

**Complete your panel
with our panel accessories**





Switchgear Factory

Larsen & Toubro is a technology-driven company that infuses engineering with imagination. The Company offers a wide range of advanced solutions in the field of Engineering, Construction, Electrical & Automation, Machinery and Information Technology.

L&T Switchgear, a part of the Electrical & Automation business, is India's largest manufacturer of low voltage switchgear, with the scale, sophistication and range to meet global benchmarks. With over seven decades of experience in this field, the Company today enjoys a leadership position in the Indian market with a growing international presence.

It offers a complete range of products including powergear, controlgear, industrial automation, building electricals & automation, reactive power management, energy meters, and protective relays. These products conform to Indian and International Standards.

1 AC Rotary Switches

31 DC Rotary Switches

35 Load Break Switches

55 Wires & Cables

61 Cable Ducts

69 Timing Devices & Supply Monitors

131 Modular Remote Control Units



AC Rotary Switches

CAM Operated Rotary Switches

Introduction

Cam Operated Rotary Switches are used to perform make and break operation in a sequential way by rotating the switch to different positions.

The Cam, which closes and opens the contacts, has rotary movement in multiple positions, thereby controlling multiple circuit functions.

Further the flexibility in the switch type selection covering various current / voltage ratings and options to select the number of contacts, is an added advantage. This ensures that a right switch is chosen for the desired application.

CAM Switches thus offer complete design flexibility to assemble complex switching programs, contact ratings and customize all switching applications. Cam Switches are suitable for AC as well as DC switching applications.

The basic operating mechanism of cam switch is intended to suit application coupled with 'Quick-Make', 'Quick-Make-Quick-Break' and 'Spring Return' operating mechanisms.

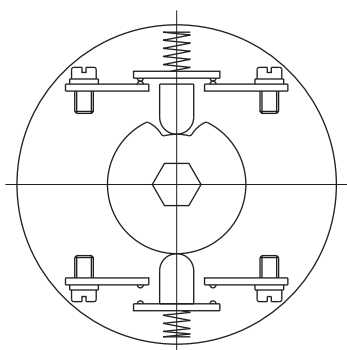
The cam switches offers versatile mounting options in addition to standard panel / flush mounting and other special features like single hole, door interlocking, padlock, lock and key for various needs.

The wide option such as type of knob, front plate color and customized marking on the marking plate eliminates the need of separate label on the panel.

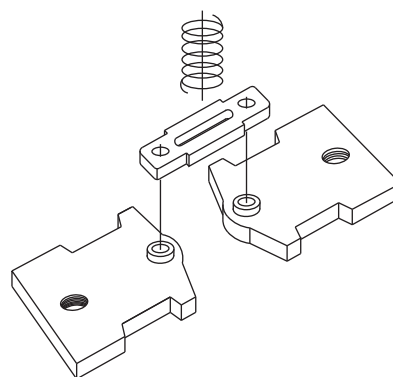
Superior quality of engineering material and 'double butt' contacts with silver bimetal on copper / brass provide stable electrical performance. The high-grade engineering plastics with high tracking index like nylon, silicon and glass filled polyamide for the components ensures greater mechanical strength.

Advanced manufacturing processes for cam switch components under stringent quality conditions ensures durability, reliability and enhanced life.

General Construction



Cam Assembly



Contact Assembly

Series S, TP, RT and SL Cam Switches incorporate two double break silver alloy contacts per stage at 180 degree disposition. The AC Switches are 'Quick Make-Slow Break' with in-built latching device feature in cam design. The Cam Switches can be offered for DC applications with additional contacts in series according to the DC switching voltage and with suitable duration the DC Switches are 'Quick Make - Quick Break'.

Contacts : Double break type AgCdO
Insulation : Glass filled polyamide with high tracking index

Operating temp : -15°C to 55°C
Operating frequency : 50 to 60 Hz
Humidity : 95%, Rh 48 hours

S Series Open Version



- Available from 6 to 400 A
- Open terminals for easy accessibility

TP Series Touch Proof



- Available from 6 to 20 A
- Finger protection (IP20)

RT Series Touch Proof & Rear Termination



- Available from 16 to 63 A
- Finger protection
- Convenient accessibility

SL Series Touch Proof & Screwless Termination



- Available from 6 & 10 A
- Finger protection (IP20)
- Cage clamp

AC Duty Rating

DC Duty Rating

Category	Typical AC Application	Category	Typical DC Application
AC-1	Non-Inductive or slightly inductive loads, Resistance furnaces	DC-1	Non-Inductive or slightly inductive loads, Resistance furnaces
AC-3	Squirrel-cage motors : starting switching off motors during running	DC-22	Switching of resistive loads, Including Control of DC electromagnets
AC-15	Control of AC electromagnetic loads	DC-13	Switching of motor loads or other
AC-21-A	Switching of resistive loads, Including moderate overloads (frequent switching)	DC-23	Highly inductive loads
AC-23-A	Switching of motor loads or other highly inductive loads (frequent switching)	----	-----

Technical Data

IEC/EN Ratings

AC Rating Code	Unit	S6 TP6	S10 TP10	S16 TP16 RT16	S20 TP20 RT20	S25 RT25	S32 RT32	S40 RT40	S63 RT53	S80	S100	S125	S200
Rated Operational Voltage (U _e)	V	440	440	690	690	690	690	690	690	690	690	690	690
Rated Frequency	Hz	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Rated Impulse with Stand Voltage (U _{imp})	kV	4	4	6	6	6	6	6	6	6	6	6	6
Rated Operational Current (I _e) AC21/AC1	A	6	10	16	20	25	32	40	63	80	100	125	200
Rated Uninterrupted Current (I _{th})	A	8	12	20	25	32	40	50	80	100	125	150	225
Rated Operational Power													
AC23 A "3 Ph, 415 V"	kW	2.2	3	7.5	7.5	11	15	18.5	22	33	41	45	55
	A	--	--	13	13	19	26	32	38	57	71	78	95
AC3	kW	1.5	3	5.5	5.5	7.5	11	15	18.5	22	33	37	45
"3 Ph, 415 V"	A	--	--	10	10	13	19	26	32	38	57	64	78
Short Circuit Capacity													
Rated Fuse Short Circuit Current	kA	3	3	5	5	10	10	20	20	25	25	25	25
Fuse Size (Type gG/gM)	A	6	10	16	20	25	32	40	63	80	100	125	200
Terminal Cross Section													
Single / Multiple	min	mm ²	0.7	0.7	1.5	1.5	1.5	2.5	2.5	4	6	10	10
	max	mm ²	1.5	1.5	4	4	4	6	10	16	25	35	50
Fine Strand	min	mm ²	0.7	0.7	1	1	1	1.5	2.5	2.5	6	10	10
	max	mm ²	1.5	1.5	2.5	2.5	2.5	4	6	10	16	25	35
Terminal Cross Section	Metric	M3.5	M3.5	M3.5	M3.5	M4	M4	M5	M5	2XM5	2XM5	2XM5	M10
Terminal Tightening Torque	Nm	0.8	0.8	0.8	0.8	1.2	1.2	2	2	2.5	2.5	2.5	2.5

Note : Rated Duty: 8 Hours, Installation, Operation and Maintenance Condition: Suitable for Environment A (for Industrial Application). Switch life under standard operating conditions: Mechanical 100,000 operations @ 300 cycles / hour, Electrical 10,000 operations at 100% rated duty for 120 cycles / hour.

CSA/UL Ratings

AC Rating Code	Unit	S6	S10	S16 TP16 RT16	S20 TP20 RT20	S25 RT25	S32 RT32	S40	S63	S80	S100	S125	S200
Ampere Rating	A	6	10	15	20	20	30	40	55	80	100	100	175
Operational Voltage	V	460	460	600	600	600	600	600	600	600	600	600	600
HP Rating 1 Phase													
120 V	HP	0.25	0.33	0.33	0.33	1.5	1.5	2	3	-	-	-	-
240 V	HP	0.50	0.75	1	1	3	3	5	7.5	-	-	-	-
3 Phase													
120 V	HP	0.75	1	1.5	1.5	3	3	5	7.5	10	10	10	15
240 V	HP	1	1	3	3	7.5	7.5	10	15	20	20	20	25
480 V	HP	1	2	3	3	10	10	20	30	40	40	40	50
600 V	HP	-	-	5	5	15	15	24	40	50	50	50	50

Note : AC4 rating = AC3 rating / 2, Star Delta rating = 60% of AC3 rating



Conformance to standards :
European : IEC-60947-1 : 1988
IEC-60947-3 : 1990
IEC-60947-5 : 1992
Canadian : CSA 22.2 No.14-2010
American : UL 508 (2009)

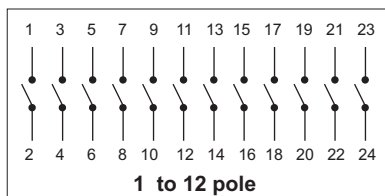
Isolators - ON/OFF Switches

Isolators are ON-OFF Switches to isolate the power to a particular area of operation. Isolator Switch comes in a wide range from 1 Pole to 12 Poles. Isolators with spring return upto 4 Poles are available to energise circuits. Isolators with pre-close contacts are used for safety circuits and for connecting neutral and earth lines. Isolators are generally rated for AC1/AC21 while for motor applications they need to be rated for AC3/AC23 A duty.

Applications: Switching of main / control and instrumentation circuits motor ON-OFF and other special application circuits.



Connection Diagram



Stayput

Script Plate Marking	60 Degree	90 Degree	90 Degree Complete Rotation	
Description	Programme Code	Programme Code	Programme Code	No. of Stages
1 Pole	61001	61191	61195	1
2 Pole	61002	61192	61198	1
3 Pole	61003	61199	61197	2
4 Pole	61004	61194	61196	2
5 Pole	61005	-	-	3
6 Pole	61006	61906	-	3
7 Pole	61007	-	-	4
8 Pole	61008	-	-	4
9 Pole	61009	-	-	5
10 Pole	61010	-	-	5
11 Pole	61011	-	-	6
12 Pole	61011	-	-	6
Feasible Ampere Rating: 6, 10, 16, 25, 32, 40, 63, 80, 100, 125, 200 & 400 Amps				

Isolators with Preclose Contact

90 Degree		1 3 5 7 9	1 3 5 7
Description		Programme code	No. of Stages
4 Pole - 1 Pole Preclose		61194	2
4 Pole - 3 Pole Preclose		61904	2
5 Pole - 3 Pole Preclose		61905	3
3 Pole with Neutral Terminal		61178	2
Feasible Ampere Rating: 6, 10, 16, 25, 32, 40, 63, 80, 100, 125, 200 & 400 Amps			

Spring Return Isolators 45 Degree

45 Degree Spring Return to OFF		1 3 5 7
Description	Programme code	No. of Stages
1 Pole Spring Return	61351	1
2 Pole Spring Return	61352	1
3 Pole Spring Return	61353	2
4 Pole Spring Return	61354	2
Feasible Ampere Rating: 6, 10, 16, 25, 32, 40 & 63 Amps		

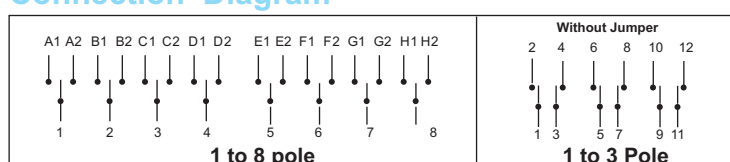
Changeover Switches with OFF

Changeover Switches also called Double Throw Switches are available with OFF and without OFF. These are used to operate two different circuits with different number of inputs and outputs. Changeover Switches without Jumpers (potential free contacts) are used to connect two different circuits from two different sources with two different operating voltages or any other incompatible lines. All contacts by default are 'Break Before Make' (BBM) type to avoid overlapping of different circuits. However, for overlapping changeover contacts. 'Make Before Break' (MBB) type are offered against specific requirements.

Application: Power Supply to Generator Changeover, Auto / Manual Changeover, Standby / Remote Changeover and other special application circuits. Mainly used in Distribution Panels, UPS etc.



Connection Diagram



Stayput

60 Degree			90 Degree	
Description	Programme code	No. of Stages	Description	Programme code
1 Pole	61025	1	1 Pole	61151
2 Pole	61026	2	2 Pole	61152
3 Pole	61027	3	3 Pole	61153
4 Pole	61028	4	4 Pole	61154
5 Pole	61029	5	-	-
6 Pole	61030	6	-	-
7 Pole	61031	7	-	-
8 Pole	61032	8	-	-
Feasible Ampere Rating: 6, 10, 16, 25, 32, 40, 63, 80, 100, 125, 200 & 400 Amps				

Spring Return

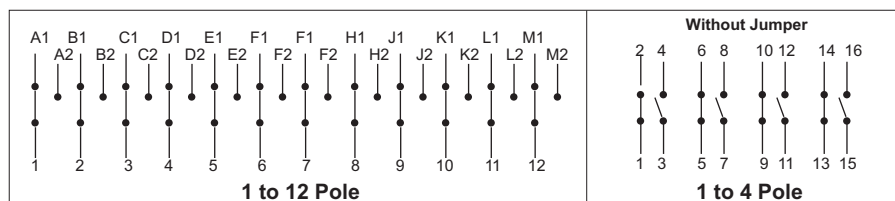
45 Degree Spring Return to 0			Spring Return from 1 to 0	
Description	Programme code	No. of Stages	Description	Programme code
1 Pole	61625	1	1 Pole	61364
2 Pole	61362	2	2 Pole	61365
3 Pole	61363	3	3 Pole	61369
Feasible Ampere Rating: 6, 10, 16, 25, 32, 40 & 63 Amps				

Without Jumper

60 Degree Stayput without Jumper			45 Degree Spring return without Jumper	
Description	Programme code	No. of Stages	Description	Programme code
1 Pole without jumper	62625	1	1 Pole without jumper	61761
2 Pole without jumper	61626	2	2 Pole without jumper	61762
3 Pole without jumper	61627	3	-	-
Feasible Ampere Rating: 6, 10, 16, 25, 32, 40, 63, 80, 100, 125, 200 & 400 Amps			Feasible Ampere Rating: 6, 10, 16, 25, 32, 40 & 63 Amps	

Changeover Programmes without OFF

Connection Diagram



Stayput

90 Degree Complete Rotation			60 Degree		
Description	Programme code	No. of Stages	Description	Programme code	No. of Stages
1 Pole	61037	1	5 Pole	61041	5
2 Pole	61038	2	6 Pole	61042	6
3 Pole	61039	3	7 Pole	61043	7
4 Pole	61040	4	8 Pole	61044	8
-	-	-	9 Pole	61045	9
-	-	-	10 Pole	61046	10
-	-	-	11 Pole	61047	11
-	-	-	12 Pole	61048	12
Feasible Ampere Rating Applicable: 6, 10, 16, 25, 32, 40, 63, 80, 100, 125, 200 & 400 Amps					

Spring Return

45 Degree Spring Return		
Description	Programme code	No. of Stages
1 Pole	61371	1
2 Pole	61372	2
3 Pole	61373	3
Feasible Ampere Rating: 6, 10, 16, 25, 32, 40 & 63 Amps		

Stayput Without Jumper


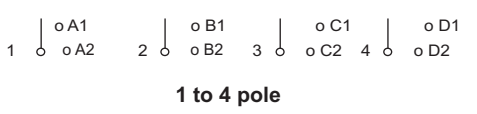
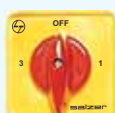
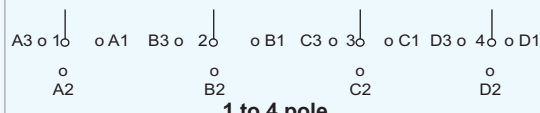
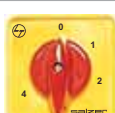
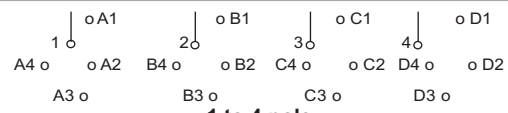
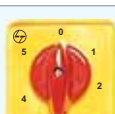
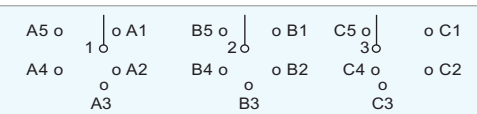
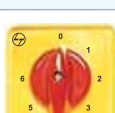
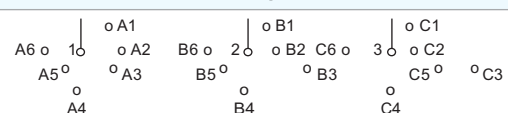
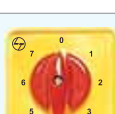
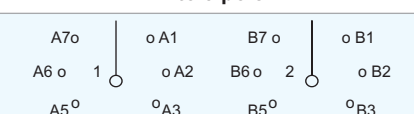
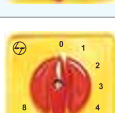
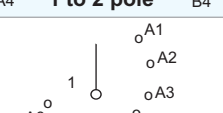
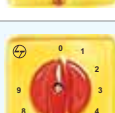
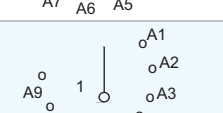
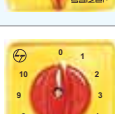
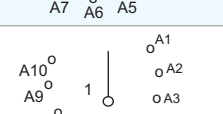

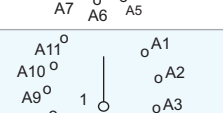
90 Degree Stayput without Jumper			45 Degree Spring return without Jumper	
Description	Programme code	No. of Stages	Description	Programme code
1 Pole without jumper	61637	1	1 Pole without jumper	61771
2 Pole without jumper	61638	2	-	-
3 Pole without jumper	61639	3	-	-
4 Pole without jumper	61640	4	-	-
Feasible Ampere Rating: 6, 10, 16, 25, 32, 40, 63, 80, 100, 125, 200 & 400 Amps			Feasible Ampere Rating: 6, 10, 16, 25, 40 & 63 Amps	

Multistep (Pole-Way) Switches with OFF

These switches are also called as Pole-Way switches, they are available with OFF & without OFF. Multistep does the function of connecting different circuits to a common supply or vice versa. 1 pole, 2 pole & 3 pole are popular for 1 Ph, 2 Ph & 3 Ph supply.

Application : Typical usage tap changing switch for Transformer / Stabilizer and other special application circuits.


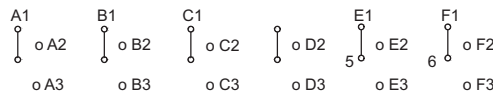

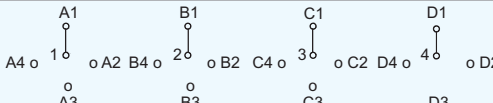

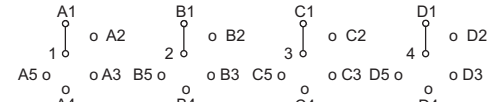

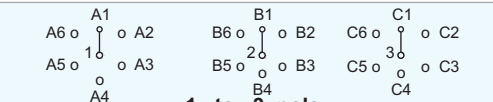

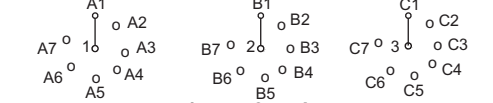

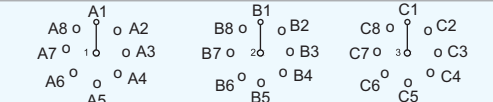

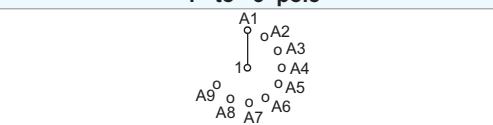

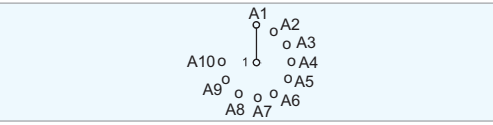

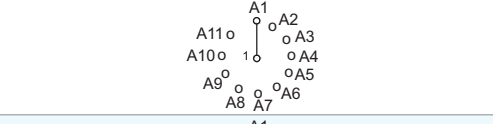

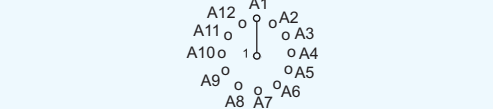


Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61059	1 Pole-2 Way	 2 Way -60°	 1 to 4 pole	1
61079	2 Pole-2 Way			2
61099	3 Pole-2 Way			3
61130	4 Pole-2 Way			4
61060	1 Pole-3 Way	 3 Way -90°	 1 to 4 pole	2
61080	2 Pole-3 Way			3
61100	3 Pole-3 Way			5
61131	4 Pole-3 Way			6
61061	1 Pole-4 Way	 4 Way -60°	 1 to 4 pole	2
61081	2 Pole-4 Way			4
61101	3 Pole-4 Way			6
61132	4 Pole-4 Way			8
61062	1 Pole-5 Way	 5 Way -60°	 1 to 3 pole	3
61082	2 Pole-5 Way			5
61102	3 Pole-5 Way			8
61063	1 Pole-6 Way	 6 Way -45°	 1 to 3 pole	3
61083	2 Pole-6 Way			6
61103	3 Pole-6 Way			9
61064	1 Pole-7 Way	 7 Way -45°	 1 to 2 pole	4
61084	2 Pole-7 Way			7
61065	1 Pole-8 Way	 8 Way -30°		4
61066	1 Pole-9 Way	 9 Way -30°		5
61067	1 Pole-10 Way	 10 Way -30°		5
61068	1 Pole-11 Way	 11 Way -30°		6


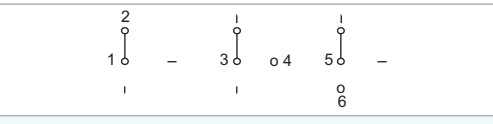

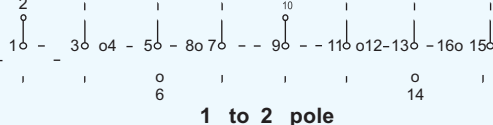
Feasible ampere ratings: 6, 10, 16, 25, 32, 40, 63, 80, 100, 125 & 200 Amps

AC Rotary Switches

Multistep (Pole-Way) Switches without OFF

Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61049	1 Pole-3 Way	 3 Way -60°	 1 to 6 pole	2
61069	2 Pole-3 Way			3
61089	3 Pole-3 Way			5
61120	4 Pole-3 Way			6
61124	5 Pole-3 Way			8
61126	6 Pole-3 Way			9
61050	1 Pole-4 Way	 4 Way -90°	 1 to 4 pole	2
61070	2 Pole-4 Way			4
61090	3 Pole-4 Way			6
61121	4 Pole-4 Way			8
61051	1 Pole-5 Way	 5 Way -60°	 1 to 4 pole	3
61071	2 Pole-5 Way			5
61091	3 Pole-5 Way			8
61122	4 Pole-5 Way			10
61052	1 Pole-6 Way	 6 Way -60°	 1 to 3 pole	3
61072	2 Pole-6 Way			6
61092	3 Pole-6 Way			9
61053	1 Pole-7 Way	 7 Way -45°	 1 to 3 pole	4
61073	2 Pole-7 Way			7
61093	3 Pole-7 Way			11
61054	1 Pole-8 Way	 8 Way -45°	 1 to 3 pole	4
61074	2 Pole-8 Way			8
61094	3 Pole-8 Way			12
61055	1 Pole-9 Way	 9 Way -30°		5
61056	1 Pole-10 Way	 10 Way -30°		5
61057	1 Pole-11 Way	 11 Way -30°		6
61058	1 Pole-12 Way	 12 Way -30°		6

Multistep Switches Without Jumper

61649	1 Pole-3 Way without OFF without Jumper	 3 Way -60°		2
61650	1 Pole-4 Way without OFF without Jumper	 4 Way -90°	 1 to 2 pole	2
61670	2 Pole-4 Way without OFF without Jumper			4

Feasible Ampere Ratings: 6, 10, 16, 25, 32, 40, 63, 80, 100, 125 & 200 Amps

Instrumentation Selector Switches

With the help of these switches we can:

- Measure Currents in different circuit with a Current Transformer, a single Ammeter & a switch
- Measure Voltages between Phases and Phase & Neutral with one voltmeter & a switch
- Measure Voltages & Currents of a circuit with one Voltmeter, one Ammeter and a single switch



Voltmeter Selector Switches

Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61312	3 Ph Line to Line			2
61313	3 Ph Line to Line & Line to Neutral			3
61314	3 Ph Line to Line Line to Neutral & without OFF			3
61317	3 Ph Line to Line & L1 to N			3
61318	3 Ph Line to Line 2 Sources			4
61311	3 Ph Line to Neutral			2
61319	3 Ph Line to Line without OFF			2

Feasible Ampere Rating: 6, 10, 16, 25 & 32 Amps

Voltmeter & Ammeter Selector Switches

Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61336	3 Voltages Line - Line & 3 Currents			5
61337	4 Voltages & 3 Currents			6
61338	3 Voltages Line to Neutral & 3 Currents			5

Feasible Ampere Ratings: 6, 10, 16, 25 & 32 Amps

Instrumentation Selector Switches

Ammeter Selector Switches

Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61325	1 Pole-3 Transformer with OFF			3
61321	1 Pole-1 Transformer			1
61331	1 Pole-2 Transformer			2
61384	1 Pole-3 Transformer without OFF			3
61326	1 Pole-4 Transformer with OFF			4
61327	2 Pole-2 Transformer with OFF			3
61328	2 Pole-3 Transformer with OFF			5
61329	2 Pole-3 Transformer without OFF			5
61330	2 Pole-4 Transformer without OFF			6
71000	Direct Ammeter Selector without Current Transformer			5

Power Factor Meter Switches

73078	One Current Transformer One Voltage Transformer			2
73079	Two Current Transformer			2

Feasible ampere rating: 6,10,16,20,25 and 32

Wattmeter Switch


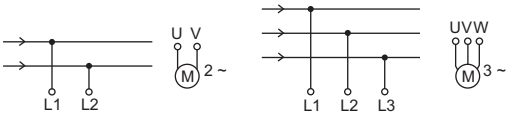

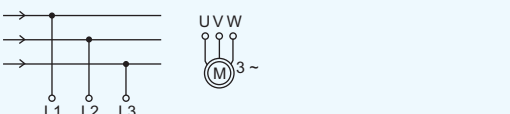
73071	Two watt meter Method			5
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Feasible Ampere Rating: 10 & 16 Amps

Motor Control Switches


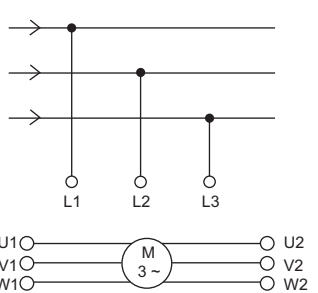


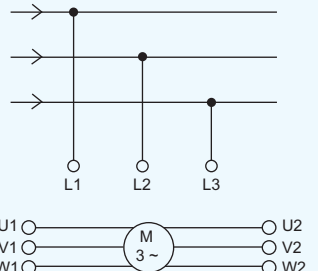

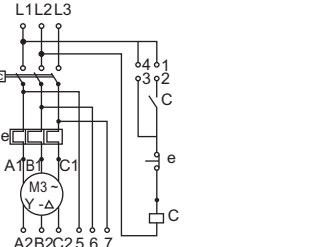

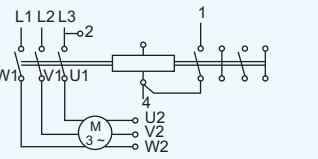
These switches directly operate the motor with AC3 or AC4 Duty Rating. They are mainly used for motor Forward - Reversing, Star-Delta, two speed Forward - Reversing and other special switches designed to operate with contactor with built-in tripping feature in the event of power failure and overload.

Motor Reversing Switches

Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61210	2 Pole			2
61211	3 Pole			3
61253	3 Pole Spring Return	 Spring Return to "0"		3

Feasible ampere rating: 6,10,16,20,25 and 32

Motor Switches / Star-Delta Switches

Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61200	OFF-STAR-DELTA			4
61201	Spring Return from STAR to OFF			4
61203	Standard			5
61239	Star Delta with Sequence Locking & LMD Contacts			3
61240	For use with Contactors			4

Feasible Ampere Rating: 6, 10, 16, 25, 32, 40 & 63 Amps

Motor Control Switches

Motor Switches / Multi Speed Switches

Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61212	2 Speed in one direction Single Winding			4
61213	2 Speed with Center OFF Single Winding			4
61215	2 Speed Single Winding for use with Contactors			5
61217	2 Speed Single Winding Forwarding/Reversing			6
61219	2 Speed 2 Separate Windings			3
61226	3 Speed 2 Windings (O-A-B-A)			6
61243	3 Speed 2 Windings (O-A-B-B)			6

Feasible Ampere Rating: 6, 10, 16, 25, 32, 40 & 63 Amps

Motor Switches - Start & Run Switches


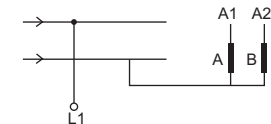
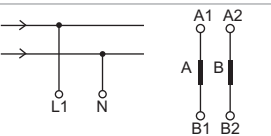
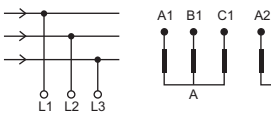

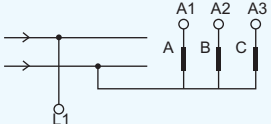
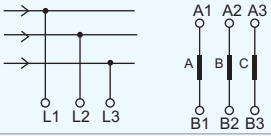
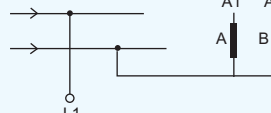

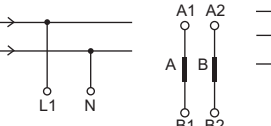
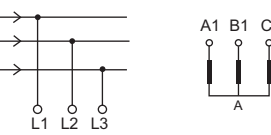
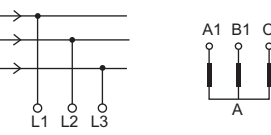

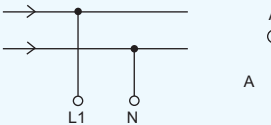
Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61208	Split-phase Start			2
61209	Split-phase Start Reversing			3
61270	Split-phase Start Reversing Switching			3

Feasible Ampere rating: 16, 20, 25 and 32 Amps and for spring return switches and for stay put 16A and above

Gang Switches

These switches are called Gang Switches, as they increase the capacity of circuits by ganging. They are used to derive different circuit capacity by serial or parallel connection. The power of Battery supply can be increased through serial connection. The power of resistor can be increased through parallel connection.

Applications: In Railway coaches for controlling the Battery supply, in Dept of Telecommunication panels and special application circuits.


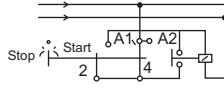
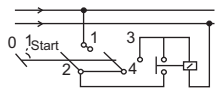

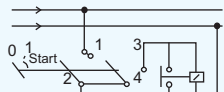

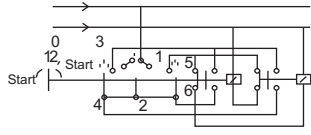

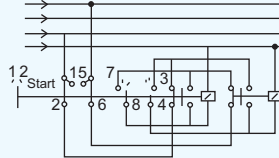
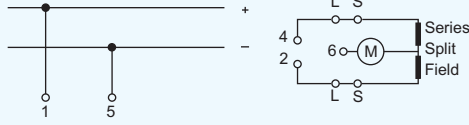
Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61109	2 Gang with OFF 1 Pole	2 Gang  60°	 1 Pole	1
61117	2 Gang with OFF 2 Pole		 2 Pole	2
61111	2 Gang with OFF 3 Pole		 3 Pole	3
61110	3 Gang with OFF 1 Pole	3 Gang  90°	 1 Pole	2
61118	3 Gang with OFF 2 Pole		 3 Pole	3
61112	3 Gang with OFF 3 Pole		 1 Pole	5
61113	2 Gang, Series with OFF 1 Pole	2 Gang Series  90°	 2 Pole	1
61115	2 Gang, Series with OFF 2 Pole		 3 Pole	2
61114	2 Gang, Series with OFF 3 Pole		 3 Pole	3
61116	2 Gang Series-Parallel with OFF 2 Pole	2 Gang Series Parallel  90°	 3 Pole	2

Feasible Ampere Rating: 6, 10, 16, 25, 32, 40 & 63 Amps

Control Switches

Control Switches are used to energize contactors for controlling motor operations. Most of the Switches are 'Spring Return' type for latching of the circuit with NO contact and facilitate tripping by the tripping device.

Applications: Control Switches offer unique alternative to multiple "Push Button Stations", when one Switch controls instead of many Push Buttons. Control Switch with many positions are offered for a suitable combination.

Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61300	1 Pole STOP-START with Spring Return	 spring return		1
61388	2 Pole STOP-START with Spring Return			2
61301	1 Pole STOP-START with Spring Return from START to RUN	 spring return from start to "1"		1
61701	Without Jumper			
61307	STOP-START Switch with Spring Return to run for 2 units	 spring return from start		2
61707	Without Jumper			
61366	Contactor Control with Spring Return to OFF	 spring return to "0"		2
61271	Motor Voltage Control Switch			2
Feasible Ampere Rating: 6, 10, 16, 25, 32, 40 & 63 Amps				

Mounting Feasibility

Mounting Code	Description	Feasibility					
		6/10A	16/20A	25/32A	40/63A	80/100/125A	200/400A
B03	Front Mounting, Standard Mounting plate		✓	✓	✓	✓	✓
B13	Front Mounting with next size plate	✓	✓	✓	✓	✓	✓
B00	Front Mounting 48x48 plate for 25/32 A and 64x64 plate for 40/63 A			✓	✓		
B19	Single Hole Mounting 32x32 plate for 6/10 A only 48x48 Plate for 16-32 A	✓	✓	✓			
B14	Single Hole Mounting 48x48 plate for 6/10 A	✓					
B33	Front Mounting with Round Padlock for 2 Position (for Isolators)		✓	✓	✓	✓	✓
B30	Front Mounting with Rectangular Padlock 2 Position (for Isolators)		✓	✓	✓	✓	✓
B63	Key Lockable type (Handle/Knob)		✓	✓	✓		
B90	Center Key Lock (Pistol grip Handle in black color only)		✓	✓			
B02	Rear/(Back/Base) Mounting	✓	✓	✓	✓	✓	✓
B21	DIN Rail Mounting on 35 mm Rail 6-32 Amps	✓	✓	✓			✓
B32	Rear/Base Mounting, Door Interlock + Rectangular Padlock (B30+B42)		✓	✓	✓	✓	✓
B34	Rear/Base Mounting, Door Interlock + Round Padlock (B33+B42)		✓	✓	✓	✓	✓
B41	Rear Mounting with Clutch Mechanism on Door (Door Open in all position without Interlock)		✓	✓	✓	✓	✓
B42	Rear Mounting with Interlock Mechanism on Door		✓	✓	✓	✓	✓
F47	Door Clutch, Mounting Plate at front		✓	✓	✓	✓	✓
B17	ABS Enclosure	Max stages upto 4	upto 3	upto 5	upto 5		
B31	ABS Enclosure with Round Padlock (B33+B17)	Max stages upto 4	upto 2	upto 2	upto 2		
M17	Metal Enclosure	Max stages upto 4	upto 4	upto 3			✓
A17	Aluminium Enclosure	Max stages upto 4	upto 3	upto 2			
B40	Single Hole Mounting with Padlock 48x48 Plate For 16-32 A		✓	✓			
B43	Single Hole Mounting with Center key 48x48 Plate for 16-32 A		✓	✓			
B45	Single Hole Mounting with Round Ring with Knob 16 A-32 A		✓	✓			

Mountings

B03

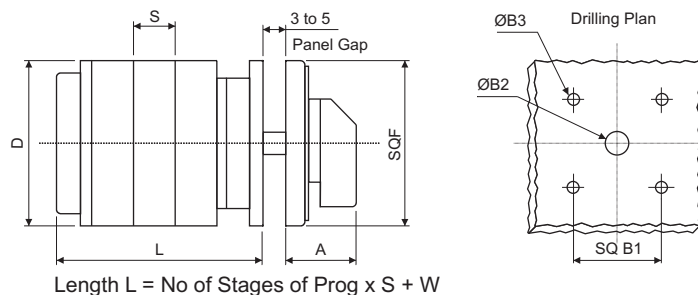


IP55 protection from front

Features:

- Standard 4 Hole front panel mounting
- Knob / Handle operable
- Suitable for all switching angles and Spring Return Switches
- Front assembly in 4 different Colors, Yellow / Red, Grey / Black, Black / Black and aluminium finish

Front Mounting



6/10 Amps by default B13 mounting 48 x 48 mm only

Quote B13 for next bigger size front plate

Type	A	B1	B2	B3	D	F	S	W	Max
S6/S10/TP6/TP10/SL6/SL10 (48x48 mm) - B13	28	36	12	4.5	38	48	9.5	18.5	12
S16/TP16/RT16/TP20/RT20	28	36	12	4.5	58	48	12	26	21
S25/S32/RT25/RT32	35	48	12	5.5	64	64	15	27	18
S40/S63/RT40/RT63	44	68	15	5.5	95	88	21	33	12
S80/S100/S125	44	68	15	5.5	118	88	26	40	10
S200	44	68	15	5.5	99	88	32	40	10
S400	44	68	15	5.5	99	88	64	40	4

B19/B14

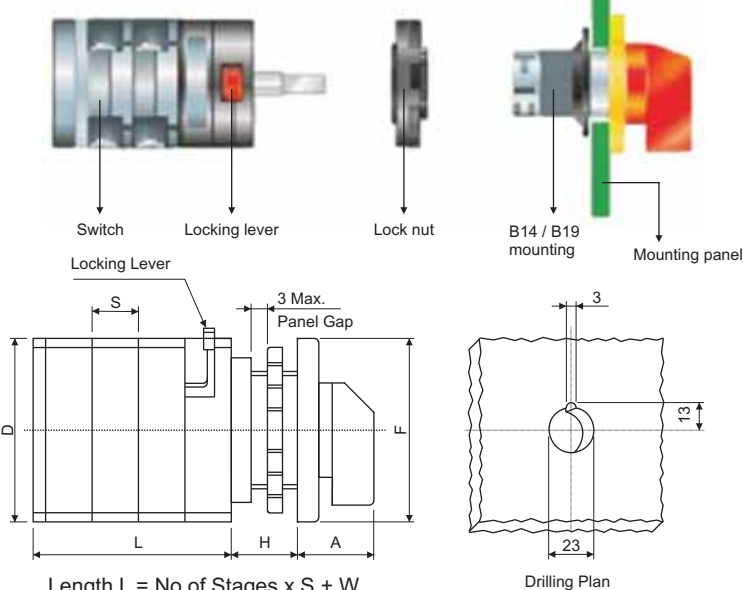


IP65 protection from front

Features:

- Single hole mounting with std dia 22.5 mm
- Eliminates the need for screws / hardware for Quick-Fit single hole panel fixing
- Easy termination
- Available upto 32 A

Single Hole Mounting (22.5 mm cutout)



Quote B14 for next bigger size front plate (available for 6/10 Amps. only)

Type	Code	A	D	F	S	H	W	Max
S6/S10/TP6/TP10	B19	25	38	32	9.5	13.5	28.5	10
	B14	27	38	48	9.5	13.5	28.5	10
S16/TP16/RT16/TP20/RT20	B19	32	58	48	12	13	36	8
S25/S32/RT25/RT32	B19	32	64	48	15	13	37	6

All dimensions in mm.

Mountings

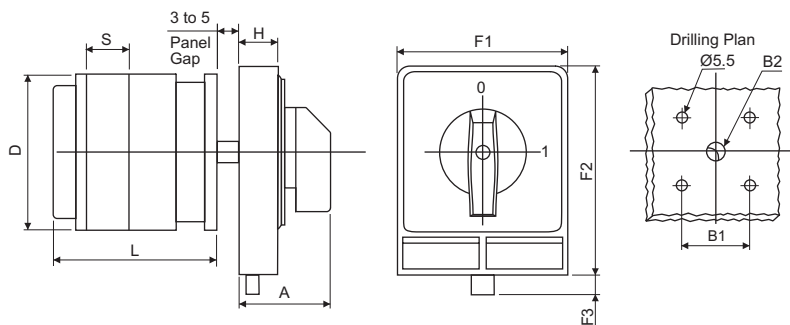
B30



IP55 protection from front

Features:

- Four hole mounting padlockable mounting
- Secure with max four padlocks in OFF position
- Prevents switching only
- Unauthorised personnel
- suitable for switches with 90° switching angle
- Available in Yellow/Red only



Length L = No of Stages x S + W

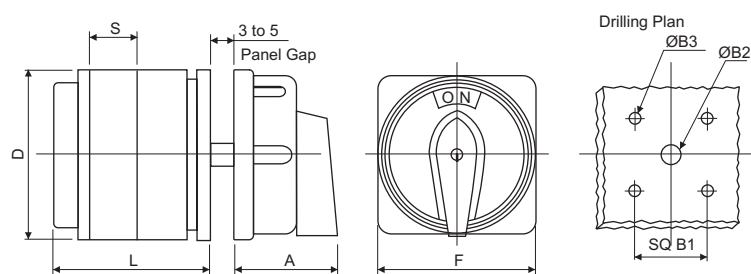
Type	A	B1	B2	D	F1	F2	F3	H	S	W	Max
S16/TP16/RT16/TP20/RT20	35	48	12	58	76	104	12	23	12	26	6
S25/S32/RT25/RT32	35	48	12	64	76	104	12	23	15	27	6
S40/S63/RT40/RT63	44	68	15	95	99	128	15	25	21	33	6
S80/S100/S125	44	68	15	118	99	128	15	25	26	40	6
S200	44	68	15	99	99	128	15	25	32	40	6
S400	44	68	15	99	99	128	15	25	64	40	3

B33



IP55 protection from front

Pad Lockable Mounting



Length L = No of Stages x S + W

F-48 mm with B1-36 mm also available on request for 16, 25, 32 Amps

Type	A	B1	B2	B3	D	F	S	W	Max
S16/TP16/RT16/TP20/RT20	44	36	12	4.5	58	65	12	26	6
S25/S32/RT25/RT32	44	36	12	4.5	64	65	15	27	6
S40/S63/RT40/RT63	48	68	15	5.5	95	95	21	33	6
S80/S100/S125	48	68	15	5.5	118	95	26	40	6
S200	48	68	15	5.5	99	95	32	40	6
S400	48	68	15	5.5	99	95	64	40	3

Features:

- Four hole round padlockable mounting
- Secure with max. 3 padlocks in OFF position prevents switching ON by unauthorized personnel
- Suitable for switches only with 90° switching angle

All dimensions in mm.

Mountings

B63

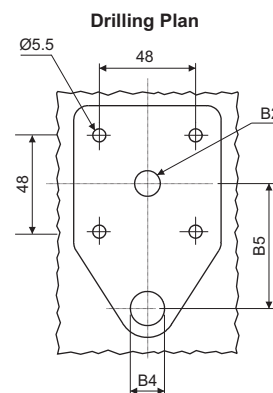
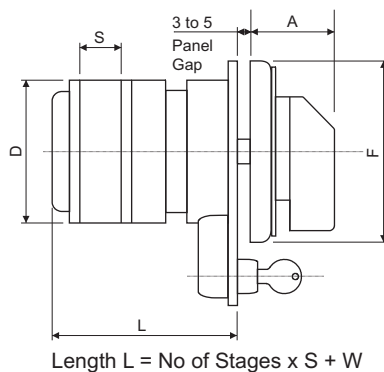


IP40 protection from front

Features:

- Knob / Handle operatable Switch with key lockable assembly prevents switching by unauthorized personnel
- Key lock / Key removable only in OFF position by default, key

Key Lockable



Type	A	B2	B4	B5	D	F	S	W	Max
S16/TP16/RT16/TP20/RT20	35	13	23	43.5	58	64	12	45	21
S25/S32/RT25/RT32	35	13	23	43.5	64	64	15	45	15
S40/S63/RT40/RT63	44	13	23	43.5	95	64	21	47	10

lockable and removable in any other position to be specified

- Lock assembly can also be provided on any side
- Common key for all Switches

B17



IP55

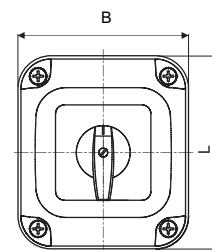
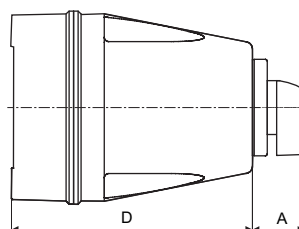
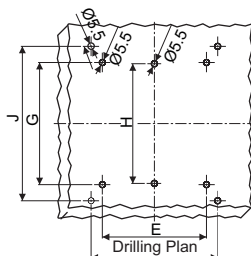
Features:

- Switch mounted in ABS enclosure
- Provides protection from dust and hazardous material with regular Front Plate and Knob
- Suitable for all switching angles
- Knob / Handle operable
- IP65 can be given on request

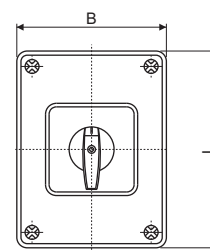
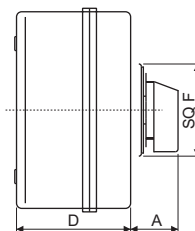
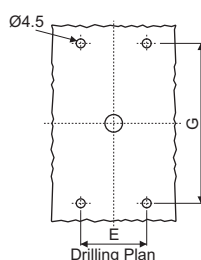
Quote B31 (B17 Enclosure and B33 Round Padlock) only for Isolator ON/OFF Switches

Enclosure

LR/HR Model



SM, M



Type	Box Type	A	L	B	D	E	G	Stages
S6/S10/TP6/TP10	SM	28	125	100	72	80	115	4
S16/TP16/RT16	SM	28	125	100	72	80	115	3
S16/TP16/RT16	M	28	175	125	90	105	155	4
S25/S32/RT25/RT32	SM	35	125	100	72	80	115	2
S25/S32/RT25/RT32	M	35	175	125	90	105	155	4
S40/S63/RT40/RT63	M	44	175	125	90	105	155	2

Type	Code	A	L	B	D	E	G	H	I	J	Stages
S25/S32/RT25/RT32	LR	38	130	115	161	87	102	100	-	-	5
S40/S63/RT40/RT63	HR	46	180	155	220	120	100	-	122	147	5

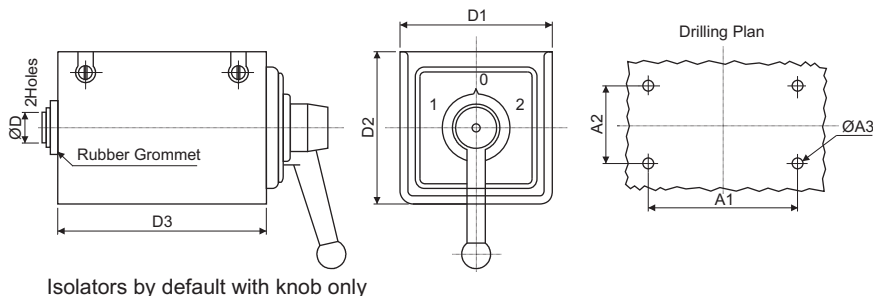
All dimensions in mm.

