.7or more)	
Motor Load	110V AC750W,220V AC1500W	
Minimum Setting Unit	15 minute units	
Minimum Setting Interval	15 minute	
No. of ON-OFF Operations	96 operations	
Net Weight	180g	

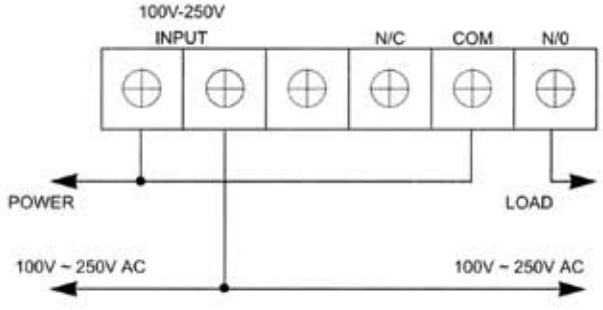
CAUTIONS

1.Please charge battery before use, and ensure the hear DI DA sound before setting. (Only for TB-370)
2.To set the correct time, turn the dial in the direction of the arrow (clockwise) and set the present time.
3.Please observe the rated voltage and voltage tolerance of the time switches for adequate use.
4. If the load capacity exceeds the rating, an electromagnetic switch is required.
5.Do not use the time switch where:

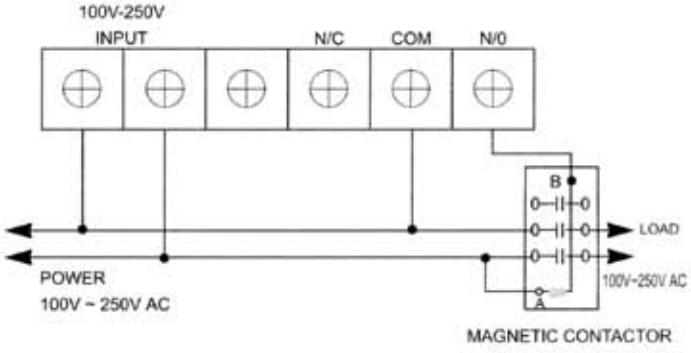
- the ambient temperature goes below-10℃ or above + 50℃
- there is much dust
- there is much moisture
- outdoors or where it will be exposed to rain or water
- there is much vibration

WIRING CONNECTION DIAGRAM

FOR LIGHT LOAD



FOR HEAVY LOAD

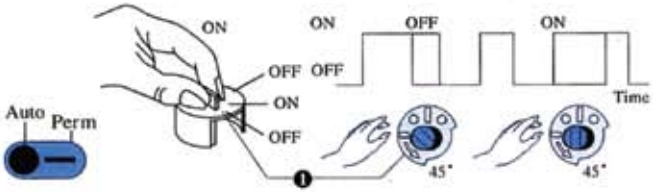


TB-380
NON POWER FAILURE 24 HOURS TIME SWITCH

SPECIFICATIONS

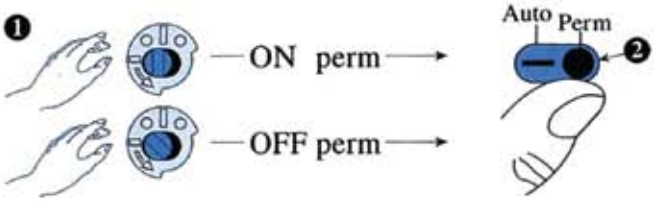
Model No.	TB-380
Movement type	AC - type
Rated Voltage	110V , 220V
Contact Configuration	SPDT
Frequency	50/60Hz Common Use
Movement	Quartz
Power Consumption	110VAC 1W, 220VAC 2W
Back up Power	150 Hours
Ambient Temperature	-10°C ~ +50°C
Resistive Load	250VAC 16A
Lamp Load	10A
Inductive Load	12A (cosø=0.7or more)
Motor Load	110VAC 750W,220VAC 1500W
Minimum Setting Unit	30 minute units
Minimum Setting Interval	30 minute
No. of ON-OFF Operations	48 operations
Net Weight	200g

MANUAL



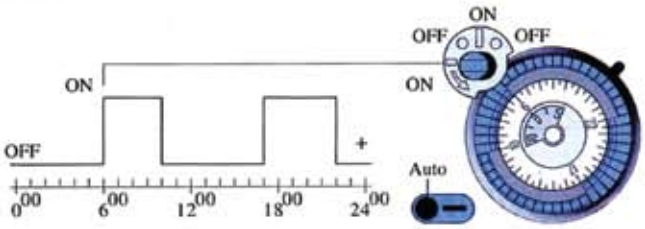
Manual Control ON/OFF (override Control)
Turn the control axis ❶ in direction of arrow by one notch; ON=⏻-/⏻- or OFF=⏻/⏻. The manual control is automatically annuled by the following counteracting command of the automatic program sequence.