Mountings

M17



Metal Enclosure



Features:

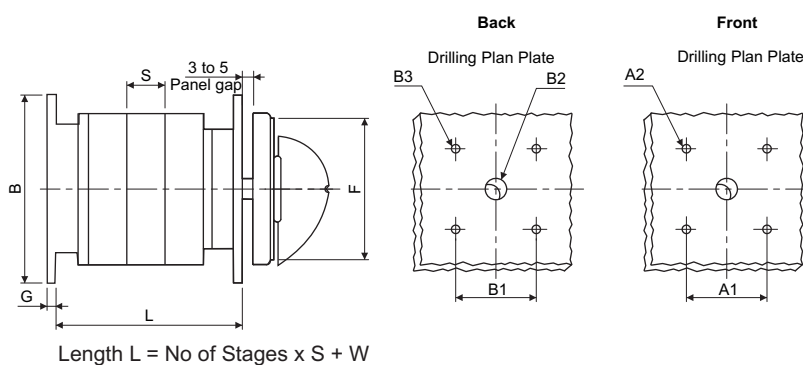
- Switches mounted in sheet metal enclosures provide protection from hazardous environment
- Knob / Handle operatable
- Suitable for Switches upto 32 A
- Ideal for forward reverse motor application

Type	A1	A2	A3	D1	D2	D3	Max
S6/S10/TP6/TP10	70	60	6	85	89	98	4
S16/TP16/RT16/TP20/RT20	70	60	6	85	89	98	4
S25/S32/RT25/RT32	70	60	6	85	89	98	4
16A Forward/OFF/Reverse Only	70	60	5	75	75	110	-

B02



Rear Mounting



Features:

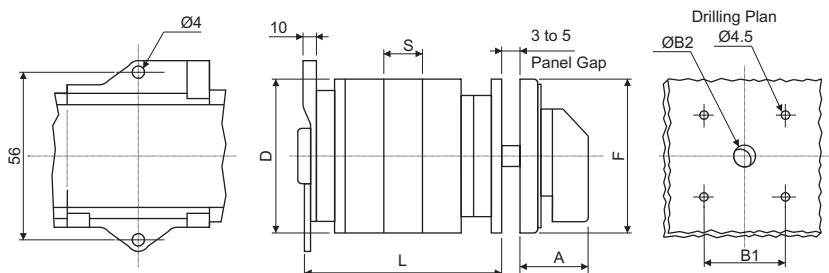
- Four hole base mounted on rear side of the panel
- Knob / Handle operable
- Can also be used for panel / door mounting

Type	A	A1	B1	B2	B3	F	B	G	S	W	Max
S6/S10/TP6/TP10	28	36	36	9	4.5	48	48	4.5	9.5	26	12
S16/TP16/RT16/TP20/RT20	28	36	48	12	4.5	48	64	3.5	12	30	12
S25/S32/RT25/RT32	35	48	48	12	4.5	64	64	3.5	15	31	8
S40/S63/RT40/RT63	43	68	68	15	5.5	88	88	5	21	41	6
S80/S100/S125	43	68	100	15	5.5	88	124	5	26	48	6
S200	43	68	83	15	5.5	88	104	5	32	48	6
S400	43	68	83	15	5.5	88	104	8	64	48	3

All dimensions in mm.

Mountings

B21



Length L = No of Stages x S + W

Features:

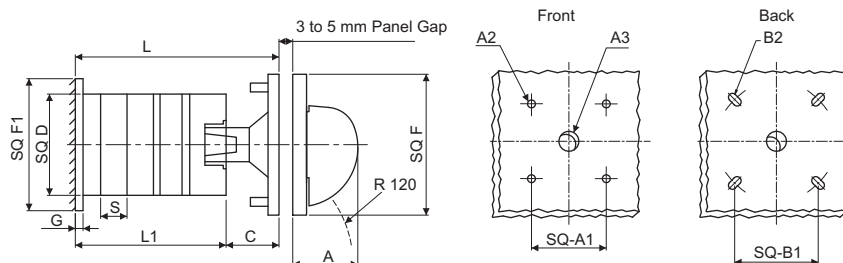
- Snap mounting base on DIN Rail 35 mm and 1.2 mm thick or two hole rear mounting
- Provides easy termination
- Can also be used for panel / door mounting

Type	A	B1	B2	D	F	S	W	Max
S6/S10/TP6/TP10	28	36	9	38	48	9.5	28.5	10
S16/TP16/RT16/TP20/RT20	28	36	12	58	48	12	37	12
S25/S32/RT25/RT32	35	48	12	64	64	15	38	8

B42



Door Interlock



Length L = No of Stages x S + W
L = L1 + C

IP55 protection from front

Features:

- Mounted on rear side of the panel and operated from the front door
- Door inter / lockable mechanism and panel door opens only in OFF position
- Provides safety feature
- Knob / Handle operable

Quote B41 for door to be opened in both positions without door interlock

Type	A	A1	A2	A3	B1	F	B	G	C	N	S	W	Max
S16/TP16/RT16 TP20/RT20	35	48	4.5	15	48	64	64	3.5	25	22	12	54	8
S25/S32/RT25/RT32	35	48	4.5	15	48	64	64	3.5	25	22	15	57	8
S40/S63/RT40/RT63	44	68	5.5	18	83	88	104	5	27	26	21	66	6
S80/S100/S125	44	68	5.5	18	100	88	124	5	27	26	26	72	6
S200	44	68	5.5	18	83	88	104	5	27	26	32	72	6
S400	44	68	5.5	18	83	88	104	8	27	26	64	72	3

Mountings

B03

(Square Latching Mechanism)

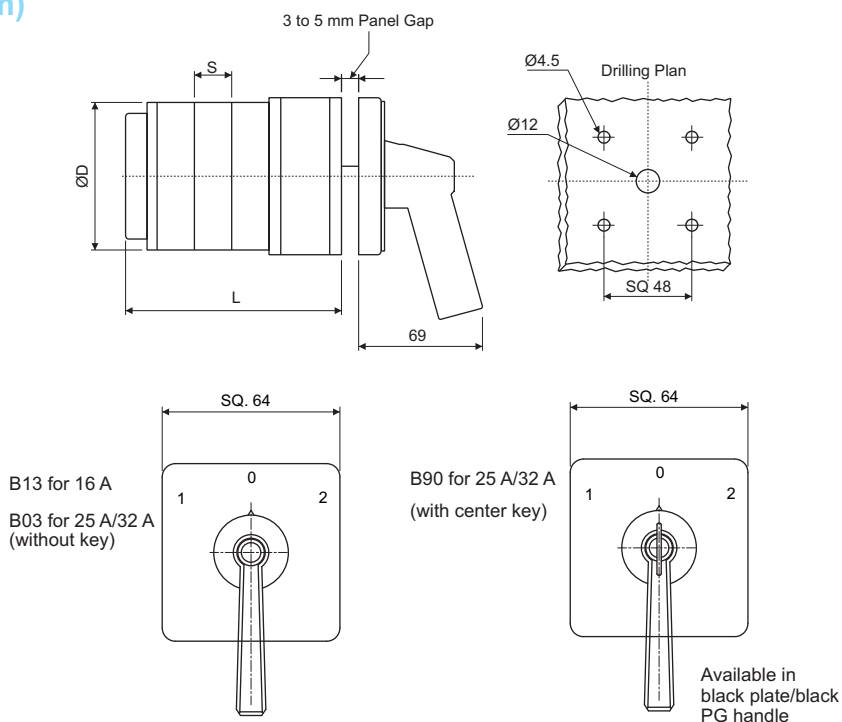


IP55 protection from front

Features:

- Standard 4 hole front panel mounting pistol grip handle operable
- Suitable for 45° / 60° only
- Advanced special star/spring design on latching provides guaranteed spring return operation

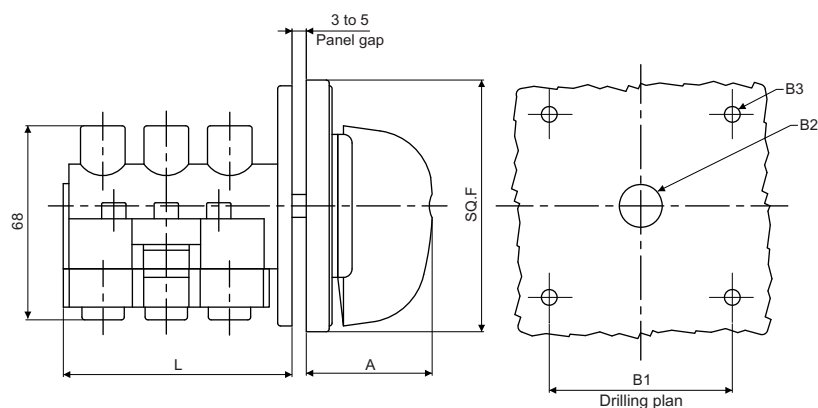
Standard Mounting-Spring Return



For B03 without key & for B90 with center key

Type	L (No. of Stages)						
	1	2	3	4	5	6	7
S16/TP16/RT16 (B13)	52.5	64.5	76.5	88.5	100.5	112.5	124.5
S25/S32/RT25/RT32	55.5	70.5	85.5	100.5	115.5	130.5	145.5

Phase Selector Dimensional Details



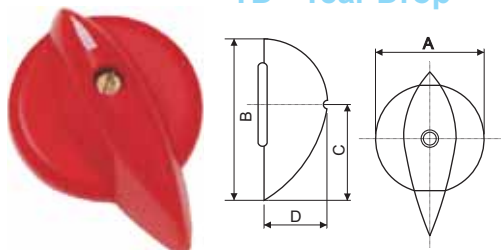
Type	B1	B2	B3	D	F	A	L
PS25 / 32	48	12	4.5	46	64	35	58
PS40 / 63	68	15	5.5	68	88	44	80

All dimensions in mm.

Knobs and Handles

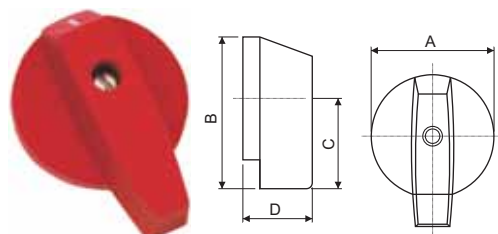
Knobs / Handle Colours ■ RED ■ BLACK

TD - Tear Drop



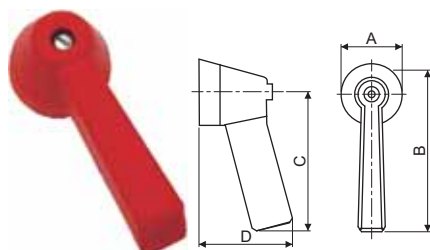
Code - TD	A	B	C	D
S6/S10/TP6/TP10	27	41	25	21
S16/TP16/RT16	27	41	25	21
S25/S32/RT25/RT32	36	51	31	25
S25/S32/RT25/RT32	50	70	42	33

FL - Flag Knob



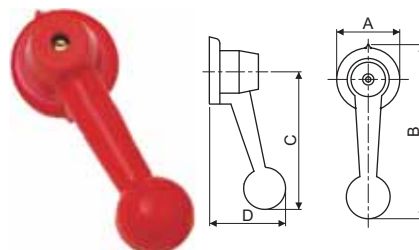
Code - FL	A	B	C	D
S6/S10/TP6/TP10	17	23	13.75	19
S16/TP16/RT16	27	38	24	23
S25/S32/RT25/RT32	27	38	24	23
S25/S32/RT25/RT32	50	68	42.5	32

PG - Pistol Grip Handle



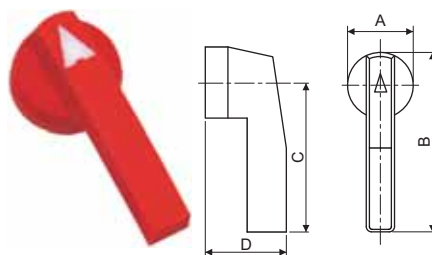
Code - PG	A	B	C	D
S16/TP16/RT16/TP20/RT20	36	102	82	56
S25/S32/RT25/RT32	36	102	82	56
S40/S63	36	102	82	56

BG - Ball Grip Handle



Code - BG	A	B	C	D
S16/TP16/RT16/TP20/RT 20	36	100	67	45
S25/S32/RT25/RT32	36	100	67	45
S40/S63	36	100	67	45

LV - Lever Handle

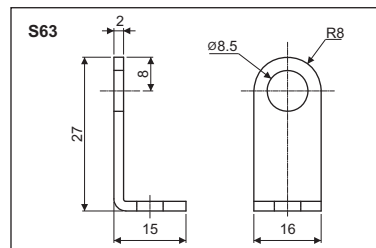
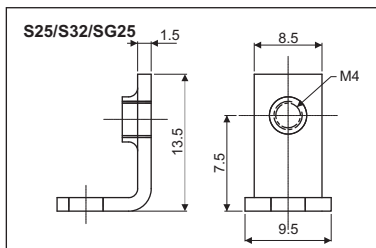
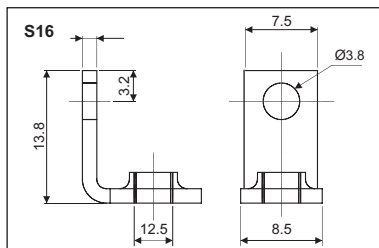


Code - LV	A	B	C	D
S80/S100/S125	50	115	90	45
S200/S400	50	115	90	45

All dimensions in mm.

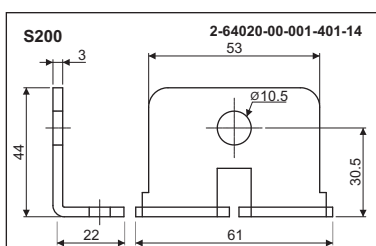
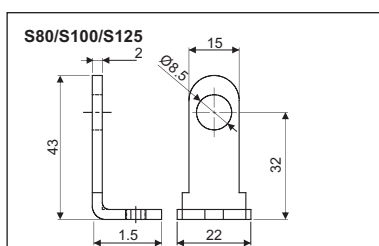
Accessories

Extended Terminals



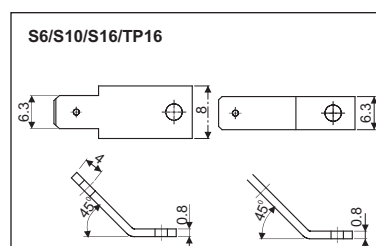
Supplied as optional for S40 and S63 on request

Extended Terminals - Always mounted on Switch



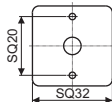
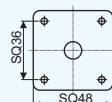

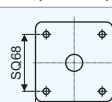
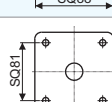
Always mounted on switch

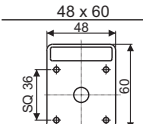
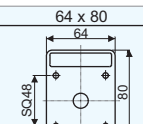
Push on Terminals



Mating terminal socket code no : 1653

Front Plate

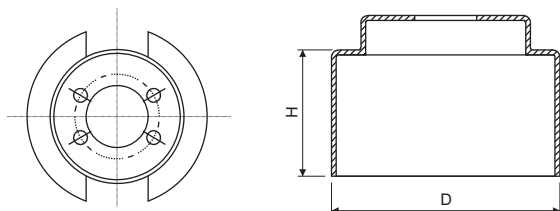
Standard Style	Frame Size	Bigger Style
Current Ratings 6/10 Amps		---
16/20 Amps		6/10 Amps
25/32 Amps		16/20 Amps
S40 Amps & above		25/32 Amps
---		S40 Amps & above

Special Front Plates		
10 Amps 16 Amps 20 Amps		---
25/32 Amps		16/20 Amps

All dimensions in mm.

Protection Covers (Shrouds)

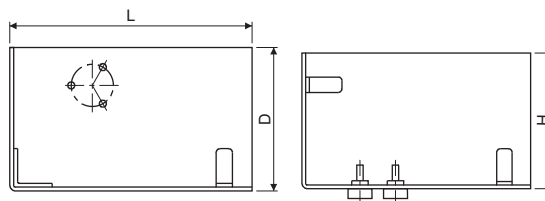
S-Series



Type	ØD	H	
		2 Stage	3 Stage
S6/S10	43 ^{±0.2}	25	34.5
S16/S25/S32	69 ^{±0.2}	35	50
S40/S63	95 ^{±0.2}	54	75

Other special size mounting plates at Front or Rear can be supplied against requirement.

Rectangular



Type	L	D	H	No. of Stages
S40/S63	210	200	73	2
	210	200	94	3
S80 to S200	175	110	115	2
	210	200	100	2

In case of fixing at site use supplied hardware only.

Customised Programme Formation

The switch design and construction gives flexibility for making customized programme within a very short period. Basically an engineer trying to specify the customized programme should concentrate on the following points:

- Number of operating positions of switch handle.
- Total number of Contacts required.
- Contact closing sequence of all the contacts required in various positions of handle.

Note: Each position should be identified and Script plate marking required in those positions should be mentioned.

- The latching angle (angle between positions) Standard latching / switching angles are 60°, 90°, 45° & 30°. Spring return are also possible for 45° & 90° switching angle.

- Total number of contacts can be decided based on the actual need. You may arrange the contacts to your convenience and number them as 1/2, 3/4, 5/6...etc.. While making the switch, we may rearrange the contacts to use solid jumpers so as to avoid loose wire jumpers.

- Fill up the programme sheet by marking 'X' at places where contacts have to Close (NC). Also ensure to specify the Ampere Rating, Mounting Style, Switching angle, Script Plate markings, Terminal marking & Lockable Position (If any).

For example, refer the sample customized programme sheet of a bedroom switch having 3 contacts controlling a tube-light, fan & night lamp.

Note: The above construction carries a five digit number starting with (7xxxx) allotted by us. This number alone is sufficient for future correspondence & further ordering.

All dimensions in mm.

AC Rotary Switches

Ordering Code for Rotary Switches




Example for :	1. Programme Code	2. Type	3. Ampere	4. Mounting	5. Knob	6. Colour
25A 3 Pole						
ON - OFF Switch	6	1	1	9	7	S
	E	B	0	3	T	D
	Y	R				

1. Programme Code

Programme	Programme Code
Isolators	Page 29
Changeovers with OFF	Page 30
Changeovers without OFF	Page 31
Multistep Switches with OFF	Page 32
Multistep Switches without OFF	Page 33
Instrumentation Switches	Page 34
Motor Control Switches	Page 36
Gang Switches	Page 38
Control Switches	Page 39

2. Type Selection

Type	Code
S-Series (6 to 400A)	S
Touch Proof (6 to 16A)	T
Rear Access Termination (16 to 63A)	R
Phase Selector Only for 1 Pole 3 Way with OFF (25 to 63A)	P
DC Switches (16 to 500A)	D

S Series
Open Version

TP Series
Touch Proof

RT Series
Touch Proof &
Rear Termination

3. Ampere Selection

Ampere	Code	Ampere	Code
6	A	100	K
10	B	125	L
16	C	160	M
20	D	200	N
25	E	250	O
32	F	300	P
40	G	400	Q
50	H	500	R
63	I	600	S
80	J	800	T





4. Mounting Style

				
B03/B13 Standard Mounting	B19/B14 Single Hole Mounting	B33 Round Padlock	B30 Rectangular Padlock	B63 Key Lockable Type
				
B17 ABS Enclosure	M17 Metal Enclosure	B02 Rear/Base Mounting	B21 DIN Rail Mounting	B42 Rear Mounting with Door Interlock

5. Knob / Handle Selection

Code - TD	Code - FH	Code - PG	Code - BG	Code - LV
				
Tear Drop	Flag Knob	Pistol Grip	Ball Grip	Lever Handle

6. Color Combination Selection Table

Code - YR	Code - GB	Code - BB	Code - AB
			
Yellow Front Plate Red Knob	Grey Front Plate Black Knob	Black Front Plate Black Knob	Aluminum Foil with Black Knob

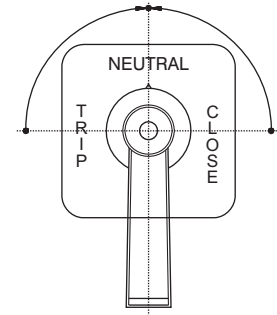
Breaker Control Switches

Under this 3 types are widely used

- Spring return
- Lost Motion contact (LMD)
- Sequence Locking (Two consecutive movement in one direction arrested)

All the above can also be with external KEY and LOCK arrangement.

- In SPRING RETURN type the handle will always returns to NEUTRAL position and does not stay in other two positions. When the handle returns to Neutral, Main/TRIP contact will be in open condition.
- In LMD, the contact block is divided into two, as main contacts and LMD contacts. LMD contacts will be closed when the handle moves to CLOSE side/TRIP side and the contact closing will be retained even though the handle is returned to NEUTRAL by virtue of spring return nature. When the handle is rotated in opposite direction only then LMD contact will open.
- Thus the LMD mechanism enables the Switch to have a memory feature of the previous operation, which is considered to be very essential for circuit breaker applications.



- Spring Return to Neutral Position from both sides
- Memory feature of previous operation (LMD)
- Permits only one Close operation (sequential lock)

In case of sequence lock, it acts like a mechanical interlock in the switch. It does not permit two consecutive 'CLOSE' operations. Turn the handle to CLOSE position and leave it, the handle will be back to NEUTRAL due to spring return action. The handle movement on the CLOSE side will be locked. When the handle is moved to TRIP position only then rotation to CLOSE position is permitted.

As indicated, all the above feature models can also be supported with external lock & key arrangement with key lockable and removable only at NEUTRAL position. Handle shall not be turned when the key is in lock condition.

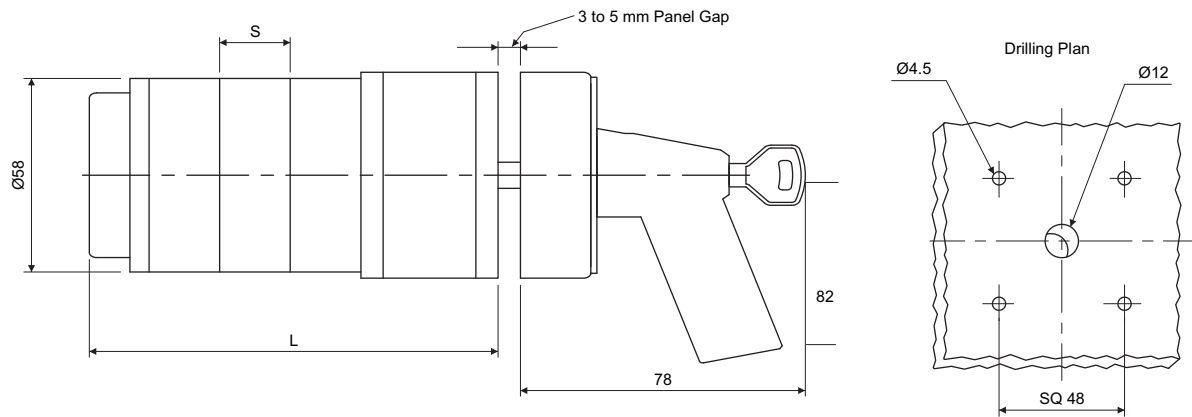
Description		Unit	S25	S32
Rated Operational Voltage	Ue	V AC	690	690
		V DC	250	250
Resistance to Surge Voltage	Uimp	kV	6	6
Rated Uninterrupted Current	Ith	A	32	40
Rated Operational Current Pilot Duty AC15 le				
220-240 V AC		A	8	14
380-440 V AC		A	5	6
Short Circuit Protection HRC Fuse Size		A	25	32
Rated Short Circuit		kA	10	10
Terminal Cross Section				
Rigid Wire	min	mm ²	1.5	2.5
	max		4	6
Flexible Wire	min	mm ²	1	1.5
	max		2.5	4
Terminal Screw			M4	M4
Terminal Tightening Torque			1.2 Nm	1.2 Nm

General Endurance :
Mechanical
100,000 operations at
300 cycles/hour

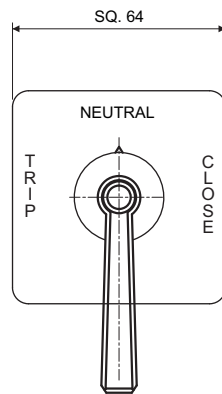
Electrical
10,000 operations at
120 cycles/hour
Operational Temperature
25°C to 55°C, frequency
upto 5 kHz

Voltage	No. of Contacts in series	S25/SG 25				S32/SG32			
		Resistive Amps	Inductive L/R Amps			Resistive Amps	Inductive L/R Amps		
			10 msec	20 msec	40 msec		10 msec	20 msec	40 msec
50 V	1	20	20	15	6	25	25	18	8
	2	-	-	20	14	-	-	25	18
	3	-	-	-	20	-	-	-	25
125 V	1	3	2.5	1.5	1.0	5	3	2	1.2
	2	20	15	10	5	25	18	12	6
	3	-	20	20	10	-	25	v	12
250 V	1	1.0	0.5	0.3	0.2	1.2	0.6	0.4	0.3
	2	5	2	1.0	0.5	6	2.5	1.2	0.6
	3	20	10	4	1	25	12	5	1.2

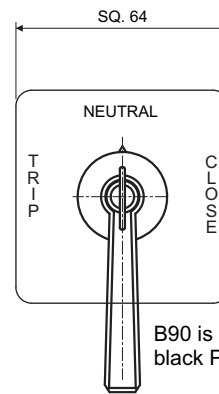
Mounting Styles



B03



B90



B90 is available only black front plate & black PG handle type

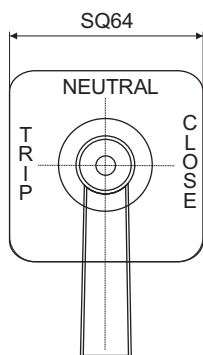
Shorter handle length also available on request

Type	L (No. of Stages)							X* LMD	Y* Sequential Lock
S25/S32	1	2	3	4	5	6	7		
	53	68	83	98	113	128	143	15	27.5

*LMD Dimension 'X' to be added

*Sequential Lock Dimension 'Y' to be added

Breaker control switch ordering code



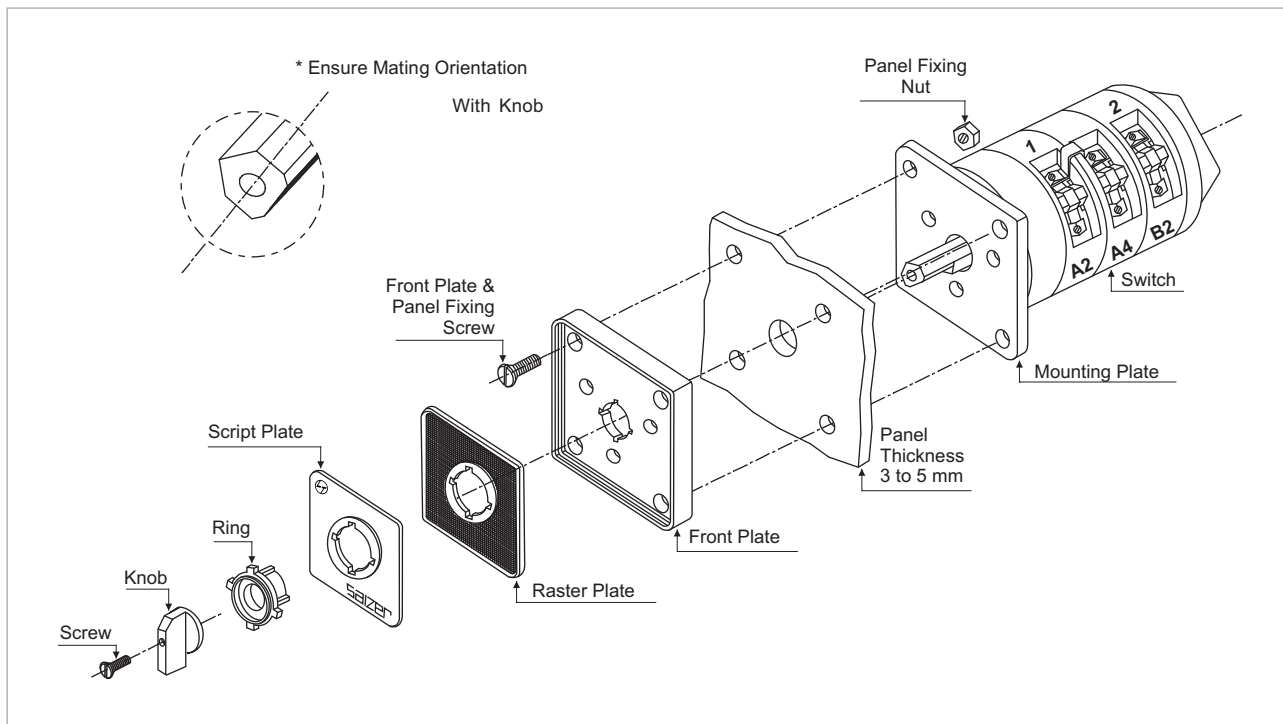
Rating	Contact Arrangement	Mounting Type	Cat. No.
25A	1NO + 1NC	Standard	73257SEB03PGGB
25A	2NO + 2NC	Standard	72009SEB03PGBB
25A	2NO + 2NC	Standard	72009SEB03PGGB
25A	2NO + 2NC	Standard	72009SEB03PGYR
25A	1NO + 1NC	Barrel Lock	73257SEB90PGBB
25A	1NO + 1NC	Standard	73257SEB03PGYR
25A	2NO + 2NC	Barrel Lock	72009GEB90PGBB
25A	2NO + 2NC	Barrel Lock	72009SEB90PGBB

Other option such as sequence inter lock (SIL) & lost motion device (IMD) available on request.

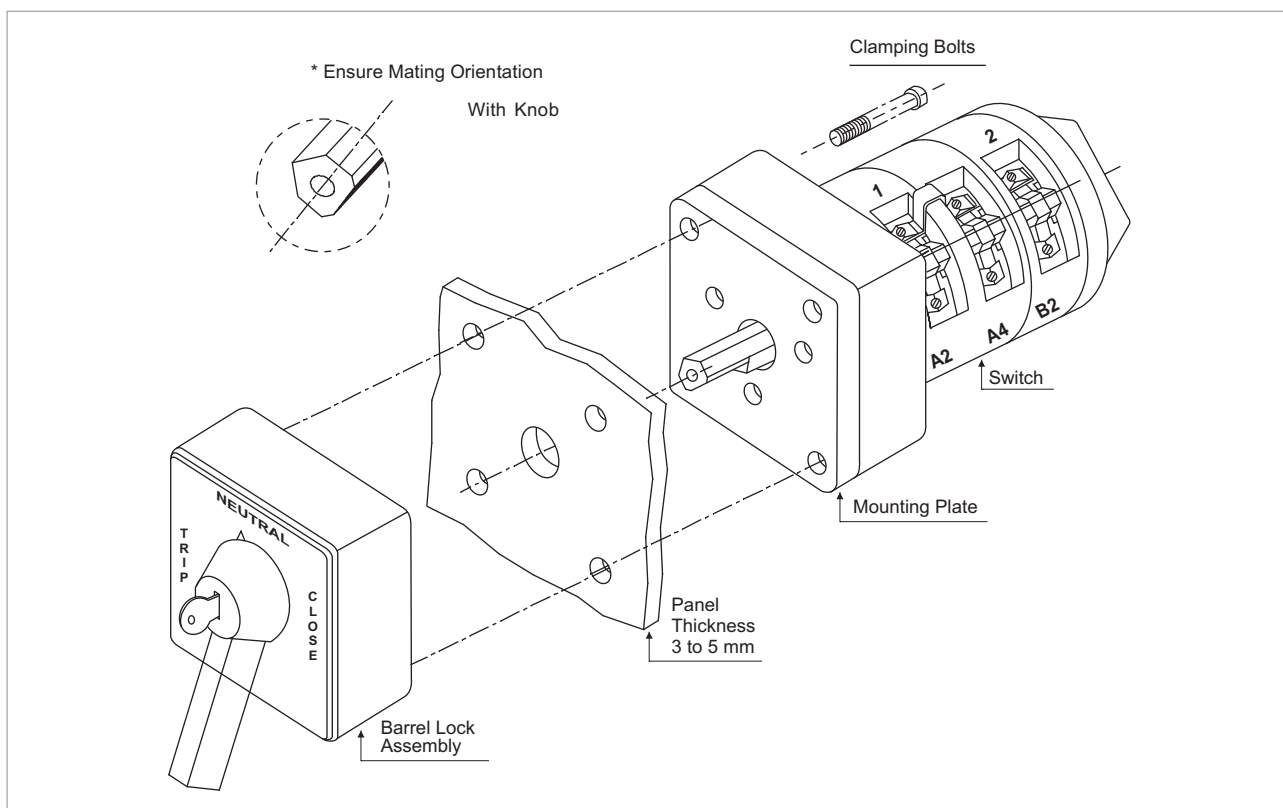
All dimensions in mm.

Installation Procedure

Cam Operated Rotary Switch



Breaker Control Switch



All dimensions in mm.



DC Rotary Switches

Construction and Features

D16 - D63

D Series Switches are designed for DC switching applications. These switches are constructed using snap action mechanism which provides 'Quick Make Quick Break' of contacts which is essential for DC switching. The contacts are of AgCdO, double break and butt type housed in a glass filled polyamide contact stage and are operated through cams for higher electrical endurance and smooth operation.

Suitable for 90 and 60 degree switching programmes and applicable for both AC and DC switching. Suitable switching programmes for Isolator, Changeover, Multistep and Gang Switches etc. are offered.

DC switches are CPRI tested and RDSO approved.

DC Switches D100 A - D500 A

Features:

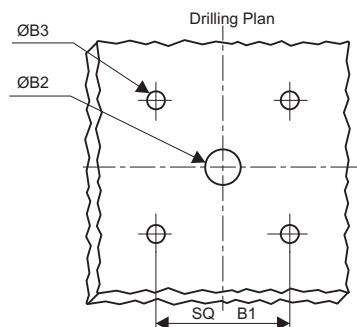
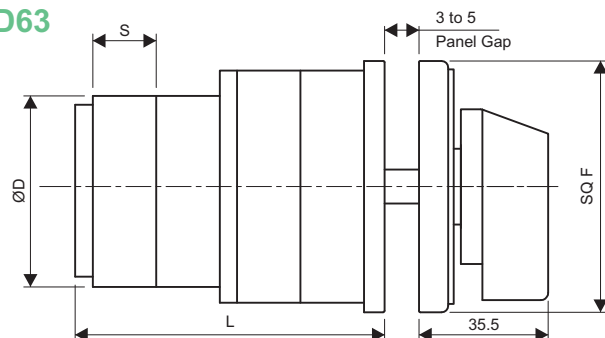
- Housing made up of SMC material for rigidity and higher mechanical strength
- 'Wiping contacts' operations helps in dust free & self cleaning concepts
- Extended terminals for Bus bar / Aluminium cable connections
- Capstone handle operation for better leverage

Applications:

- D40R - Railway coaches lighting & fan circuits switching
- All DC power circuits - Railways, Telecommunications & Power plants
- Battery charging equipment

DC Ratings	Description		Unit	Rated Operational Current Ie				
				Switch Type				
				D 16	D 25	D 32	D 40	D 63
Rated on Interrupted Current (I th)			A	20	32	40	50	80
DC 22A L/R 2m sec								
Rated Operational Voltage	110 V	250 V	A	16	25	32	40	63
No of Series Contacts	1	2						
AC Ratings	Ac3 Rating 3 Phase	380-440 V	HP	7	10	14	20	25
	AC21 Rating		A	16	25	32	40	63
General	Fuse Protection		A	16	25	32	40	63
	Short Circuit Through Fault Current		kA	5	10	10	20	20
	Terminal Cross Section	[Rigid] min	mm²	1.5	1.5	1.5	1.5	1.5
		[Flex] max	mm²	4	4	6	10	16
	Tightening Torque		Nm	0.8	1.2	1.2	2	2
	Maximum Contact Stages			16	10	10	6	6
Description			Unit	D 100	D 200	D 300	D 400	D 500
Duty Rating - DC 22 A L/R 2m sec								
Operational Voltage			V DC	250	250	250	250	250
Voltage for AC Rating			V AC	460	460	460	460	460
Operational Current			A	100	200	300	400	500
Thermal Current (I th)			A	125	250	375	500	625
Switching Angle			Deg	90	90	90	90	90
Maximum Contact Stages				9	9	9	9	9

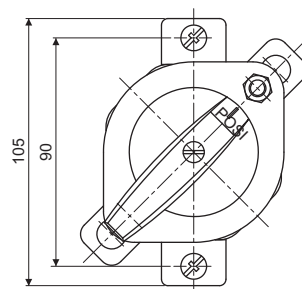
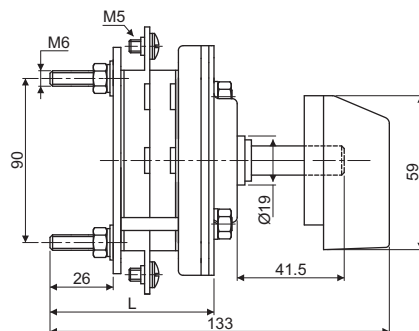
D16 - D63



Type	B1	B2	B3	D	F	S
D16	48	12	5.5	50	64	12
D25/D32	48	12	5.5	50	64	15
D40/D63	68	15	5.5	70	88	21

Stages		1	2	3	4	5	6	7	8	9	10	11	12
Length L in mm	D16	62	74	86	98	110	122	134	146	158	170	182	194
	D25/32	65	80	95	110	125	140	155	170	185	200	215	230
	D40/63	69	90	111	132	153	174	195	216	237	258	279	300

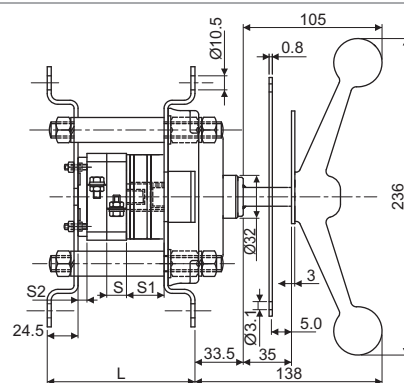
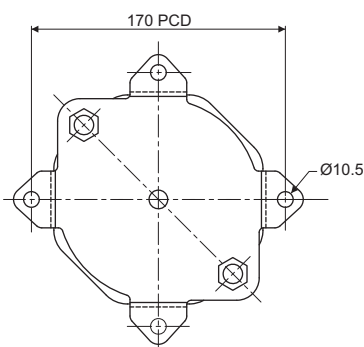
D40 R



Type	S	S1	S2	Length L							
				1	2	3	4	5	6	7	8
D40	10	30.5	15	55.5	65.5	75.5	85.5	95.5	105.5	115.5	125.5

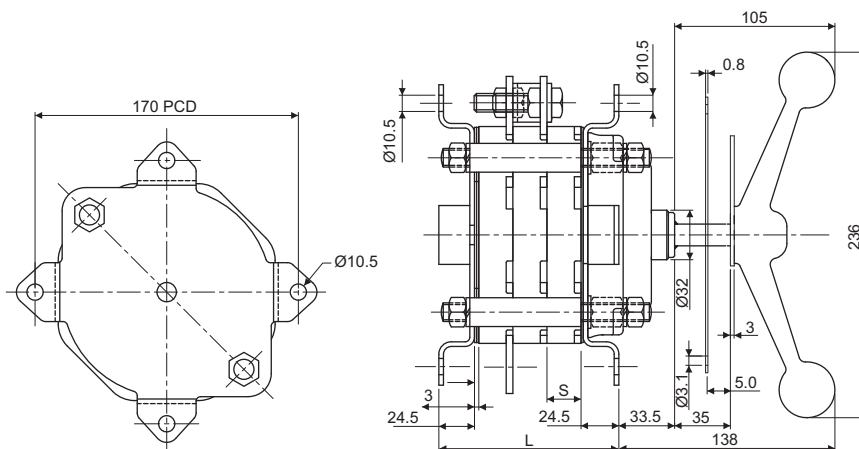
L = No. of Stages x S + (S+S)

D100



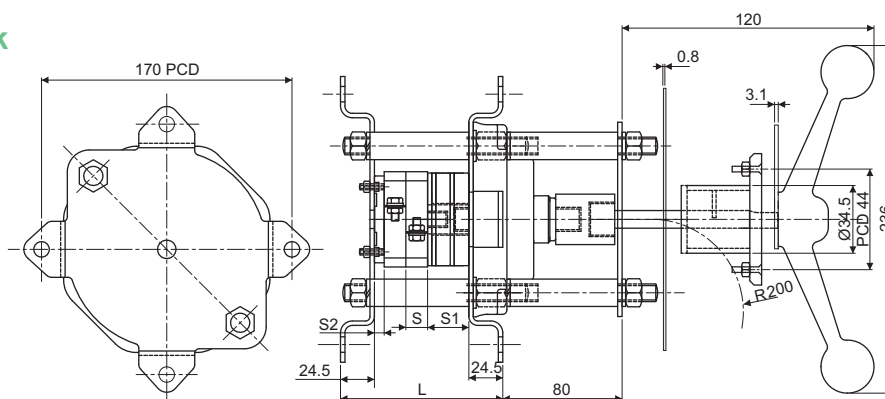
Type	S	S1	S2	Length L						
				1	2	3	4	5	6	7
D100	32	32	15	112	144	176	208	240	272	304

All dimensions in mm.

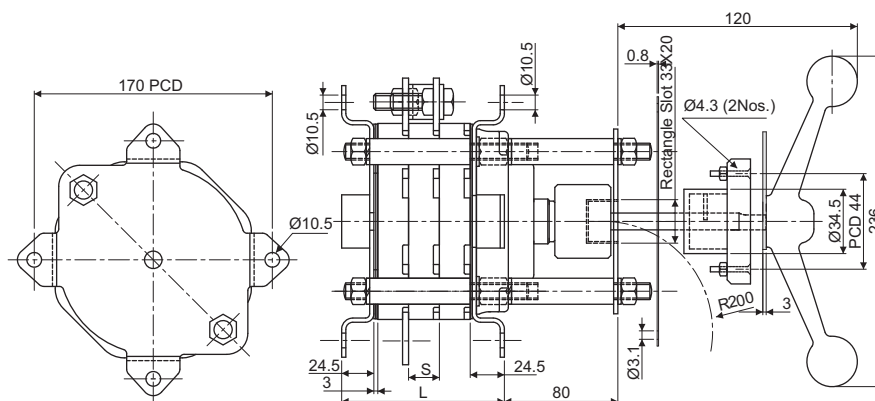


Type	S	Length L				
		3	4	5	6	7
D200-D500	22	117	139	161	183	205

A black and white photograph of a mechanical component, likely a valve or actuator. It features a square faceplate with a central circular opening and a handle extending from the right side. The component is mounted on a base with several bolts.



Type	S	S1	S2	Length L							
				1	2	3	4	5	6	7	8
D100	32	35	15	210	242	274	306	338	370	402	434



Type	S	Length L				
		3	4	5	6	7
D200-D500	22	197	219	241	263	285

DC Rotary Switches



Load Break Switches

General

Load Break Switches comply with the latest specifications for modern low voltage devices.

Outstanding electrical characteristics of LB Switches with compact design, contribute to space saving installation and operational convenience.

Basic construction and design of the switch makes it compact, safe and highly reliable.

The switch uses polyamide glass filled material, having excellent track resistance (CTI) for insulation to prevent flashover between phases in the most severe conditions.

The special contact design and configuration makes the switch highly reliable to withstand high short circuit currents.

Features:

- Double break contracts
- Polycarbonate shroud for wired terminal protection is included
- Excellent switching and high short circuit capacity
- Compact and reliable
- Easy installation
- Versatile mounting options, i.e. front mounting, rear mounting DIN 35 and enclosure mounting
- Quick, simple and convenient, dia. 22.5 mm single hole mounting is offered for 16A/20A switches with padlocking option
- Finger protection - IP 20
- Terminal screws with fixed clamp for easy wiring
- Add-on main/neutral/auxiliary contacts can be mounted on both sides of the switch at site
- 4th Pole addition is possible at site

Applications:

- Isolator
- Motor Start and Stop
- Manual Motor controller as Motor Disconnect
- Main Switch
- Emergency ON-OFF
- Control Switch
- Changeover Switch

Technical Data

UL Standard	UL508
European Standard	IEC60947-3, EN60947-3

Data	Measure	Switch Code	LB116	LB120	LB225	LB232	LB240	LB263	LB4080	LB4100	LB4125
Rated Operational Voltage, U_e											
IEC/EN	Volts	V	690	690	690	690	690	690	690	690	690
UL	Volts	V	600	600	600	600	600	600	600	600	600
Main Switch: Isolating Voltage upto	Volts	V	750	750	750	750	750	750	750	750	750
Resistance to Surge Pulse Voltage, U _{imp}	Volts	kV	6	6	6	6	6	6	6	6	6
Rated Uninterrupted current, I_u	Amp	A	16	20	25	32	40	63	80	100	125
Rated Uninterrupted current, I_e											
IEC/EN											
AC 22	Amp	A	16	20	25	32	40	63	80	100	125
AC-21A	Amp	A	20	25	32	40	63	80	80	100	125
AC-1	Amp	A	20	25	32	40	63	80	80	100	125
Rated Operational power at 50 to 60 Hz											
AC-23A IEC/EN											
3 Phase, 3 Pole	220-240V	kW	7.5	7.5	11	15	22	30	37	44	60
	380-440V	kW	11	11	15	18.5	30	37	45	55	75
	500-690V	kW	15	15	22	22	45	45	90	90	90
AC-3 IEC/EN											
3 Phase, 3 Pole	220-240V	kW	4	5.5	8	11	15	22	30	37	44
	380-440V	kW	5.5	11	15	15	30	30	55	55	55
	500-690V	kW	11	11	15	15	30	30	55	55	55
Short Circuit Capacity: (IEC/EN)											
Max. Fuse Size (Type gG)	Amp	A	20	20	32	32	63	63	125	125	125
Rated fused short circuit current	Amp	kA	5	5	30	30	30	30	30	30	30
UL/CSA Rating (Power)											
DOL RATING											
3 Phase 3 Pole	120V	HP	1.5	1.5	3	3	5	7.5	5	7.5	7.5
	240V	HP	3	3	7.5	7.5	10	15	20	20	30
	480V	HP	7.5	7.5	15	20	20	25	30	30	40
	600V	HP	10	10	20	25	30	30	40	40	50
1 Phase	120V	HP	0.5	0.5	1.5	2	3	3	3	3	3
	240V	HP	1.5	1.5	2	3	5	7.5	7.5	7.5	7.5
Short Circuit Capacity (UL)											
Fuse	Type	Class	Rk5	Rk5	J	J	J	J	J	J	J
Max. Fuse Size	Amp	A	20	20	45	45	70	70	125	125	125
Rated Fused Short Circuit Current	Amp	kA	10	10	10	10	10	10	10	10	10
Terminal Cross Section											
Solid/Multiple Strand Wire	Min-mm ²		1	1	2.5	2.5	2.5	2.5	2.5	2.5	2.5
	Max-mm ²		4	4	10	10	25	25	50	50	50
Fine-Strand Wire with Sleeve	Min-mm ²		0.5	0.5	0.75	0.75	2.5	2.5	4	4	4
	Max-mm ²		4	4	6	6	10	10	50	50	50
American Wire Gauge	AWG		12	12	10	10	6	6	1	1	1
Thread Dimensions for Terminal Screw			M3.5	M3.5	M4	M4	M4	M4	M6	M6	M6
Recommended Tightening Torque for terminals	Nm		0.8	0.8	1.7	1.7	2	2	2.5	2.5	2.5

Switching Programmes

LB116, LB120, LB225, LB232, LB240, LB263, LB4080, LB4100, LB4125

3 Pole	3 Pole + 1 Main Module	4 Pole + 1 Main Module	6 Pole	8 Pole
32300	32400	32500	32600	32800
32309	32409	32509	32609	32809

LB116, LB120 Available upto 5 Pole only

3 Pole + 1 Neutral Module	4 Pole + 1 Neutral Module	3 Pole + 1 Auxillary Module	4 Pole + 1 Auxillary Module	3 Pole + 2 Neutral Module	3 Pole + 2 Auxillary Module
32310	32410	32320	32420	32330	32340
32319	32419	32329	32429	32339	32349

LB116, LB120 Available upto 5 Pole only

LB4080, LB4100, LB4125

32309	32409	32509	32609	32809

32319	32419	32329	32429	32339	32349

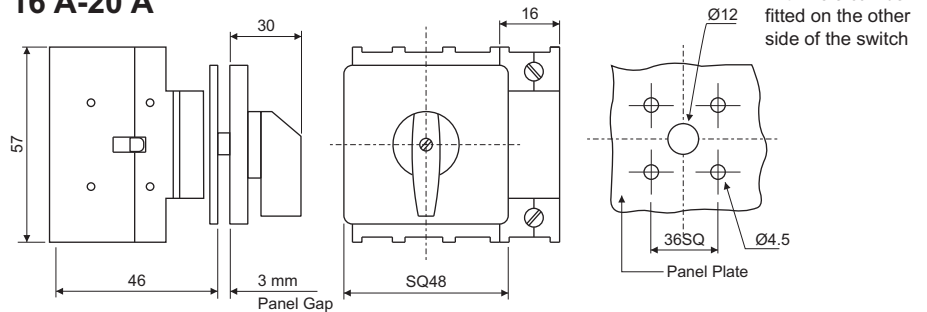
Load Break Switches

Front Mounting

B03



16 A-20 A

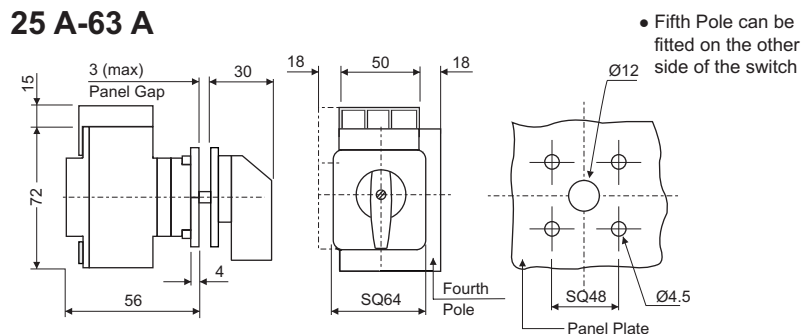


- 4 Hole front panel mounting
- Degree of protection : Front IP55

B13



25 A-63 A

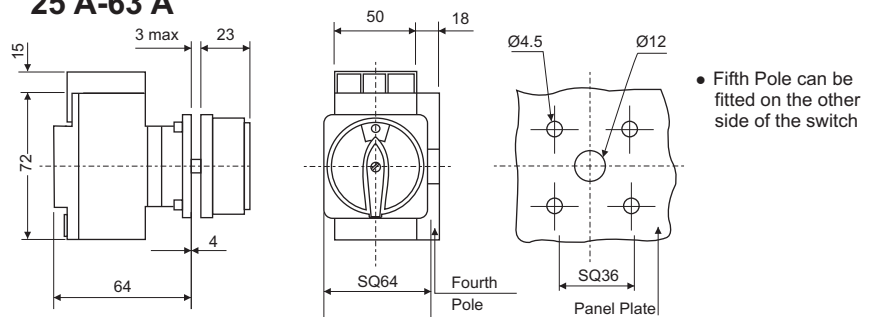


- 4 Hole front panel mounting
- Degree of protection : Front IP55

B33



25 A-63 A

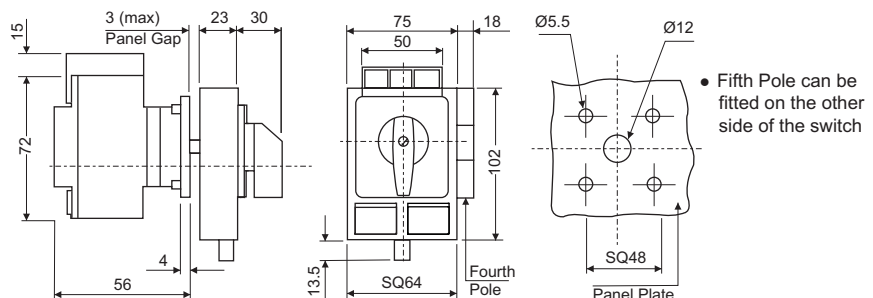


- 4 Hole front panel mounting
- Degree of protection : Front Ip65
- Switch with round padlocking device to prevent from being switched ON by unauthorized personnel
- Max 3 padlocks

B30



25 A-63 A



- 4 Hole front panel mounting
- Degree of protection : Front IP55
- Switch with rectangular padlocking device to prevent the switch from being switched ON by unauthorized personnel
- Max 4 padlocks

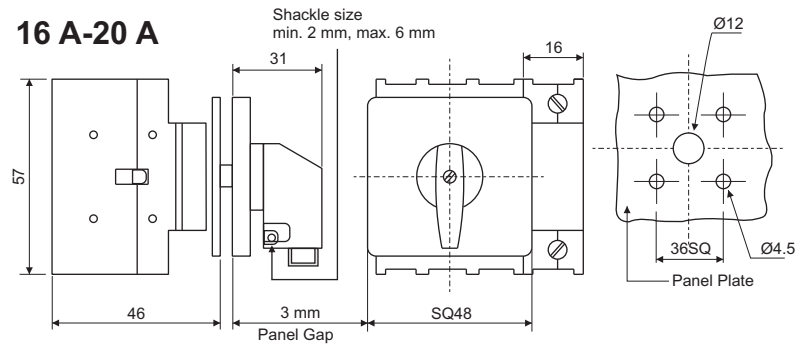
All dimensions in mm.

Front Mounting

B40



16 A-20 A

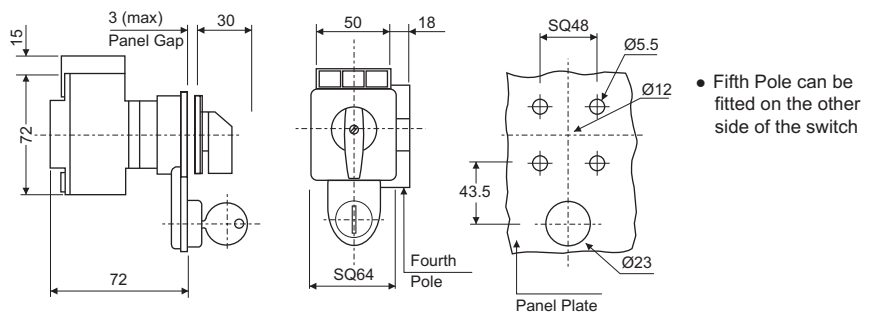


- 4 Hole, front panel mounting
- Degree of protection : Front Ip55
- Switch with padlockable flag knob
- Maximum 1 padlock

B63



25 A-63 A



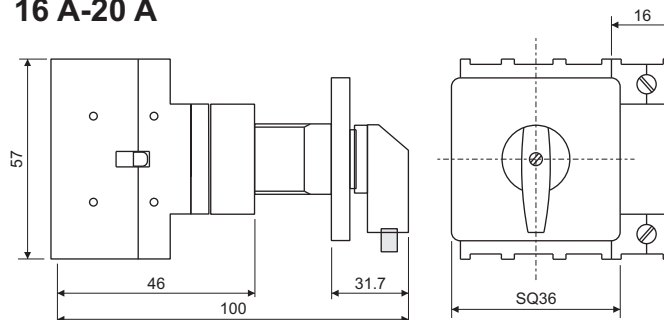
- 4 Hole front panel mounting
- Degree of protection : Front IP55
- Knob operated, keylock, key removable in OFF position (other options on request)

- Fifth Pole can be fitted on the other side of the switch

B19



16 A-20 A



- Dia 22.5 mm, single hole panel mounting
- Degree of protection : Front IP55
- Switch with padlockable flag knob
- Maximum 1 padlock

Amps	A	B	C
16 -20A	57	100	36
25 - 63A	72	110	50

All dimensions in mm.

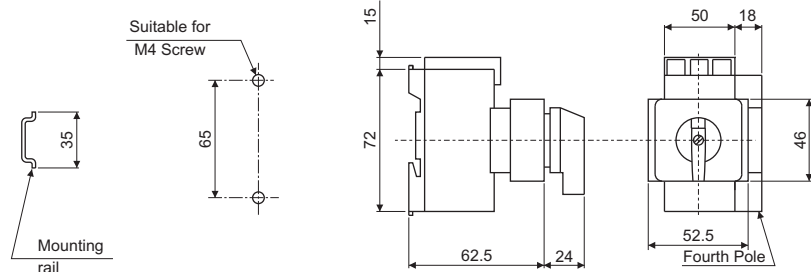
Rear Mounting

B23

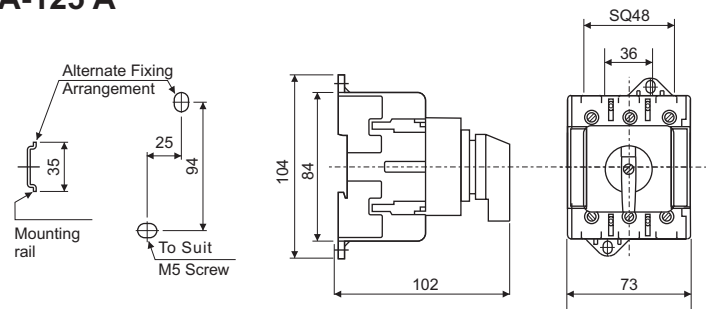


- 2 Hole rear mounting
- Alternately snap mounting on DIN EN50022 rail (35 mm)
- Degree of protection : Front IP30

25 A-63 A



80 A-125 A

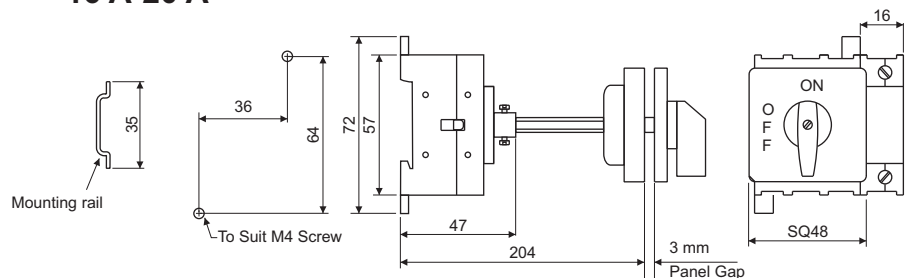


MB42

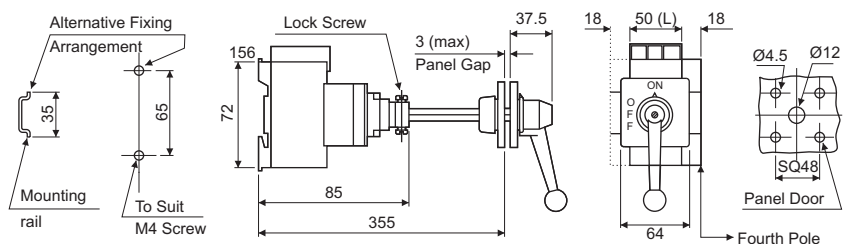


- 2 Hole rear mounting or snap mounting on DIN EN50022 rail (35 mm) can be operated from the front (door) - coupled with door mechanism
- Door interlock (Door openable only in OFF position)
- Degree of protection : Front IP55

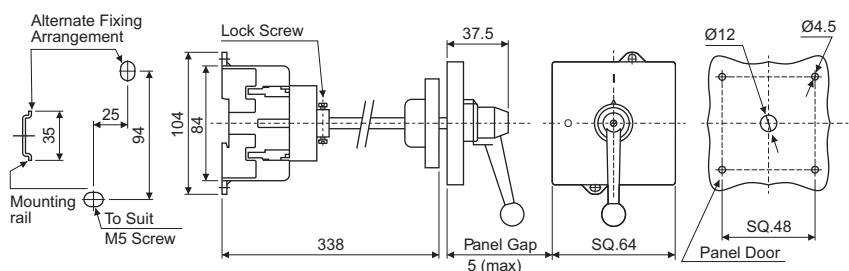
16 A-20 A



25 A-63 A



80 A-125 A



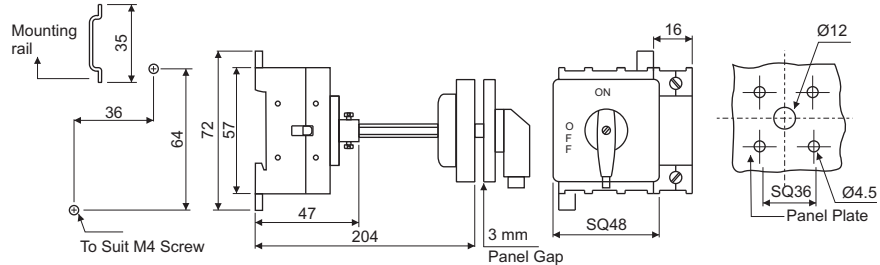
All dimensions in mm.

Rear Mounting

MB34

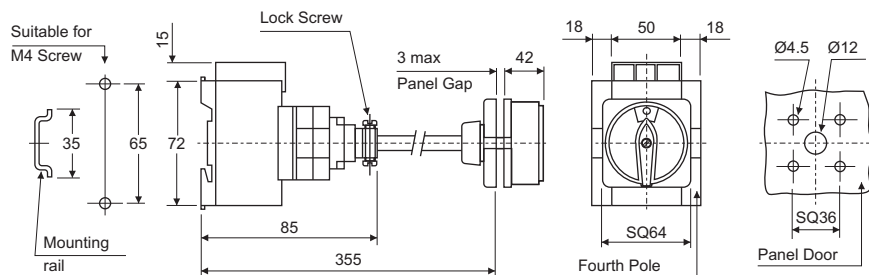


16 A-20 A

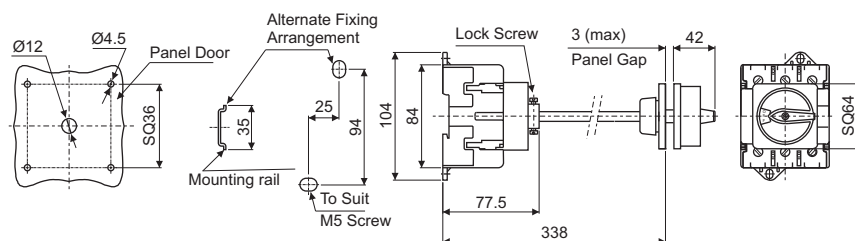


- 2 Hole rear mounting or snap mounting on DIN EN50022 rail (35 mm) can be operated from the front (door) coupled with door mechanism
- Door interlock (Door openable only in OFF position)
- Degree of protection : Front IP65
- Rigid metal shaft / switch assembly
- Switch with round padlocking device to prevent the Switch from being made ON by unauthorized persons
- Max. 3 padlocks as under :
 16 A-20 A : Max. 1 padlock
 25 A-63 A : Max. 2 padlocks
 80 A-125 A : Max. 3 padlocks

25 A-63 A



80 A-125 A



- Adjustable mounting by cutting the metal shaft to appropriate length, to suit panel height
- Specific length of shaft can be offered on request

All dimensions in mm.

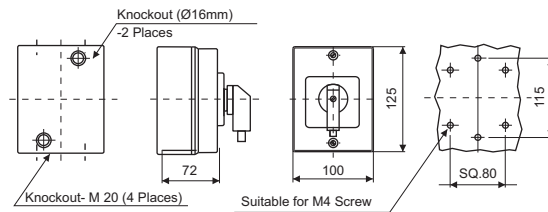
Load Break Switches

Plastic Enclosure Mounting

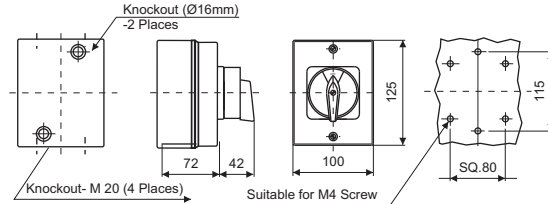
B31SM



16 A-20 A



25 A-32 A



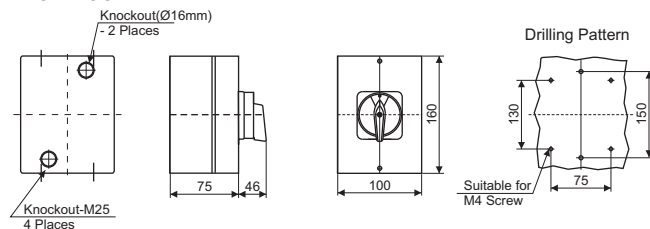
- Switch mounted in ABS / polycarbonate (optional) enclosure
- Round padlocking device (max. 3 padlocks) to prevent the switch from being made ON by unauthorized personnel
- Knob version available on request
- Switch rear mounted for easy connection

- Door interlock-cover cannot open in ON condition
- Tested for Nema Rating 1, 2, 3, 3R, 4, 4x, 12 & 13 as per UL50 & Nema 250
- Degree of protection : IP65
- Red / Yellow-handle colour for Main / Emergency switches
- Enclosure colour : Dark grey base and light grey cover
- Fourth pole can be added
- 25A/32A-6 Pole/8 Pole can be offered in B31L

B31M



25 A-63 A



- Switch mounted in ABS enclosure, optional in polycarbonate
- Tested for Nema Ratings 1, 2, 3, 3R, 4, 4x, 12 & 13 as per UL50 & Nema 250

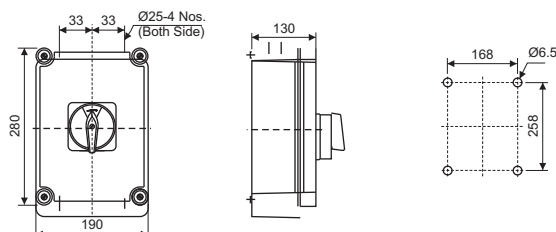
- Round padlocking device (max. 3 padlocks) to prevent the Switch from being made to ON by unauthorized personnel
- Degree of protection : IP65
- Switch rear mounted for easy connection
- Door interlock-cover cannot open in ON condition

- Red / Yellow-handle colour for Main / Emergency Switches
- Enclosure colour : Dark grey base and light grey cover
- Fourth and Fifth pole can be added
- 6 Pole/8 Pole can be offered in B31L

B31L



80 A-125 A



- Switch mounted in ABS / polycarbonate (optional) enclosure
- Door interlock-cover cannot open in ON condition

- Tested for Nema Ratings 1, 2, 3, 3R, 4, 4x, 12 & 13 as per UL50 & Nema 250
- Degree of protection : IP65
- Switch rear mounted for easy connection
- Leech Handle (Max.1 padlock) to prevent the Switch from being made to ON by unauthorised personnel

- Red / Yellow-handle colour for Main / Emergency switches
- Interlock provided to open the lid only in OFF position
- Enclosure colour : Grey
- Fourth and fifth pole can be added

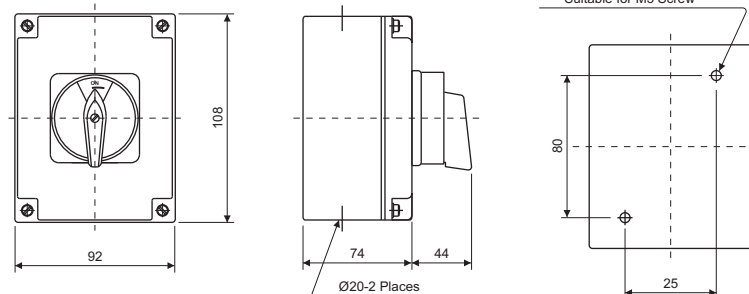
All dimensions in mm.

Metal Enclosure

AB31S



Upto 25 A



Caution : Open the cover only in 'OFF' position

- Switch mounted in aluminium enclosure
- Round padlocking device (max. 3 padlocks) to prevent the switch from being made

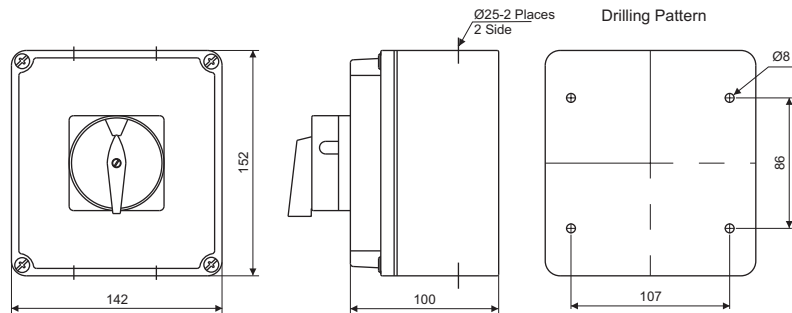
- ON by unauthorized personnel
- Degree of protection : IP65
- Red / Yellow-handle colour for Main / Emergency switches

- Enclosure colour : Dark grey base and light grey cover
- Door Interlock

AB31M



32 A to 40 A



- Switch mounted in aluminium enclosure
- Round padlocking device (max. 3 padlocks) to prevent

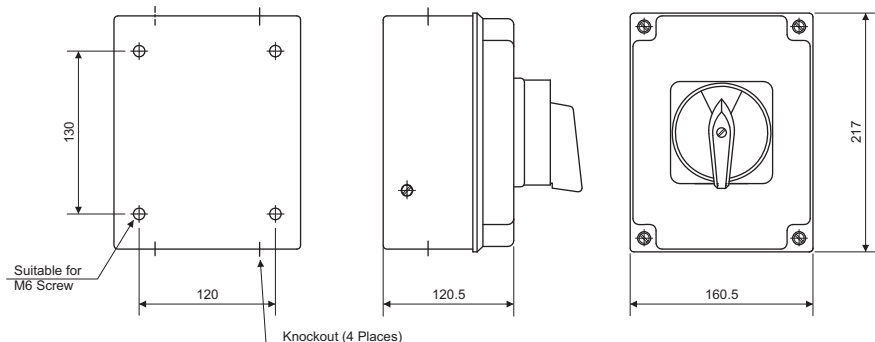
- the switch from being made to ON by unauthorized personnel
- Degree of protection : IP65
- Red / Yellow-handle colour for

- Main / Emergency switches
- Enclosure colour : Dark grey base and light grey cover
- Door Interlock
- Fourth pole can be added

AB31L



80 A-125 A



- Switch mounted in aluminium enclosure
- Round padlocking device (max. 3 padlocks) to prevent the Switch

- from being made ON by unauthorized personnel
- Degree of protection : IP65
- Red / Yellow-handle colour for Main / Emergency switches

- Enclosure colour : Dark grey base and light grey cover
- Door Interlock

All dimensions in mm.

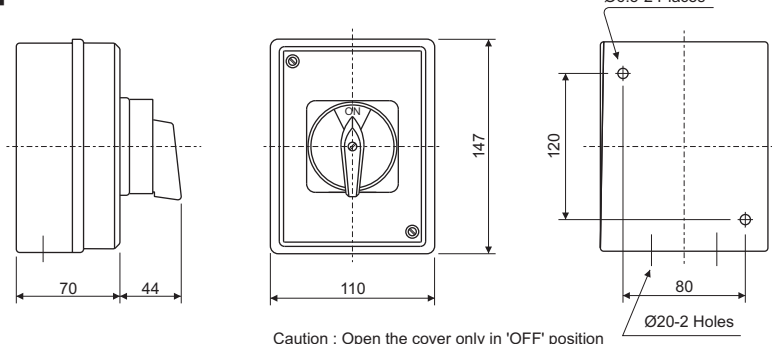
Load Break Switches

Metal Enclosure

SB31S



Upto 25 A



- Switch mounted in Steel enclosure
- Round padlocking device (max. 3 padlocks) to prevent the switch from being made ON by

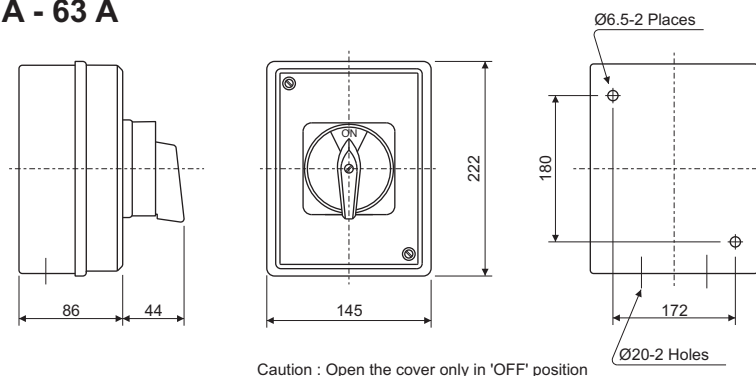
- unauthorized personnel
- Degree of protection : IP53*
- Knob version available on request
- Red / Yellow-handle colour for

- Main / Emergency switches
- Enclosure colour : Dark grey base and light grey cover
- Door Interlock

SB31M



32 A - 63 A



- Switch mounted in Steel enclosure
- Round padlocking device (max. 3 padlocks) to prevent the switch from being made ON by

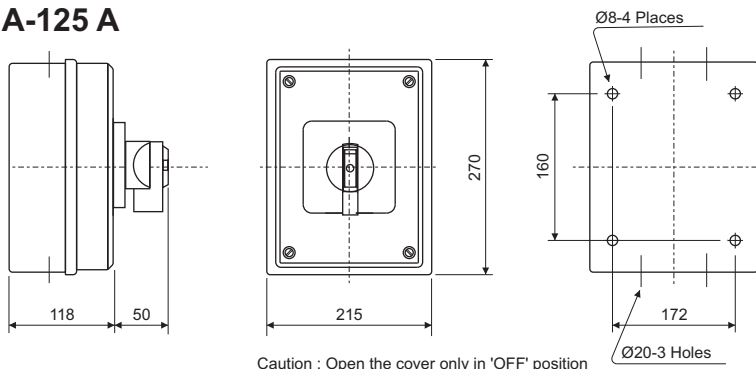
- unauthorized personnel
- Degree of protection : IP53
- Knob version available on request
- Red / Yellow-handle colour for

- Main / Emergency switches
- Enclosure colour : Dark grey base and light grey cover
- Fourth pole can be added
- Door Interlock

SB31L



80 A-125 A



- Switch mounted in Steel enclosure
- Round padlocking device (max. 3 padlocks) to prevent the switch from being made ON by

- Degree of protection : IP53
- Knob version available on request
- Red / Yellow-handle colour for Main / Emergency switches
- Enclosure colour : Dark grey base and light grey cover

- Fourth pole can be added
- Door Interlock
- 6 Pole / 8 Pole can be offered in SB31XL

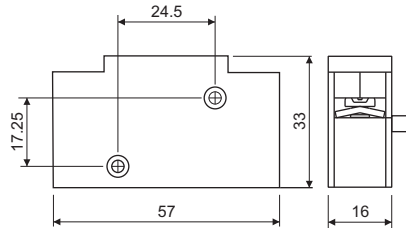
All dimensions in mm.

Accessories

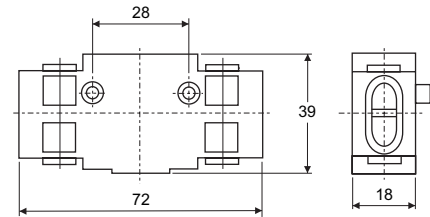
Add on Main Pole (16 A-63 A)



For Switch Code	Code for Front Mounting Switch	Code for Rear Mounting Switch
LB116	FMC 116	RMC 116
LB120	FMC 120	RMC 120



For Switch Code	Code for Front Mounting Switch	Code for Rear Mounting Switch
LB225	FMC225	RMC225
LB232	FMC232	RMC232
LB240	FMC240	RMC240
LB263	FMC263	RMC263



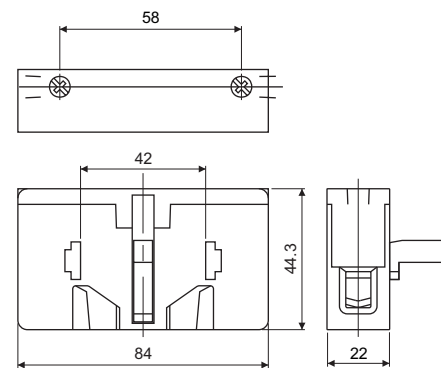
- Equivalent switch electrical rating
- Used as 4th / 5th pole on either side of the switch

Add on Main Pole (80 A-125 A)



For Switch Code	Code for Front Mounting Switch	Code for Rear Mounting Switch
LB4080	FMC80	RMC80
LB4100	FMC100	RMC100
LB4125	FMC125	RMC125

- Equivalent switch electrical rating
- Used as 4th / 5th pole on either side of the switch



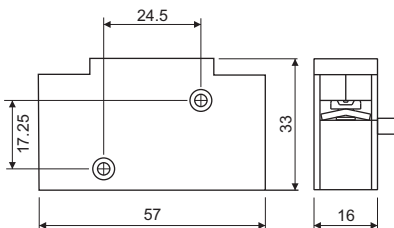
Applications

For switching action of additional pole, when mounted with the switch. The additional pole on either side of the switch can be used to switch on any single phase requirements simultaneously.

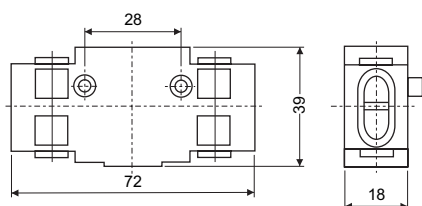
Add on Neutral Pole (16 A-63 A)



For Switch Code	Code for Front Mounting Switch	Code for Rear Mounting Switch
LB116	FNC116	RNC116
LB120	FNC120	RNC120



For Switch Code	Code for Front Mounting Switch	Code for Rear Mounting Switch
LB225	FNC225	RNC225
LB232	FNC232	RNC232
LB240	FNC240	RNC240
LB263	FNC263	RNC263



- Early make late break contact
- Can be fitted on either side of the switch

Applications

To be used as Neutral Conductor to the switch.

All dimensions in mm.

Accessories

Add-on Neutral Pole (80 A-125 A)

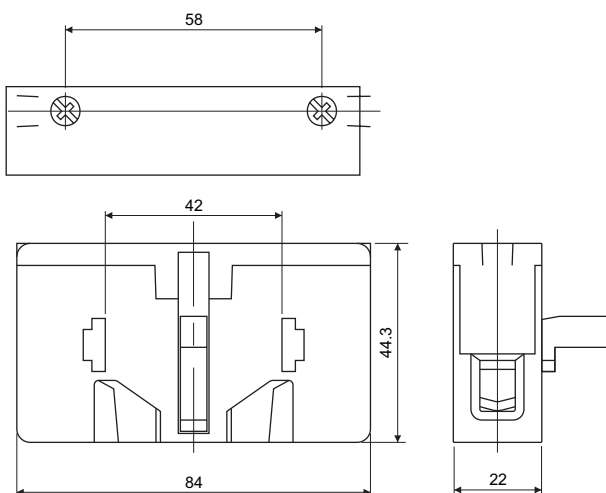


- Early make late break contact
- Can be fitted on either side of the switch

Applications

To be used as Neutral Conductor to the switch.

	For Switch Code	Code for Rear Mounting Switch	Code for Front Mounting Switch
	LB4080	FNC80	RNC80
	LB4100	FNC100	RNC100
	LB4125	FNC125	RNC125





Add-on Auxiliary Pole



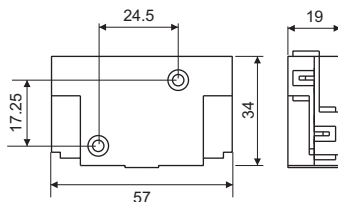
- 1NO contact early break / late make + 1NC contact
- Can be fitted on either side of the Switch

Applications

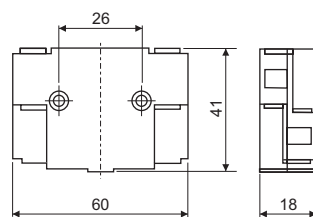
Auxiliary contact module has two contacts, 'NO and NC'. 'NO' contact is early break, late make contact. This is used to trigger any auxiliary circuits.

	For Switch Code	Code for Front Mounting Switch 1NO+1NC	Code for Rear Mounting Switch 1NO+1NC	Code for 2 NO Front Mounting Switch	Code for 2 NO Rear Mounting Switch
 & 	LB116	FAC116	RAC116		
	LB120				
	LB225	FAC216	RAC216	LB263 FA2NO	LB263 RA2NO
	LB232				
	LB240				
	LB263				
	LB4080	FAC416	RAC416	LB4125 FA2NO	LB4125 RA2NO
LB4100					
LB4125					

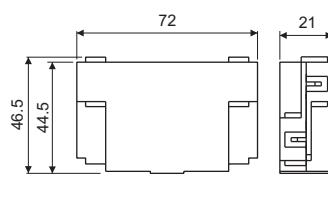
LB116-LB120



LB225-LB263



LB4080-LB4125



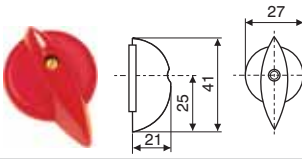
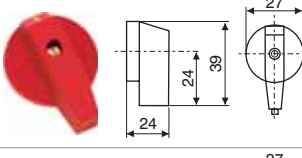
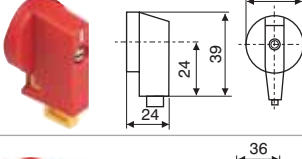
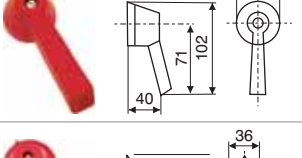
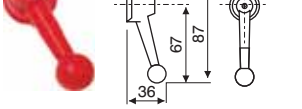
Rating

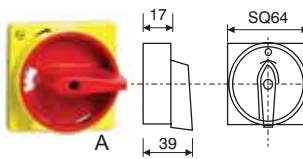
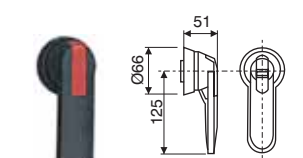
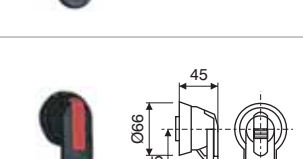
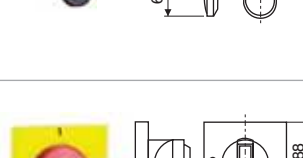
IEC / EN	16 A, 500V	
AC-15	220-240V	6 A
	380-440V	4 A

Terminal Cross Section

Single/Multiple Strand Wire	min. mm ²	1.0
	max. mm ²	1.5
American Wire Gauge	AWG	16

Knobs & Handles

	Code	Type
	TD	Tear Drop Knob
		
	A	B
TD ¹	27	41
TD	36	52
	C	D
	25	21
	31	25
	Code	Type
	FL	Flag Knob
		
	A	B
FL ¹	27	39
FL	36	50
	C	D
	24	24
	27	25
	Code	Type
	FP	Flag Knob Padlockable
		
	A	B
FP ¹	27	39
FP	36	50
	C	D
	24	24
	27	25
	Code	Type
	PG	Pistol Grip Handle
		
	A	B
PG ¹	27	39
PG	36	50
	C	D
	24	24
	27	25
	Code	Type
	BG	Ball Grip Handle
		
	A	B
BG ¹	27	39
BG	36	50
	C	D
	24	24
	27	25

	Code	Type
	RD	Round Knob, Padlockable
		
	A	B
RD ¹	27	41
RD	36	52
	C	D
	25	21
	31	25
	Code	Type
	RH	Roll Handle, Padlockable
		
	A	B
RH ¹	27	39
RH	36	50
	C	D
	24	24
	27	25
	Code	Type
	SH	Short Handle Padlockable
		
	A	B
SH ¹	27	39
SH	36	50
	C	D
	24	24
	27	25
	Code	Type
	LH	Leech Handle Padlockable
		
	A	B
LH ¹	27	39
LH	36	50
	C	D
	24	24
	27	25

LB Switches: Knob/Handle and Mounting Options

Mounting	LB116	LB120	LB225	LB232	LB240	LB263	LB4080	LB4100	LB4125
B03	FL, TD	FL, TD	-	-	-	-	-	-	-
B19	FP, FL, TD	FP, FL, TD	-	-	-	-	-	-	-
B40	FP	FP	-	-	-	-	-	-	-
B13	-	-	FL, PG, BG	FL, PG, BG	FL, PG, BG	FL, PG, BG	-	-	-
B30	-	-	TD, FL	TD, FL	TD, FL	TD, FL	-	-	-
B33	-	-	RD	RD	RD	RD	RD	RD	RD
B63	-	-	TD, FL	TD, FL	TD, FL	TD, FL	FL	FL	FL
B23	-	-	TD, FL	TD, FL	TD, FL	TD, FL	FL	FL	FL
MB34	FP	FP	SH, RD LH, RH	SH, RD LH, RH	SH, RD LH, RH	SH, RD LH, RH	RD LH, RH	SH, RD LH, RH	RD LH, RH
MB42	FL	FL	BG, PG	BG, PG	BG, PG	BG, PG	BG, PG	BG, PG	BG, PG
AB31S, SB31S	RD	RD	RD	RD	RD	RD	-	-	-
B31SM, B31M, AB31M, SB31M	FP	FP	RD	RD	RD	RD	-	-	-
B31L	-	-	-	-	-	-	RD, LH BG, RH	RD, LH BG, RH	RD, LH BG, RH
SB31XL	-	-	-	-	-	-	BG, LH	BG, LH	BG, LH

LB Switches: Knob/Handle, Enclosure Mounting Options

Enclosure Mounting	B31SM	B31M	B31L	SB31S	SB31M	SB31L	AB31S	AB31M
Knob/Handle	RD, FP	RD	RD, LH	RD, BG, PG	RD, BG, PG	LH, BG, PG, RD	RD, FL, BG, PG	RD, BG, PG

The knobs/handles highlighted in red are standard, others indicate possible options.

All dimensions in mm.

Changeover Switches

EB-DG Changeover Switches

Switching Programme

Code : 31153 3 Pole Changeover

	R	Y	B	R	Y	B
I	X	X	X			
O						
II				X	X	X

Code : 31154 4 Pole Changeover

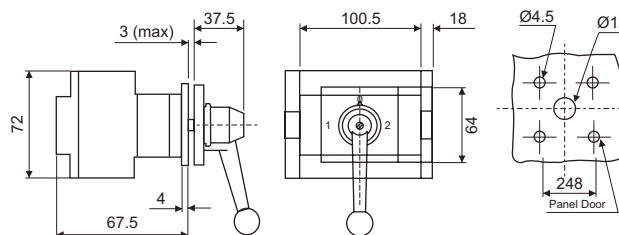
	R	Y	B	N	R	Y	B	N
I	X	X	X	X				
O								
II					X	X	X	X

Features

- 25 A - 125 A, 3 and 4 Pole, AC 23 duty
- Available with and without SS enclosure
- Different mounting options
- Excellent switching performance
- High short circuit capacity
- Door interlock and padlock available
- Provides adequate space for cable termination and very convenient for installation termination

B13

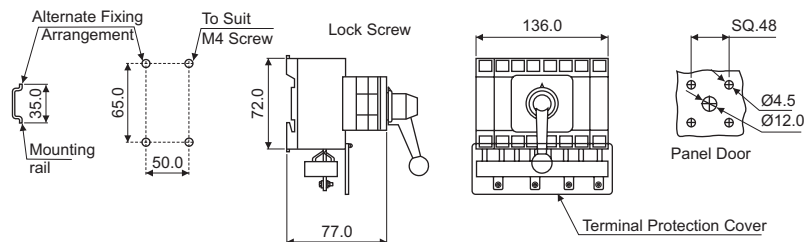
25 A-63 A, Front Mounting



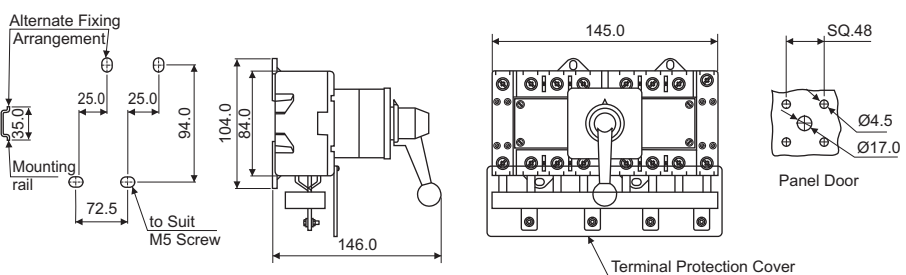
- 4 Hole front panel mounting
- Degree of protection : Front IP55

B21

25 A-63 A, Rear Mounting



80A - 125A , Rear Mounting

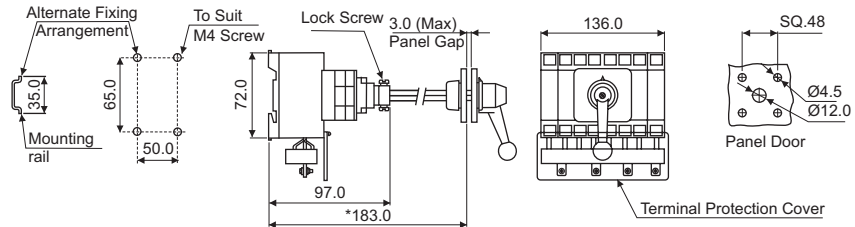


All dimensions in mm.

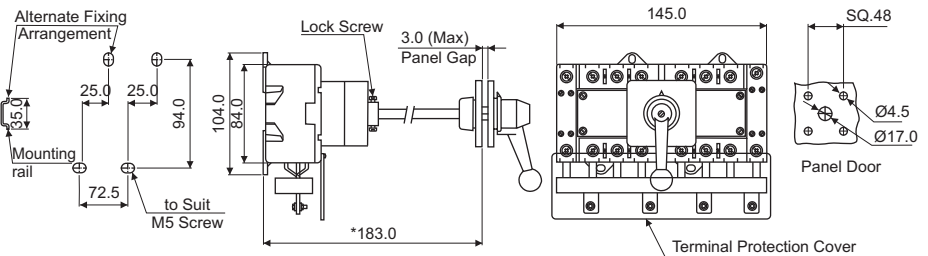
Changeover Switches

MB42

25 A-63 A, Rear Mounting

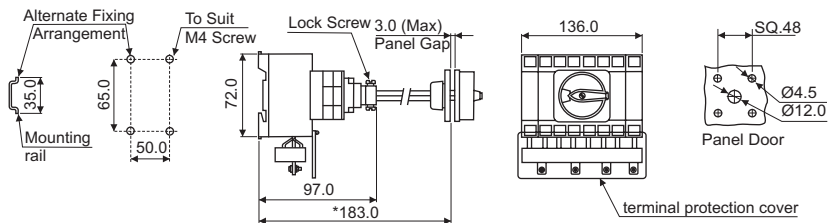


80A - 125A, Rear Mounting

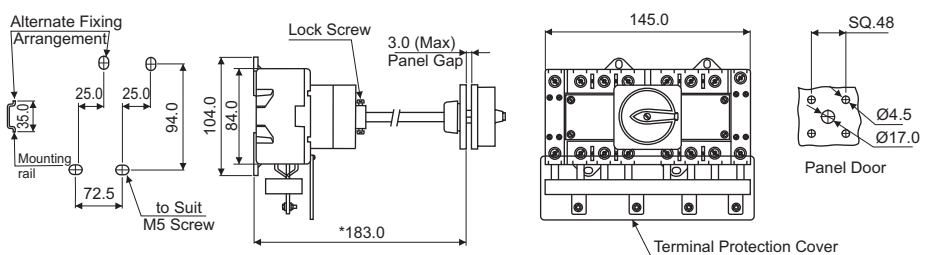


MB34

25 A-63 A, Rear Mounting



80A-125A, Rear Mounting



- 2 Hole rear mounting or snap mounting on DIN rail and operable from the front (door) coupled with door mechanism
- Door interlock (door operable only in OFF position)
- Degree of protection : Front IP65
- Rigid metal shaft/switch assembly
- Switch with round padlocking device to prevent the switch from being made ON by unauthorized persons
- Max. 3 padlocks
- Adjustable mounting by cutting the metal shaft to appropriate length to suit panel height
- Specific length of shaft can be offered on request

All dimensions in mm.