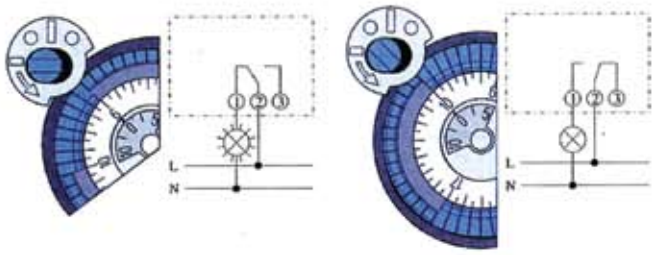
PERMANENT



Permanent Control ON/OFF
Set the hand lever ❷ to ≫Perm≪= permanent control; turning the control axis ❶ in direction of arrow, the required, permanent control ON or OFF can now be adjusted. Turning the hand lever to ≫Auto≪ = Automatic Control, the permanent control is terminated. The actual switch position is maintained until the next counteracting command of the automatic program sequence is triggered. An immediate correction can be carried out by means of the manual control(override control).

24H PROGRAM





TB-45 NON POWER FAILURE 24 HOURS TIME SWITCH

FEATURES

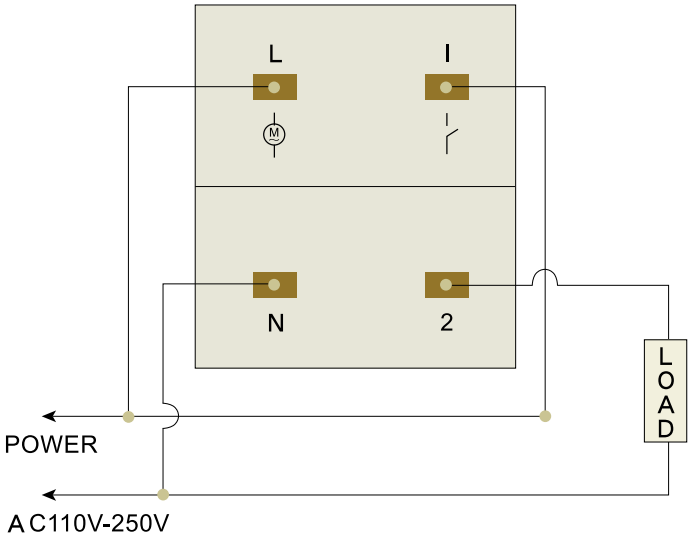
- Back up Battery For 100 Hours When Power Failure (just for clock running not for output on/off switching)
- 15-Minute-Interval, 24 Hours Dial With Built In Time Set Pins.
- HANDY Ⓛ/ I SELECT SWITCH
  Ⓛ: 24H PROGRAM AUTO CONTROL
  I : PERMANENT CONTROL ON

TB-45

SPECIFICATIONS

Model No.	TB-45
Movement Type	AC Type
Rated Voltage	110-250V
Frequency	45-60Hz
Movement	Quartz
Back up Power	100 Hours
Resistive Load	250V AC 16A
Lamp Load	2A
Inductive Load	10A(cos Ø = 0.7 or more)
Motor Load	4A
Minimum Setting Unit	15 minute units
Minimum Setting Interval	15 minute
No. of ON-OFF Operations	96 operations