Changeover Switches

Enclosure Changeover Switches

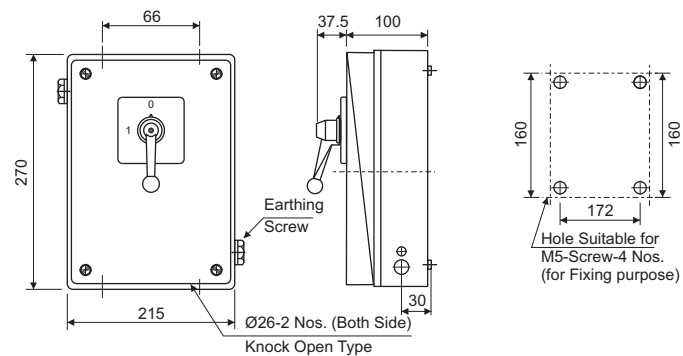
Features

- 25 A - 125 A, 4 Pole, AC 23 duty
- Range available : 3 Pole Changeover - 31153, 3 Pole + Neutral Pole Changeover - 31154
- Powder coated steel enclosure with separate earthing or IP65, ABS enclosure having interlock to open the lid only in OFF position for safety
- Colour : Yellow front plate and Red ball grip handle

SB31



25 A-63 A

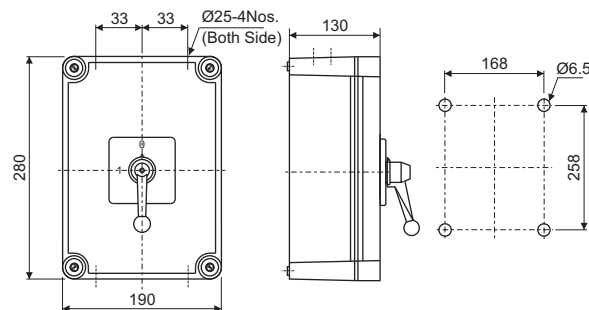


- Powder coated steel enclosure
- Interlock provided to remove cover only in OFF position for safety
- Separate earthing provided
- Colour : Yellow front plate and Red ball grip handle / grey front plate and Black ball grip handle

B31L



63 A

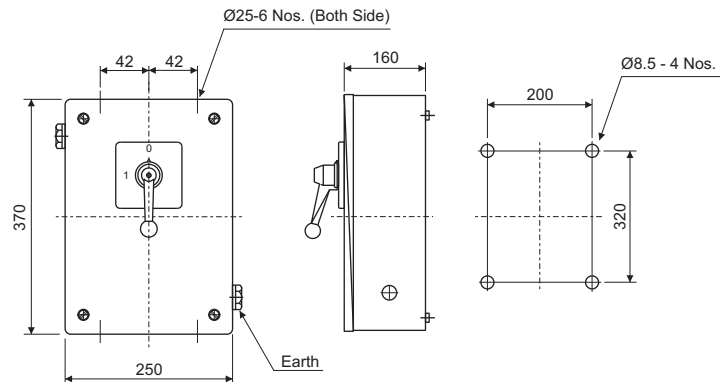


- Switch mounted in grey ABS / Polycarbonate optional enclosure with IP65 protection and interlock provided to open the lid in OFF position

Changeover Switches

SB31XL

80 A-125 A



- Powder coated steel enclosure
- Separate earthing provided
- Interlock provided to remove cover only in OFF position for safety
- Colour : Yellow front plate and Red ball grip handle / grey front plate and Black ball grip handle

Changeover Switches: Knob/Handle and Mounting Options

Mounting	LB225	LB232	LB240	LB263	LB4080	LB4100	LB4125
B13	PG, BG	PG, BG	PG, BG	PG, BG	-	-	-
MB34	RD	RD	RD	RD	RD	RD	RD
MB42	PG, BG	PG, BG	PG, BG	PG, BG	PG, BG	PG, BG	PG, BG
B21	BG, PG	BG, PG	BG, PG	BG, PG	PG, BG	BG, PG	BG, PG
SB31	BG, PG	BG, PG	BG, PG	BG, PG	-	-	-
SB31XL	-	-	-	-	BG, PG	BG, PG	BG, PG
B31L	RD, BG	RD, BG	RD, BG, PG	RD, BG, PG	-	-	-

The Knobs/handles highlighted in blue are standard, others indicates possible options.

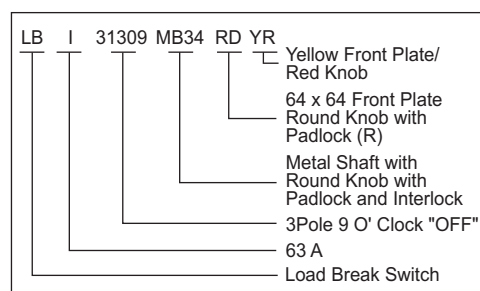
All dimensions in mm.

Ordering code for load break switches

LB Load Break Switch	X Switch Rating	XXXXX Programme Code	XXXXX Mounting Options	XX Knob Options	XX Colour
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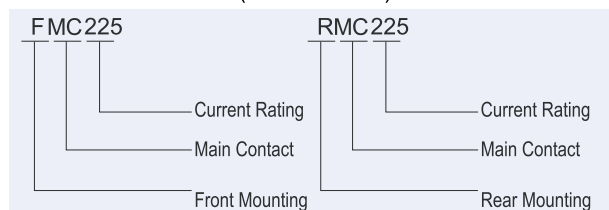
Example

- LB Switches, 25 A, 3P, 9 O'clock, 4 hole front mounting, yellow front plate, red tear drop knob
- LB I 31309 B13 TD YR
- LB Switches, 63 A, 3P, 9 O'clock, 4 hole front mounting, with metal shaft, yellow front plate, red round knob
- LB I 31309 MB34 RD YR
- LB Switches 40 A, 3P, 12 O'clock OFF in B31SM enclosure, grey front plate, black round knob
- LB G 31300 B31SM RD GB
- EB-DG Changeover Switch, 63 A, 3P, metal enclosure with interlock, yellow front plate, red ball grip handle
- EB I 31153 SB31 BG YR

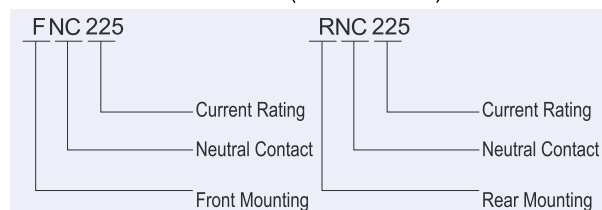


Accessories

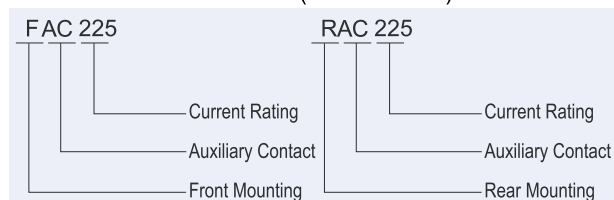
ADD ON MAIN POLE (16A TO 125A)



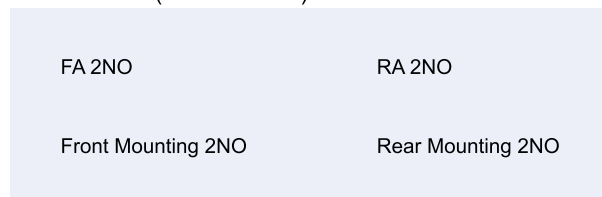
ADD ON NEUTRAL POLE (16A TO 125A)



ADD ON AUXILIARY POLE (16A TO 125A)



ADD ON 2NO(25A TO 125A)



Rating Selection Table

Ampere (A)	Code (X)
16	C
20	D
25	E
32	F
40	G
63	I
80	J
100	K
125	L

*** Note : Please contact nearest L&T branch office.

Load break switches (Ratings: 16A to 125A)



Description	3 Pole LB switch		4 Pole LB switch	
	Cat. No.	Can also be given on request	Cat. No.	Can also be given on request
Single Hole MTG Switch with Flag Knob	LBX32300B19FPYR		LBX32400B19FPYR	
Front Plate MTG with Flag Knob	LBX32300B40FPYR		LBX32400B40FPYR	
Front Panel MTG with B03 (48x48) Plate	LBX32300B03FLYR	32309 TDYR	LBX32400B03FLYR	32409 TDYR
Front Panel MTG with B13 (64x64) Plate with Flag Knob	LBX32300B13FLYR	32306/32309 TDYR	LBX32400B13FLYR	32406/32409 TDYR
Front Panel MTG with B13 (64x64) Plate with BG Handle	LBX32300B13BGYR	32309	LBX32400B13BGYR	32409
DIN Rail MTG Switch with Flag Knob	LBX32300B23FLGB		LBX32400B23FLGB	
Rectangular Pad Lock Switch with TDYR	LBX32300B30TDYR		LBX32400B30TDYR	
Round Pad Lock Switch with RDYR	LBX32309B33RDYR		LBX32409B33RDYR	
Switch with B63 Lock & Key Version	LBX32309B63TDYR		LBX32409B63TDYR	
Base MTG Switch with DIL and Pad Lock	LBX32309MB34RDYR		LBX32409MB34RDYR	
Base MTG Switch with BG Handle	LBX32309MB42BGYR		LBX32409MB42BGYR	
Switch in ABS Enclosure - in B31SM	LBX32300B31SMRDYR		LBX32400B31SMRDYR	
Switch in ABS Enclosure - in B31M	LBX32309B31MRDYR		LBX32409B31MRDYR	
Switch in SS Enclosure - in B31L with Round Plate	LBX32309SB31LRDYR		LBX32409SB31LRDYR	

EB-Gen Changeover Switches (25-63A)

Description	3 Pole EB-GEN Changeover switch Cat. No.	4 Pole EB-GEN Changeover switch Cat. No.
Changeover with Front Panel Mounting	EBX31153B13BGYR	EBX31154B13BGYR
Changeover with Rear Mounting	EBX31153MB42BGYR	EBX31154MB42BGYR
Changeover in SS Enclosure	EBX31153SB31BGYR	EBX31154SB31BGYR
Changeover with Rear Mounting	EBX31153B21BGYR	EBX31154B21BGYR
Changeover with Rear Mounting	EBX31153MB34LHGB	EBX31154MB34LHGB
Changeover in ABS Enclosure	EBX31153B31LBGYR	EBX31154B31LBGYR



Rating Selection Table

Ampere (A)	Code (X)
25	E
32	F
40	G
63	I

*** Note : Please contact nearest L&T branch office.



Wires & Cables

FR (Flame Retardant) PVC Insulated House Wires



L&T House Wires are made up electrolytic grade, bright, plain annealed copper conductor, as per **IS : 8130 - 1984**. These wires are suitable for all Commercial & Domestic wiring applications.

For additional safety, the insulation is of Flame Retardant - **FR PVC** compound. It has high oxygen and temperature index. These properties restrict propagation of flame and wires do not catch fire up to 250 degree centigrade at ambient oxygen level.

L&T House Wires are twin coated for superior insulation. The House Wires have uniform diameter and are available in standard lengths of 90 meter and 180 meter coils.

Single core, twin insulated wires in voltage grade 1100V, conforming to IS : 694-1990 with additional FR properties.

Range - 0.75 Sq.mm to 16 Sq.mm

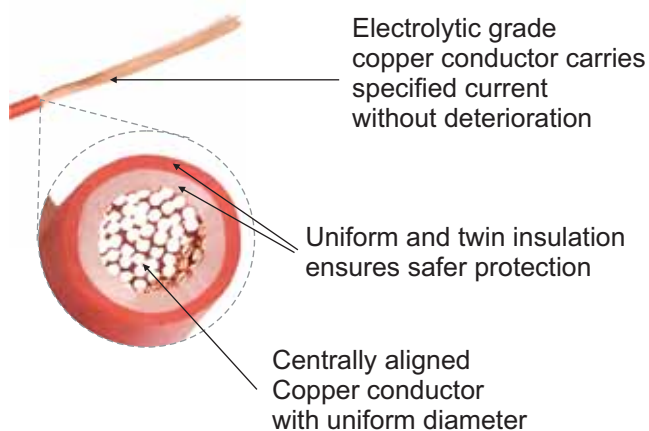
Nominal area of conductor	Number/Nom. Dia of wire	Thickness of insulation (Nom)	Approx. overall Diameter	Current carrying capacity* 2 cables, single phase		Max Resistance per km at 20°C
				In conduit/ Trunking	Unenclosed-clipped directly to surface or on cable tray	
Sq. mm	mm	mm	mm	Amp.	Amp.	Ohms
1.0	# 14/.3	0.7	2.8	11	12	18.10
1.5	# 22/.3	0.7	3.1	14	16	12.10
2.5	# 36/.3	0.8	3.8	19	22	7.41
4.0	\$ 56/.3	0.8	4.4	26	29	4.95
6.0	\$ 84/.3	0.8	5.0	31	37	3.30

Above data is indicative. L&T will not be liable for damage arising out of incorrect applications.

Standard Colour : Red, Yellow, Blue, Green, Black. * As per IS : 3961 (Part V) - 1968.

As per Conductor Class 2 of IS : 8130 - 1984. \$ As per Conductor Class 5 of IS : 8130 - 1984.

Special Insulation wires



L&T Flame Retardant Low Smoke (FRLS) wire - These wires are made of special insulation material with higher oxygen and temperature indices and lower smoke density rating and acid gas generation. This insulation retards flame propagation and generates low smoke under fire condition.

Range - 1 Sq.mm to 16 Sq.mm.

L&T Zero Halogen Flame Retardant (ZHFR) wire - The insulation is free from halogen, thus preventing emission of corrosive gases under conditions of fire. These wires are primarily used where critical control supply is essential during fire like - lifts, fire alarms, hospitals etc.

Oxygen Index is used as a measure of flame retardant property of the insulating material. The oxygen index indicates percentage of oxygen required for supporting combustion of insulating material at room temperature. Higher oxygen index is desirable.

Temperature Index indicates the temperature at which normal oxygen content of 21% in air will support combustion of insulating material. Higher temperature index is better.

Smoke Density indicates the loss of light transmission from insulation material under fire. Lower the smoke density, the better is the visibility & efficacy of fire fighting operations.

Acid Gas Generation indicates the amount of hydrochloric acid gas evolved from insulation of cable under fire. lower acid gas generation is desirable.

Characteristics	Standard	Typical Value
Oxygen index	ASTM-D 2863	More than 29%
Temperature index	ASTM-D 2863	More than 250°C
Smoke density rating	ASTM-D 2843	Less than 60%
Acid gas generation	IEC 754-1	Less than 20%

Flexible Wires

L&T Flexible wires are made of bright, plain multi-stranded annealed copper conductor, as per Class 5 of **IS : 8130 - 1984** with PVC insulation. These wires are used for all industrial wiring applications and are available in single and multicore in standard length of 100 meter.

Single unsheathed cable (Flexible) voltage grade 1100 V, conforming to IS : 694-1990

Range - 0.5 Sq.mm to 240 Sq.mm

Nominal area of conductor	Number/ Nom. Dia of wire	Thickness of insulation (Nom)	Approx. overall Diameter	Current carrying Capacity as per IS : 3961	Max Resistance per km at 20°C
Sq. mm	mm	mm	mm	Amp.	Ohms
0.5	16/.2	0.6	2.20	04	39.00
0.75	24/.2	0.6	2.40	07	26.00
1.0	32/.2	0.6	2.60	11	19.50
1.5	30/.25	0.6	2.90	14	13.30
2.5	50/.25	0.7	3.50	19	7.98
4.0	56/.3	0.8	4.30	26	4.95
6.0	84/.3	0.8	4.80	31	3.30
10	80/.4	1.0	6.10	42	1.91
16	126/.4	1.0	7.00	57	1.21
25	196/.4	1.2	8.70	71	0.78
35	276/.4	1.2	10.00	91	0.55
50	396/.4	1.4	12.00	120	0.38
70.0	360/.5	1.6	14.30	160	0.27

Above data is indicative. L&T will not be liable for damage arising out of incorrect applications.



Core Colours :

- **2 Cores** - Red, Black
- **3 Cores** - Red, Black, Yellow / Green
- **4 Cores** - Red, Yellow, Blue, Yellow / Green

Sheath Color : Black

Agriculture Submersible Flat Cable

L&T agriculture submersible Flat cables are made of bright, plain multi-strand annealed copper conductor, as per class 5 of IS : 8130 : 1984. These cables are used for Agricultural submersible motor applications and are available in 3 core - 500 meter & 1000 meter drums.

Voltage Grade 1.1 kV (1100 V) conforming to IS : 694 : 1990.

Nominal Area of Conductor (Sq. mm)	No. of Conductor/ Nominal Dia of Wire (mm)	Thicknesses of Insulation (Nominal) (mm)	Nominal Thickness of Sheath (mm)	Max. Overall Diameter (mm)		Current Carrying Capacity as Per IS : 3961 (Amp.)	Max. Resistance Per Km at 20 °C (Ohms)
				W	B		
1.0	14/0.3	0.60	0.90	9.80	4.60	11	18.10
1.5	22/0.3	0.60	0.90	10.70	5.20	14	12.10
2.5	36/0.3	0.70	1.00	12.90	5.80	19	7.41
4.0	56/0.3	0.80	1.10	15.00	6.80	26	4.95
6.0	84/0.3	0.80	1.20	17.50	7.50	31	3.30
10.0	80/0.4	1.00	1.20	21.40	8.80	45	1.91

L&T XLPE Agricultural Flat Cables - These wires are made of cross-linked polyethylene material with high continuous conductor temperature - 90°C and high intermittent overloading - 130°C. Since it has better corrosion resistance, it is suitable for alkaline hard water areas.

Flat Cable Selection Chart

Submersible Pumpset Cable Selection Chart for 415 V - Three Phase - 50 Hz

Length (m) HP	10	20	30	40	50	60	70	80	90	100	120	140	160	180	200	250	300	350	400	450	500
3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5	2.5	2.5	4	4	4	6	6	6
4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5	2.5	4	4	4	6	6	6	10	10
5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5	2.5	2.5	4	4	4	6	6	10	10	10	10
6	1.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5	4	4	4	6	6	10	10	10	10	16
7.5S	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	4	4	4	4	4	6	6	10	10	10	16	16	16
7.5D	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5	2.5	4	4	4	6	6	10	10	10
10	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5	2.5	2.5	4	4	4	6	6	10	10	10	10	16
12.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	4	4	4	4	4	6	6	10	10	10	16	16	16
15	2.5	2.5	2.5	2.5	2.5	2.5	2.5	4	4	4	4	6	6	6	10	10	10	16	16	16	16
17.5	4	4	4	4	4	4	4	4	4	4	6	6	6	10	10	10	16	16	16	25	25
20	4	4	4	4	4	4	4	4	4	6	6	10	10	10	10	16	16	16	25	25	25
25	4	4	4	4	4	4	4	4	4	6	6	10	10	10	10	16	16	25	25	25	35
30	6	6	6	6	6	6	6	6	6	6	10	10	10	10	16	16	25	25	25	35	35
40	10	10	10	10	10	10	10	10	10	10	10	16	16	16	25	25	25	35	35	50	50
50	16	16	16	16	16	16	16	16	16	16	16	16	16	25	25	35	35	50	50	50	70

Submersible Pumpset Cable Selection Chart for 220 V - Single Phase - 50 Hz

0.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5	2.5	4	4	4	6	6	6	10	10
0	1.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5	2.5	2.5	4	4	4	6	6	6	10	10	10	16	16
1.5	1.5	1.5	1.5	2.5	2.5	2.5	4	4	4	6	6	10	10	10	10	16	16	16	25	25	25
2	1.5	1.5	2.5	2.5	4	4	4	6	6	6	10	10	10	16	16	16	25	25	25	35	35
3	1.5	1.5	2.5	2.5	4	4	6	6	6	10	10	10	16	16	16	16	25	25	25	35	35
4	1.5	2.5	2.5	4	4	6	6	10	10	10	10	16	16	16	16	16	25	25	35	35	35
5	2.5	2.5	4	4	6	6	10	10	10	10	16	16	16	25	25	25	35	35	50	50	50

Note: 1. HP 7.5 D and above are STAR/DELTA motors

2. For STAR DELTA Starting reduce current by 1/3 for selecting suitable cable.

Conversion Table:
1 m = 3.28 ft.
1 ft = 0.305 m

Single Phase:

For other voltages the cable size is to be selected as follows:-

Calculated length = (220 + Volt) x actual length

Example: for a 3 HP 460 Volt motor and 100 meters actual cable length, calculated length = (220 + 460) x 100 = 48 m. The size of the cable to be selected for 48 m from the chart is 4 mm².

Three Phase:

For other voltages the cable size is to be selected as follows:-

Calculated length = (415 + Volt) x actual length.

Example: For a 20 HP motor at 350 Volt and 90 metres actual cable length, calculated length = (415 + 350) x 90 = 107 m the size of the cable to be selected for 107 m from the chart is 6 mm².

Electrical Data

Selection chart for Typical Domestic Loads*

Sr. No.	Items	Load / Wattage	MCB rating	Wire size Sq. mm
01	Fan	60 W	-	1
02	Lamp, Tubelight	40 W	-	1
03	Room Heater	200 W	1 A	1.5
04	Water Heater			
	8 ltrs	1200 - 2000 W	10 A	2.5
	15 ltrs	3000 - 4000 W	20 A	4
	60 ltrs	4000 - 6000 W	32 A	6
05	Immersion Heater	1000 W	6 A	1.5
06	Hot Plate - single	1000 W	6 A	1.5
07	Iron - non automatic automatic	500 W	3 A	1.5
		1000 W	6 A	1.5
08	Mixer / Juicer	300 W	2 A	1.5
09	TV / VCR	200 W	1 A	1.5
10	Music system	200 W	1 A	1.5
11	Refrigerator			
	165 ltrs	400 W	3 A	1.5
	285 ltrs	600 W	4 A	1.5
	350	750 W	6 A	1.5
12	Toaster	500 W	3 A	1.5
13	Vacuum Cleaner	400 W	3 A	1.5
14	Washing Machine			
	without heater	300 - 1300 W	10 A	2.5
	with heater	5000 - 6300 W	32 A	6
15	Water Cooler	700 W	6 A	1.5
16	Desert Cooler	300 W	2 A	1.5
17	Oven	750 W	6 A	1.5
18	Electric Kettle	1500 W	7.5 A	1.5
19	Air Conditioner			
	1 ton		10 A	2.5
	1.5 ton		16 A	4
	2 ton		16 A	4
20	Hair Dryer	1000 W	7.5 A	1.5
21	Microwave	800 W	6 A	1.5

Formula for Calculations :
 Incomer Rating : Single Phase = $\frac{\text{Total Load in Watts}}{230 \text{ volts}}$
 Three Phase = $\frac{\text{Total Load in Watts}}{3 \times 230 \text{ volts}}$

The above data is only for guidance and may vary for different manufacturers. The proper load of items should be checked for current requirement and appropriate Wire and MCB size should be accordingly chosen.

Max. Short Circuit current as per Transformer kVA*

Transformer Rating kVA	Full Load Current at 415 V A	Max. Short Circuit Current (kA)	
		4% impedance	5% impedance
25	35	0.875	0.7
40	56	1.4	1.1
63	88	2.2	1.8
100	139	3.5	2.8
125	174	4.4	3.5
160	223	5.6	4.5
200	278	7	5.6
250	348	8.7	7
315	438	11	8.8
400	560	14.2	11.3
500	695	17.4	13.9
630	876	21.9	17.5
800	1112	27.8	22.2
1000	1390	34.8	27.8
1250	1740	43.5	34.8
1600	2230	55.8	44.6
2000	2780	69.5	55.6
2500	3480	87	69.6

Derating of Wires*

Ambient Temp. °C	30	35	40	45	50
Rating factor	1.09	1.04	1	0.85	0.77

* Above data is indicative. L&T will not be liable for damage arising out of incorrect applications.

L&T Wire Range



FR House Wires

0.75 mm² to 16 mm²



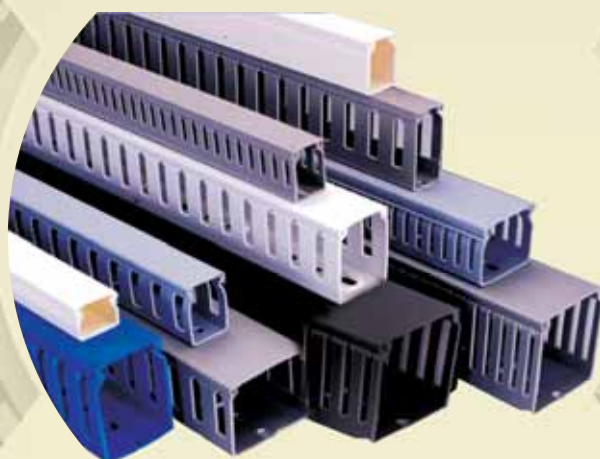
Flexible Wires

0.5 mm² to 240 mm²



Flat Cables

1.0 mm² to 35 mm²



Cable Ducts

Features

- Manufactured from specially compounded high-impact rigid polyvinyl chloride
- Will not peel, chip or crack
- Resists oil, salt solution and fungus
- Nonflammable, warp-proof and non-brittle
- High dielectric strength and withstands temperature upto 60°C
- Unique cover locking design prevents popping up of wires while removing cover
- Elongated slots at the bottom allow flexible mounting
- Heavy & robust sections
- All ducts are ROHS Compliant & FRLS (Fire retardant low smoke)

Applications

- Facilitates systematic Wiring
- Enhances aesthetics and clarity
- Permits faster connections, addition and fault tracing of wires
- Avoids bunching and tapping
- Provides complete electrical insulation
- CE marked

Material Specification

- Material : High impact, self extinguishing, warp-proof rigid PVC
- Other materials such as chlorine free PPO is available on request

Colour

- Standard : Greenish grey for B type and light grey for A type
- Other colours : Black, Ivory, White, Blue and Green are available for large quantities

Mechanical Properties

- Tensile strength - 390 kg/cm²
- Izod Impact strength - 7 kg.cm/cm

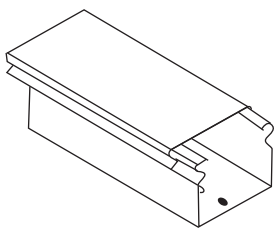
Electrical Properties

- Dielectric strength - 36 kV/mm
- Specific resistance - 6.1×10^{14}

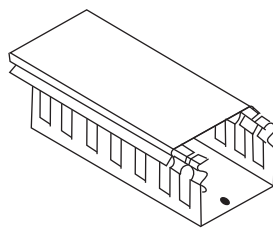
Thermal Properties

- Flammability - UL 94 VO

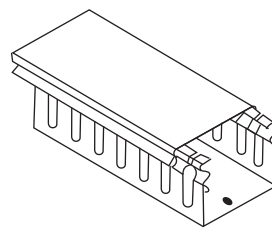
Slotting Styles (A & B Types)



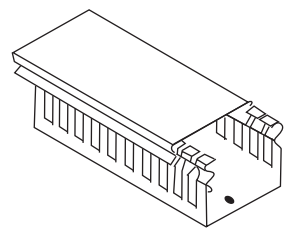
Unslotted
(US)



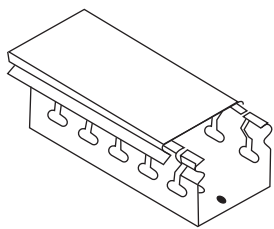
Standard Slotted
(S)



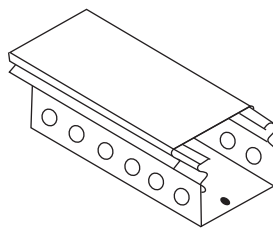
Straight Slotted
(L)



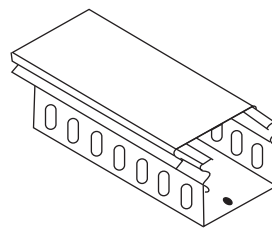
Thin Slotted
(T)



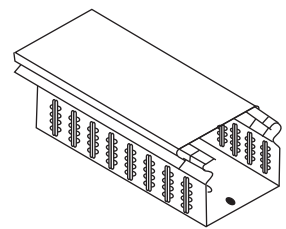
Horizontal Slotted
(H)



Circular Slotted
(C)

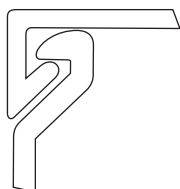


Oblong Slotted
(O)

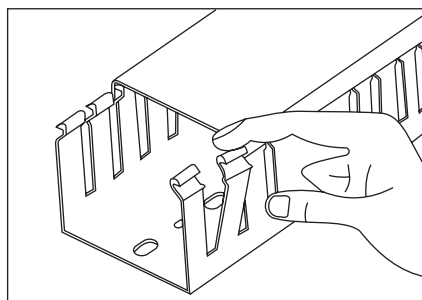
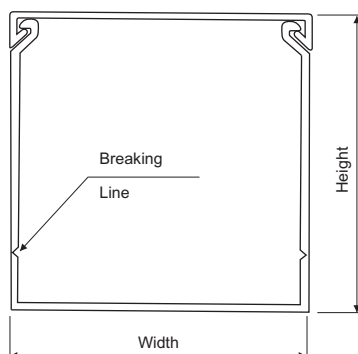


Multiple Slotted
(M)

B Type



Non slip cover design of minimum encumbrance and maximum grip



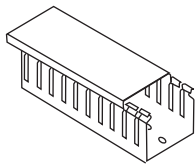
Snap-off side wall fingers permit enlarging slot for any size of wire or wire bundles. Requires no tools for cutting.

Channel with cover width x Height (mm)	Cable housing Capacity (numbers)			Standard Pack Channel with cover (in 1 mtrs)	Standard Pack Channel with cover (in 2 mtrs)	Available Slotting Style
	1.5 mm ² OD 3.18 mm (16 AWG)	2.5 mm ² OD 3.53 mm (14 AWG)	4 mm ² OD 4.01 mm (12 AWG)			
B25 x 30	37	30	23	100	36	S
B25 x 40	48	39	31	75	36	S, T
B25 x 60	72	57	45	50	18	S, T
B25 x 80	92	75	59	50	18	S, T
B25 x 100	126	105	81	50	18	S
B30 x 20	31	25	20	100	36	US
B40 x 40	81	65	51	50	18	S, T
B40 x 60	121	98	77	50	18	S, T
B40 x 80	160	130	102	50	18	S, T, O
B40 x 100	200	164	128	50	18	S, T
B50 x 100	135	195	152	30	12	S, T
B60 x 20	61	50	39	50	18	US
B60 x 40	123	99	78	50	18	S, T
B60 x 60	180	146	114	50	12	S, T
B60 x 80	246	199	156	40	12	S, T, O
B60 x 100	308	247	194	30	8	S, T
B72 x 64	234	190	149	32	18	S
B75 x 75	291	236	185	32	8	S
B75 x 100	394	333	251	25	8	S, T
B80 x 40	165	134	105	50	12	S, T
B80 x 60	251	203	159	40	12	S, T
B80 x 80	337	272	214	32	12	S, T, O
B80 x 100	416	332	248	24	8	S, T
B100 x 60	316	256	201	30	8	S, T
B100 x 80	425	344	270	25	8	S, T
B100 x 100	531	429	336	18	8	S, T
B120 x 80	499	405	318	18	8	S
B150 x 100	807	653	512	12	4	S, T

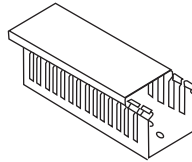
All dimensions in mm.

Cover Standard Pack		
Cover Code for B type	Size (with in mm)	Cover Standard Pack Total Length In mtrs
BC25	25	50
BC30	30	50
BC40	40	50
BC45	45	50
BC50	50	50
BC60	60	50
BC72	72	50
BC80	80	50
BC100	100	50
BC125	125	50
BC150	150	50

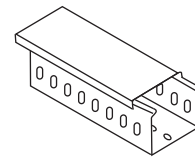
Slotting Style



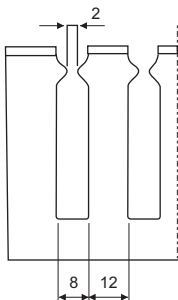
Standard Slot (S)



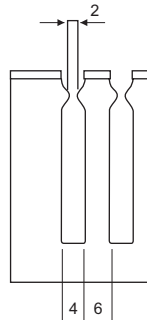
Thin Slot (T)



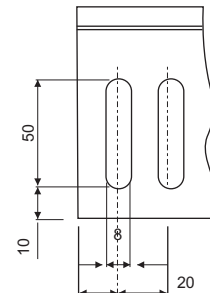
Oblong Slot (O)



Standard Slot



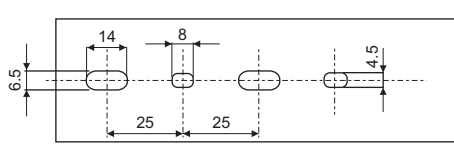
Thin Slot



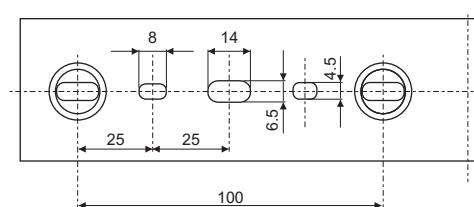
Oblong Slot

Bottom Slotting Style

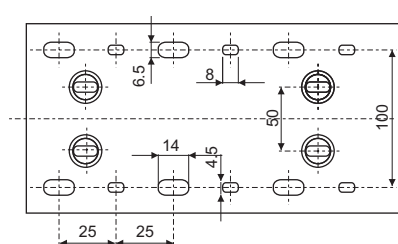
Duct Width : 25 mm, 30 mm



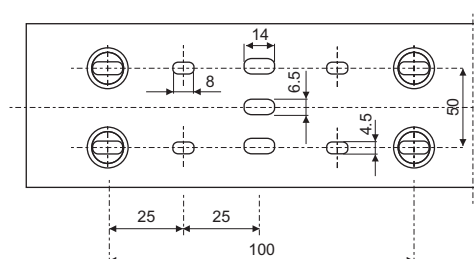
Duct Width : 40 mm, 50 mm, 60 mm, 72 mm, and 75 mm



Duct Width : 150 mm



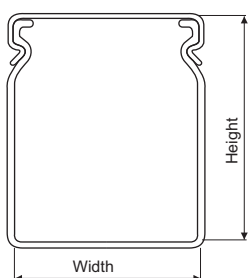
Duct Width : 80 mm, 100 mm and 120 mm



All dimensions in mm.

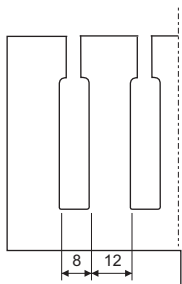
A Type

Specially designed profiles of duct and cover for fast and efficient locking.

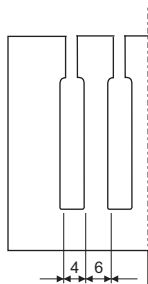


Channel with Cover Height X Width (mm)	Cable Housing Capacity (nos)			Available Slotting Styles	Standard Pack Channel with Cover	
	1.5 mm ² OD 3.53 mm (16 AWG)	2.5 mm ² OD 3.53 mm (14 AWG)	4 mm ² OD 4.01 mm (12 AWG)		1 mtrs	2 mtrs
A15 x 15	11	9	7	H	100	48
A15 x 25	19	15	12	H	100	48
A25 x 25	31	25	20	S, O, T	100	36
A30 x 25	37	30	23	S, O, T	100	36
A40 x 30	59	48	37	S, T	75	24
A45 x 25	56	45	35	S, O, C, M, T, L	75	18
A45 x 30	67	54	42	S, O, C, M, T, L	50	24
A45 x 45	100	81	63	S, O, C, M, T, L	50	18
A45 x 60	134	108	84	S, O, C, M, T, L	50	12
A60 x 25	74	60	47	S, O, T	50	18
A60 x 45	134	108	84	S, O, T	50	18
A60 x 60	178	145	112	S, O, T	50	12
A60 x 120	356	289	224	S	18	8
A75 x 45	167	135	105	S, T, C	40	12
A75 x 75	278	226	175	S, T, C	32	12
A80 x 80	316	257	199	S, T	25	12
A100 x 100	495	401	311	S	18	8

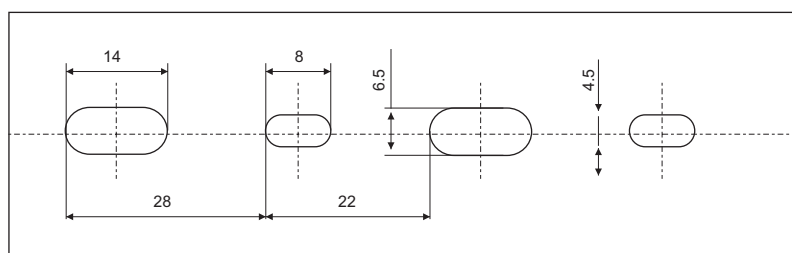
Note: All sizes are available in unslotted (us) style.



Standard Slot



Thin Slot



Bottom Mounting Slots for All Sizes

All dimensions in mm.

Cover Standard Pack		
Cover Code for A type duct	Size (with in mm)	Standard Pack Total Length In mtrs
AC15	15	50
AC25	25	50
AC30	30	50
AC40	40	50
AC45	45	50
AC60	60	50
AC75	75	50
AC80	80	50
AC100	100	50
AC125	125	50
AC150	150	50

Flame Retardent Low Smoke (FRLS) Cable duct

The flammability and smoke performance of rigid PVC (RPVC) plays a significant role in its selection for wiring duct applications. One of the most serious problems of general RPVC wiring duct combustion is that it produces large volume of smoke and toxic gases which becomes the main cause of fire related death. Apart from the irritant effect of HCl gas on the eyes and respiratory system, smoke can cause disorientation and hinder escape from the scene of the fire; which impedes the entry of fire fighters. Hence, the reduction of smoke emissions is clearly desirable.

FRLS PVC Cable ducts efficiently carry and protects wires and cables that are manufactured from specially compounded, low smoke, flame retarded and high impact rigid polyvinyl chloride (RPVC) resin. Modified RPVC wiring duct formulations are used with low doses of plasticizer and lubricants to get higher limiting oxygen index (LOI) and low smoke density rating (SDR) with excellent flame retardant (V0) characteristics. Our wiring duct offers an effective resistance against fire propagation and emits very negligible amount of smokes during fire catching.

It has a flammability rating of V0, REACH and RoHS compliance and has a continuous use temperature up to 140°F (60 °C). Wide range of colour, sizes and different slotting styles to meet the customer requirements.

FRLS Wiring Ducts Tests				
Test	Test Purpose	Test Standard	Criteria	Typical Values
Limiting Oxygen index (LOI)	Minimum Oxygen concentration for supporting combustion of wiring duct insulation at normal temperature	ASTM D 2863	Min. 29	Min. 40
Temperature index	Temperature index at which normal Oxygen content (21%) of Air will support combustion of wiring duct material	ASTM D 2863	>200°C	>200°C
Maximum Smoke density rating (SDR)	Indicates the visibility under fire	ASTM D 2843	<50%	<45%
Flammability class	Should be highly Flame retardant	UL - 94	V - 0	Passed

Technical Data

Properties	Units	Test Standard	Typical Values
General Characteristics			
Specific gravity	g/CC	ASTM D 792	<1.48
Heat Deflection temperature (HDT) @ 18.2Mpa	°F	ASTM D 648	Upto 160
Vicat softening point (VSP) at 5 kg load	°F	ASTM D 1525	Upto 185
Water absorption	%	ASTM D 570	0.045
Hardness - Shore D	D	ASTM D 2240	Max. 78
Burning Characteristics			
Flammability class	-	UL - 94	V - 0
Oxygen index test (LOI)	%	ASTM D 2863	Min. 40
Maximum Smoke density rating (SDR)	%	ASTM D 2843	< 50
Mechanical Characteristics			
Tensile modulus	Kg / cm ²	ASTM D 638	> 12000
Tensile strength at break	Kg / cm ²	ASTM D 638	> 390
Izod impact strength (Notched)	Kg.cm / cm	ASTM D 256	> 7.0
Compressive strength	Kg / cm ²	ASTM D 695	>1100
Electrical Characteristics			
Power factor	-	ASTM D 150	0.018
Dielectric constant	-	ASTM D 150	< 3
Dielectric Strength	Kv / mm	ASTM D 149	> 12
Surface resistivity	Ohm	ASTM D 257	> 1 x 10 ¹⁵
Volume resistivity	Ohm.cm	ASTM D 257	> 3 x 10 ¹⁶

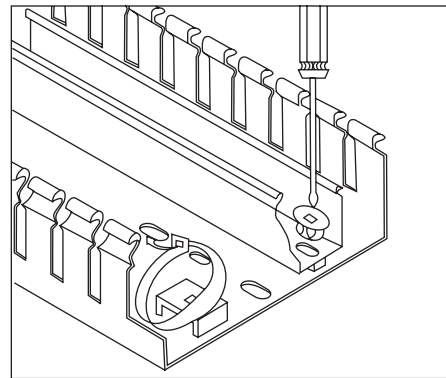
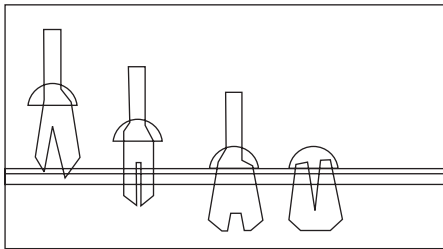
Accessories









HFFR: (Halogen Free Fire Retardent Cable Ducts)

HFFR Cable ducts are made from specially formulated compound, which does not release significant amount of toxic gases or corrosive gases when ignited in a fire. These wiring ducts are free from halogens such as fluorine, chlorine, bromine, iodine, and/or astatine. These are tested and confirms to EN 50085 and IEC 60754-2 for. These have maximum application temperature (+90°C) than PVC ducts. Hence can be used in halogen free or high temperature indoor applications. It confirms to UL94 - V0 and 960°C Glow wire test as per IEC 60695-2-11.

Applications:

- Oil, Gas and Petrochemical facilities
- Railways, Ships and Metro rails
- Outdoor Panels, data centres and power generation facilities



Sr. Nos.	Part Name	Figure	Ordering Code	Standard Packing
1	Fixing Lug		BFL 1	100
2	Cable Tie Attachment		BCT 1	100
3	Nylon Fastener		BNF 6 (6 mm) BNF 4 (4 mm)	100 100
4	Wire Retainer I		BWRT (Thin)*	100
5	Wire Retainer II		BWRS (STD)	100
6	Name Plate		BNPS (STD) BNPT (Thin)	100
7	Mounting Clip I		BMC 1	100
8	Mounting Clip II		BMC 2	100

* Pls. specify size & slotting style while Ordering.

Disclaimer for Rotary Switches, Cable Duct, Load Break Switches, House Wire

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We reserve the right to make changes, without prior notice, in the catalogue.

Products with CAT no. having, with or without, dot as suffix are same.



**Timing Devices &
Supply Monitors**

Timers and supply monitoring devices find their use in a wide variety of applications in the industry. L&T's reliable Timing devices and Supply monitors from GIC over the past 3 decades have provided the best solutions to its customers.

GIC product range includes:

- Time switches
- Timers
- Supply monitoring devices (Voltage and Current)
- Digital hour meter / Digital counter

Time Switches are used for fixed time based daily / weekly applications. They are ideal for lighting applications and are also used to control air-conditioners / coolers, geysers, conveyers, pumps & exhaust fans etc.

Timers are used to control processing times in a wide range of applications which includes star to delta changeover operations in Motor control / Starter panels, elevators, conveyor belt sequences, air conditioning systems, warning light systems etc.

The supply monitors ensure reliable detection of phase parameters such as phase loss, phase sequence and phase unbalance in all three-phase networks. They find application in HVAC, welding machines, elevators and cranes, etc.

The Current Monitoring Relay provides monitoring and protection of loads against overload, underload, phase loss, phase asymmetry and phase sequence faults. Their applications include all motor and pump protection panels with single phase and three phase supply.

The Earth Leakage Relay monitors, detects and protects power systems from earth leakage faults with wide selectable range of 30 mA to 30 A. They are widely used in mines and in Gen sets.

Standards for Timing Devices & Supply Monitors

EMI/EMC:		
Harmonic current emissions	IEC 61000 - 3 - 2	Ed. 3.0 (2005 - 11) Class A
Voltage flicker & fluctuation	IEC 61000 - 3 - 3	Ed. 2.0 (2008 - 06) Class A
ESD	IEC 61000 - 4 - 2	Ed. 1.2 (2001 - 04) Level II
Radiated susceptibility	IEC 61000 - 4 - 3	Ed. 3.0 (2006 - 02) Level III
Electrical fast transients	IEC 61000 - 4 - 4	Ed. 2.0 (2004 - 07) Level IV
Surge	IEC 61000 - 4 - 5	Ed. 2.0 (2005 - 11) Level IV
Conducted susceptibility	IEC 61000 - 4 - 6	Ed. 2.2 (2006 - 05) Level III
Power frequency magnetic field	IEC 61000 - 4 - 8	Ed. 1.1 (2001 - 03)
Voltage dips and interruption (AC)	IEC 61000 - 4 - 11	Ed. 2.0 (2004 - 03) Class B
Conducted emission	CISPR 14 - 1	Ed. 5.0 (2005 - 11) Class B
Radiated emission	CISPR 14 - 1	Ed. 5.0 (2005 - 11) Class B
Safety:		
Test voltage between input and output	IEC 60947 - 5 - 1	Ed. 3.0 (2003 - 11) 2 kV
Impulse voltage between input and output	IEC 60947 - 5 - 1	Ed. 3.0 (2003 - 11) Level IV
Single fault	IEC 61010 - 1	Ed. 2.0 (2001 - 02)
Insulation resistance	UL508	Ed. 17 (1999 - 01) > 2000 M
Leakage current	UL508	Ed. 17 (1999 - 01) < 3.5 mA
Environmental testing:		
Cold heat	IEC 60068 - 2 - 1	Ed. 6.0 (2007 - 03)
Dry heat	IEC 60068 - 2 - 2	Ed. 5.0 (2007 - 07)
Vibration	IEC 60068 - 2 - 6	Ed. 7.0 (2007 - 12) 5 g
Repetitive shock	IEC 60068 - 2 - 27	Ed. 4.0 (2008 - 02) 40 g, 6 ms
Non-repetitive shock	IEC 60068 - 2 - 27	Ed. 4.0 (2008 - 02) 30 g, 15 ms

Time Switches

Analog Time Switch

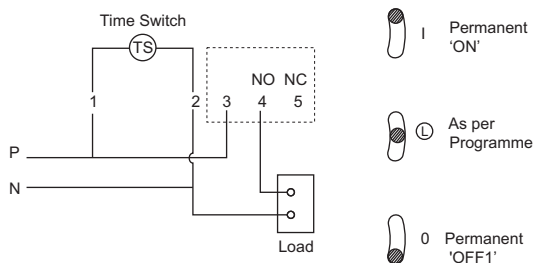
Type FM/1

- Modular construction
- Power reserve upto 150 hrs
- Inbuilt over-ride facility
- High switching capacity
- Tamper proof sealing
- 1 set of changeover, 240 V AC, 16 A (resistive)



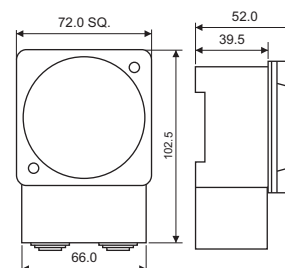
Product Description		Cat. No.
FM1 / Quartz Daily	240 V AC Base/DIN Mounting	J648B1
	110 V AC Base/DIN Mounting	J638B1
	240 V AC Flush Mounting	J648F1
	110 V AC Flush Mounting	J638F1
FM1 / Quartz Weekly	240 V AC Base/DIN Mounting	J848B1
	110 V AC Base/DIN Mounting	J838B1
	240 V AC Flush Mounting	J848F1
	110 V AC Flush Mounting	J838F1

Connection Diagrams

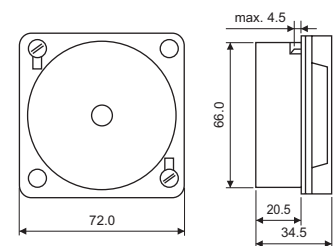


Overall Dimensions

Base/DIN Mounting



Flush Mounting



Time Switches		FM1 / QT
Supply voltage & frequency		240 V AC, 50/60 Hz
Power consumption		2 VA
Accuracy		±1.5 Sec / day at 20°C
Switching contact		1 C/O contact - AgCdO
Contact rating	Resistive	16 A @ 250 V AC
	Inductive (cosφ = 0.6)	8 A @ 250 V AC
	Incandescent lamp	1350 W
Shortest switching time	Daily	15 min
	Weekly	2 hrs
Power reserve		150 hrs
Memory locations		NA
Ambient temperature		-20°C to 55°C
Manual over-ride		Provided
Mounting		Flush, Base/DIN
Weight (unpacked)		185 gms (approx)

Time Switches

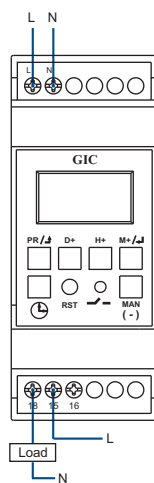
Crono & Pulse

- Precise time programming for daily/weekly/pulse applications
- 25 ON/OFF programs
- Weekend exclusion & weekly OFF programming
- LED Indication for relay status
- 12/24 hour display format
- 6 years battery reserve
- Simple reset & manual override
- Settable DST & keypad lock feature



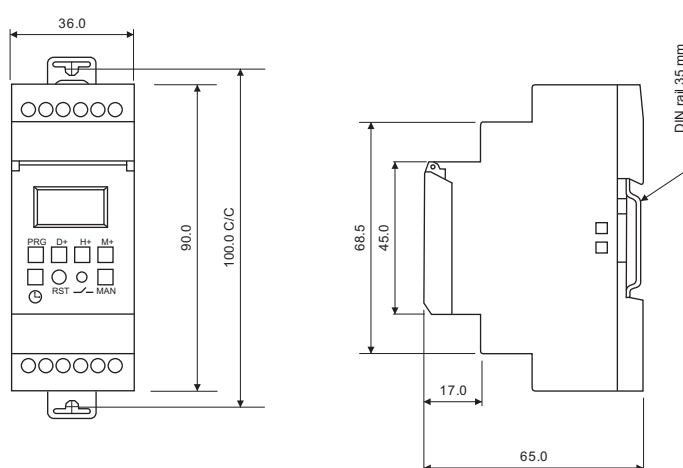
	Product Description	Cat. No.
Time Switch (Crono)	110 - 240 V AC 1 C/O Base/DIN 25 ON/OFF	67DDT0
	24 V DC 1 C/O Base/DIN 25 ON/OFF	6GHDT0
	12 V DC 1 C/O Base/DIN 25 ON/OFF	69HDT0
Time Switch (Pulse) *	110 - 240 V AC 1 C/O Base/DIN 16 Pulse	67DDT9
	24 V DC 1 C/O Base /Din 16 Pulse	6GHDT9
	12 V DC 1 C/O Base /Din 16 Pulse	69HDT9

Connection Diagrams






67DDT0, 67DDT9, 6GHDT0, 69HDT0

Overall Dimensions



Time Switches

Crono & Pulse

Cat. No.		Crono			Pulse		
		67DDT0	6GHDT0	69HDT0	67DDT9	6GHDT9	69HDT9
Supply voltage (Φ)		110 to 240 V AC (-20% to +10%) 50/60 Hz	24 V DC	12 V DC	110 to 240 V AC (-20% to +10%) 50/60 Hz	24 V DC	12 V DC
Power consumption (Max.)		6 VA					
Battery backup		Approx 6 years running reserve					
LED indication		Red LED for Relay status					
Clock format		Either AM / PM (12 h) or 24 h clock					
Reset		Programs and clock are reset to default					
Number of memory locations		25 ON / OFF programs			16 ON programs		
Number of operating modes		5 Modes <ul style="list-style-type: none">• Auto program run• ON Auto - Instant ON upto next Auto event• Auto OFF - Instant OFF upto next Auto event• ON - Continuous ON• OFF - Continuous OFF			3 Modes <ul style="list-style-type: none">• Auto program run• ON - Continuous ON• OFF - Continuous OFF		
Contact arrangement		1 C/O (SPDT)					
Contact rating:	Resistive	16 A (NO) and 5 A (NC) @ 240 V AC / 24 V DC					
	Incandescent lamps	1000 W					
	Inductive load (Cos Ø = 0.6)	6 A @ 250 V AC					
Minimum switching load		40 mA at 24 V DC					
Mechanical life		50 x 10 ³					
Electrical life		30,000 cycles @ rated load					
Minimum switching time		1 min			1 second		
Utilization category:	AC-15	Ue Rated voltage (V): 120/240, Ie Rated current (A): 3.0/1.5					
	DC-13	Ue Rated voltage (V): 24/125/250, Ie Rated current (A): 2.0/0.22/0.1					
Clock accuracy		±2 s / day max. over the operating temperature range					
Operating temperature range		-10°C to +55°C					
Humidity (Non-condensing)		95% Rh					
Maximum operating altitude		2000 m					
Degree of protection		IP20 for terminals, IP40 for enclosure					
Mounting		Base/DIN rail					
Enclosure		Flame retardant UL 94-V0					
Weight (unpacked)		110 gms (approx)					
Certification		  					

Time Switches

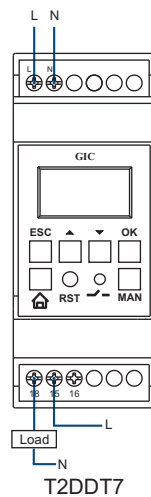
Astro Mini

- Astronomical time switch in 35 mm size
- Latitude / longitude precise to the minute with time zone
- Sunrise / sunset or twilight rise / set trigger modes
- DST, Offset, OFF hours, weekly OFF features
- 12 / 24 hour display format
- 6 years battery reserve
- Easy manual override
- Ideal for outdoor & street lighting application

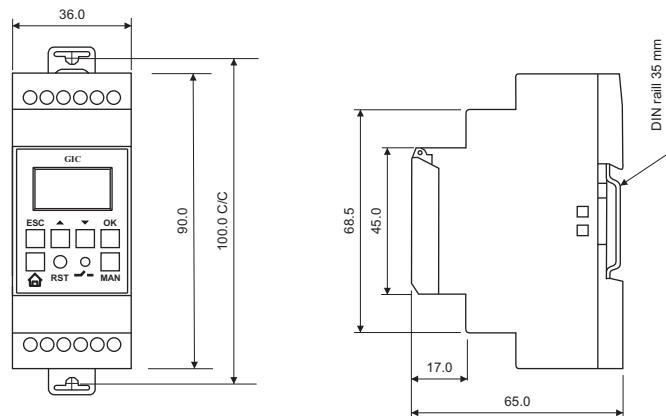


Description	Cat. No.
Astro Mini, 110 - 240 V AC 1 Phase 2 Wire (50/60 Hz), 1 C/O (SPDT)	T2DDT7

Connection Diagrams



Overall Dimensions



Operational Modes

Trigger Modes: The output can be programmed to switch ON/OFF at either sunrise / sunset or Twilight rise / set. The time settings of all outputs can either be based on sunrise / sunset or twilight. The trigger mode SRISE / SET will provide the reference time from sunrise / sunset, while the trigger mode TWILIGHT will provide the reference time from start / end of twilight.

OFFSET: The OFFSET feature is used to switch ON the output before or after sunset or switch OFF the output before or after sunrise. It may be necessary to have an output action before or after some time of sunrise / sunset. This OFFSET from sunrise / sunset can be achieved using OFFSET feature of the ASTRO Mini that allows OFFSET upto 99 minutes.


OFF-Hours: The OFF-Hours feature is used to switch OFF the output for a particular time period on daily basis. For example, OFF-Hours from 23:00 to 02:00 will switch the output OFF for three hours everyday.

Weekly OFF: The Weekly OFF feature is used to switch off the outputs during weekends or weekly off or weekly off days. This feature allows to define the Weekly off days including the start and end time. However ASTRO allows to program weekly off day (s) and related begin / end time. This feature offers energy savings by switching an output off on weekly-off day (s).

Day-light Saving Time (DST): DST is the period in which clocks in certain countries are set one hour or more ahead of standard time to effectively use natural daylight. ASTRO provides settings to easily define DST start and end months and DST offset time to effectively manage the shifting of clock year after year without any manual intervention. This is applicable for European countries only.

Time Switches

Astro Mini

Cat. No.		T2DDT7
Supply voltage (≡)		110 to 240 V AC (-20% to +10%) 50/60 Hz
Power consumption (Max.)		6 VA
Battery backup		Approx 6 years running reserve
LED indication		Red LED for Relay Status
Clock format		Either AM / PM 12 h or 24 h Clock
Reset		Programs and clock are reset to default
Modes		Auto ON, Auto OFF, Auto <ul style="list-style-type: none"> • Auto - As per user defined program settings • ON Auto - Instant ON upto next Auto Event • Auto OFF - Instant OFF upto next Auto Event
Programming		Based on:
		1) Latitude / Longitude precision to the minute, with time zone
		2) Option for both sunrise / set & twilight rise / set
		3) DST feature - 1 hour (with indication on the screen)
		4) Weekly OFF
		5) Offset facility
		6) OFF hours
Contact arrangement		1 C/O (SPDT)
Contact rating	Resistive	16 A (NO) and 5 A (NC) @ 240 V AC / 24 V DC
	Incandescent lamps	1000 W
	Inductive load (Cos Ø = 0.6)	6 A @ 250 V AC
Minimum switching load		40 mA at 24 V DC
Mechanical life		50 x 10 ³
Electrical life		30,000 cycles @ rated load
Minimum switching time		1 min
Utilization category	AC-15	Ue Rated voltage (V): 120 / 240, Ie Rated current (A): 3.0 / 1.5
	DC-13	Ue Rated voltage (V): 24 / 125 / 250, Ie Rated current (A): 2.0 / 0.22 / 0.1
Clock accuracy		±1s / day @ 25°C
Operating temperature range		-10°C to +55°C
Humidity (Non-condensing)		95% Rh
Maximum operating altitude		2000 m
Degree of protection		IP20 for terminals, IP40 for enclosure
Mounting		Base/DIN rail
Enclosure		Flame retardant UL 94-V0
Weight (unpacked)		110 gms (approx)
Certification		CE 

Time Switches

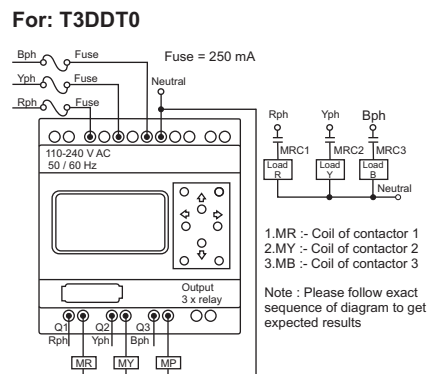
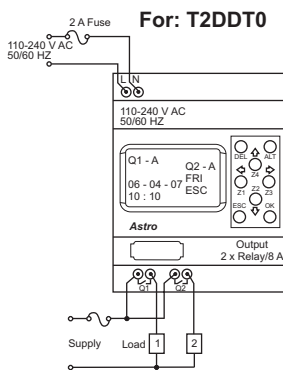
Astro

- Sunrise / sunset or twilight trigger mode
- Protection against Under voltage & Over voltage for Three Phase version
- ON / OFF / Pulse
- Midnight off hours selectable
- OFF-hours feature to alternate channel on alternate days
- Turn off outputs on weekly off-days in offices
- Automatic offset change for specified period
- Easy, fast and single key press manual override
- Designed for lighting applications
- Modbus communication for 3 phase version

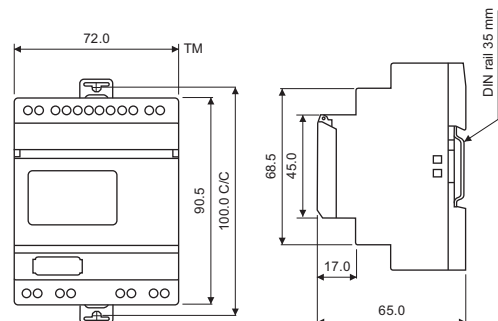


Description		Cat. No.
Astro time switch, 110 - 240 V AC (50-60 Hz), 1 Phase 2 Wire, 2 NO (SPST)		T2DDT0
Astro time switch, 110 - 240 V AC (50-60 Hz), 3 Phase 4 Wire (P-N), 3 NO (SPST)		T3DDT0
Accessories for Astro	Software on PC	TGDDT6
	Serial interface cable	GFDNN2S
	Memory card	GFDNN3M
	USB interface cable	GFDNN1

Connection Diagrams



Overall Dimensions



Additional Modes of Operation

Astro has following modes of operations in addition to Astro Mini's operational modes.

Operating Mode: ASTRO has three operating mode ON, OFF, and PULSE. An 'ON' or 'OFF' op-mode causes an output to be turned 'ON' or 'OFF' with respect to sunrise / sunset. A PULSE op-mode is used to have an output ON for few seconds from a particular time.

Season Mode: During rainy season or in cloudy atmosphere, sunlight may be insufficient. Hence different time offset needs be programmed to control light switching. User can program period of such season and the related time-offset. This feature helps switch lights early with respect to sun rise / set and automatically move back to original settings after the season period.




OFFSET: It may be necessary to have an output action before or after some time of sunrise / sunset. This offset from sunrise / sunset can be achieved using OFFSET feature of the ASTRO. It allows offset upto $\pm 10:59$ hrs.

Alternate Mode: In this mode, the off-hours feature is applied to alternate output on alternate days. This mode is useful to save energy due to off-hours feature and is useful to maximize load's life due to alternate action.

UV/OV Mode: When Under / Over Voltage condition prevails, load can be tripped off thereby protecting load from damage due to extreme voltage irregularities. Users can set Under & Over Voltage as per their requirement.

Time Switches

Astro

Cat. No.		T2DDT0	T3DDT0
Supply voltage (Un)		110 - 240 V AC (-20% to +15%), 50/60 Hz (1 Phase, 2 Wire)	110 - 240 V AC (-20% to +15%), 50/60 Hz (3 Phase, 4 Wire)
Power consumption		8 VA @ 300 V AC	
Operating temperature		-10°C to +50°C	
Switching contacts		2 NO	3 NO
Contact rating		8 A (Res.) @ 240 V AC and 5A (Res.) @ 30 V DC	
Power reserve (For clock only)		6 Years	
Utilization category	AC-15	Ue Rated voltage (V): 120/240, Ie Rated current (A): 3.0/1.5	
	DC-13	Ue Rated voltage (V): 24/125/250, Ie Rated current (A): 2.0/0.22/0.1	
Shortest switching time (Daily)		1 Minute	
Clock deviation (max)		±1 second per day over the operating temperature range	
Geographical Co-ordinates		Resolution 1°1'	
DST		Programmable	
Manual override		Provided use keys on keypad	
Display		Backlit LCD text display for diagnostic view	
Degree of protection		IP20 for terminals, IP40 for enclosure	
Mechanical life		10 million	
Electrical life		0.1 million	
Under/Over voltage (UV/OV) trip value		Not applicable	Settable UV: 0-220 V and OV: 130-330 V
Trip time for UV/OV		Not applicable	5-16 seconds
Recovery time		Not applicable	1-4 seconds
Mounting		Base/DIN rail	
Dimension (in mm)		72 x 90 x 67	
Weight (unpacked)		190 gms (approx)	208 gms (approx)
Certification		  	

Time Switches

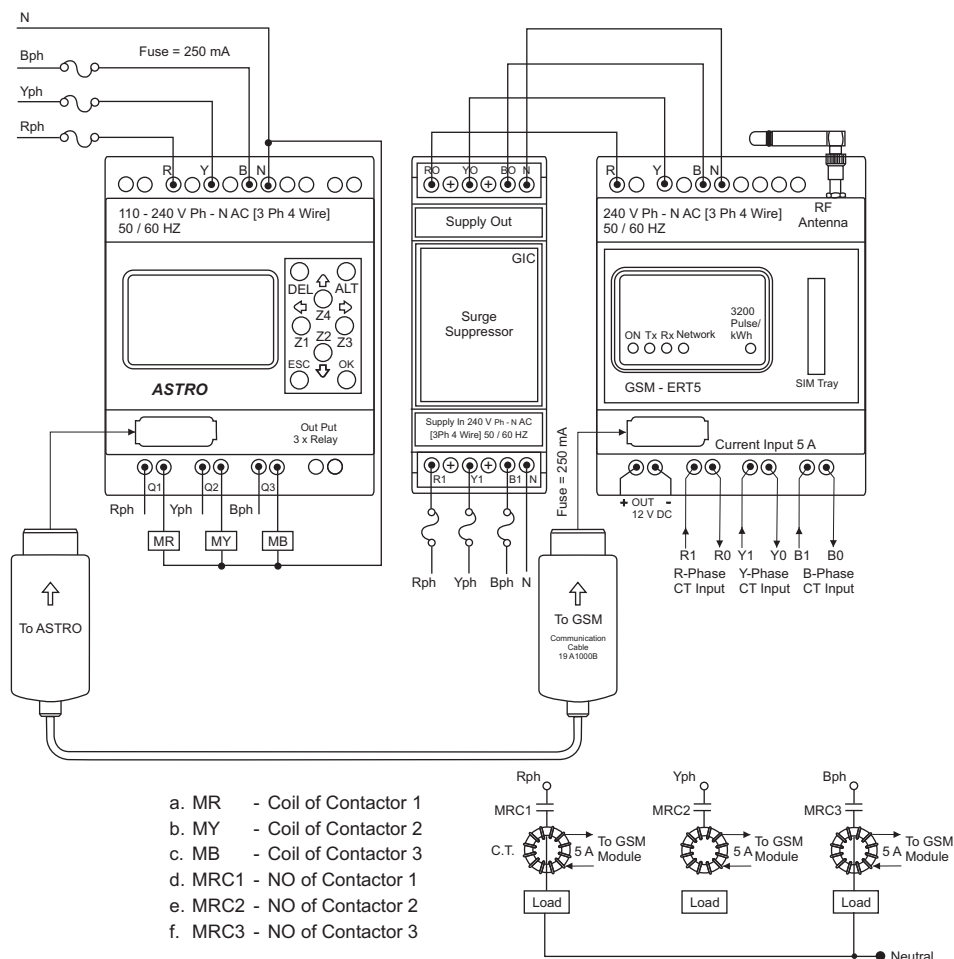
Astro using GSM Technology

- Energy meter functionality. Parameter like load current, supply voltage, power, energy can be known remotely
- ASTRO parameters set remotely using SMS queries. i.e. output mode, offset hrs etc, UV, OV settings
- Relay output can be override remotely using SMS query
- With the help of 'Auto Error Code Update' following onsite errors can be known remotely during output event
 - Under voltage
 - Over voltage
 - Over current
 - Output actuator short
 - Load open






Description	Cat. No.
Astro GSM module (GSM - ERT5), Remote side	19D20B00
Communication cable (TTL - TTL) between Astro & GSM module	19A1000B
Surge suppressor	19D2000C
Windows based application software for Astro	TGDDT6

Connection Diagrams



Time Switches

Astro using GSM Technology

Cat. No.	19D20B00 (ERT 5)	19C20C00
Supply voltage (⌚)	240 V AC (3 Phase, 4 Wire)	110 - 240 V AC (1 Phase)
Supply variation	-30% to +25%	
Frequency	50/60 Hz	
Active phase selection	Yes	
Operating temperature	-15°C to +60°C	
GSM type	Dual band 900 / 1800 GSM	
GPRS packet data	Class 10 coding scheme	
AT Command set suitability	N. A.	Yes
SMS type functionality	Data call through GSM, SMS	GSM 7.05 & 7.07
SIM holder	Text, Cell broadcast	
Antenna	Connected with the product	
Antenna impedance	50	
Energy measurement	Yes	
Energy measurement accuracy	Class 0.5	
Current sensing range	5 A	
CT ratio	Settable upto 40	
LED indications	Tx, Rx, Network, Power, Pulse out	
Pulse out rate	3200 pulses / kWh	
Auxiliary output	12 V DC, 200 mA	
General port connectivity	TTL port for connecting time-switch (Astro) USB through USB interface cable GFDNN1, RS 232 through serial interface GFDNN2S, RS 485 through TTL-RS485 converter G7XDTR4"	
Mounting	Base/DIN rail	
Enclosure	Flame retardant UL 94-V0	
Dimension (W x H x D) (in mm)	72 x 90 x 67	
Weight (unpacked)	190 gms (approx)	
Certification	  	

Note:

1. ERT5 can measure maximum 5 A current.

2. Maximum current measurement limit for ERT-5 is 200 A.

Eg. For CT selection if current required to be measured is upto 200 A then CT of 200:5 A (CT ratio 40) needs to be used.

Timers

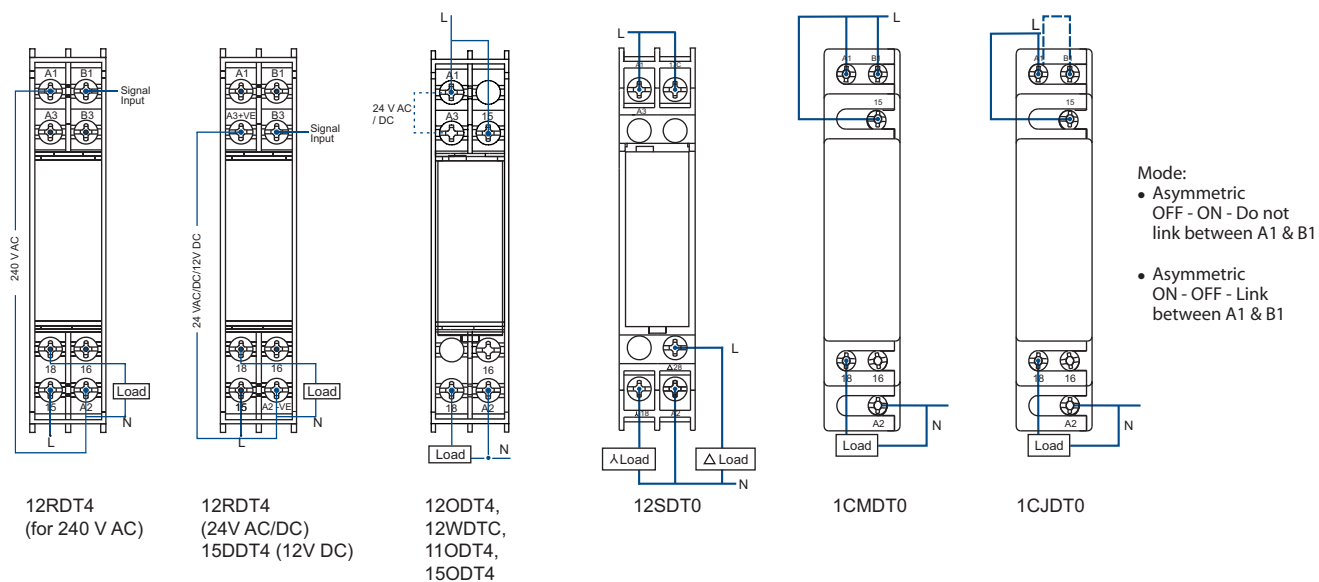
Micon 175

- Compact 17.5 mm wide
- Multiple timing ranges
- Low power consumption
- LED indication for power and relay status
- DIN rail and base mountable
- Integrated dual voltage selection

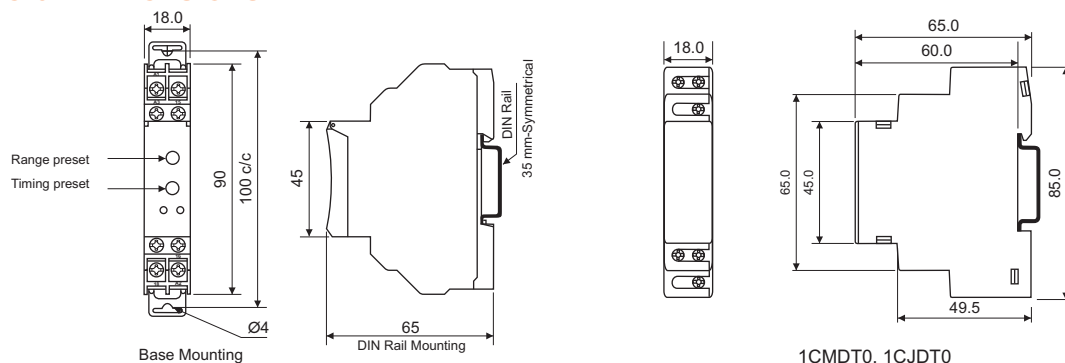


Type	Time	Voltage	Contact Arrangement	Cat. No.
ON Delay	0.3 sec - 30 hrs	240 V AC/24 V AC/DC	1 C/O	12ODT4
		110 V AC/24 V AC/DC		11ODT4
		12 V DC		15ODT4
ON Delay & Interval	0.1 sec - 100 hrs	240 V AC/24 V AC/DC	1 C/O	12WDTC
Star Delta Timer	3 sec - 120 sec	240 V AC	1 NO (Star)+1 NO (Delta)	12SDT0
	3 sec - 30 sec	240 - 415 V AC	1 C/O (Star)+1 C/O (Delta)	14SDT1S
Signal OFF Delay	0.3 sec - 30 hrs	240 V AC/24 V AC/DC	1 C/O	12RDT4
	0.3 sec - 30 hrs	12 V DC		15DDT4
Multifunction Timer	0.1 sec - 100 hrs	12 - 240 V AC/DC	1 C/O	1CMDT0
Asymmetrical ON/OFF & OFF/ON	0.1 sec - 100 hrs	12 - 240 V AC/DC	1 C/O	1CJDT0
One Shot	0.3 sec - 30 hrs	110 V AC/24 V AC/DC	1 C/O	11BDT4
		240 V AC/24 V AC/DC		12BDT4
		12 V DC		15BDT4

Connection Diagrams





Overall Dimensions

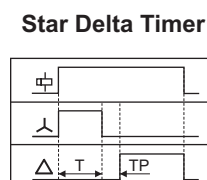
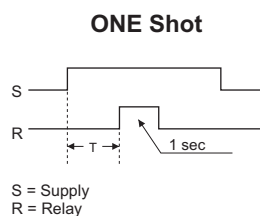
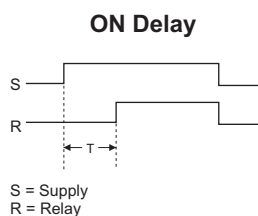


Timers

Micon 175

Cat. No.	12ODT4	11ODT4	15ODT4	12BDT4	11BDT4	15BDT4	12RDT4	15DDT4	12WDTC								
Nominal supply (Ur)	240 V AC/ 24 V DC/DC, 50/60 Hz	110 V AC/ 24 V AC/DC, 50/60 Hz	12 V DC	240 V AC/ 24 V DC/DC, 50/60 Hz	110 V AC/ 24 V AC/DC, 50/60 Hz	12 V DC	240 V AC/ 24 V DC/DC, 50/60 Hz	12 V DC	240 V AC/ 24 V DC/DC, 50/60 Hz								
Limits	-20% to 10% of Ur																
Power consumption	15 VA																
Contact arrangement	1 C/O																
Contact rating	240 V AC/ 28 V DC @ 5 A (resistive)																
Mechanical life	5 x 10 ⁶ operations (At no load & max switching frequency)																
Electrical life																	
a. 240 V AC pf = 1.0, rated max load current										1 x 10 ⁵ operations							
b. 240 V AC, pf= 0.4, rated max load current										4 x 10 ⁴ operations							
c. 30 V DC, L/R = 7 ms										6 x 10 ⁴ operations							
Switching frequency (Max)	1000 operations/hr																
Status indication on front panel	Red LED: Relay ON																
Modes available	ON Delay			One Shot			Signal OFF Delay		ON Delay & Interval								
Timing ranges 6 Ranges	3 s - 30 s, 3 m - 30 m, 3 hr - 30 hr																
Setting accuracy	±5% of full scale																
Repeat accuracy	±1%																
Variation in timing due to voltage change	±2%																
Variation in timing due to temperature change	±5%																
Reset time	100 msec (max)																
Supply indication on front panel	Green LED : Power ON																
Mounting	Base/DIN rail (35 mm sym.)																
Dimensions	17.5 ^{+0.5 -0.0} (W) x 65.0 (H) x 90.0 (D) mm																
Weight (unpacked)	75 gms (approx)																
Certification	 																

Timing Diagrams

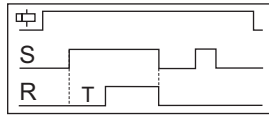


Timers

Micon 175

Functional Diagrams For 1CMDT0

SIGNAL ON DELAY [stn]



On application of input signal, the preset delay time period starts. On completion of the preset time, the output is switched ON and remains ON till the input signal is present.

CYCLIC ON/OFF [cnf]



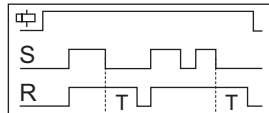
On application of supply voltage, the output is initially switched ON for the preset time duration (T) after which it is switched OFF for the same time duration (T). This cycle continues till the power supply is present.

CYCLIC OFF/ON [cfn]



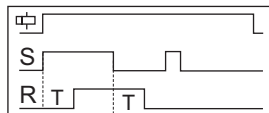
On application of supply voltage, the output is initially switched OFF for the preset time duration (T) after which it is switched ON for the same time duration (T). This cycle continues till the power supply is present.

SIGNAL OFF DELAY [sf]



On application of input signal to the timer, the output is immediately switched ON. When the input signal is switched OFF, the preset time delay period starts. On completion of the time period the output is switched OFF.

SIGNAL OFF/ON [sfn]

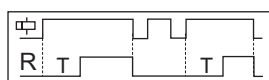


On application of input signal to the timer, the preset delay time period (T) starts. On completion of the time preset time, the output is switched ON. When the input signal is switched OFF, again the preset time delay period (T) starts. On completion of the time period the output is switched OFF.

Derived Modes

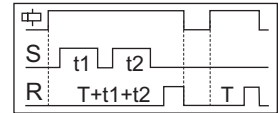
Select mode, 'Signal ON Delay' and short the connection between A1 - B1 before power ON. Select mode, 'Accumulative Delay ON Signal' and keep the connection between A1 - B1 open.

ON DELAY



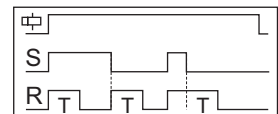
When supply power is applied to the timer, the preset delay time period starts. On completion of the preset time, the output is switched ON and remains ON till the input supply is present.

ACCUMULATIVE DELAY On SIGNAL [san]



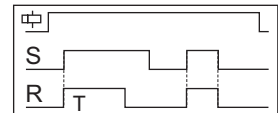
On application of supply voltage, the preset delay time period starts. If input signal is applied during this period, the preset time stops and resumes only when the input signal is removed. On completion of the preset time, the output is switched ON.

IMPULSE ON/OFF [inf]



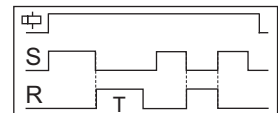
On application or removal of input signal to the timer, the output is immediately switched ON for the preset time duration (T). If the state of the input signal is changed during the preset time, the output does not change state only the time is reset.

LEADING EDGE IMPULSE [iL]



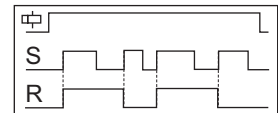
When input signal is applied to the timer the output is immediately switched ON. The output remains ON for the preset time duration (T) after which it is switched OFF. If the input signal is removed during the preset time, the output is immediately switched OFF.

TRAILING EDGE IMPULSE [it]



When the input signal to the timer is removed, the output is immediately switched ON for the preset time duration (T) after which it is switched OFF. If the input signal is applied during the preset time, the output is immediately switched OFF.

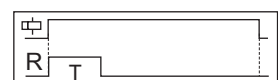
LEADING EDGE BISTABLE [sbi]



On application of input signal to the timer, the output is switched ON and remains ON even after the input signal is removed. On subsequent application of input signal, the output keeps on changing its state.

Select mode, "Leading Edge Impulse" and short the connection between A1 & B1.



INTERVAL





When supply power is applied to the timer, the output is instantly switched ON. On completion of the preset time, the output is switched OFF.

Timers

Micon 175

Cat. No.	12SDT0	14SDT1S
Timer description	Star delta timer	
Nominal supply (Ur)	240 V AC, 50/60 Hz	240 - 415 VAC, 50/60 Hz
Limits	-20% to 10% of Ur	
Power consumption	8 VA	
Contact arrangement	Star - 1 NO, Delta - 1NO	
Contact rating	240 V AC / 28 V DC @ 5 A (resistive)	
Mechanical life	5 x 10 ⁶ operations (At no load & max switching frequency)	
Electrical life	1 x 10 ⁵ operations	
Status indication on front panel	Red LED 1: Star ON, Red LED 2: Delta ON	
Timing range	3 s to 120 s	3 s to 30 s
Pause time	60 ms	
Reset time	150 ms (max)	
Setting accuracy	±5% of Full scale	
Repeat accuracy	±1%	
Degree of protection	IP20 for terminals, IP40 for enclosure	
Mounting	Base/DIN rail	
Dimensions	17.5 (W) x 65.0 (H) x 90.0 (D) mm	
Weight (unpacked)	75 gms (approx)	
Certification	 	

Cat. No.	1CMDT0	1CJDT0
Timer description	Multi function timer	Assymetrical timer
Modes	1) Signal ON delay	1) Assymterical ON / OFF
	2) Cyclic ON / OFF	2) Assymterical OFF / ON
	3) Cyclic OFF / ON	
	4) Signal OFF delay	
	5) Signal OFF / ON	
	6) Accumulative delay on signal	
	7) Impulse ON / OFF	
	8) Leading edge impulse	
	9) Trailing edge impulse	
	10) Leading edge bi-stable	
Derived modes	ON Delay, Interval	NA
Nominal supply (Ur)	12 - 240 V AC, 50/60 Hz	
Limits	-15% to +10% of Ur	
Power consumption	2 VA	
Contact arrangement	1 CO	
Contact rating	240 V AC / 28 V DC @ 5 A (resistive)	
Mechanical life	5 x 10 ⁶ operations (At no load & max switching frequency)	
Electrical life	1 x 10 ⁵ operations	
Status indication ON	Green LED: Power ON,	
Front panel	Yellow LED: Relay ON	
Timing range	0.1 s to 100 h	
Reset time	200 ms (max)	
Setting accuracy	±5% of full scale	
Repeat accuracy	±1%	
Degree of protection	IP20 for terminals, IP40 for enclosure	
Mounting	Base/DIN rail	
Dimensions	17.5 (W) x 65.0 (H) x 90.0 (D) mm	
Weight (unpacked)	75 gms (approx)	
Certification	 	

Timers

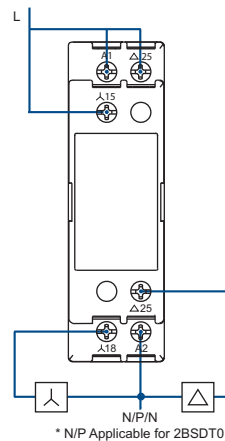
Micon 225

- Compact 22.5 mm wide Base/DIN rail Timer
- Multi-voltage, Multi-function & Multi-range timers
- Time range - 0.1 sec to 10 hrs
- Flush knobs for better security
- Finger proof terminals (IP20)

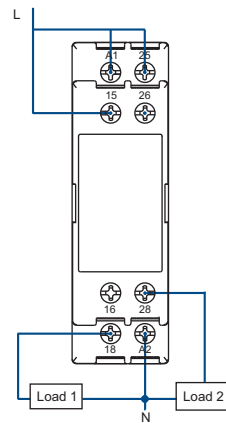


Type	Timing Range	Voltage	Contact Arrangement	Cat. No.
ON Delay	0.1 sec - 10 hrs	24 - 240 V AC/DC	2 C/O	2AODT5
Star Delta Timer	3 sec - 120 sec	24 - 240 V AC/DC	1 NO (Star)+1 NO (Delta)	2ASDT0
		240 - 415 V AC		2BSDT0
Multifunction Timer	0.1s - 120 days	24 - 240 V AC/DC	2 C/O (1 Inst+1 Delayed)	2A8DT6
Multifunction Multirange	0.1 sec - 10 hrs	24 - 240 V AC/DC	2 C/O	2A5DT5
		240 - 415 V AC		2B5DT5
Signal Base Multi function- Multirange	0.1 sec - 10 hrs	24 - 240 V AC/DC	1 C/O	2ANDT0
Multifunction Timer 6 Functions	0.1 sec - 10 hrs	24 - 240 V AC/DC	2 C/O (1 Inst+1 Delayed for 6th Mode)	2A6DT6
		240 - 415 V AC		2B6DT6
True OFF Delay	0.6 sec - 600 sec	24 - 240 V AC/DC	2 C/O	23GDT0
Asymmetrical ON/OFF	0.1 sec - 10 hrs	24 - 240 V AC/DC	2 C/O	2AADT5

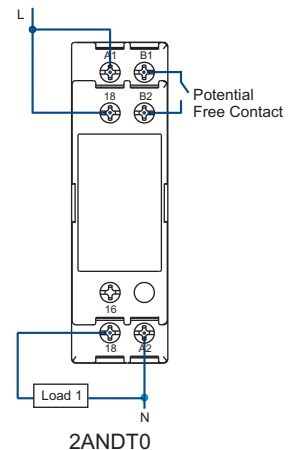
Connection Diagrams



2ASDT0, 2BSDT0

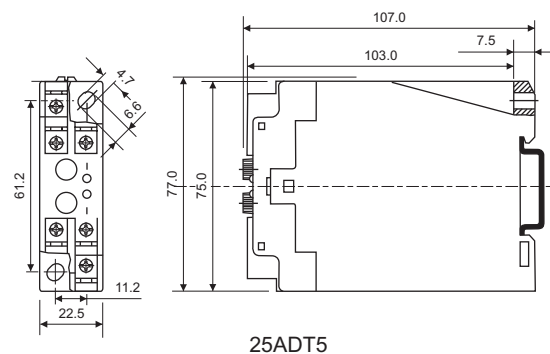
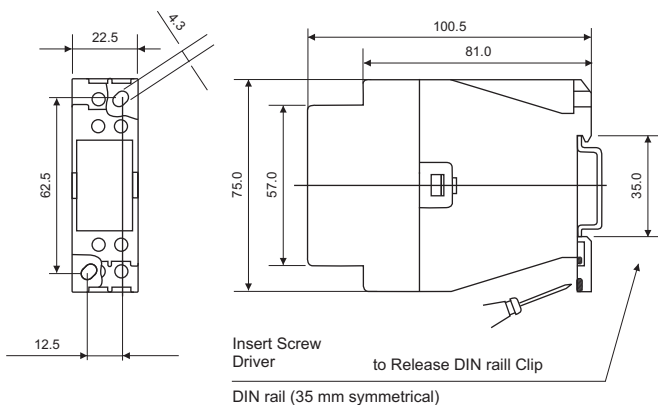


2AODT5, 2AADT5, 2A5DT5,
2B5DT5, 2A6DT6, 2B6DT6,
23GDT0,



2ANDT0


Overall Dimensions



25ADT5

Timers

Micon 225

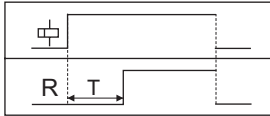
Cat. No.		2A5DT5	2ASDT0	2BSDT0	23GDT0
Functions		Multi-function with 5 modes	Star - Delta		True OFF delay
Supply voltage (㉟)		24 - 240 V AC/DC	24 - 240 V AC/DC	240 - 415 V AC	24 - 240 V AC/DC
Supply variation		-20% to +10% (of㉟)			
Supply frequency		50/60 Hz			
Power consumption (Max.)		4 VA	4 VA	7 VA	2.5 VA
Setting accuracy		±5% of full scale			±10% of full scale
Repeat accuracy		+1%			
Initiate time		Max. 100 ms	Max. 100 ms		
Reset time		Max. 200 ms	Max. 200 ms		
Set time (Ts)		0.1s - 10 h	3 s - 120 s		0.6 - 600 s
Pause time (P)		NA	60 ms, 90 ms, 120 ms, 150 ms		NA
Operating temperature		-15°C to +60°C			
Minimum energizing time		NA			1 sec
Max. operating altitude		2000 m			
Humidity		95% (Rh)			
LED indication		Green LED : Power ON; Red : Relay ON	Star relay ON; Delta relay ON		Green LED: Power ON
Housing		Flame retardant UL 94-V0			
Dimensions in mm (WxHxD)		22.5 x 75 x 100.5			
Mounting		Base/DIN rail			
Contact rating		5 A (Res.) @ 240 V AC / 28 V DC			
Mechanical life		10 million			
Electrical life		0.1 million			
Switching frequency		Electrical: 1800 operations / h at rated load			
Utilization category	AC-15	Rated voltage (Ue): 230 V / 125 V; Rated current (Ie): 1.3 A / 2.5 A			
	DC-13	Rated voltage (Ue): 250 V / 120 V / 24 V; Rated current (Ie): 0.1 A / 0.22 A / 2 A			
Contact arrangement		2 C/O	1 NO + 1 NO		2 C/O
Degree of protection		IP20 for terminal, IP40 for housing			
Weight (unpacked)		130 gms (approx)			120 gms (approx)
Certification		CE 			

Timers

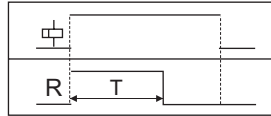
Micon 225

Timing Diagram

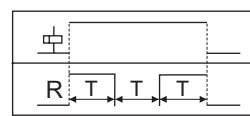
2A5DT5, 2B6DT6



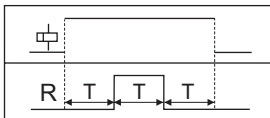
ON DELAY



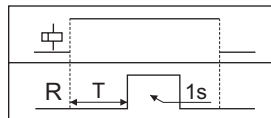
INTERVAL



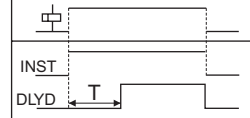
CYCLIC ON/OFF



CYCLIC OFF/ON



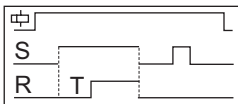
ONE SHOT



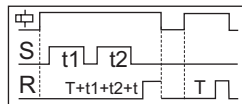
ON DELAY (1 INST. + 1 DLYD.)*

* Available only with Cat. No. 2A6DT6 & 2B6DT6

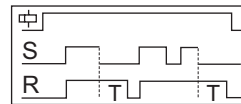
2ANDT0



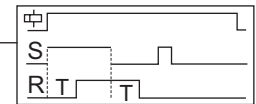
SIGNAL ON DELAY



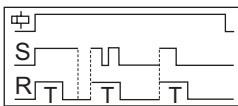
ACCUMULATIVE ON DELAY



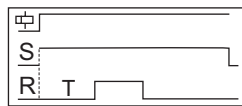
SIGNAL OFF DELAY



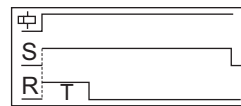
SIGNAL OFF/ON DELAY



LEADING EDGE IMPULSE

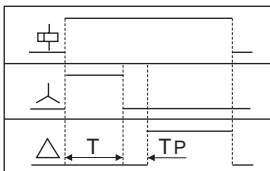


ON DELAY



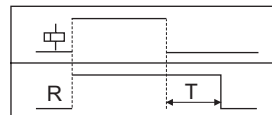
INTERVAL

2ASDT0, 2BSDT0



STAR - DELTA

23GDT0

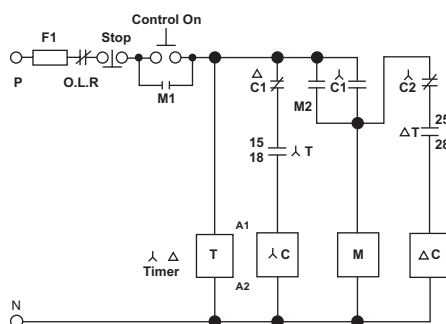


TRUE OFF DELAY

Star delta connection

Recommended Star - Delta Control Circuit:

(Below circuit is for STAR - DELTA Timer with 240 V AC Supply)



- 1) F1 - Mains Protection Fuse
- 2) O.L.R - Over Load Relay
- 3) M1 - First 'NO' Contactor Main Contactor
- 4) M2 - Second 'NO' Contactor Main Contactor
- 5) M - Main Contact of driving Motor
- 6) ΔC - 'NO' Contact
- 7) $\Delta C1$ - 'NO' Contact of Star Contactor
- 8) $\Delta C2$ - 'NO' Contactor Star Contactor
- 9) ΔC - Delta Contactor
- 10) $\Delta C1$ - 'NC' Contactor Delta Contactor
- 11) ΔT - Star Contact of Timer (Δ - Δ)
- 12) ΔT - Delta Contact of Timer (Δ - Δ)

Timers

Micon 225

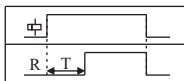
Cat. No.	2A6DT6	2ANDT0	2A0DT5	2AADT5	2B5DT5	2B6DT6
Functions	Multifunction (6 modes)	Signal based multifunction	ON delay	Asymmetric ON OFF timer	Multifunction timer 5 mode	Multifunction (6 modes)
Supply voltage	240-415 V AC	24-240 V AC/DC	24-240 V AC/DC	24-240 V AC/DC	240-415 V AC	240-415 V AC
Relay output	2 CO, 1Inst+1 delayed (for 6 mode)	1 C/O	2 C/O	2 C/O	2 C/O	2 CO,1Inst+1 delayed (for 6 mode)
Power consumption (Max.)	7 VA	4 VA	4 VA	4 VA	7 VA	7 VA

* Other features are same as given in previous Micon 225 table on page 108.