WIRING CONNECTION DIAGRAM



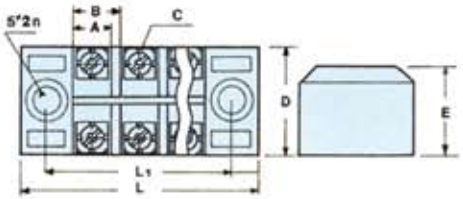
CAUTIONS

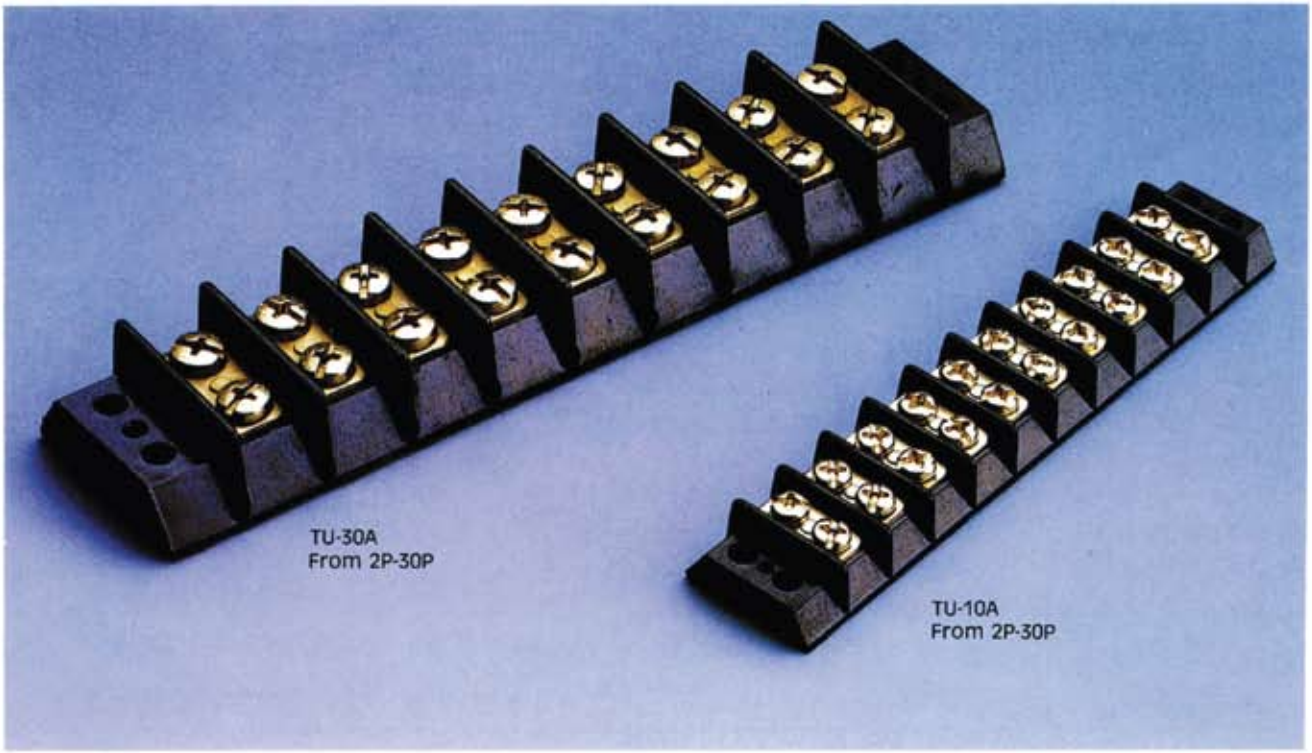
1. Please charge battery before use, and ensure the hear DI DA sound before setting.
2. To set the correct time, turn the dial in the direction of the arrow and set the present time.
3. Please observe the rated voltage and voltage tolerance of the time switches for adequate use.
4. Do not use the time switch where:
   - there is much dust
   - there is much moisture
   - outdoors or where it will be exposed to rain or water
   - there is much vibration
5. When the time switch is used for loads exceeding the rated capacity, it is imperative that the time switch be used in combination with one or more magnetic contactors according to each load.
6. Mounting methods : BY DIN RAIL (35mm)

Terminal Blocks

MOLDED TERMINAL BLOCKS WITH COVER

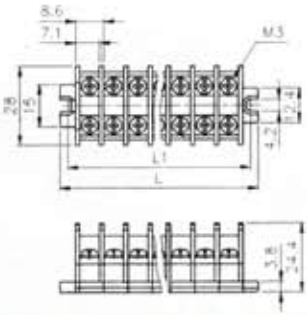
TYPE	RATINGS	NUMBER OF POLES	DIMENSIONS (mm)							PACKING	
			L	L_1	A	B	C	D	E	inner Box	inner Carton
TB-1503	600V 15A	3	46.5	36.5	7	9	M3	22	17.5	150PCS	6 BOXES
TB-1504		4	55.5	45.5	7	9	M3	22	17.5	120PCS	
TB-1506		6	73.5	63.5	7	9	M3	22	17.5	100PCS	
TB-1512		12	128.5	118	7	9	M3	22	17.5	50PCS	
TB-2503	600V 25A	3	50.5	40	8	10.5	M4	28	19	120PCS	4 BOXES
TB-2504		4	61.5	51	8	10.5	M4	28	19	100PCS	
TB-2506		6	82.5	72	8	10.5	M4	28	19	70PCS	
TB-2512		12	147	136	8	10.5	M4	28	19	40PCS	





Assembly Type

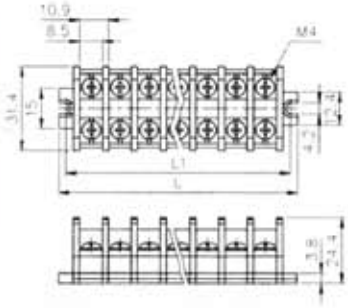
FTB-10



L≒16.7+8.6×n
L1≒10.3+8.6×n
n＝P數

P數	2	3	4	5	6	7	8	9	10	11	12
L	33.9	42.5	51.1	59.7	68.3	76.9	85.5	94.1	102.7	111.3	119.9
L1	27.5	36.1	44.7	53.3	61.9	70.5	79.1	87.7	96.3	104.9	113.5

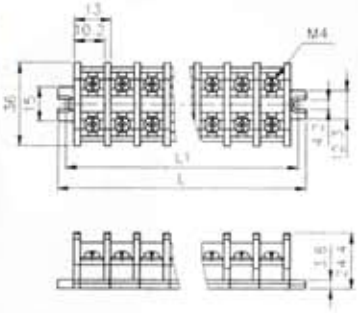
FTB-20



L≒17.6+10.9×n
L1≒11.2+10.9×n
n＝P數

P數	2	3	4	5	6	7	8	9	10	11	12
L	39.4	50.3	61.2	72.1	83	93.9	104.8	115.7	126.6	137.5	148.4
L1	33	43.9	54.8	65.7	76.6	87.5	98.4	109.3	120.2	131.1	142

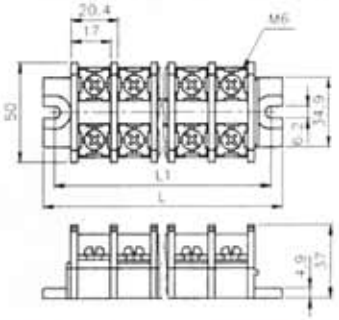
FTB-30



L≒18+13×n
L1≒11.5+13×n
n＝P數

P數	2	3	4	5	6	7	8	9	10	11	12
L	44	57	70	83	96	109	122	135	148	161	174
L1	37.5	50.5	63.5	76.5	89.5	102.5	115.5	128.5	141.5	154.5	167.5

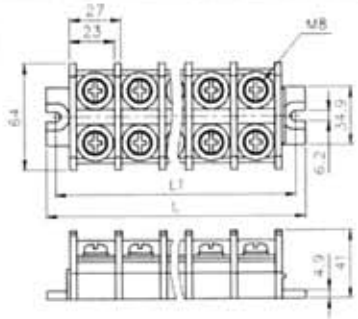
FTB-60



L≒33.5+20.4×n
L1≒18.5+20.4×n
n＝P數

P數	2	3	4	5	6	7	8	9	10	11	12
L	74.3	94.7	115.1	135.5	155.9	176.3	196.7	217.1	237.5	257.9	278.3
L1	59.3	79.7	100.1	120.5	140.9	161.3	181.7	202.1	222.5	242.9	263.3

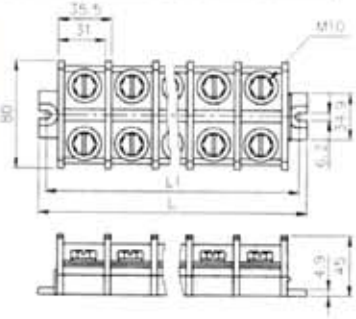
FTB-100



L≒34+27×n
L1≒19+27×n
n＝P數

P數	2	3	4	5	6	7	8	9	10	11	12
L	88	115	142	169	196	223	250	277	304	331	358
L1	73	100	127	154	181	208	235	262	289	316	343