Operating Modes / Functions of Timers

☐ : SUPPLY, S: SIGNAL, R: RELAY OUTPUT,

T: SET TIME, TP: PAUSE TIME, T_{ON}: ON TIME, T_{OFF}: OFF TIME, T₁, T₂, T₃: POWER DOWN REGION

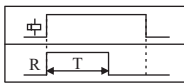
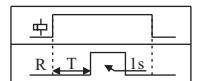


ON DELAY (DELAY ON ENERGIZATION):

On application of supply voltage to the timer, the preset delay time period starts. On completion of the preset time, the output is switched ON and remains ON till the supply voltage is present.

ONE SHOT (PULSE):

On application of supply Voltage to the timer, the preset delay time period starts. On completion of the preset time, the output is switched ON for a period of one second after which it is switched OFF.

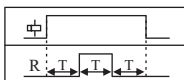
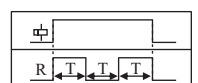


INTERVAL (IMPULSE ON):

On application of supply voltage to the timer, the output is instantly switched ON for the preset time period. On completion of the preset time, the output is switched OFF.

CYCLIC ON/OFF (SYMMETRIC):

On application of supply voltage, the output is initially switched ON for the preset time duration (T) after which it is switched OFF for the same time duration (T). This cycle repeats and continues till the supply is present.

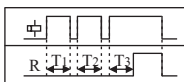
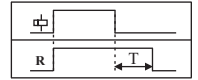


CYCLIC ON/OFF (SYMMETRIC):

On application of supply voltage, the output is initially switched OFF for the preset time duration (T) after which it is switched ON for the same time duration (T). This cycle repeats and continues till the supply is present.

TRUE OFF DELAY (POWER OFF DELAY):

On application of supply voltage, the output relay energizes instantly. On removal of supply voltage to the timer, the preset delay time period starts. On completion of the preset time, the output is switched OFF.

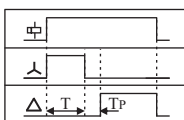


ON DELAY RETENTIVE (NO VOLT):

On application of supply voltage to the timer, the preset delay time period starts. On completion of the preset time, the output is switched ON and remains. If power fails during preset time duration, the elapsed time is retained by timer. Upon resumption of power, the remaining cycle continues.

ASYMMETRIC ON-OFF / CYCLIC ON-OFF (ASYMMETRIC):

On application of supply voltage, the output is initially switched ON for the preset 'ON' time duration (T) after which it is switched OFF for the preset 'OFF' time duration (T). This cycle repeats and continues till the supply is present. The ON time & OFF time are set independently.

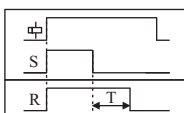
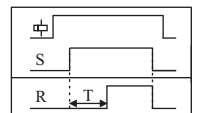


STAR DELTA:

On application of supply voltage, the output Star relay energizes instantly. On completion of the preset delay time, the output Delta relay energizes after a fixed pause time. This pause time (60, 90, 120, 150 ms) provides the shortest possible 'current off' pause and simultaneously ensures smooth change over.

SIGNAL ON DELAY:

On application of input signal to the timer, the preset delay time period starts. On completion of the preset time, the output is switched ON and remains ON till the input signal is present.



SIGNAL OFF DELAY:

On application of inputs signal the output relay energizes instantly. On removal of input signal to the timer, the preset delay time period starts. On completion of the preset time, the output is switched OFF.

Timers

Micon 225 Signal Based Multi - Function Timer

- Multi-function with Signal Start and Supply Start
- 16 Timing Functions selected by DIP switch
- Two independent relay outputs with either both relays timed delay or one timed delay and one instantaneous
- Wide Input Signal & Supply range - 24-240 V AC/DC
- Wide Timing Range - 0.1 s to 120 days

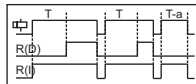


Functional Diagrams

⏻ : Supply Voltage, S: Input Signal, R: Relay Output, R(I): Instant Relay, R(D): Delayed Relay
T: Preset Time, TON: Preset ON Time, TOFF: Preset OFF Time, T-a: Timing Break Before completion

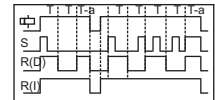
ON DELAY (Non Signal Based)

When supply is applied, timing starts and after the preset time duration 'T', output switches ON and remains ON till the supply is present.



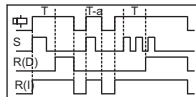
CYCLIC ON/OFF

When the supply applied and signal is closed, output switches ON for the preset time duration 'T' and then switches OFF for preset time duration 'T'. This cycle repeats while the supply is present. Changing the state of signal during 'T' does not affect the output.



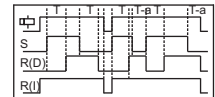
SIGNAL ON DELAY TYPE 1

When the input supply & signal are applied, timing starts and after preset time duration 'T' output switches ON & remains ON till the supply is present. Changing the state of signal during 'T' does not affect the output.



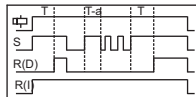
SIGNAL ON/ OFF Delay

Signal ON/OFF Delay: When the supply is applied and signal is closed, outputs switches ON after preset time 'T'. During the timing 'T' if signal is opened, the output switches ON immediately and OFF delay starts. Once this time period has elapsed the output switches OFF. During this OFF delay if signal is closed, the output switches OFF immediately and ON Delay restarts.



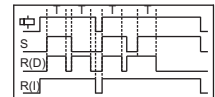
SIGNAL ON DELAY

Time commences as supply and signal is present. When input signal is opened, the timing resets. The output is switched ON at the end of the preset time duration 'T'. When output is ON if signal is opened then the output switches OFF.



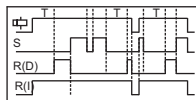
IMPULSE ON/OFF

When supply is applied and if signal closed or opened, output switches ON for Preset time duration 'T'. During time period 'T', changing state of input signal does not affect the output but resets the timing.



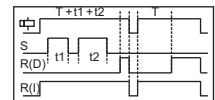
INVERTED SIGNAL ON DELAY

When supply is applied and signal is opened, preset time duration 'T' starts. On completion of the 'T', output switches ON. If the signal is closed during timing 'T', timing resets.



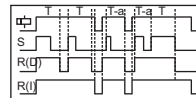
ACCUMULATIVE DELAY ON SIGNAL

Accumulative Delay ON Signal: On application of the supply voltage, the preset timing commences. Whenever signal is closed, timing pauses & resumes back only when the input signal is opened. The output switches ON at the end of the preset time duration 'T'.



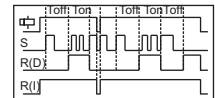
INTERVAL

When supply voltage is applied & signal is closed, output switches ON & timing function starts. If signal is opened and closed during the preset time, the timing restarts. After preset time 'T' has elapsed, the output switches OFF.



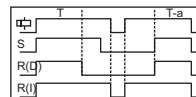
DELAYED IMPULSE

Delayed Impulse: When supply voltage is applied and signal is closed, output switches ON at the end of the preset time 'TOFF'. Then the preset ON time 'TON' starts irrespective of the signal state and remains ON till the completion of preset time duration 'TON'. If signal closed during the timing 'TOFF', the timing restarts but the output state remains unaffected. The signal change does not have any effect during the timing period 'TON'.



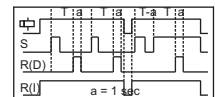
LEADING EDGE IMPULSE

When the supply applied and signal is closed, the output switches ON for preset time 'T'. After the completion of preset time 'T', the output switches OFF. If signal closed or opened during preset time duration 'T', the output remains unaffected.



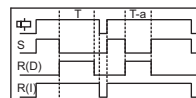
ONE SHOT

One Shot: When the supply voltage is applied and signal is closed, timing starts and after the preset time duration 'T', output switches ON for One sec. only.



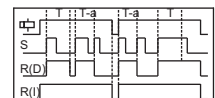
TRAILING EDGE IMPULSE

When supply voltage is applied and signal is opened, output switches ON for the preset time duration 'T'. After completion of preset time 'T', output switches OFF. If the signal is closed during preset timing 'T', output switches OFF & timing stops.



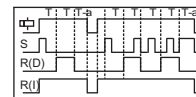
STEP MODE

Step Mode: When the supply voltage is applied and signal closed, output switches ON for preset time duration 'T', removal of the input signal during this time duration 'T' does not affect the output state. But if the signal is closed during time duration 'T', output switches OFF.



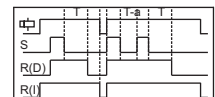
CYCLIC OFF/ON

When the supply applied and signal is closed, output switches OFF for the preset time duration 'T' and then switches ON for preset time duration 'T'. This cycle repeats while the supply is present. Changing the state of signal during 'T' does not affect the output.



SIGNAL OFF DELAY

Signal OFF Delay: When the supply is applied and signal is closed, output is switches ON. When signal is opened, the preset timing commences and output is switches OFF at the end of time duration 'T'. If signal is closed during timing period, then timing stops and restarts when signal.























Timers

Micon 225 Signal Based Multi - Function Timer

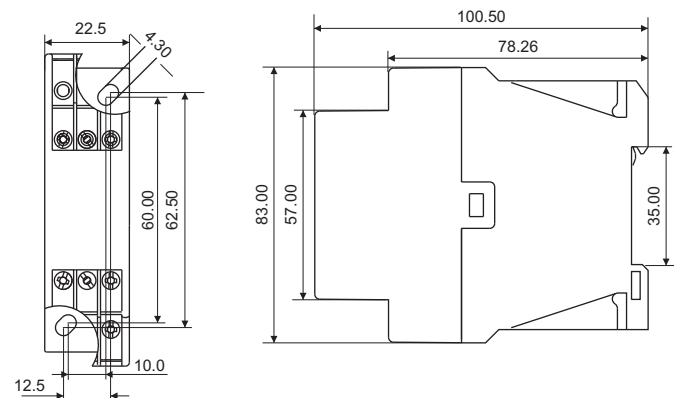
Cat. No.		2A8DT6
Description		Multi-function timer with 16 timing functions (refer page 111)
Supply Voltage (Φ)		24-240 V AC / DC
Supply Variation		- 20% to +10% (of Φ)
Frequency		50/60 Hz
Power Consumption (Max.)		3 VA
Signal Voltage	Low Range (B1L-A2)	24-60 V AC/DC
	High Range (B1H-A2)	85-265 V AC, 100-265 V DC
Signal Sensing Time		For AC Signals: 50 ms Max. For DC Signals: 20 ms Max.
Signal stabilization Delay		100 ms (Applicable at Power ON Only)
Setting Accuracy		$\pm 5\%$ of Full scale
Repeat Accuracy		$\pm 1\%$
Output	Relay Output	1 C/O (Delayed) & 1 C/O (Configurable as either Delayed or Instant)
	Contact Rating	5A @ 240 V AC / 28 V DC (Resistive)
	Electrical Life	1×10^5
	Mechanical Life	1×10^7
Set Time (Ts)		0.1 seconds to 120 Days
LED Indication on front panel		Green LED ON: Power ON, Amber LED ON :Relay ON for Delayed contact
Mounting		Base / DIN Rail
Max. Operating Altitude		2000 m
Housing		Flame retardant (UL 94-V0)
Operating Temperature		-10°C to +60°C
Storage Temperature		-20°C to +70°C
Dimension (W x H x D) (in mm)		22.5 X 83 X 100.5
Weight (unpacked)		130 g
Certification		CE 
Degree of Protection		IP20 for Terminals, IP40 for Enclosure

Selection of Function:

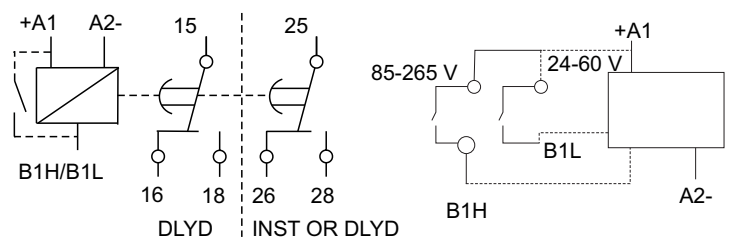
Operating Mode & timing can be selected by using DIP switches

Function		Function	
1 2 3 4	On Delay (Non Signal)	1 2 3 4	Signal OFF Delay
			
	Signal On Delay Type 1		Step Mode
	Signal On Delay		One Shot
	Inverted Signal On Delay		Delayed Impulse
	Interval		Accumulative Delay On Signal
	Leading Edge Impulse		Impulse ON / OFF
	Trailing Edge Impulse		Signal ON / OFF Delay
	Cyclic OFF / ON		Cyclic ON / OFF
1I + 1D or 2D Selection		Timing Multiplier Selection	
5		6	
	1I + 1D Operation		Timing = 'T' X 't' X 1
	2 Delayed Operation		Timing = 'T' X 't' X 12

Mounting Dimension (mm)



Connection Diagram



Timers

Motor Restart control Timer

- Single phase motor restart control timer with memory time
- Under voltage trip and ON delay



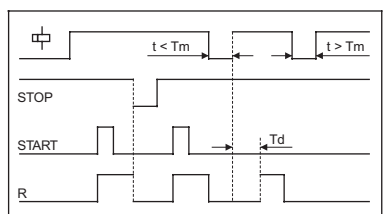
Description	Cat. No.
240 V AC, Motor restart control timer, 1 C/O	22LDT0
110 V AC, Motor restart control timer, 1 C/O	23LDT0

Working

The timer is used for instantaneous or delayed motor startup after a short-time power failure (max. 6 sec). The start occurs immediately if power supply is disrupted for less than 0.2 sec. If the power failure lasts longer, the relay activates its memory for a time that can be set to 0.2 to 6 sec, after which no automatic restart is possible.

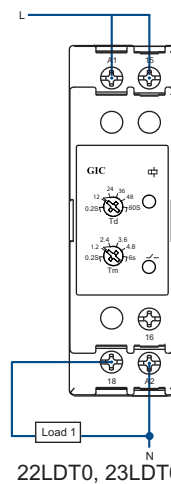
If power supply is restored while the memory period is elapsing, the relay commands a motor restart with a delay time from power supply restoration that can be set to 0.2 to 60 sec. A system stop cancels the memory function after 50 ms, and therefore the stop signal should be on for at least this time. The relay is non-sensitive to any control voltage fluctuation or disruption during or after the motor stop.

Timing Diagrams



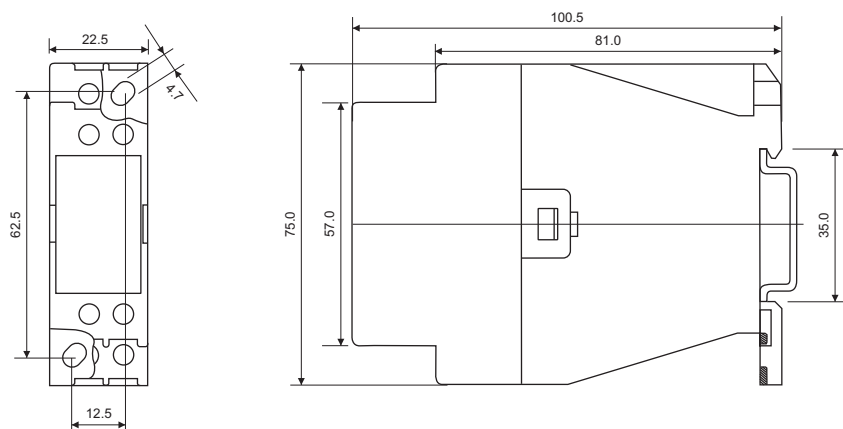
t: Power Fail Time; Td: Delay Time; Tm: Memory Time

Connection Diagram






22LDT0, 23LDT0

Overall Dimensions



Timers

Motor restart control Timer

Cat. No.		22LDT0	23LDT0
Nominal supply (Ur)		240 V AC, 50/60 Hz	110 V AC, 50/60 Hz
Limits		-20% to +10% of Ur	
Power consumption		4 VA	
Contact arrangement		1 C/O	
Timing ranges		Memory time TM: 0.2 to 6 s, Delay time Td: 0.2 to 60 s	
Trip voltage		176 V AC (±6 V)	80 V AC (±6 V)
Hysteresis		4 V AC to 10 V AC	
Reset time		200 ms (max)	
Relay output		1 C/O	
Contact rating		240 V AC / 28 V DC @ 5 A (resistive)	
Mechanical life		1 x 10 ⁷ operations	
Electrical life		1 x 10 ⁵ operations	
Operating temperature		-15°C to +60°C	
LED indication		Green LED: Power ON, Red LED: Relay ON	
Utilization category	AC-15	Rated voltage (Ue): 120/240 V, Rated current (Ie): 3.0/1.5 A	
	DC-13	Rated voltage (Ue): 24/125/250 V, Rated current (Ie): 2.0/0.22/0.1 A	
Setting accuracy		±5% of full scale	
Repeat accuracy		±1%	
Enclosure		Flame retardant UL 94-V0	
Degree of protection		IP20 for terminals, IP40 for enclosure	
Mounting		Base/DIN rail (35 mm sym.)	
Dimensions		22.5 x 75 x 100.5 (W x H x D) mm	
Weight (unpacked)		130 gms (approx)	
Certification		  	

Timers

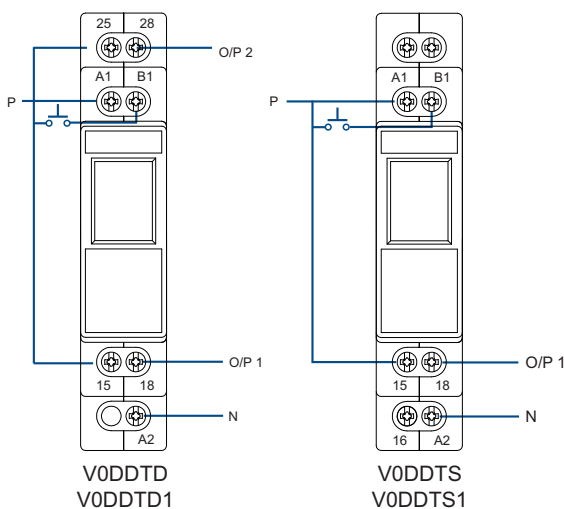
Digicon

- Multimode timer
- Timing ranges from 0.1 sec to 999 hrs
- Wide supply
- Selectable up / down counting modes to show elapsed / remaining time
- 3 Digit LC display for preset time and run time
- LED indication of relay status
- Tamper proof with key lock function
- Finger proof terminals
- Compact size (17.5 mm single width module)

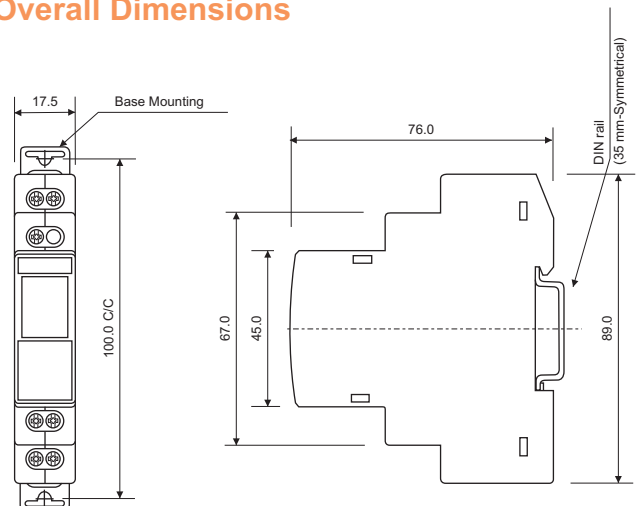


Description	Cat. No.
8 Functions, 0.1 sec - 999 hrs, 24 - 240 V AC/DC, 1 C/O Base/DIN mounting	V0DDTS
8 Functions, 0.1 sec - 999 hrs, 24 - 240 V AC/DC, 2 NO Base/DIN mounting	V0DDTD
18 Functions, 0.1 sec - 999 hrs, 24 - 240 V AC/DC, 1 C/O Base/DIN mounting	V0DDTS1
18 Functions, 0.1 sec - 999 hrs, 24 - 240 V AC/DC, 2 NO Base/DIN mounting	V0DDTD1

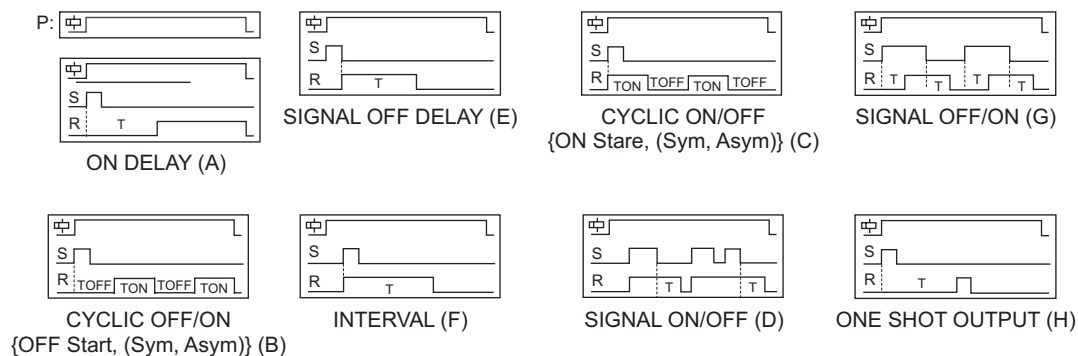
Connection Diagram



Overall Dimensions




Timing Diagrams for V0DDTS & V0DDTD



Note: 1. For Power-On operation (P) connect the terminal B1 to A1 permanently.

2. If the Signal (S) changes during the Timer Duration (T), it does not change the output relay but re-triggering takes places and the timer duration is extended.

Digicon

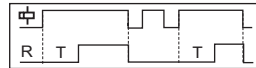
Cat. No.	V0DDTS	V0DDTD
Nominal supply (Un)	24-240 V AC / DC (-15% to +10%) (50/60 Hz, ±2 Hz)	
Power consumption (Max.)	~10 VA	
Contact arrangement	1 C/O	2 NO
Contact rating	8 A @ 240 V AC / 24 V DC (Resistive)	
Repeat accuracy	±0.5% of selected range	
Mechanical life	2×10^7	
Electrical life	1×10^5	
Switching frequency (Max.)	1800 Operations / hr @ rated load	
Status indication on panel	Red LED - Relay ON	
Modes available	1. ON Delay (A) 5. Signal OFF Delay (E) 2. Cyclic OFF / ON (Sym, Asym) (B) 6. Interval (F) 3. Cyclic ON / OFF (Sym, Asym) (C) 7. Signal OFF / ON (G) 4. Signal ON / OFF (D) 8. One Shot Output (H)	
Timing range	h:m m:s hr min sec 9:59 9:59 999 999 999 99.9 99.9 99.9	
Variation in timing due to voltage change	±2%	
Variation in timing due to temperature change	±5%	
Operating temperature limits	-10°C to +55°C	
Humidity (Non-condensing)	93% Rh	
Mounting	Base/DIN rail (35 mm Sym.)	
Terminal capacity	1.5 mm ² (Pin type lugs)	
Certification	CE cULus  RoHS Compliant	

Timers

Digicon

Timing Diagram For V0DDTS1 & V0DDTD1

ON DELAY [0]



On application of supply voltage, the preset time duration (T) starts. On completion of the preset time, the output is switched ON and remains ON till the supply voltage is present.

CYCLIC OFF/ON {OFF Start, (Sym, Asym)} [1]



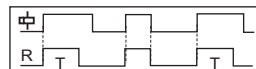
On application of supply voltage, the output is initially switched OFF for the preset 'OFF' time duration (TOFF) after which it is switched ON for the preset 'ON' time duration (TON). This cycle repeats and continues till the supply is present.

CYCLIC ON/OFF {ON start, (Sym, Asym)} [2]



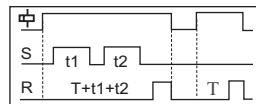
On application of supply voltage, the output is initially switched ON for the preset 'ON' time duration (TON) after which it is switched OFF for the preset 'OFF' time duration (TOFF). This cycle repeats and continues till the supply is present.

IMPULSE ON ENERGIZING [3]



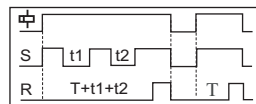
On application of supply voltage, the output is instantly switched ON for the preset time duration (T) after which it is switched OFF.

ACCUMULATIVE DELAY ON SIGNAL [4]



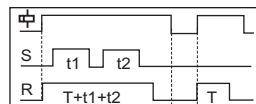
On application of supply voltage, the preset timing duration commences. When input signal is applied, the timing pauses and resumes only when the input signal is removed. The output is switched ON at the end of the preset time duration (T).

ACCUMULATIVE DELAY ON INVERTED SIGNAL [5]



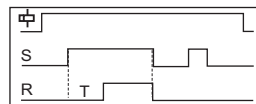
On application of supply voltage and input signal, the preset timing duration commences. When the signal is removed the timing pauses and resumes when the signal is applied. The output is switched ON at the end of the preset time duration (T).

ACCUMULATIVE IMPULSE ON SIGNAL [6]



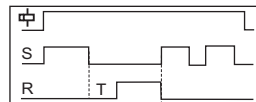
On application of supply voltage the output is switched ON & the preset timing duration commences. When the signal is removed the timing pauses and resumes when the signal is applied. The output is switched OFF at the end of the preset time duration (T).

SIGNAL ON DELAY [7]



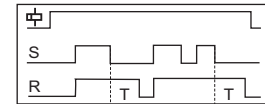
On application of input signal, the preset time duration (T) starts. On completion of the preset time, the output is switched ON and remains ON till the input signal is present.

INVERTED SIGNAL ON DELAY [8]



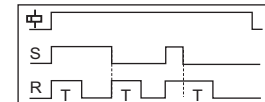
On application of supply voltage, the preset time duration (T) starts. When input signal is applied, the timing pauses & resumes only when the signal is removed. On completion of the preset time, the output is switched ON.

SIGNAL OFF DELAY [9]



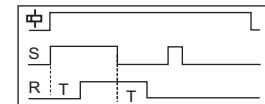
On application of supply voltage and input signal, the output is switched ON. When the signal is removed the preset time duration commences & the output is switched OFF at the end of the time duration.

IMPULSE ON/OFF [A]



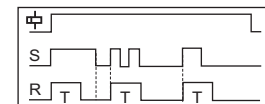
On application or removal of input signal, the output is switched ON & the preset time duration (T) starts. On completion of the time duration the output is switched OFF. When timing commences, changing the state of the input signal resets the time.

SIGNAL OFF/ON [b]



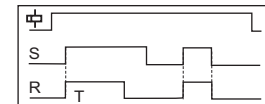
On application of input signal, the preset delay time period (T) starts. On completion of the preset time, the output is switched ON. On removal of input signal, the preset time period starts again and the output is switched ON when the preset time duration is complete.

LEADING EDGE IMPULSE1 [C]



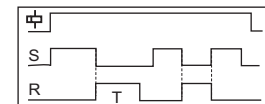
On application of input signal the output is immediately switched ON. The output remains ON for the preset time duration (T) after which it is switched OFF. If the input signal is removed during the preset time, the output remains unaffected.

LEADING EDGE IMPULSE2 [d]



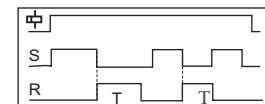
On application of input signal the output is immediately switched ON. The output remains ON for the preset time duration (T) after which it is switched OFF. If the input signal is removed during the preset time, the output is immediately switched OFF.

TRAILING EDGE IMPULSE1 [E]



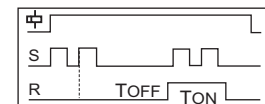
When the input signal to the timer is removed, the output is immediately switched ON for the preset time duration (T) after which it is switched OFF. If the input signal is applied during the preset time, the output is immediately switched OFF.

TRAILING EDGE IMPULSE2 [F]



When the input signal to the timer is removed, the output is immediately switched ON for the preset time duration (T) after which it is switched OFF. If the input signal is applied during the preset time, the output remains unaffected.

DELAYED IMPULSE [G]



On application of input signal, the preset 'OFF' time duration (TOFF) starts. the output is switched ON at the end of the preset 'OFF' time duration & the preset 'ON' time duration commences irrespective of signal level and remains ON till the completion of 'ToN'.

⏏: Supply Voltage, S: Input Signal, R: Relay Output

T: Preset Time, T: Preset ON Time, T: Preset OFF Time

Timers

Digicon

Cat. No.	V0DDTS1		V0DDTD1	
Nominal supply (U)	24 - 240 V AC / DC (-15 % to +10% of U) (50/60 Hz, ±2 Hz)			
Power consumption (Max.)	~10 VA			
Contact arrangement	1C/O		2 NO	
Contact rating	240 V AC / 24 V DC @ 8 A (resistive)			
Mechanical life	2 x 10 ⁷			
Electrical life	1 x 10 ⁵			
Switching frequency (Max.)	1800 Operations / hr @ rated load			
Status indication on panel	Red LED - Relay ON			
Modes available	Refer 'Timing diagrams of modes'			
Timing range	h:m	m:s	hr	min sec
	9:59	9:59	999	999 999
			99.9	99.9 99.9
Repeat accuracy	±0.5% of selected range			
Variation in timing due to voltage change	±2%			
Variation in timing due to temperature change	±5%			
Temperature limits	Operating: -10°C to +55°C			
Humidity (Non-condensing)	93 % Rh			
Mounting	Base/DIN rail (35 mm Sym.)			
Initiate time	40 ms			
Reset time	<200 ms			
Isolation (Between input and output)	2.5 kV			
Degree of protection	IP30 (Enclosure), IP20 (Terminals)			
Utilization category AC-15	Ue Rated voltage V: 120/240			
	Ie Rated current I: 3.0/1.5			
Utilization category DC-13	Ue Rated voltage : 125/250			
	V Ie Rated current I : 0.22/0.1			
Weight (unpacked)	85 gms (approx)			
Certification	CEULUSRoHSCompliant			

Timers

EM series- Auto Reset Synchronous Timer

- Time delay is independent of normal voltage and temperature fluctuations
- Black pointer gives clear indication of time set on a calibrated dial while the red one indicates the time left complete the cycle
- Automatic reset on de-energisation of the clutch coil
- Base mounting or flush mounting versions
- No-volt feature is available



Cat. No.	
EM 1000 Ordering Information	
Timing Ranges (SR) B <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
B 0.15-3.0 sec C 1.5-30 sec D 0.15-3.0 min E 1.5-30 min F 0.15-3.0 hrs G 1.5-30 hrs H 0.3-6.0 sec J 3.0-60 sec K 0.3-6.0 min L 3.0-60 min M 0.3-6.0 hrs N 3.0-60 hrs P 0.6-12 sec Q 6.0-120 sec R 0.6-12 min S 6.0-120 min T 0.6-12 hrs V 6-120 hrs	Delay 1 Standard ON delay 2 With 'NO VOLT' Mounting B Base Mounting F Flush (Door) Mounting Contact 1 1 Inst + 1 Del C/O 2 1 Inst + 2 Del C/O Voltage 3 110 V AC 50 Hz 4 240 V AC 50 Hz C 110 V AC 60 Hz D 240 V AC 60 Hz
Timing Ranges (MR) X 0.15 sec - 3.0 hrs Y 0.3 sec - 6.0 hrs Z 0.6 sec - 12.0 hrs	
Overall Dimensions Base Mounting	
Timing Diagrams	

Timers

EM series- Auto Reset Synchronous Timers

EM 1000

Supply variation	-20% to 10%
Frequency	95% - 105%
Nominal consumption	10 V AC max.
Timing range	0.15 sec to 120 hrs
Repeat accuracy	± 0.5% of FSR at constant frequency
Contact rating	1 Ins t + 1 delayed - AgCdO 1 Ins + 2 delayed - AgCdO (Optional) 6 A (resistive) @ 250 V AC
Switching frequency	3000 operations / hr (Max.)
Operating temperature	-5°C to 45°C
Housing	Conforms to IP30 - IS 13947
Dimension (W x H x D)	96 x 96 x 100 (in mm)
Mounting	Flush & Base
Terminal connection	1- 2.5 mm ² solid / stranded
Protection	IP20

Supply Monitors

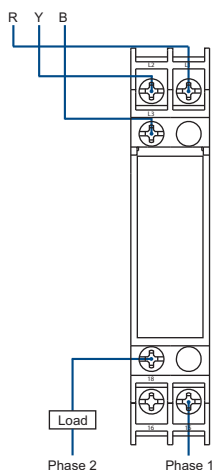
SM 175

- Compact 17.5 mm wide
- Protects against Phase loss, Phase reversal & Phase asymmetry
- Multi voltage: 3 x 208 to 3 x 480 V
- Selectable Under voltage / Over voltage & Asymmetry
- LED Indications for all faults for changed in settings - during run time for better security
- Adjustable time delay
- 1 C/O configuration



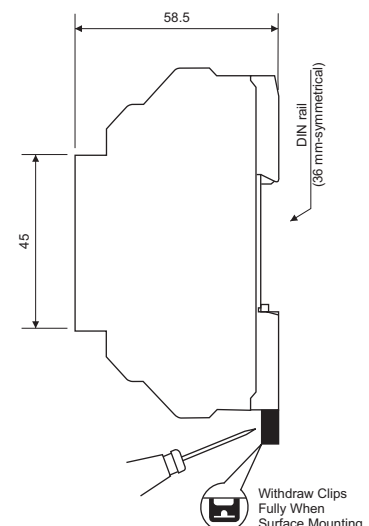
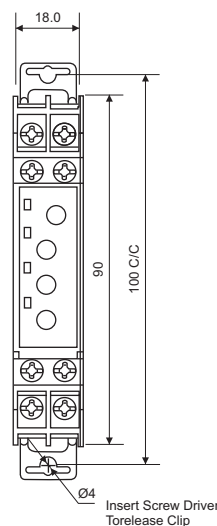
Type	Supply Monitoring Type	Time Delay	Assymetry	Voltage & Contact Arrangement	Cat. No.
SM175 (3 Ph, 3W)	Phase loss + Phase Sequence Monitoring	ON Delay 500 msec & OFF Delay 100 msec	—	208 - 480 V AC, 1 C/O (Steps of 208 - 220 - 380 - 400 - 415 - 440 - 480 V AC)	MK21D5
		ON Delay 500 msec & OFF Delay 100 msec	Phase Asymmetry (30% fixed)		MC21D5
		ON Delay 5 sec & OFF Delay 100 msec (0 to 15s Selectable)	Phase Asymmetry (5% to 15% variable)		MA21DN
	Phase Loss + Phase Sequence + Under Voltage + Over Voltage monitoring (UV: -2% to -20% of $\frac{U_n}{\sqrt{3}}$, OV: 2% to 20% of $\frac{U_n}{\sqrt{3}}$)	ON Delay 5 sec and Selectable OFF Delay (0 to 15 sec)	—		MD21DF
	Phase Loss + Phase Sequence + Under Voltage + Over Voltage (UV: -5% to -25% of $\frac{U_n}{\sqrt{3}}$, OV: 5% to 25% of $\frac{U_n}{\sqrt{3}}$)	Selectable ON Delay (0.5 to 15 sec) and OFF Delay 5 sec	Phase Asymmetry 10% fixed		MG21DH
		ON Delay 5s and Selectable OFF Delay (0 to 15 ses)			MG21DF

Connection Diagrams






MC21D5, MK21D5, MG21DF,
MD21DF, MG21DH, MA21DN

Overall Dimensions



Supply Monitors

SM 175

Cat. No.			MK21D5	MC21D5	MA21DN	MD21DF	MG21DH	MG21DF
Function			Phase loss and Phase sequence			Phase loss + phase sequence + Over Voltage + Under Voltage		
Supply Voltage (☎)			208 to 480 V AC, 3-Phase 3-Wire (-12% to +10%)					
Frequency			50/60 Hz					
Power consumption			3 VA (Max.)					
Adjustable nominal voltage (☎)			N. A.			208 - 220 - 380 - 400 - 415 - 440 - 480 V AC		
Trip levels	Under voltage		N. A.			-2% to -20% of ☎		-5% to -25% of ☎
	Over voltage		N. A.			2% to 20% of ☎		5% to 25% of ☎
	Asymmetry		N. A.	30% fixed	5% to 15%	N. A.	10% fixed	
Setting accuracy			±5% of full scale					
Time delay	Operate time		500 ms fixed		5 s fixed	5 s fixed	(< 0.5 to 100) s	5 s fixed
Setting accuracy ±10% of Full scale	Release time		100 ms fixed		(< 0.5 to 15) s	(< 0.5 to 15) s	5 s fixed	(< 0.5 to 15) s
	In the event of phase sequence or phase loss fault, release time is ~100 ms							
LED Indications	R/☎	Healthy	R Continuous ON			☎ Continuous ON		
		Phase reverse	R Flashing			☎ Flashing		
		Asymmetry	N. A.	R OFF	R OFF	N. A.		
	OV		N. A			Over voltage		
	UV		N. A.			Under voltage		
	AS		N. A.			Asymmetry		
	All OFF		Phase fail / Supply voltage > 577. 5 V AC					
	LED's flashing		N. A.			☎ Pot changed during running conditions		
Output	Relay		1 C/O , 5 A (Res.) @ 250 V AC / 30 V DC					
	Utilization category	AC-15	Rated voltage (Ue): 120/240 V; Rated current (Ie): 3.0/1.5 A					
		DC-13	Rated voltage (Ue): 24/125/250 V; Rated current (Ie): 2.0/0.22/0.1 A					
Mechanical life			3 x 10 ⁶ operations					
Electrical life			1 x 10 ⁵ operations					
Operating temperature			-15°C to +60°C					
Humidity (Non-condensing)			95% (Rh)					
Max. operating altitude			2000 m					
Degree of protection			IP20 for terminals, IP30 for housing					
Housing			Flame retardant UL 94-V0					
Mounting			Base/DIN rail (35 mm Symmetrical)					
Dimensions in mm (W x H x D)			18 x 59 x 90					
Weight (unpacked)			70 gms (approx)					
Certifications			  					

Supply Monitors

SM 301

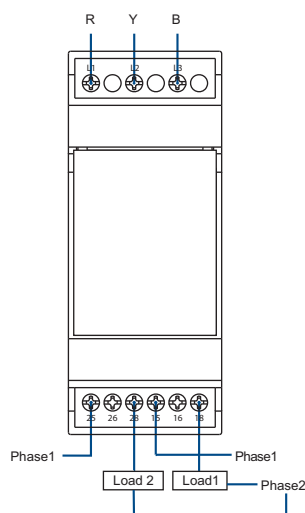
Supply Monitoring

- Protects against Phase loss, Phase reversal and Phase - Phase unbalance
- Compact 36 mm wide
- No auxiliary supply needed
- DIN rail and base mountable
- Voltage sensing principle
- Designed to meet industrial and agricultural segment needs



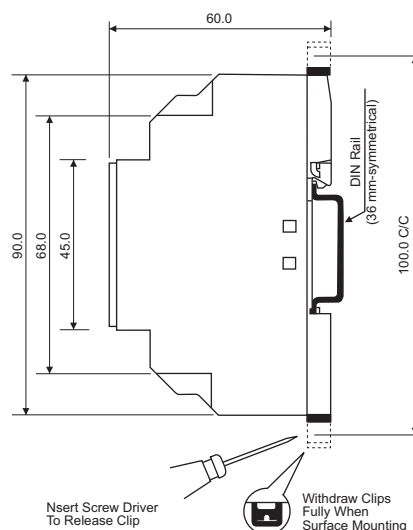
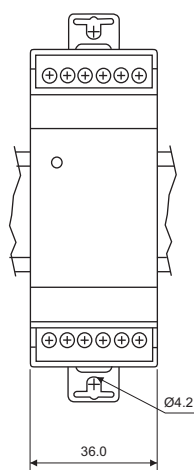
Type	Supply Monitoring Type	Time delay	Asymmetry	Voltage & Contact Arrangement	Cat. No.
SM301 (3Ph, 3W)	Single Phasing Preventor (SPP*) Fail Safe Type	ON Delay 2 sec and OFF Delay 7 sec	65 V AC Asymmetry	415 V AC, 1 C/O	MA51BC
				415 V AC, 2 C/O	MC21B5
			40 V AC Asymmetry	415 V AC, 1 C/O	MA51BK

Connection Diagram





MA51BC, MA51BK (1 CO), MC21B5 (2 CO)

Overall Dimensions



Supply Monitors

SM 301

Cat. No.		MA51BC	MC21B5	MA51BK
Supply voltage (φ)		3-Phase 3-Wire, 415 V AC, 50/60 Hz		
Power consumption		15 VA (Max.)		
Trip settings:	Phase - Phase unbalance	65 V AC ±10 (fixed)		40 V AC + 10
	Unbalance hysteresis	10-18 V AC		
Time delay	ON delay	2 sec (fixed)		
	OFF delay	7 sec (fixed)		
Relay output		1 C/O (SPDT)	2 C/O	1 C/O
Contact rating		5 A (Res) @ 250 V AC/28 V DC		
Electrical life		1 x 10 ⁵ operations		
Mechanical life		3 x 10 ⁶ operations		
LED indication	ON	Healthy		
	OFF	Phase Loss		
	Fast Blink	Assymetry		
	Slow Blink	Phase Sequence fault		
Setting accuracy		+10% of full scale		
Operating temperature		-10°C to +50°C		
Utilization category	AC-15	Rated voltage (Ue): 125 / 240 V, Rated current (Ie): 3 / 1.5 A		
	DC-13	Rated voltage (Ue): 125 / 240 V, Rated current (Ie): 0.2 / 0.1 A		
Humidity (Non-condensing limits)		Max. 95%		
Max. operating altitude		2000 m		
Degree of protection		IP20 for terminals, IP40 for housing		
Housing		Flame retardant UL 94-V0		
Mounting		Base/DIN rail (35 mm Symmetrical)		
Dimensions in mm (W x H x D)		36 x 60 x 90		
Weight (Unpacked)		120 gms (approx)		
Certifications		 		

Supply Monitors

SM 301 (Non Fail Safe Type)

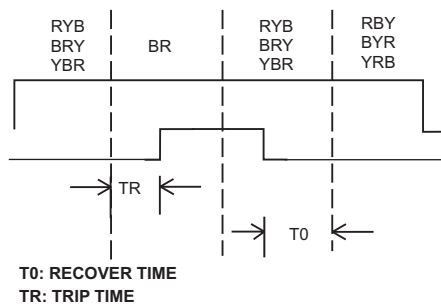
Supply Monitoring

- Protects against Phase loss, Phase reversal and Phase - Phase unbalance
- Monitors own supply
- Phase Loss detection
- Failure due to Asymmetry 30%
- Fixed Recover Time
- Trip Time Delay
- SPDT Relay output (5A, Resistive)
- LED indication for failure conditions
- DIN rail & base mounting
- Energies to trip relay (Non-Fail safe)
- Failure of any of the three phases

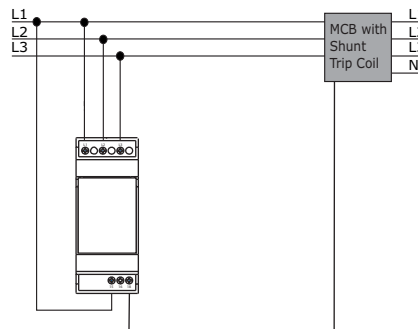


Type	Supply Monitoring Type	Time Relay	Asymmetry	Voltage & Contact Arrangement	Cat. No.
SM301 (3Ph, 3W)	Single Phasing Preventor (SPP*) Non Fail Safe Type	OFF Delay 500 msec and Recover Delay 2 Sec	30% Fixed	415 VAC, 1 C/O	MA59B5

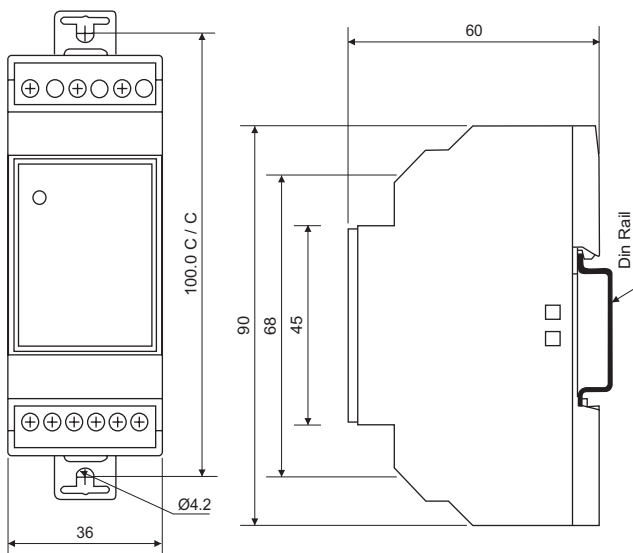
Waveform



Connection Diagram for (Non Fail Safe Type)



Overall Dimensions



Technical Specification

Cat. No.:			MA59B5
Functions			Phase and Voltage Control
Supply Voltage (ϕ)			3-Phase 3-Wire, 415 V AC
Supply Tolerance			-25% to +10% of ϕ
Frequency			50 / 60 Hz
Power Consumption			4 VA (Max.)
Trip Conditions	Asymmetry/Phase Fail		30% (+ /- 4.4%)
	Hysteresis		7 % (+/- 4.4 %)
	Phase Reverse		NA
	Under Voltage		NA
	Over Voltage		NA
Time Delay	Recovery Delay		2 sec
	Trip Delay		≤ 500 msec
LED Indication	RED LED	Condition/Faults	Indication or Status of LED
		Healthy Power ON	Continuous ON
		Phase Asymmetry	Blink (200 msec ON, 200 msec OFF)
		Phase Reverse	NA
		Under Voltage	NA
		Over Voltage	NA
Relay Output	Contact Arrangement		1 C/O
	Contact Rating		5A (Res.) @ 240 V AC / 30 V DC
	Contact Material		Ag Alloy
Mechanical Life Expectancy			1 x 10 ⁶ Operations
Electrical Life Expectancy			1 x 10 ⁵ Operations
Operating Temperature			-10°C to +55°C
Storage Temperature			-20°C to +70°C
Humidity (Non-Condensing limits)			Max. 95%
Max. Operating Altitude			2000 m
Degree of Protection			IP20 for Terminals; IP40 for Housing
Pollution Degree			Type II
Housing			Flame Retardant UL 94-V0
Mounting			Base / Din-Rail (35 mm symmetrical)
Dimensions in mm (W x Hx D)			30 x 60 x 90
Weight (Unpacked)			120 g Approx.
Certifications			CE, RoHS

Supply Monitors

SM 500

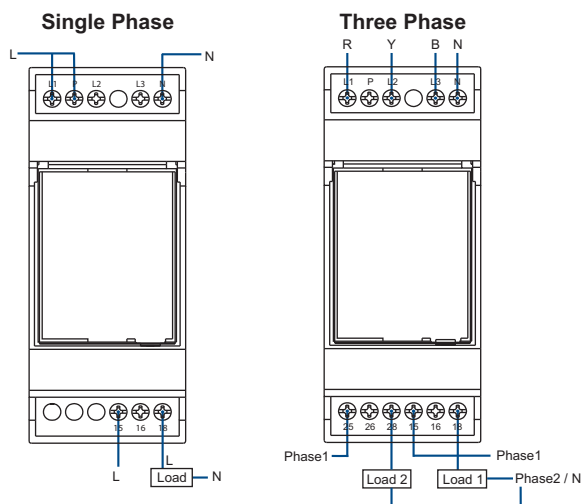
Three Phase Four Wire Voltage Monitoring

- Protects against Phase loss, Phase reversal and Phase-Phase unbalance
- Can be configured for 3 phase 4 wire or 1 phase system
- Selectable Over / Under voltage trip level
- Adjustable time delay
- LED indications for power and fault conditions
- Voltage sensing principle
- 1 C/O or 2 C/O configuration



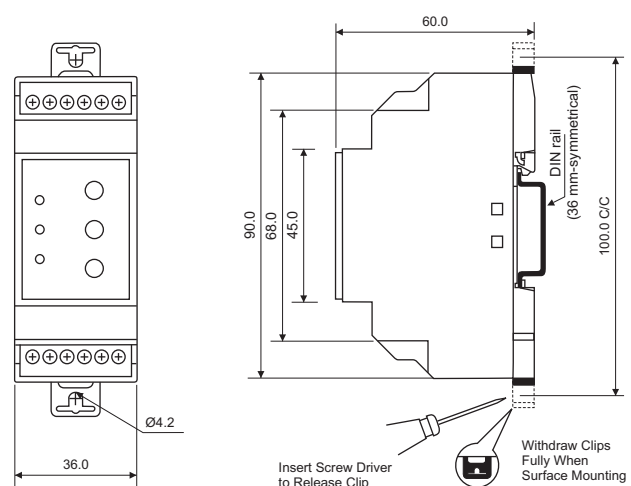
Type	Supply Monitoring Type	Time delay	Asymmetry	Voltage & Contact Arrangement	Cat. No.
SM500 (3 Ph / 1 Ph, 4W)	Selectable Under Voltage + Selectable Over Voltage	Selectable ON Delay (0 to 15 min)	-	240 V AC, 1 C/O	MD71B9
		Selectable ON Delay (0 to 15 sec)	-		MD71BH
		Selectable OFF Delay (0 to 15 sec)	-		MD71BF
	Single Phasing Preventor + Selectable Under Voltage + Selectable Over Voltage	Selectable ON Delay (0 to 15 min) & OFF Delay 5 sec	Phase Asymmetry 10% fixed	240 V AC, 2 C/O	MG73B9
		Selectable ON Delay (0 to 15 sec) & OFF Delay 5 sec	Phase Asymmetry 10% fixed		MG73BH
		Selectable OFF Delay (0 to 15 sec) & ON Delay 5 sec	Phase Asymmetry 10% fixed		MG73BF
	SPP + UV/OV, with fixed UV (173 V) & OV (288 V)	Selectable ON (10 Sec) and OFF Delay (5 Sec)	Phase Asymmetry 20% fixed		MG73BR

Connection Diagram




MD71BH, MD71B9, MG71BF,
MG73BH, MG73B9, MG73BF

Overall Dimensions



Supply Monitors

SM 500

Cat. No.:		MD71B9	MD71BH	MD71BF	MG73B9	MG73BH	MG73BF
Function		Phase and Voltage control					
Supply voltage (Φ)		1-Phase 240 V AC; 3-Phase 4-Wire 240 V AC					
Frequency		50/60 Hz					
Power consumption		5 VA (Max.)					
Trip levels	Under voltage	55% to 95% of Φ					
	Over voltage	105% to 125% of Φ					
	Asymmetry	N. A.			10%		
Setting accuracy		±5% of full scale					
		Note: Voltage setting are with respect to neutral					
Time delay setting accuracy ± 10% of full scale	ON Delay	0 - 15 min	0 - 15 s	5 s	0 - 15 min	0 - 15 s	5 s
	OFF Delay	5 s	5 s	0 - 15 s	5 s	5 s	0 - 15 s
LED indications	Green	Power ON					
	OV	Over voltage					
	UV	Under voltage					
	Blink	N. A.			Phase asymmetry		
	ON	N. A.			Phase reverse		
	All LEDs OFF	Phase fail					
Contact arrangement		1 C/O			2 C/O		
Contact rating		5 A (Res.) @ 250 V AC					
Mechanical life		3 x 10 ⁶ Operations					
Electrical life		1 x 10 ⁵ Operations					
Operating temperature		-10°C to +55°C					
Humidity (Non-condensing)		95% (Rh)					
Max. operating altitude		2000 m					
Degree of Protection		IP20 for terminals, IP40 for housing					
Enclosure		Flame retardant UL 94-V0					
Mounting		Base/DIN rail (35 mm Symmetrical)					
Dimensions in mm (W x H x D)		36 x 60 x 90					
Weight (Unpacked)		120 gms (approx)					
Certifications		CE 					

Supply Monitors

SM 500

Neutral Loss Protection Relay

- Monitors Own Supply
- Phase loss (failure) detection
- Neutral loss detection
- Phase reverse detection
- Phase asymmetry
- Adjustable Over & Under voltage trip level
- Fixed Operate Time & Release Time Delay
- 2 C/O Relay output (5 A, Resistive)
- DIN rail & base mounting
- LED indication for all failure conditions
- Automatic recovery on fault removal



Type	Supply Monitoring Type	Time delay	Asymmetry	Voltage & Contact Arrangement	Cat. No.
SM500 (3 Ph / 1 Ph, 4W)	SPP + Selectable UV + Selectable OV with Neutral Loss Protection	ON Delay 5 sec and OFF Delay 5 sec, 500ms-1s for Neutral fail	94 V AC Asymmetry	415 V AC, 3 Ph 4W, 2 C/O	MAC04 D0100

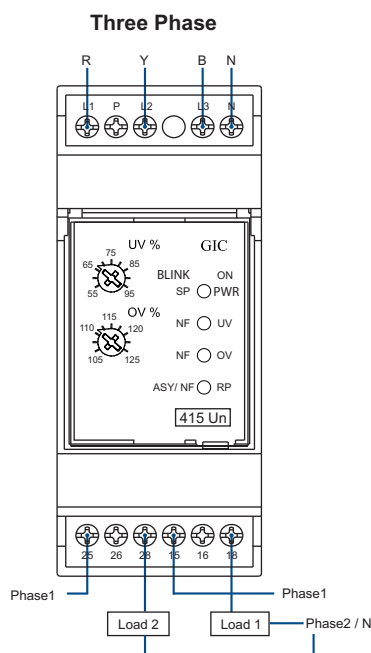
Functional Description:

Output Relay will energize after the operating time if the following conditions are fulfilled:

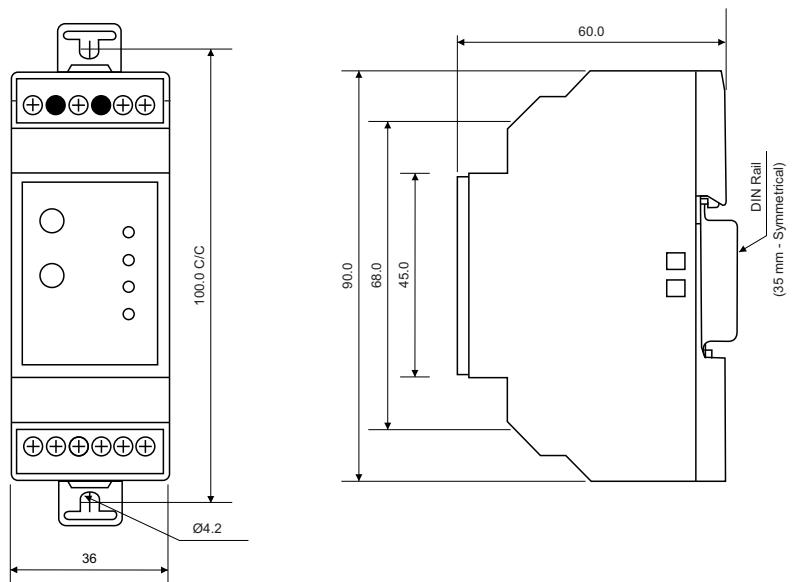
1. All phases are present and phase voltage are within the over & under voltage trip levels set on the device.
2. Neutral is present.
3. Phase Sequence is ok.
4. Phase to phase asymmetry is less than value mentioned in technical specification.

Relay will trip after the release time, if any of the above condition fails. In case of balanced load condition, if neutral is open, virtual neutral is formed at the star point, hence the product will not trip & remain healthy.

Connection Diagram:




Overall Dimensions



Supply Monitors

SM 500

Cat. No.		MAC04D0100			
Function		Phase, Neutral and Voltage Control			
Supply voltage (φ)		3-Phase 4-Wire, 415 V AC			
Frequency		47 to 53 HZ			
Power consumption		10 VA (MAX.)			
Trip levels	Under voltage	55% to 95% of supply voltage			
	Over voltage	105% to 125% of supply voltage			
	Asymmetry	94 V + 4 V Ph - Ph.			
	Hysteresis	7 V + 2 V			
Setting Accuracy		± 5% of full scale			
Time delay	ON delay	5 s ± 1 s (fixed)			
	Trip time for: Phase failure Phase to phase Imbalance Under Voltage Over Voltage	5 s ± 1 s (fixed)			
	Trip time for neutral failure	500 ms to 1 s			
	Product relay will not become on, if the phase sequence is reverse at power on. If the phase sequence is reversed during running condition the product will remain healthy.				
LED indications	Respective fault condition will be indicated by LED immediately & relay will be tripped after specified trip time only.				
		Green LED	UV	OV	Blink : ASY ON : REV
	Power ON	ON	OFF	OFF	OFF
	Phase reverse	ON	OFF	OFF	ON
	Asymmetry	ON	OFF	OFF	BLINK
	UV	ON	ON	OFF	OFF
	OV	ON	OFF	ON	OFF
	Phase fail	BLINK	OFF	OFF	OFF
	Neutral fail	ON	BLINK	BLINK	BLINK
Relay output	Contact arrangement	2 C/O			
	Contact rating	5 A (Res.) @ 240 V AC			
Utilization category AC-15		Rated voltage (Ue) : 230 V / 125 V; Rated			
Utilization category DC-13		Rated voltage (Ue) : 250 V / 120 V / 24 V; Rated			
Mechanical life expectancy		1 ×10 ⁷ Operation			
Electrical life expectancy		1 × 10 ⁵ Operation			
Operating temperature		-10°C to 60°C			
Humidity (non-condensing)		95% Rh (without condensation)			
Degree of protection		IP20 for Terminals ; IP30 for Housing			
Housing		Flame retardant UL 94-V0			
Mounting		Base/DIN Rail (35 mm symmetrical)			
Dimensions in mm (W × H × D)		36 × 90 × 60			
Weight (Unpacked)		120 gms (approx)			
Certification		CE 			

Supply Monitors

SM 501

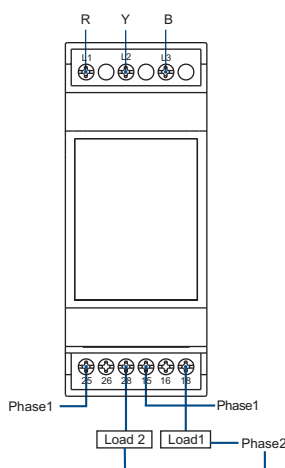
Three Phase Three Wire UV + OV & Single Phasing Protection

- Protects against Phase loss, Phase reversal and Phase-Phase unbalance & q Under / Over voltage faults
- 3 phase 3-wire models
- Adjustable ON delay & Trip time delay
- LED indications for power ON, UV, OV and phase faults
- DIN rail and base mountable
- Compact 2M size
- Voltage sensing principle



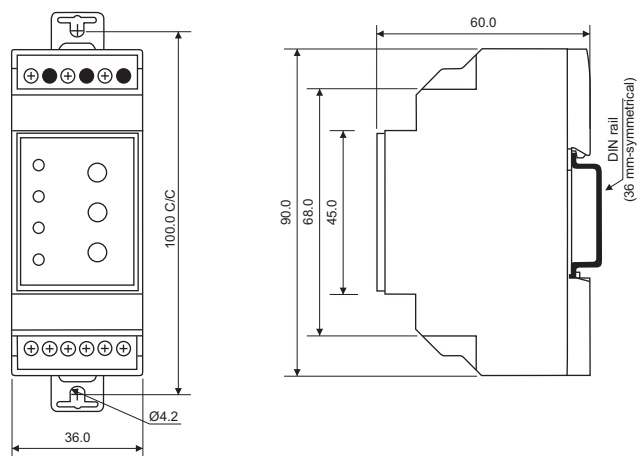
Type	Supply Monitoring Type	Time delay	Asymmetry	Voltage & Contact Arrangement	Cat. No.
SM501 (3 Ph, 3W)	SPP + Under Voltage (80% of U_n)	Selectable ON Delay and OFF Delay 15 sec	Selectable Asymmetry (5% to 17%)	415 VAC, 2 C/O	MB53BM
	Single Phasing Preventor + Selectable Under Voltage + Selectable Over Voltage	Selectable ON Delay 15 sec & OFF Delay 5 sec	Phase Asymmetry 10%		MG53BH
		Selectable OFF Delay 15 sec & ON Delay 5 sec	Phase Asymmetry 10%		MG53BF
		ON Delay 5 sec and OFF Delay 5 sec	65 V AC Asymmetry		MG53BI
		ON Delay 3 min and OFF Delay 5 sec UV 85% of U_n OV 110% of U_n	Phase Asymmetry 10%		MG53BO

Connection Diagram




MB53BM, MG53BI, MG53BH, MG53BF, MG53BO,
for 220 VAC : MG53BH, MG53BF

Overall Dimensions



Supply Monitors

SM 501

Cat. No.			MG53BH	MG53BF	MG53BI	MG53BO	MB53BM	MG63BH	MG63BF	
Supply voltage (⌘)			3 Phase 3 Wire, 415 V AC						3 Phase, 3 Wire, 220 V AC	
Frequency			50/60 Hz							
Power consumption			10 VA (Max.)						5 VA (Max.)	
Trip levels	Under voltage		55% to 95% of ⌘			85% Fix	Voltage 80% of⌘(Fix)	55% to 95% of ⌘		
	Over voltage		105% to 125% of ⌘			110% Fix	N. A.	105% to 125% of ⌘		
	Asymmetry		10%		94 Volt	10%	5% to 17%	10%		
Setting accuracy			±5% of full scale							
Time delay	ON delay		(<0.5-15) s	5 s	5 s	3 min	(<0.5-15) s	(<0.5-15) s	5 s	
	OFF delay		5 s	(<0.5-15) s	5 s	5 s	(<0.5-15) s	5 s	(<0.5-15) s	
			In the event of phase sequence or phase loss fault off delay is ~100 ms							
	Setting accuracy		±10% of full scale							
LED indications	ON	Continuous ON	Power ON							
	UV	Continuous ON	Under voltage							
	OV	Continuous ON	Over voltage				N. A	Over voltage		
	ASY/REV	Blinking	Phase asymmetry				N. A	Phase asymmetry		
		Continuous ON	Phase reverse				N. A	Phase reverse		
	ASY/REV	Continuous ON	N. A.				Phase reverse	N. A		
	All LEDS OFF		Phase fail							
Supply voltage > 577.5 V						Supply voltage>302.5 V				
Relay output	Contact arrangement		2 C/O							
	Contact rating		5 A (Res.) @ 250 V AC / 30 V DC							
Utilization category		AC-15	Ue Rated voltage V: 120/240 V, Ie Rated current I: 3.0/1.5 A							
		DC-13	Ue Rated voltage V: 24/125/250 V, Ie Rated current I: 2.0/0.22/01 A							
Mechanical life			3 x 10 ⁶ operations							
Electrical life			1 x 10 ⁵ operations							
Operating temperature			-15°C to +55°C							
Humidity (Non-condensing limits)			Max. 95%							
Max. operating altitude			2000 m							
Degree of protection			2							
Pollution degree			IP20 for terminals, IP40 for housing							
Housing			Flame retardant UL 94-V0							
Mounting			Base/DIN rail (35 mm Symmetrical)							
Dimensions in mm (W x H x D)			36 x 60 x 90							
Weight (Unpacked)			120 gms (approx)							
Certifications			CE 							

Supply Monitors

Supply Monitoring Series - Current Control

- Microprocessor relay protects against Overload, Phase loss, Phase reverse and Phase unbalance faults
- Wide range of sensing current: 1 A - 45 A
- Models for 1 Phase and 3 Phase systems
- Auto / Manual reset selection
- Fail-safe protection
- Inverse time model with underload, locked rotor protection and selectable trip class
- Definite time model with underload and selectable start and trip time



Phase	Type	Current & Contact Arrangement	Cat. No.
3 Phase	Inverse Time Current Monitoring Relay	2 - 5A 1 C/O	17A422CB0
		3 - 9A, 1 C/O	17A122CB0
		8 - 24A, 1 C/O	17A222CB0
		15 - 45A, 1 C/O	17A322CB0
	Definite Time Current Monitoring Relay	2 - 5A 1 C/O	17B422AA0
		3 - 9A, 1 C/O	17B122AA0
		8 - 24A, 1 C/O	17B222AA0
		15 - 45A, 1 C/O	17B322AA0
1 Phase	Inverse Time Current Monitoring Relay	2 - 5A 1 C/O	17C412EB0
		3 - 9A, 1 C/O	17C112EB0
		8 - 24A, 1 C/O	17C212EB0
		15 - 45A, 1 C/O	17C312EB0
	Definite Time Current Monitoring Relay	2 - 5A 1 C/O	17D412DA0
		3 - 9A, 1 C/O	17D112DA0
		8 - 24A, 1 C/O	17D212DA0
		15 - 45A, 1 C/O	17D312DA0

Supply Monitoring Series - Current Control

The Current Monitoring Relay (CMR) provides monitoring and protection of loads against overload, underload, Phase loss, Phase asymmetry and Phase sequence faults. The CMR measures current directly through the use of built-in current transformers & can be set to detect faults for a wide range of current.

The CMR can also be used for higher current ranges by using an external CT. Under Load protection is provided by undercurrent trip to avoid dry running, cavitations, etc. Phase Loss/Imbalance protection prevents negative sequence current thus protecting the rotor winding.

There are two types of current monitoring relays: definite time based and inverse time based. In the case of definite time based relays, the trip time is settable while with inverse time relays, the trip time is inversely proportional to the current depending on the trip class. The relays protect motors from over-load and under-load conditions.

In the case of definite time relays, Under load protection is provided by undercurrent trip. It is suitable for small pumps to avoid dry running, cavitations, etc. Negative sequence current due to phase unbalance or phase loss may damage rotor winding. Relay gives excellent protection for Phase imbalance or phase loss. Relay detects the phase reversal during starting only. For this feature motor start duration should be more than 0.2 seconds. In case of Auto reset mode, relay resets approximately 15 minutes after trip in case of 3 Phase products and 10 minutes after trip in case of 1 - phase products. For all trips relay could be reset immediately. For manual reset press and hold reset switch for 2 seconds.

With inverse time relays, relay implements the thermal image of the motor during heating and cooling periods. If the motor current exceeds 1.1 times set value of the current, relay trips the motor as soon as the value of thermal capacity exceeds threshold value. It protects motor from locked rotor conditions due to mechanical fault or due to high inertia load.

The applications include all motor and pump protection panels with single phase and three phase supply.

Supply Monitoring Series - Current Control

Product		Three Phase									Single Phase							
		P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17
Auxiliary supply		220 to 415 V AC, -20% to +15%, 50/60 Hz									110 to 240 V AC, -20% to +10%, 50/60 Hz							
Power consumption (Max.)		10 VA (approx)									5 VA (approx)							
LED Indication	Power ON	ON (Green LED)																
	OL (Over load)	ON (Red LED 1)																
	UL (Under load)	ON (Red LED 2)																
	Phase REV. / UNB	ON: Phase reverse / Blink : Imbalance (Red LED 3)									N. A.							
	Phase loss indication	All LEDs are OFF									N. A.							
Relay contact arrangement & rating		1 NO (Fail safe operation) 5 A @ 240 V AC																
Utilization category AC-15		Ue Rated voltage V : 120 / 240 V, Ie Rated current I: 3.0 / 1.5 A I																
Mechanical life		1 x 10 ⁷ Operations																
Electrical life		1 x 10 ⁵ Operations @ rated load																
Number of CTs		2									1							
Trip characteristics		Inverse time				Definite time					Inverse time				Definite time			
Thermal memory		Yes				NA					Yes				NA			
Trip class (IEC 60947-4-1)		10 A, 10, 20 , 30				NA					5, 10, 20, 30				NA			
Start time		NA				0.2 to 30 s					NA				0.2 to 30 s			
Delay time		NA				0.2 to 10 s					NA				0.2 to 10 s			
Under load protection		40% to 90% (Trip time < 5 s)				50% (Trip time: < 5 s)					40% to 90% (Trip time < 5 s)				50% (Trip time: < 5 s)			
Locked rotor protection		300% of the set Value trip time: < 3 s after starting				N A					300% of the set value trip time:< 3 s after starting				NA			
Phase imbalance protection		50% Imbalance (Trip time < 5 s)									NA							
Phase loss protection		70% Imbalance (Trip time < 3 s)									NA							
Phase reverse protection		Yes, 0.2 s approx									NA							
Reset mode		Auto / Manual																
Test function		Yes																
Setting accuracy		±5%																

Table continued on page 113

Three Phase Products

	Cat. No.	Trip Char.	Current
P1	174226B0	Inverse	2 A to 5 A
P2	17A122CB0	Inverse	3 A to 9 A
P3	17A222CB0	Inverse	8 A to 24 A
P4	17A322CB0	Inverse	15 A to 45 A
P5	17B422AA0	Definite	2 A to 5 A
P6	17B122AA0	Definite	3 A to 9 A
P7	17B222AA0	Definite	8 A to 24 A
P8	17B322AA0	Definite	15 A to 45 A
P9	17B422PA0	Instant	2 A to 5 A

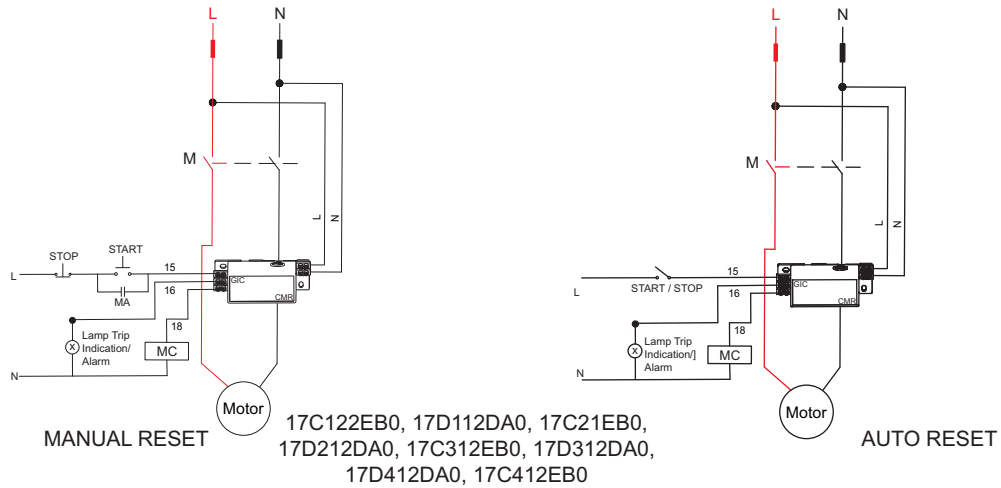
Single Phase Products

	Cat. No.	Trip Char.	Current
P10	17C412EB0	Inverse	2 A to 5 A
P11	17C112EB0	Inverse	3 A to 9 A
P12	17C212EB0	Inverse	8 A to 24 A
P13	17C312EB0	Inverse	15 A to 45 A
P14	17D412DA0	Definite	2 A to 5 A
P15	17D112DA0	Definite	3 A to 9 A
P16	17D212DA0	Definite	8 A to 24 A
P17	17D311DA0	Definite	15 A to 45 A

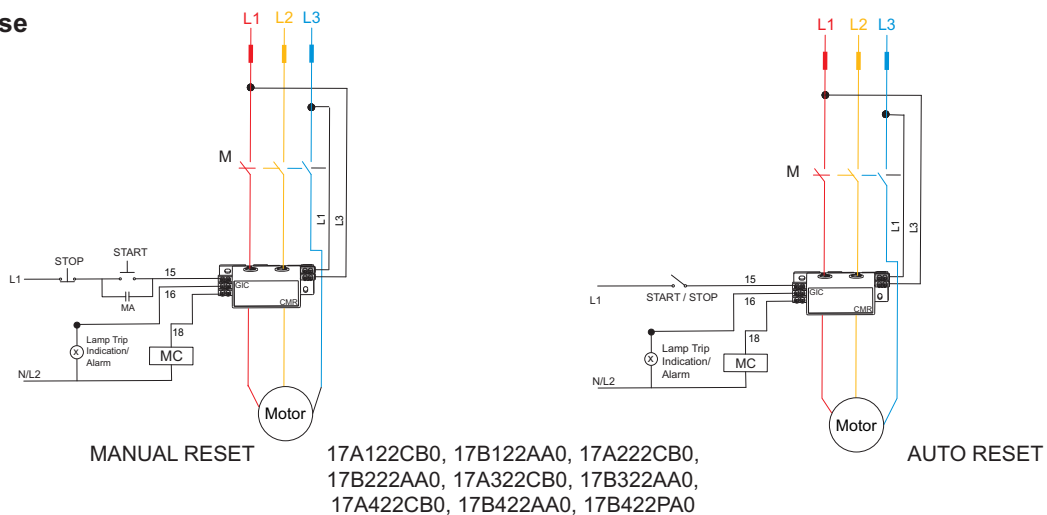
Supply Monitors

Connection Diagram

Single Phase



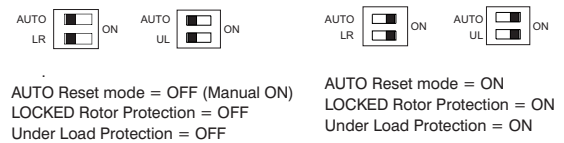
Three Phase



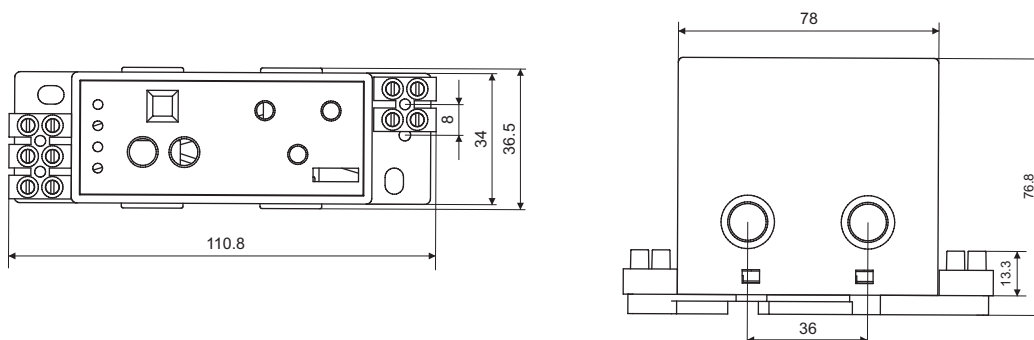
MODE Selection:

Two position DIP slide switch has been provided on the front facial of the product. By using these switches following protection / modes can be made On and OFF

- 1) Auto Reset mode.
- 2) Locked Rotor Protection (for Inverse Time products)
- 3) Underload Protection mode (for Definite products)




Overall Dimensions

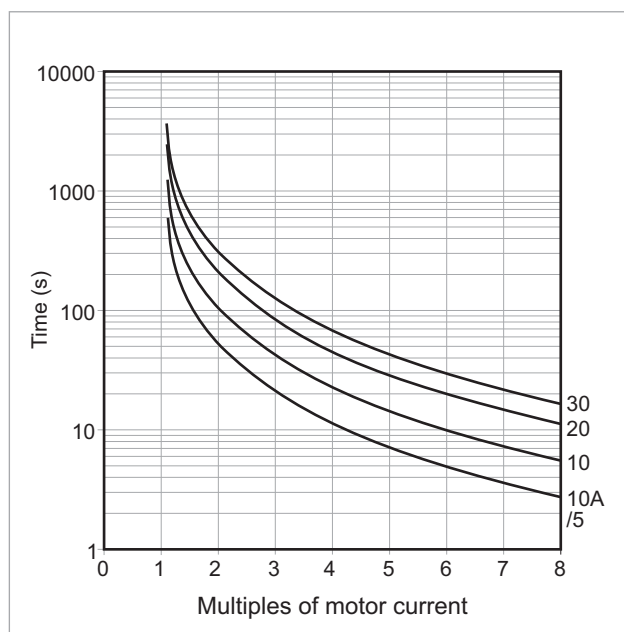


All dimensions are in mm

Supply Monitoring Series - Current Control

Product	Three Phase									Single Phase							
	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17
Repeat accuracy	±2%																
ON delay	450 ms ± 50 ms																
Reset time	< 300 ms																
Type of insulation	Reinforced insulation																
Dimensions in mm (W x H x D)	101 x 34 x 76.9																
Mounting	Base mounting																
Weight approx (Unpacked)	210 gms (approx)																
Degree of protection	IP40 for enclosure																
Operating position	Any																
Maximum operating altitude	2000 m																
Operating temperature	-10°C to +60°C																
Relative humidity	95% Rh (without condensation)																
Number of wires	4 (L1, L2, 15, 18)									4 (L1, N, 15, 18)							
Size & length of wires	1 mm ² , 65 cm Length																
Max. size of wire passing thro. CT	16 mm ²																
Auto reset time	15 min									10 min							
Manual reset	Immediate																
Product certification	CE 																

Inverse trip characteristic curves:



Supply Monitors

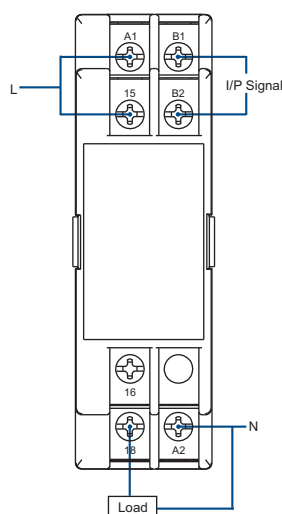
Frequency Monitoring Relay Series

- Models for Over frequency and Under / Over frequency monitoring
- Monitors frequency of three signals - Sine, Square & Triangular
- Model for frequency limit control: 5 Hz to 135 Hz
- Wide signal Input voltage: 15 to 500 V AC
- Ease of frequency setting with simple addition & subtraction
- LED indications for healthy, unhealthy & no signal conditions



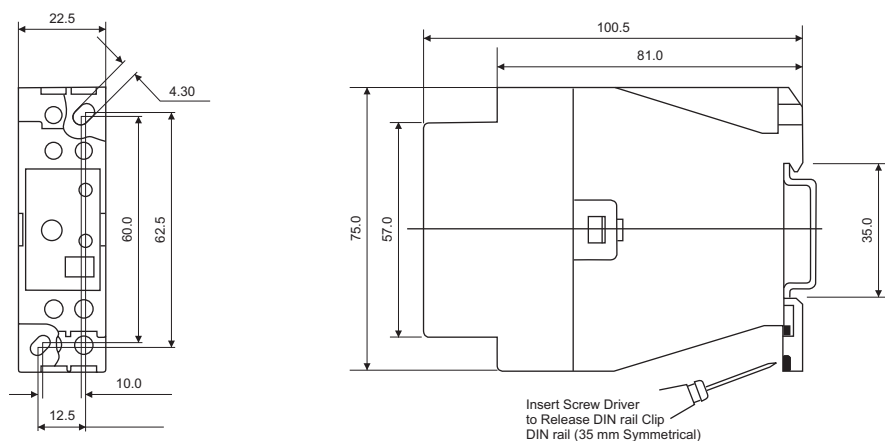
Description	Cat. No.
110-240 V AC, Over frequency monitoring series PD 225 with ON delay of 500 ms (Fixed), & OFF delay of 500 ms (Fixed), 1 C/O	MI81BJ
220-440 V AC, Over frequency monitoring series PD 225 with ON delay of 500 ms (Fixed), & OFF delay of 500 ms (Fixed), 1 C/O	MI91BJ
10-240 V AC, Under/Over frequency monitoring series PD 225 with ON delay of 500 ms (Fixed) & OFF delay of 500 ms to 5 Sec. (Selectable), 1 C/O	MI81BL
220-440 V AC, Under/Over frequency monitoring series PD 225 with ON delay of 500 ms (Fixed) & OFF delay of 500 ms to 5 Sec. (Selectable), 1 C/O	MI91BL

Connection Diagram








MI81BJ, MI91BJ, MI81BL, MI91BL

Overall Dimensions



Supply Monitors

Frequency Monitoring Relay Series

Cat. No.			MI81BJ		MI91BJ		MI81BL		MI91BL		
Supply voltage (Un)			110-240 V AC		220-440 V AC		110-240 V AC		220-440 V AC		
Supply variation			-15% to +15% of Un								
Supply frequency			48/62 Hz								
Power consumption			3 VA								
Contact rating			1 C/O, 6 A @ 240 V AC / 28 V DC (Resistive)								
Utilization category		AC-15	Ue Rated voltage: 120 / 240 V, Ie Rated current: 3 / 1.5 A								
		DC-13	Ue Rated voltage: 125 / 250 V, Ie Rated current: 0.22 / 0.1 A								
Mechanical life			3 x 10 ⁶ operations								
Electrical life			1 x 10 ⁵ operations								
Signal type (Sig)			Sinusoidal, Square, Triangular								
Signal input voltage range			(15 to 500) V								
Overall frequency range			(5 to 135) Hz						(40 to 70) Hz		
Frequency range selection			A	B	Frequency range						
			0	0	(5 to 15) Hz					50 Hz	
			1	0	(15 to 45) Hz						
			0	1	(45 to 135) Hz					60 Hz	
			1	1	N. A.						
Trip levels	Over frequency (F _{OVR})		0.33 to 1 of full scale						(+1 to +10) Hz		
	Under frequency (F _{UND})		N. A.						(-1 to -10) Hz		
Trip levels for signal frequency	Reset hysteresis (%) (F _{RST})		1.5 % of full scale selected						Not applicable		
	Setting accuracy (%)		+5%								
	Repeat accuracy (%)		+0.02%								
	Operate time (OT)		500 ms (Fixed)								
Response time	Release time (RT)		500 ms (Fixed)						500 ms - 5 s		
	Reset time		< 150 ms								
LED indications		Green LED	Continuous OFF	Power fail							
			Continuous ON	Power supply healthy							
		Red LED	Continuous ON	Relay ON					Not applicable		
			Continuous OFF	Relay OFF							
			Flashing	No signal							
	UF	Red LED	Continuous OFF	Not applicable					F _{IN} > F _{UND} Under frequency signal		
			Continuous ON								
	OF	Red LED	Continuous OFF	Not applicable					F _{IN} < F _{UND} Over frequency signal		
			Continuous ON								
	All LEDs		Continuous OFF	Power fail							
		Flashing	Switch position is changed during runtime								
Degree of protection			IP40 for Enclosure, IP20 for Terminals								
Operating temperature			-20°C to +80°C								
Relative humidity			95% (without condensation)								
Operating position			Any								
Maximum operating altitude			2000 m								
Certifications			  								

Supply Monitors

PTC Thermistor Relay Series

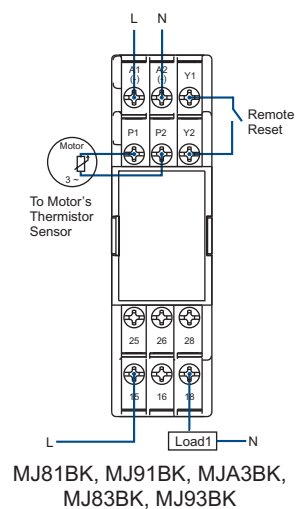
- Monitors and protects motors with integrated PTC resistor sensors
- Protection against over heating for heavy duty load, high switching frequency, high operating temperature & insufficient cooling conditions
- Reset Options: Manual, Automatic and Remote



Description	Cat. No.
110 - 240 V AC, Thermistor series PD 225, 1 C/O	MJ81BK
220 - 440 V AC, Thermistor series PD 225, 1 C/O	MJ91BK
24 V AC/DC, Thermistor series PD 225, 2 C/O	MJA3BK
110 - 240 V AC, Thermistor series PD 225, 2 C/O	MJ83BK
220 - 440 V AC, Thermistor series PD 225, 2 C/O	MJ93BK

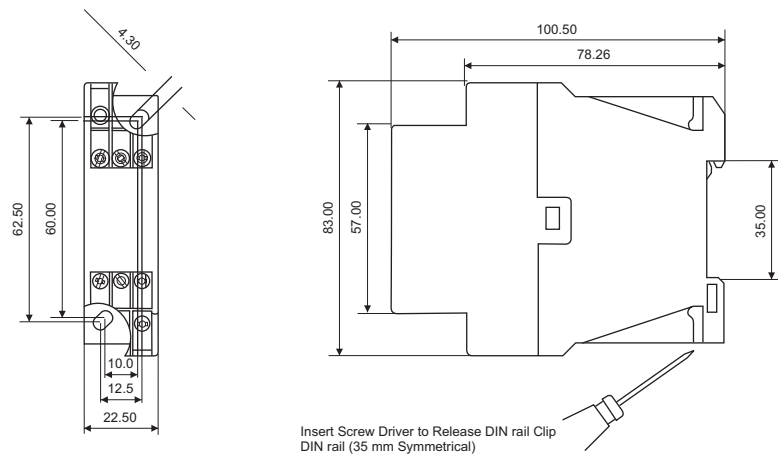
Connection Diagram

PTC Thermistor Relay Series







Overall Dimension

PTC Thermistor Relay Series



Supply Monitors

PTC Thermistor Relay Series

Cat. No.			MJ81BK	MJ91BK	MJA3BK
Supply voltage (Un)			110 to 240 V AC, (50/60 Hz)	220 to 440 V AC, (50/60 Hz)	24 V AC/DC, (50/60 Hz)
Supply tolerance			-20% to +10% of Un		
Power consumption			8 VA		2 VA
Contact arrangement			1 C/O		2 C/O
Contact rating			6 A @ 250 V AC / 28 V DC		
Utilization category	AC-15	Ue rated voltage V Ie rated current A	120 / 240 3.0 / 1.5		
	DC-13	Ue rated voltage V Ie rated current A	24 / 125 / 250 2.0 / 0.22 / 0.1		
Mechanical life			3 x 10 ⁶ operations		
Electrical life			1 x 10 ⁵ operations		
Trip Resist			1.33 k Ω to 2.85 k Ω		
Reset level			< 1.47 k Ω		
Sensor short			20 Ω ± 4 Ω		
Sensor short hysteresis			20 Ω ± 4 Ω		
Sensor open			20 k Ω + 5%		
Max. cold resistance of sensor chain			20 k Ω to 1.33 k Ω		
Reset mode			Manual reset / Auto reset / Remote reset		
Manual Reset mode			Manual reset using RESET key		
Repeat accuracy			1%		
Response time	Operate time (OT)		80 to 150 ms		
	Release time (RT)		~ 100 ms		
	Reset time		~ 150 ms		
LED indications		Continuous ON	Power supply healthy		
		Continuous OFF	Power fail		
		Flashing	Sensor open		
		Continuous ON	Relay ON		
		Continuous OFF	Relay OFF		
		Flashing	Sensor Short or Cable Short		
		Continuous ON	N. A		
		Continuous OFF			
	Terminal capacity			(1 to 4) mm ²	
Mounting / Dimensions (W x H x D)			Base or / DIN rail / (22.5 x 83 x 100.5)		
Weight (Unpacked)			~ 120 gms (approx)		
No of sensors			3 PTC in series manufactured as per DIN 44081 or 44082		
Operating temperature			-15°C to +60°C		
Relative humidity			95% (without condensation)		
Degree of protection			IP40 Enclosure; IP20 Terminals		
Certifications			CE 		

Supply Monitors

Earth Leakage Relay

- Monitors, detects and protects power systems from leakage faults
- Wide auxiliary supply range: 110 - 240 V AC/110 V DC, 220 - 415 V AC/220 V DC, 15 V DC
- Wide range of selectable Earth leakage current: 30 mA-30A,
- Configurable Earth leakage Trip time: 0 - 10 s
- Easily configurable operating modes
- Test feature to check complete product functionality
- Manual / Remote reset feature
- LED indication for relay status, CT open, Earth leakage fault & test / reset switch short



2M series
(35 mm)

Type	Voltage & Contact Arrangement	Current Range	Cat. No.	Type	Voltage & Contact Arrangement	Current Range	Cat. No.
Earth Leakage Relay	110-240 V AC, 110 V DC, Manual reset	30mA - 30A	17G715GF2	CBCT (moulded case)	38 mm ID	30mA - 30A	17H7NNHN3
	220-415 V AC, 220 V DC, Manual reset		17G745GF2		57 mm ID		17H7NNIN3
	15 V DC, Manual reset		17G755GF2		70 mm ID		17H7NNQN3
	110-240 V AC, 110 V DC, Auto reset		17G715KF2		92 mm ID		17H7NNJN3
	220-415 V AC, 220 V DC, Auto reset		17G745KF2		120 mm ID		17H7NNLN3
	15V DC, Auto reset		17G755KF2		215 mm ID		17H7NNKN3

Supply Monitors

Earth Leakage Relay

Earth Leakage Protection:

Earth Leakage relay is a micro controller based device meant to measure leakage current and isolate the faulty circuit from the system. Leakage current is sensed through core balance current transformer. Trip occurs when Earth Leakage Current exceeds the Set value of trip current, for the trip time which is adjustable by means of a front mounted potentiometer. The Red LED "EL" indicates the presence of Earth Leakage.

CT Connection:

All conductors to be protected shall pass through the core balance current transformer. Current transformer secondary terminals should be connected to the product terminals by a shielded twisted two core wires. The shield to be connected to Y2 terminal. The CT wires should be placed adequately away from high current carrying conductors or source of strong magnetic field to avoid noise pickup. The Earth Leakage Relay also verifies CT connection. If CT winding is open, red LED "EL" blinks.

Earth Leakage Relay - Series CMR


Test / Reset: Press & hold Tact switch for 1s. Product will change its state from Healthy to Trip (Test) and vice versa (Reset).

Remote Test / Reset: For Remote Test Reset, connect an external push button switch between Y1 and Y2. For test sequence, press and hold the external push button switch for 1s.

Auto / Reset: In case of 17G715GF2 & 17G715KF2, product will reset after 15 min only for 4 attempts. Reset count is cleared after 1 hour of healthy condition or supply interruption or press of test / reset switch.