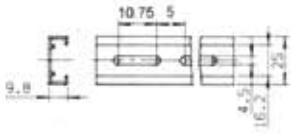
FTB-200



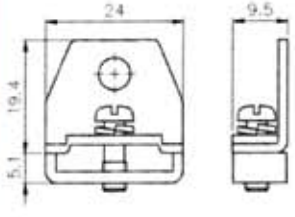
L≒34.5+35.5×n
L1≒19.5+35.5×n
n＝P數

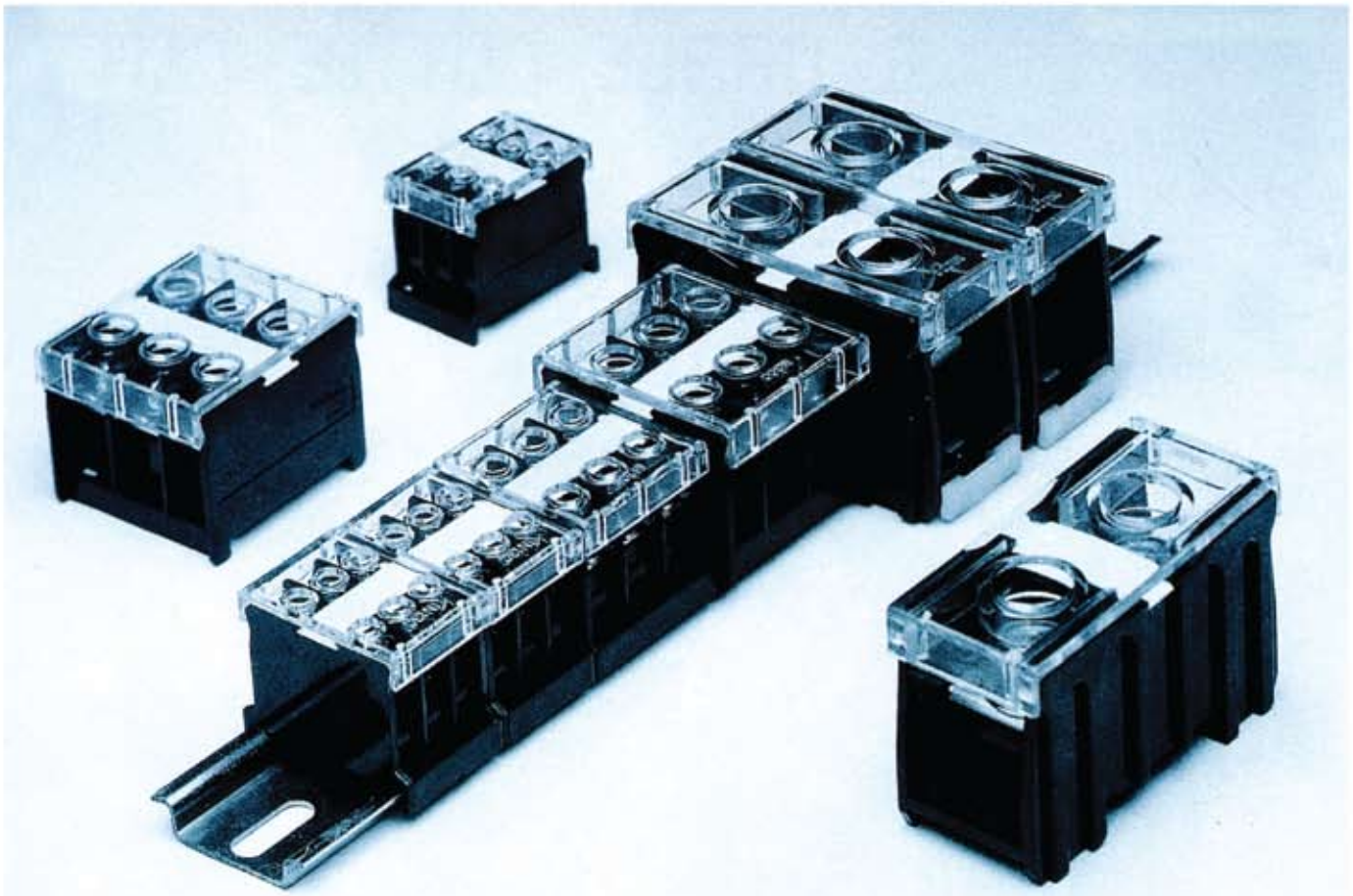
P數	2	3	4	5	6	7	8	9	10	11	12
L	105.5	141	176.5	212	247.5	283	318.5	354	389.5	425	460.5
L1	90.5	126	161.5	197	232.5	268	303.5	339	374.5	410	445.5

RAIL



STOPPER





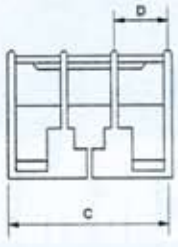
RAIL TYPE TERMINAL BLOCK IN SERIES

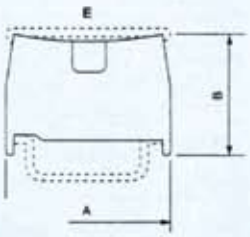
- *THIS TERMINAL BLOCK CAN BE MOUNTED TO THE RAIL BY SINGLE FINGER OPERATION*
- *RATED VOLTAGE: 600V*
- *DIELECTRIC STRENGTH: 2500V, 1MIN*
- *INSULATION RESISTANCE: 100MΩ MIN*

■ SPECIFICATIONS

UNIT: mm

Item No.	RATINGS	DIMENSIONS					PACK
		A	B	C	D	E	
IN12 BK	2P 2mm² max 20A	40	30	20	8	37	30 PCS
IN13 SBK	3P 2mm² max 20A	40	30	25	6.7	37	20 PCS
IN20 BK	3P 3.5mm² max 30A	40	30	35	9.7	37	20 PCS
IN30 BK	3P 8mm² max 50A	45	34	43	12.2	48	10 PCS
IN411 S	1P 14mm² max 60A	45	34	15.5	13.5	48	30 PCS
IN60 BK	1P 22mm² max 90A	56	38	22	17	56	10 PCS
IN100 K	1P 38mm² max 130A	75	45	32	24	73.5	6 PCS
IN200 K	1P 100mm² max 240A	86	57	39	31	86.5	3 PCS





Relay


MH
MK3P-1
2884C
2884C
PHASE & VOLTAGE
PROTECTION RELAY
VP-002
OVER
%
UNDER
%
on
MH

PHASE & VOLTAGE PROTECTION RELAY

VP-002

MAIN FEATURES

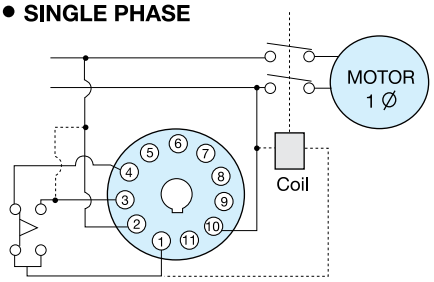
- The VP-002 is a range of phase failure/phase sequence/under voltage/overvoltage protection relays to continuously monitor AC power supplies both single phase and three phase.
- Output relay will operate to ON (pin 1 & pin 3 close) when power is applied to the unit normally, and simultaneously detect if supplied power voltages (single or three phase) are within the set voltage range, and phase in correct sequence for three phase type.
- 0% to 20% Knob-adjustable separately for over voltage and under voltage. If voltage is over or under than the setting voltage for over 3 second, then the output relay will be released to its original position (pin 1 & pin 4 close).

SPECIFICATIONS

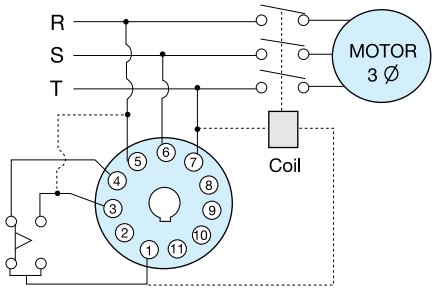
ITEM NO.	VP-002-1 SINGLE PHASE	VP-002-3 THREE PHASE
RATED VOLTAGE	AC 110V, 220V, 230V 380V, 415V, 440V	AC 220V, 230V, 380V 415V, 440V
FREQUENCY	50 or 60 Hz	
RESPONSE TIME OF RELAY	DELAY ON : 0.5 Sec DELAY OFF : 3 Sec	
CONTACT RATING	250V AC 5A (P.F. =1)	
MOUNTING & SOCKET	SURFACE : PF-113AE	
RESET TIME	0.2 Sec Max.	
AMBIENT TEMP.	-10°C ~ -55°C	
SETTING ERROR	± 10% MAX.	
REPEAT ERROR	± 2% MAX.	
VOLTAGE ERROR	± 2% MAX.	
TEMP. ERROR	± 2% MAX.	

CONNECTION DIAGRAM

- **SINGLE PHASE**

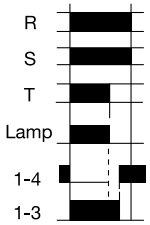


- **THREE PHASE**

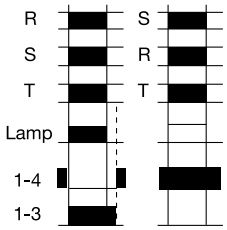


OPERATION CHART

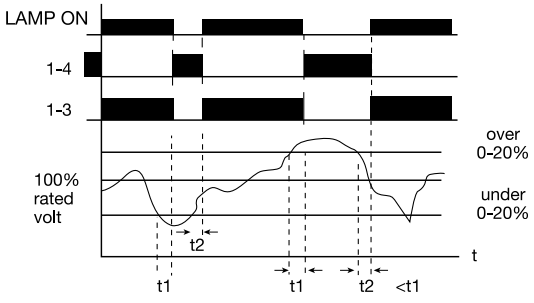
A. Phase Failure



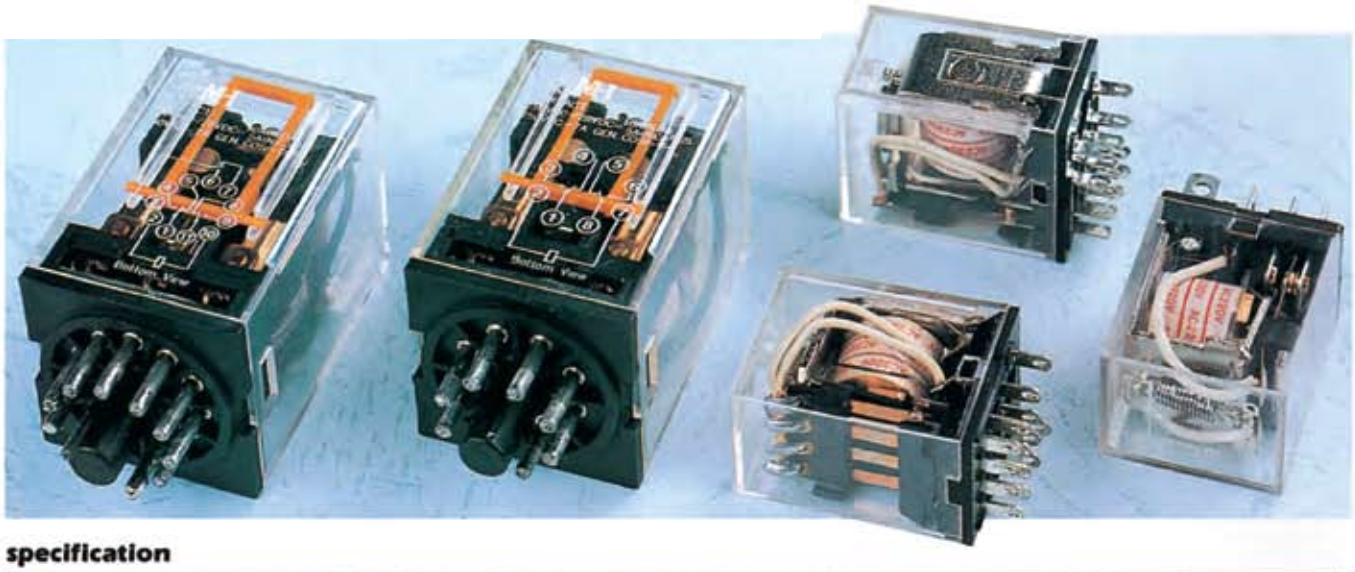
B. Phase sequence



C. Over & under voltage

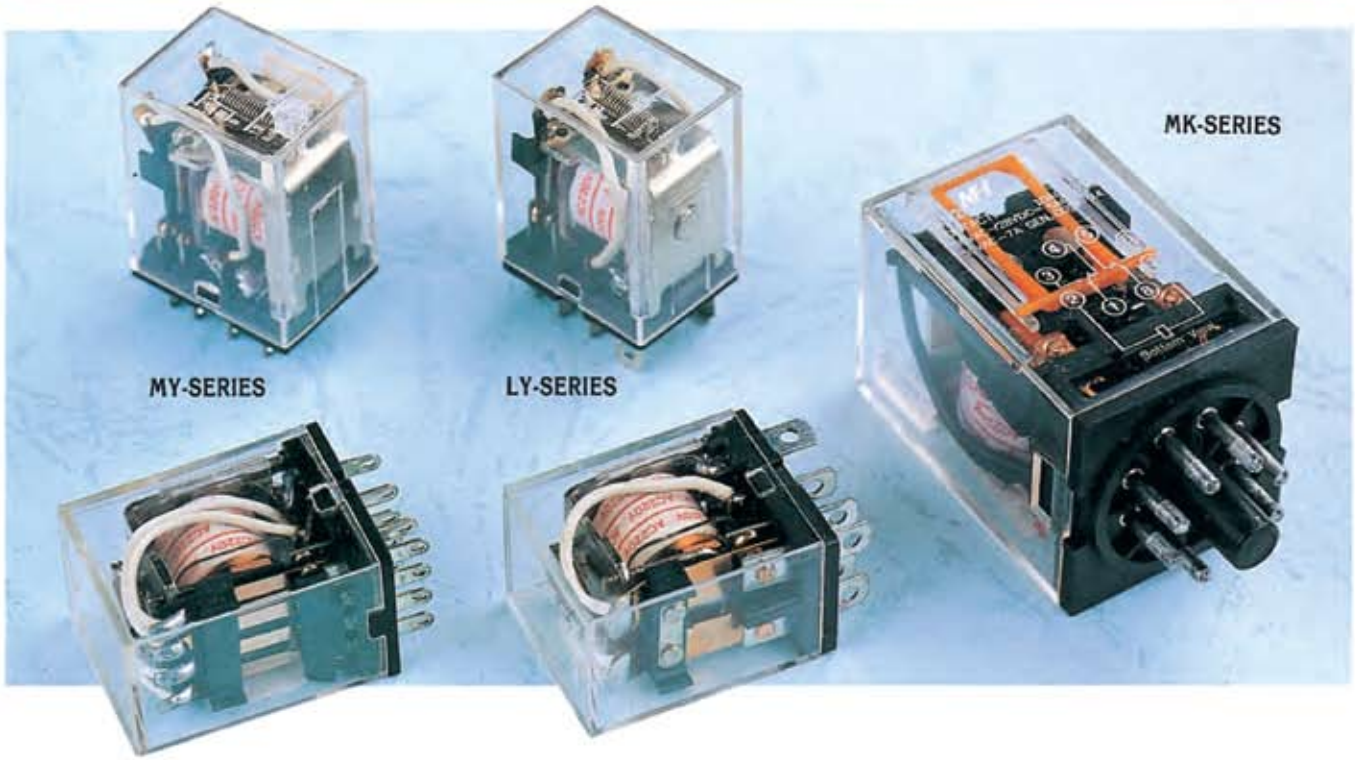


t1 = 3 sec delay off t2 = 0.5 sec delay on



specification

		MY SERIES			LY SERIES			MK SERIES	
MODEL		MY-2	MY-3	MY-4	LY-2	LY-3	LY-4	MK2P-I	MK3P-I
EXTERNAL DIMENSION (mm)	L W H	27.6 21.5 34			27.6 21.5 36	27.6 31.5 36	27.6 41.5 36	34.7 34.7 52	
CONTACT FORM		2A2B	3A3B	4A4B	2A2B	3A3B	4A4B	2A2B	3A3B
CONTACT CAPACITY		28V DC 220V AC			28V DC 220V AC			28V DC 220V AC	
		5A		3A	15A10A	10A		10A 5A	
COIL VOLTAGE	DC	6,12,24,36,110 V			6,12,24,36,48,110V			6,12,24,48,60,110,220V	
	AC	6,12,24,36,110,220V			6,12,24,36,48,110,220V			6,12,24,36,48,110,127,220,380V	
CONTACT RESISTANCE		≤ 50mΩ			≤ 50mΩ			≤ 50mΩ	
INSULATION RESISTANCE		≥ 1000MΩ			≥ 1000MΩ			≥ 500MΩ	
DIELECTRIC STRENGTH		1000V AC 50/60Hz			1500 AC 50/60 Hz			1500V AC 50/60Hz	
SERVICE LIFE	MECHANICAL	10,000,000			10,000,000			10,000,000	
	ELECTRICAL	100,000			100,000			100,000	
TERMINAL		OUTLET AND PRINTED-CIRCUIT BOARD			OUTLET AND PRINTED-CIRCUIT BOARD			OUTLET SOLDER	



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