Supply Monitors

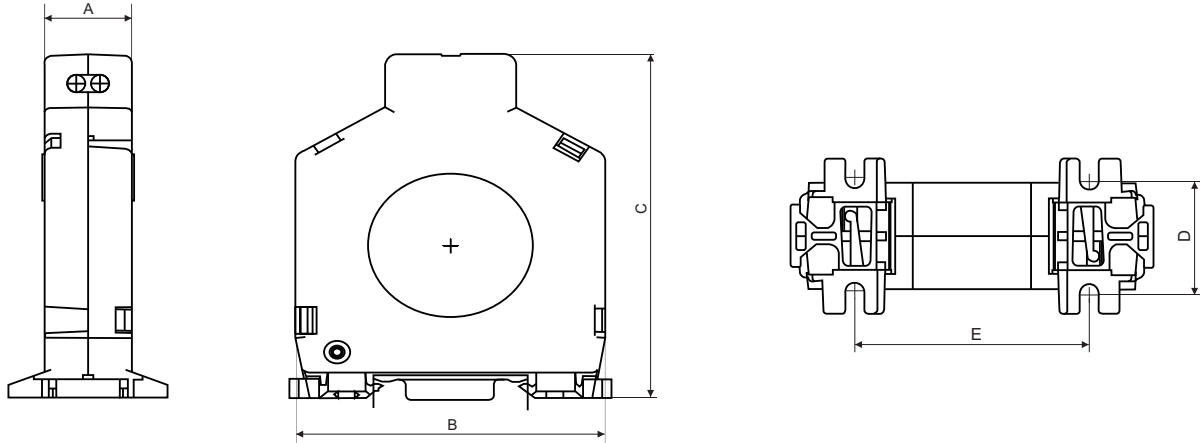
Earth Leakage Relay

Cat. No.		17G715GF2	17G715KF2	17G745GF2	17G745KF2
Supply voltage (中)		110 - 240 V AC, 50/60 Hz		220 - 415 V AC, 50/60 Hz	
Supply variation		-20% to +20%			
Power consumption sensitivity		5 VA		10 VA	
LED Indication	Power ON	ON (Green LED)			
	EL / CT	ON (Red LED) Relay trip / Blinking (CT open)			
	Leakage current / TS	By Bar graph 30% (Green), 45% (Green), 60% (Yellow), and 75% (Red), Blink Test / Reset switch is pressed			
Overall leakage current $I_{\Delta n}$		30 mA - 30 A (in 10 steps)			
Contact rating		1 C/O + 1 NO; 5 A (Resistive) @ 240 V AC / 30 V DC			
Contact arrangement		1 NO SPST and 1C/O SPDT			
Utilization category	AC-15	Ue Rated voltage: 120 / 240 V, Ie Rated current: 3.0 / 1.5 A			
	DC-13	Ue Rated voltage: 125 / 250 V, Ie Rated current: 0.22 / 0.10 A			
Mechanical life		1 x 10 ⁷ operations			
Electrical life		1 x 10 ⁵ operations			
Contact material		Ag Alloy			
Reset		Manual reset	Auto reset	Manual reset	Auto reset
No. of auto resets		-	4	-	4
Clear auto reset		After 1 hour of healthy condition or supply interruption			
Test / Reset		Local and Remote (Non potential free contacts) (Upto 10 m)			
Δ Settings (s)		0.040 - 0.06 - 0.15 - 0.25 - 0.5 - 0.8 - 1 - 2.5 - 5 - 10			
Reset enable		Below 50% on current threshold set by potentiometer and in presence of CBCT			
Reset time		<1 s			
Threshold ($I_{\Delta n}$)		0.03 - 0.1 - 0.3 - 0.5 - 1- 3 - 5 - 10 - 20 - 30			
Type class		'A' True RMS measurement (as per IEC 60947-2 Annex M)			
Max. crest factor		5 (for 30 mA to 30 A)			
Setting accuracy		-20% (Including CBCT accuracy)			
Repeat accuracy		±2%			
Operating temperature		-15°C to +60°C			
Relative humidity		95% Rh (without condensation)			
Max. operating altitude		2000 m			
Degree of protection		IP20 for Terminals, IP40 for Enclosure			
Operating position		Any			
Mounting		Base/DIN rail			
Dimensions in mm (W x H x D)		36 x 90 x 65			
CBCT Burden		Should support 50, 2 W, to give 1 V output at 30 A			
Dimensions (with Enclosure in mm W x H x D) ID	CBCT1	37 x 91 x 71, ID 38 mm (17H7NNHN3)		Turns Ratio-1 500:1 Linearity: ±2% over the range of 30 mA to 30 A Characteristics: Type A as per IEC 60947-2.	
	CBCT2	37 x 117 x 97, ID 57 mm (17H7NNIN3)			
	CBCT3	37 x 155 x 132, ID 92 mm (17H7NNJN3)			
	CBCT4	17 x 215 x 244 ID 215 mm			
Weight (Unpacked)		150 gms (approx)			
Certifications		CE 			

If the trip time is set at '0' sec, then for 5 $I_{\Delta n}$ & 10 $I_{\Delta n}$, the tripping time will be </- 40 ms for all current ranges.

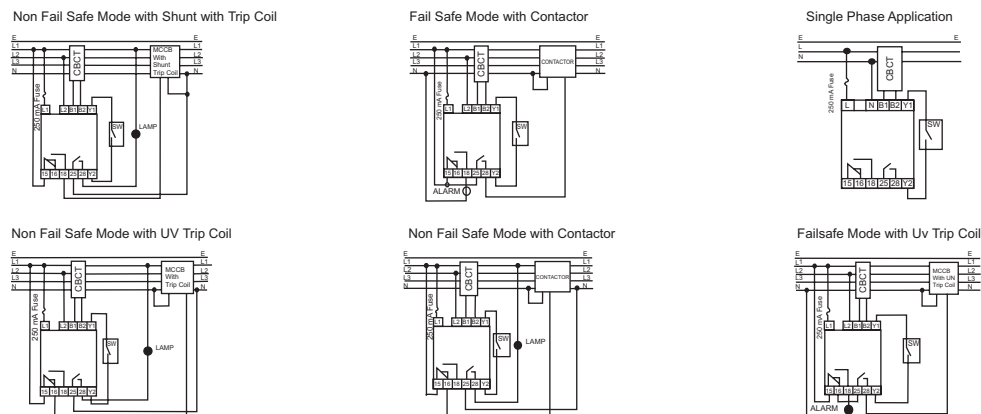
Supply Monitors

CBCT Overall Dimensions

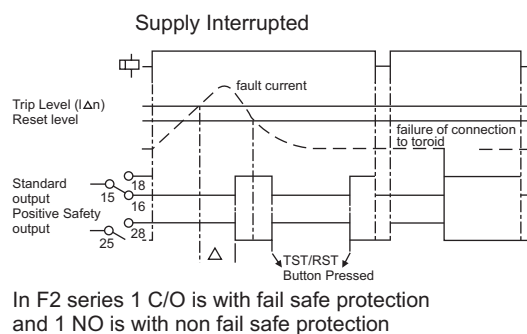


CBCT	Internal Diameter in mm	Weight (in gms)	A	B	C	D	E
17H7NNHN3	38	110	20	71	91	27	48
17H7NNIN3	57	185	20	97	117	27	55
17H7NNQN3	70	240	20.2	109.3	133	27	59.7
17H7NNJN3	92	250	20	132	155	27	73
17H7NNLN3	120	255	20	153	176	27	73
17H7NNKN3	215	280	20.5	250	282	28	128

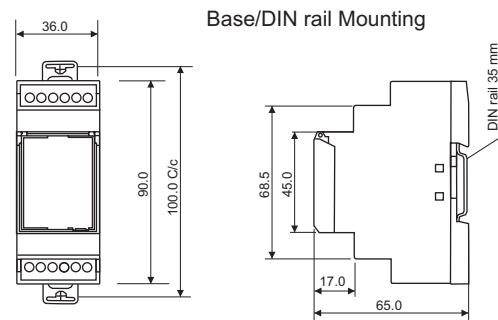
Connection Diagram (F2 series)



Functional Diagram



Overall Dimensions (F2 series)



All dimensions are in mm

Supply Monitors

Earth leakage occurs due to reasons like normal wear and tear of equipment or moisture around terminals which can result in partial breakdown of insulation between supply and earth. Earth leakage currents are dangerous as it can lead to cable heat generation and insulation failure. This can result in a major catastrophe thus leading to significant loss of property and human lives.

Difference between earth fault and earth leakage

According to IEC 60947-2, Annex B, Earth fault current is the current flowing to earth due to insulation fault and Earth leakage current is the current flowing from the live parts of the installation to earth in the absence of an insulation fault.

Conventional SCPD are not designed to detect earth leakage currents. Earth Leakage Circuit breaker (ELCB or RCCB) has integral current breaking device. It detects as well as protects the system by opening the protected circuit when the residual current exceeds the set value. ELR is a relay that sends a signal to the circuit breaker or contactor whenever the leakage current exceeds the set level.

Effect of earth leakage on human body

Earth Leakage current beyond 30mA can be lethal leading to death. 30mA sensitivity is required for protection in domestic installations where the person may come in direct contact with electric equipment in locations for eg labs, schools, workshops, etc. 100mA and 300mA protection is required where there is indirect contact or due to insulation failure in the cables.



ELR with CBCT:

Core Balanced Current Transformer (CBCT) uses the technology of residual magnetic flux. All conductors to be protected shall pass through the core balance current transformer. The vector sum of all the currents should be equal to zero.

$$\bar{I}_r + \bar{I}_y + \bar{I}_b = 0 \quad \text{for 3 phase 3 wire system.}$$

$$\bar{I}_r + \bar{I}_y + \bar{I}_b + \bar{I}_n = 0 \quad \text{for 3 phase 4 wire system}$$

The CT wires should be placed adequately away from high current carrying conductors or source of strong magnetic field to avoid noise pickup.

L&T's ELR with Type class 'A' true RMS measurement (as per IEC 60947-2 Annexure M) provides the user with benefits that go the extra mile.

Earth Leakage relay is a micro controller based device meant to measure low level of leakage current and isolate the faulty circuit from the system. Leakage current is sensed through core balanced current transformer. Definite Time Trip occurs when Earth Leakage Current exceeds the trip time which is adjustable by means of a front mounted potentiometer.

The user can set the threshold level ranging from 30mA to 30A. In case of earth leakage then the LED indicators will glow depending upon the percentage of set threshold value. For eg: If the set level is 30mA and the leakage current is around 23mA then 75% LED indicator will glow which will provide a visual alert to the user. This empowers the user to take corrective actions before any accident.

Typical usage areas for ELR

Steel Plants, Generators and Transformers, Cement plants, Oil Refineries, Buildings, Mobile Operating equipment, Control Panels, Switchboards

Digital Hour Meter / Digital Counter

Hour Meter Series HM 36

- Robust design
- Frequency independent for AC applications
- High degree of accuracy
- Wide supply voltage working models 4-30 V AC/DC, 10-80 V DC and 90-264 V AC
- Wide temperature range from -40 to 85°C
- Totally sealed from dust and moisture

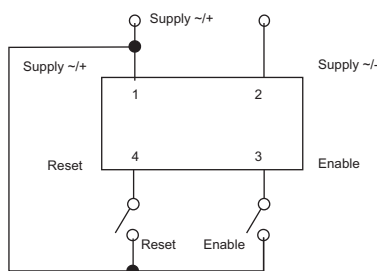
Digital Counter

- Wide supply voltage
- Large 6 digit display, easy to read
- Exceptional reliability due to non volatile memory (EEPROM) which can retain the data for 100 years
- Available in 3 different shaped Bezels
- Low power consumption
- Electrical reset and enable



Description	Cat. No.
Digital Hour Meter / Digital Counter (Resettable)	Z□□FB□
<div><div>Z□□FB□</div><div><div><div>Voltage</div><div>H 10 - 80 V DC</div><div>7 85 - 265 V AC</div><div>J 12 - 48 V AC/DC</div></div><div><div>1 Hour Meter</div><div>2 Counter</div></div><div><div>Bezel</div><div>A Round</div><div>B 24 x 48</div><div>C Screw Mount</div></div></div></div>	

Connection Diagram

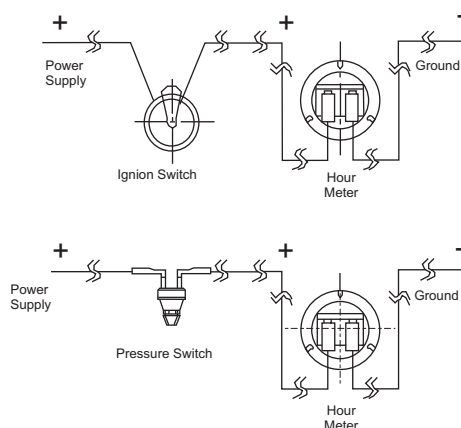


Terminal Description

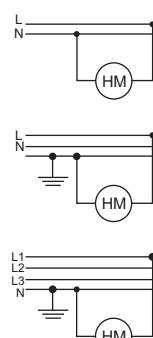
- Pin 1: Supply (~ / +)
Pin 2: Supply (~ / -)
Pin 3: Enable
Pin 4: Reset

HM 36 Series

For: DC Series



For: AC Series



Single phase, 2 wire, 120/240 V system:
Connect power wire to one terminal and neutral wire to opposite terminal.

Single phase, 3 wire, 120/240 V system:
Connect any one power wire to one terminal and neutral wire to opposite terminal.

Three phase, 4 wire, 120/240 V system:
Connect any one power wire to one terminal and neutral wire to opposite terminal.
Caution
Tighten terminals with flat head screwdriver with tip size 4.3 x 0.6 mm.

Digital Hour Meter / Digital Counter

HM36

Description	Cat. No.
90 - 240 V AC, Rectangular bezel	LA21F1
90 - 240 V AC, Rectangular 2 holes bezel	LA22F2
90 - 240 V AC, Round bezel	LA23F1
90 - 240 V AC, Round 3 holes bezel	LA24F1
90 - 240 V AC, Square mount bezel	LA25F1
90 - 240 V AC, Cup mount bezel	LA26F1
90 - 240 V AC, Stirrup mount bezel	LA27F1
10 - 80 V DC, Rectangular bezel	LD11F1
10 - 80 V DC, Rectangular 2 holes bezel	LD12F1
10 - 80 V DC, Round bezel	LD13F1
10 - 80 V DC, Round 3 holes bezel	LD14F1
10 - 80 V DC, Cup mount bezel	LD15F1
10 - 80 V DC, Stirrup mount bezel	LD16F1
10 - 80 V DC, Square mount bezel	LD17F1
4 - 30 V AC/DC, Rectangular bezel	LC11F1
4 - 30 V AC/DC, Rectangular 2 holes bezel	LC12F1
4 - 30 V AC/DC, Round bezel	LC13F1
4 - 30 V AC/DC, Round 3 holes bezel	LC14F1
4 - 30 V AC/DC, Cup mount bezel	LC15F1
4 - 30 V AC/DC, Stirrup mount bezel	LC16F1
4 - 30 V AC/DC, Square mount bezel	LC17F1

Views of Different Bezels



Rectangular Bezel



Rectangular 2 holes Bezel



Round Bezel



Round 3 holes Bezel



Cup Mount Bezel

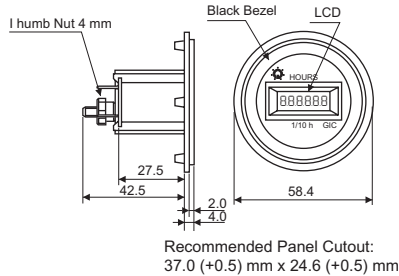


Stirrup Mount Bezel

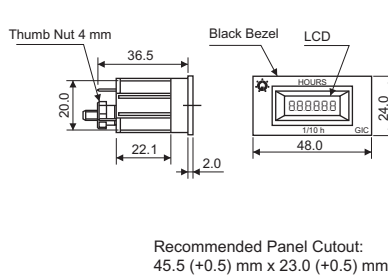
Digital Hour Meter / Digital Counter

Counter

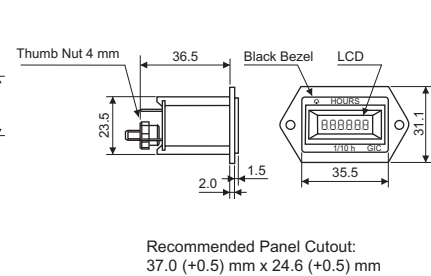
Round bezel



24x48 bezel

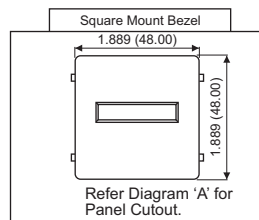
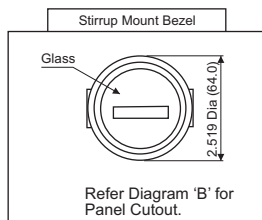
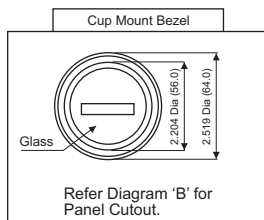
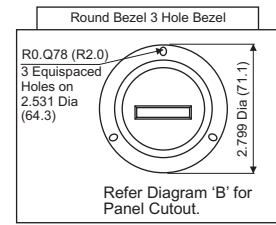
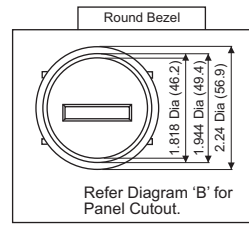
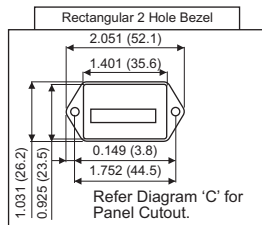
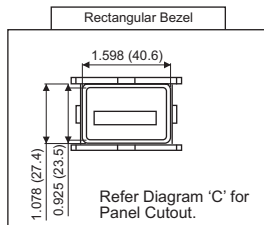


Screw Mount Bezel



HM 36

View of Different Bezels :



Panel Cutout

Diagram A

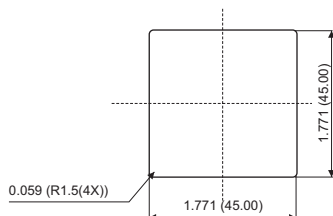


Diagram B

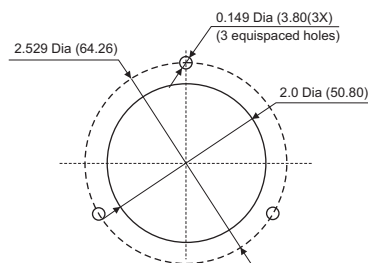
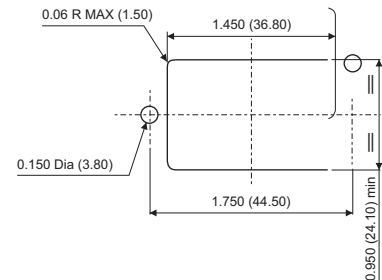


Diagram C



Max. Panel Thickness : 0.029 (0.76) to 0.401 (10.20)

Panel cutout Dimensions - Tolerance: ± 0.010 (0.30)

All dimensions are in Inches, values in parenthesis are in mm

Digital Hour Meter / Digital Counter

Digital Hour Meter

Cat. No.	Z72FBX	ZJ2FBX	ZH2FBX
Supply voltage	85-265 V AC 50/60 Hz	10-55 V AC/DC 50/60 Hz	10-80 V DC
Rating	0.8 VA	0.4 watt	0.6 watt
Range	999999 Counts		
Resolution	1 Count		
Accuracy	±1 Count		
Counting frequency	10 Hz		30 Hz
Mounting	Flush / Panel mounting		
Temperature limits	Operating: -10°C to +50°C		
Degree of protection	IP54 (for front side only)		
Terminals	1, 2 : Input supply, 3 : Enable, 4 : Reset		
Weight	with Round bezel - 35 g (approx)		
	with 24 x 48 bezel - 29 g (approx)		
	with Screw mount bezel - 31 g (approx)		

Hour Meter Series HM 36

Cat. No.	LA25F1	LD15F1	LC36F1	30A6B1	30D1B1
Supply voltage	90-264 V AC	10-80 V DC	4-30 V AC/DC	90-264 V AC/270-460 V AC	10-80 V DC
Frequency	50/60 Hz	NA	50/60 Hz	50/60Hz	NA
Over voltage and reverse polarity protection	NA	Protected for 2 times battery voltage and / or Reverse polarity	Not applicable to AC and 48 V for DC application	NA	96 V DC, Yes
Power consumption	0.5 VA	0.25 VA	1 VA	1 VA	0.25 VA
Bezel	Square mount	Cup mount	Stirrup mount	DIN	DIN
Read out	99999.9				
Least count	1/10 h				
Accuracy	±0.02% over entire range				
Weight	55 g (approx)				
Termination	1/4" (6.3) Spade terminal				
Degree of protection	IP66			IP40 for Enclosure	

Front Facia

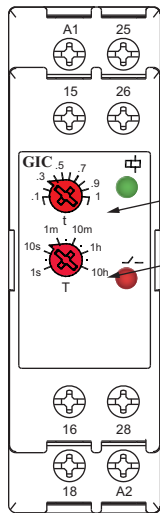
Timer: Micon 225

ON Delay

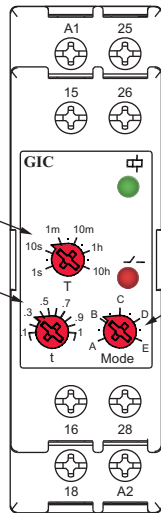
Multi Function

Asymmetric ON-OFF

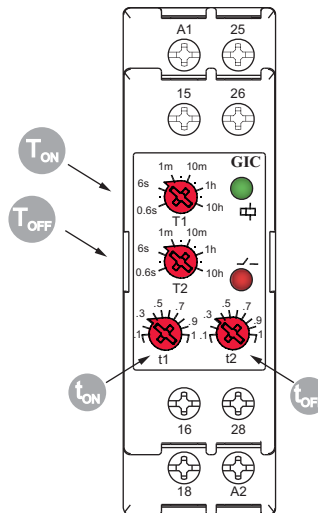
Signal based Multi Function



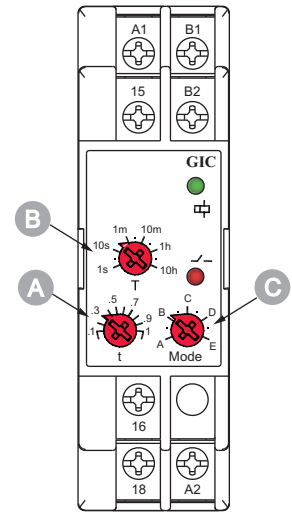
2A0DT5,



2A5DT5, 2B5DT5,
2A6DT6, 2B6DT6



2AADT5,

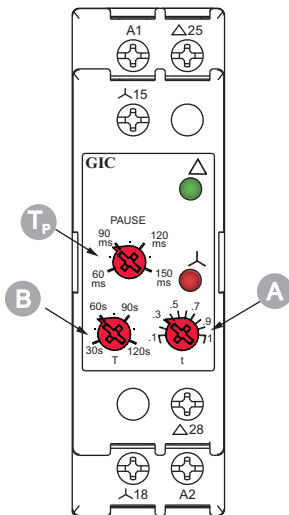


2ANDT0

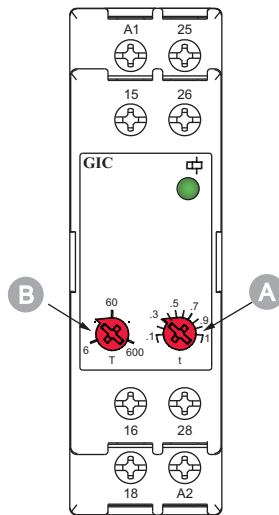
Star Delta

True OFF Delay

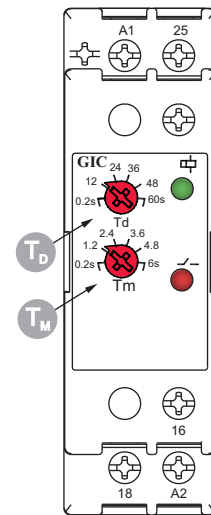
Motor Restart Relay



2ASDT0,
2BSDT0



23GDT0



22LDT0,
23LDT0

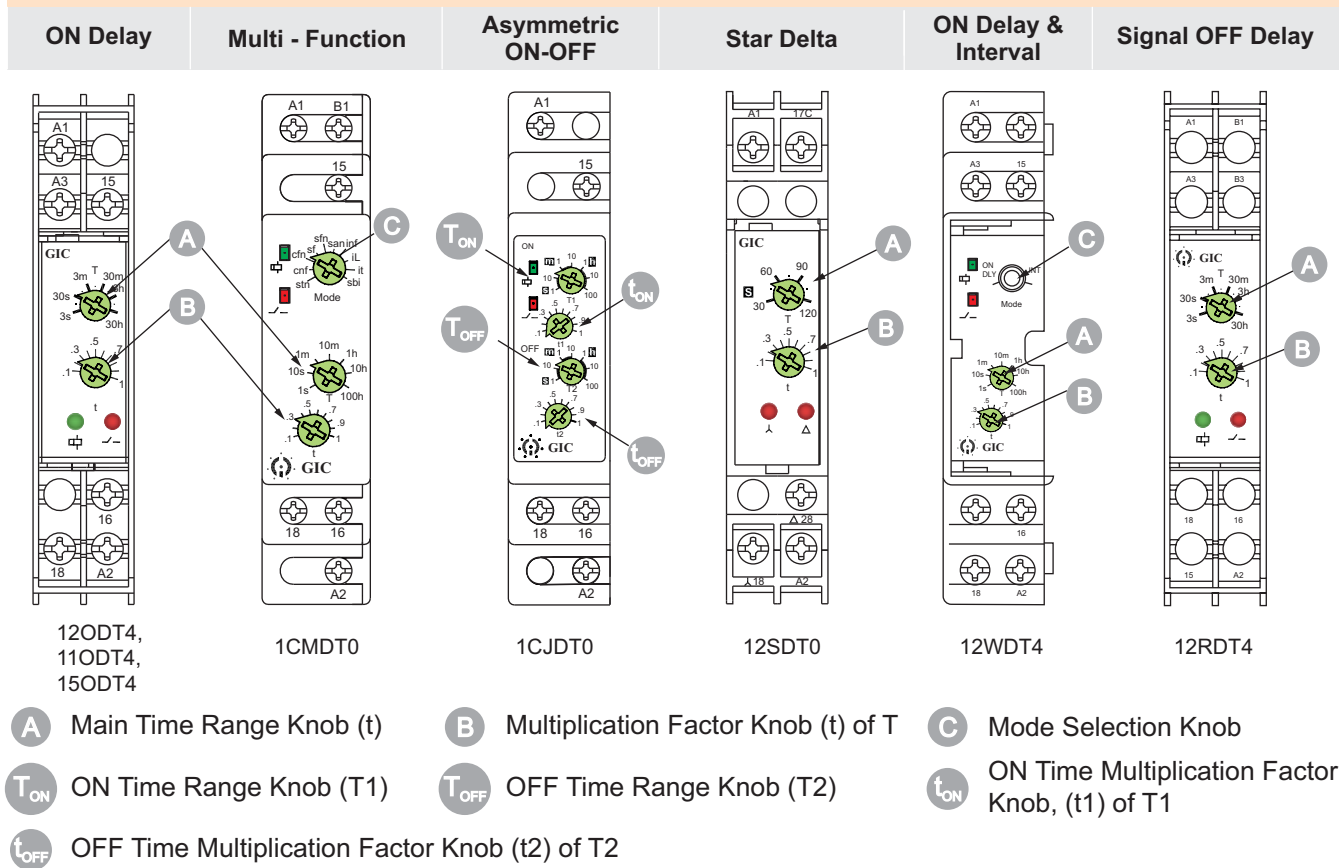
- A** Main Time Range Knob (T) **B** Multiplication Factor Knob (t) of T **C** Mode Selection Knob
- T_{ON}** ON Time Range Knob (T1) **T_{OFF}** OFF Time Range Knob (T2) **t_{ON}** ON Time Multiplication Factor Knob, (t1) of T1
- t_{OFF}** OFF Time Multiplication Factor Knob (t2) of T2 **T_D** Delay Time Setting Knob **T_M** Memory Time Setting Knob,
- T_P** Pause Time Knob

The timing duration of timer is adjusted through 'T' and 't' knobs.

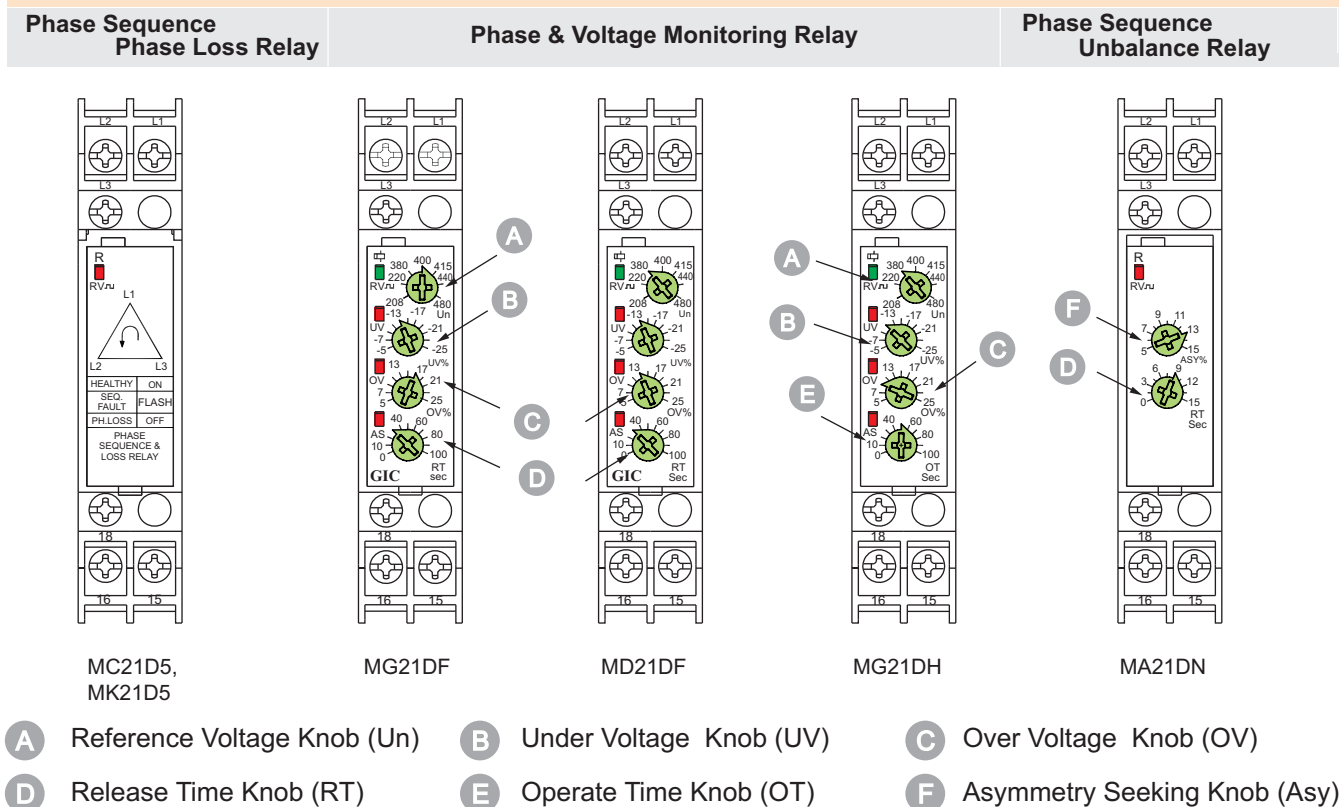
$$\begin{matrix} 1m & 10m \\ 10s & 1h \\ 1s & 10h \end{matrix} \times \begin{matrix} .3 & .7 \\ .1 & 1 \end{matrix} = 7 \text{ secs}$$

Front Facia

Timer: Micon 175



Supply Monitoring: SM 175

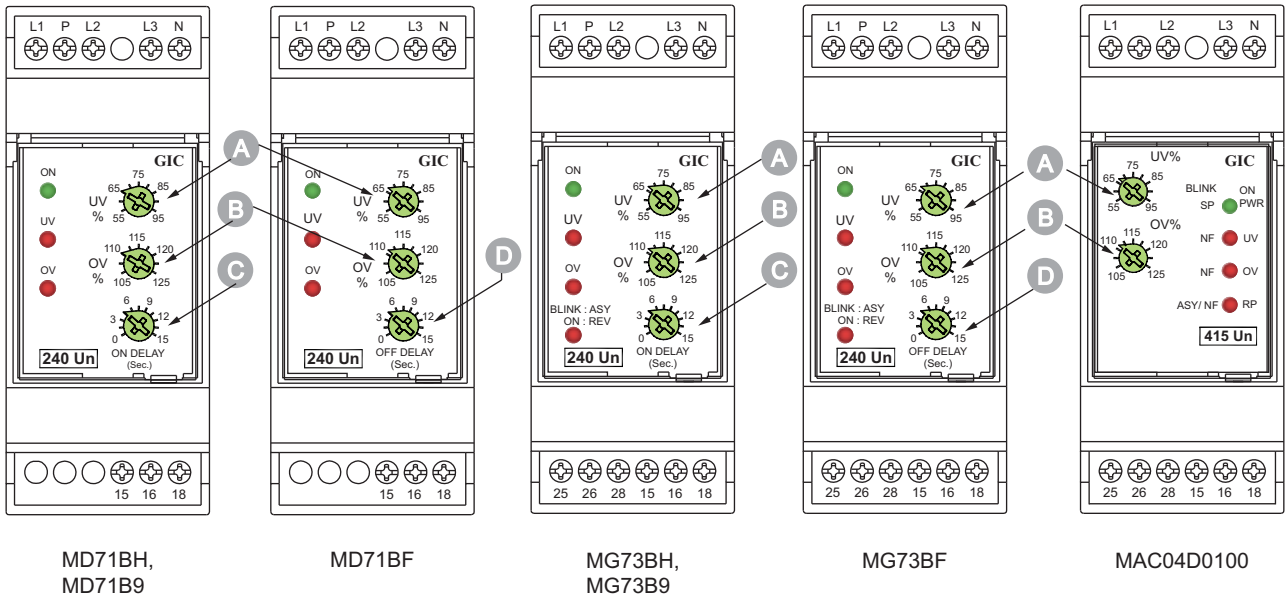


Front Facia

Supply Monitoring: SM 500

Phase & Voltage Control

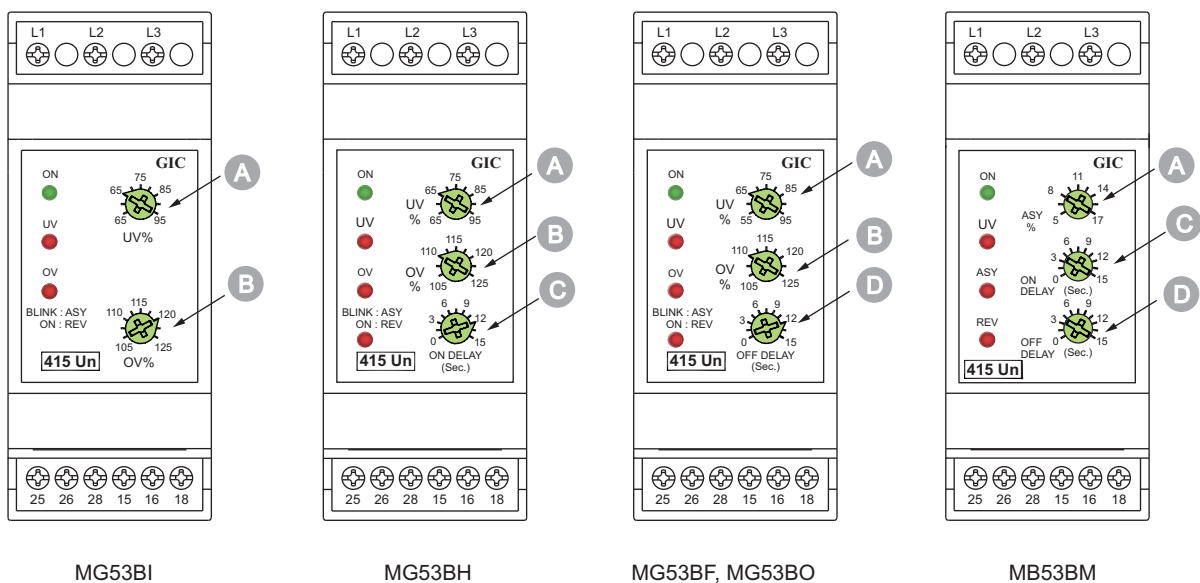
Neutral Loss Protection



- A** Under Voltage Knob (UV)
- B** Over Voltage Knob (OV)
- C** ON Delay Time Knob
- D** OFF Delay Time Knob

Supply Monitoring: SM 501

Phase & Voltage Control

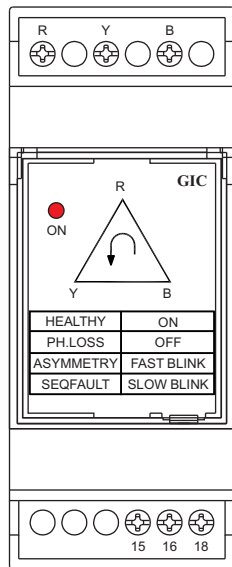


- A** Under Voltage Knob (UV)
- B** Operate Time Knob (OV)
- C** ON Delay Time Knob
- D** OFF Delay Time Knob

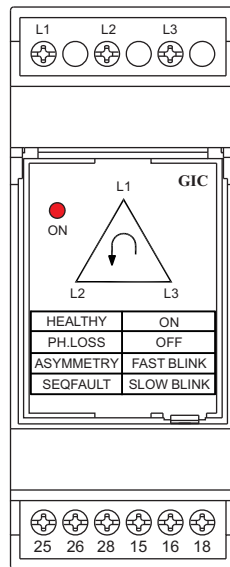
Front Facia

Supply Monitoring: SM 301

Single Phasing Preventor



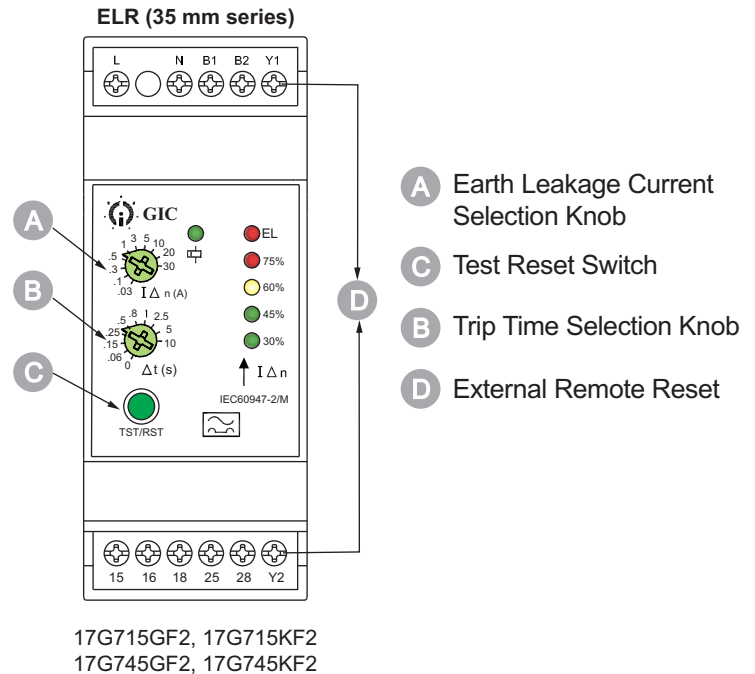
MA51BC



MC21B5

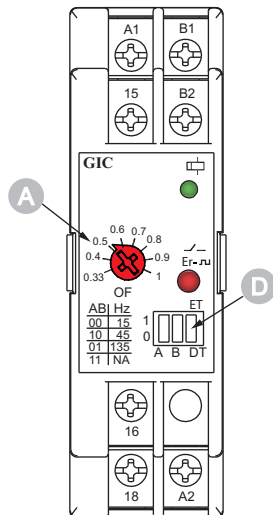
Supply Monitoring: Earth Leakage Relay

Earth Leakage Relay

17G715GF2, 17G715KF2
17G745GF2, 17G745KF2

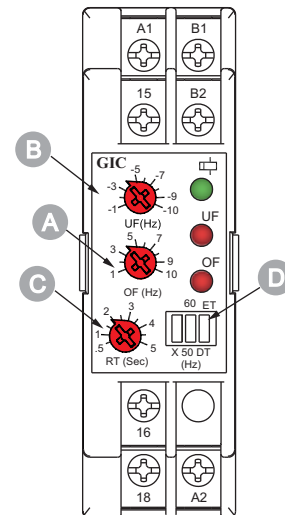
Supply Monitoring: Frequency Monitoring Relay

Over Frequency Monitoring Relay



MI81BJ, MI91BJ

Under/Over Frequency Monitoring Relay



MI81BL, MI91BL

- A Over Frequency Knob (OF) B Under Frequency Knob (UF) C Release Time Knob (RT)
- D Enable to Trip (ET), Disable to Trip (DT)

Disclaimer for Rotary Switches, Cable Duct, Load Break Switches, House Wire

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We reserve the right to make changes, without prior notice, in the catalogue.

Products with CAT no. having, with or without, dot as suffix are same.



Modular Remote Control Units

Remote control units play a crucial role on factory shop floor for operational safety and reliability. Reliable push buttons and indicators from our partners ESBEE, have been trusted by users across industries over the past 3 decades.

ESBEE's product range includes:

New Gen Next Range of Products

- Gen Next Actuators & Contact Blocks
- Gen Next Push Button Station
- Gen Next LED Indicators
 - 16 Ø mm & 22.5 Ø mm
- Gen Next Integral Actuators
- Panel mounted buzzer

Standard Range of Products

- Standard Actuators & Contact Blocks
- Standard Push Button Stations
- Accessories

The new ranges of Gen Next series products are compact in size and aesthetically appealing.

16 mm Gen Next LED Indicators have sleek and integral design with special fire retardant plastic. They provide uniform and bright illumination with operating life of more than 0.1 million burning hours.

Patented Integral actuator is a ready to use solution for OEM and Panel builders that provides IP67 protection with shroud. It has isolated terminals for NO+NC applications.

Illuminated actuators with LED have snap fit for ease in assembly with low power consumption of 0.6 W max.

Push button stations provide round ergonomic enclosure with good aesthetics that occupies less space. They are robust, easy to grip, assemble and operate. It is available in standard configuration of actuators and LED indicators.


Gen Next Series

Gen Next LED Indicator

- Surface Mounted Device LED technology
- Low Power consumption < 0.6W
- Surge & Low Voltage Glow Protection (LVGP)




 Ø16 mm	Description	Cat. No.	Colour (4 th Digit)	Voltage (5 th , 6 th , 7 th & 8 th Digit)
	Gen Next LED Indicator 16 mm	SIL□□□□□	R-Red G-Green Y-Yellow A-Amber B-Blue W-White	012C - 12 V AC/DC 024C - 24 V AC/DC 030C - 30 V AC/DC 048C - 48 V AC/DC 064C - 64 V AC/DC 110C - 110 V AC/DC 240A - 240 V AC
 Ø22.5 mm Cluster design	Gen Next LED Indicator 22.5 mm	EIL□□□□□	R-Red G-Green Y-Yellow A-Amber B-Blue W-White	012C - 12 V AC/DC 024C - 24 V AC/DC 030C - 30 V AC/DC 048C - 48 V AC/DC 064C - 64 V AC/DC 110A - 110 V AC 110D - 110 V DC 240A - 240 V AC 220D - 220 V DC
				415A - 415 VAC

Gen Next Universal LED Indicator

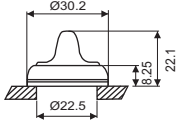



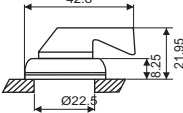










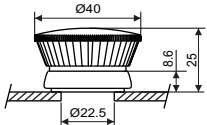

 Ø22.5 mm	Description	Cat. No.	Colour (8 th Digit)	Voltage (9 th , 10 th , 11 th & 12 th Digit)
	Gen Next Universal Voltage LED indicator	EG0100L□□□□□	R-Red G-Green Y-Yellow A-Amber B-Blue W-White	224C-24 to 240 V AC/DC 424C-40 to 240 V AC/DC

Gen Next Push Button & Selector Actuators Ø 22.5 mm

- Snap Mounting with compact contact blocks (EC1C & EC2C)
- Max 3 row x 3 column stackable contact blocks

 Ø30.2 Ø22.5	Description	Cat. No.	Colour (4 th Digit)
	Flush Head	EMN□FD1	R-Red G-Green C-Black Y-Yellow W-White B-Blue A-Amber F-Gray
 Ø30.2 Ø22.5	Projecting Head Push Function	EMN□PD1	R-Red G-Green C-Black Y-Yellow W-White B-Blue A-Amber F-Gray
	Mushroom Head 'Push - Turn Function'	EMN□MH1	R-Red G-Green C-Black Y-Yellow
 Ø40 Ø22.5	Mushroom Head 'Push - Function'	EMN□MD1	R-Red G-Green C-Black Y-Yellow

Gen Next Push Button & Selector Actuators Ø 22.5 mm

	Description	Cat. No.	Colour (4 th Digit)
 	Symmetric Head	2 Position	R-Red G-Green C-Black W-White
		 Non Spring Return EMN□SK1	
		 Spring Return EMN□SI1	
		3 Position	
		 Non Spring Return EMN□SL1	
		 Spring Return EMN□SJ1	
		 Spring Return L. H. EMN□SM1	
 	Lever Head	2 Position	R-Red W-White C-Black
		 Non Spring Return EMN□LK1	
		 Spring Return EMN□LI1	
		3 Position	
		 Non Spring Return EMN□LL1	
		 Spring Return EMN□LJ1	
		 Spring Return L. H. EMN□LM1	
 	Lock & Key Rotary Type	2 Position	C-Black
		 Non Spring Return EMN□KK1	
		 Spring Return EMN□KI1	
		3 Position	
		 Non Spring Return EMN□KL1	
		 Spring Return EMN□KJ1	
		 Spring Return L. H. EMN□KM1	
 	Push Pull	EG02MG0□	R-Red
 	Twin Touch with Black centre strip	EG02TD0I	—

Note : 1. Actuators & Selector Actuators with black ABS collar are offered as Standard

2. Actuators (except Mushroom Head Push - Pull Actuators) are also available with chrome plated ABS & Brass collar



- For Chrome plated ABS Collar replace 7th digit 1 by 3 eg. : **EMNPD3**

- For Brass Metal Collar replace 7th digit 1 by 2 eg. : **EMNPD2** (Please contact nearest branch office for MRP)

3. For Non-Illuminated Actuator / Selector Actuator at least 1 NO or NC Block required to make a complete Assembly


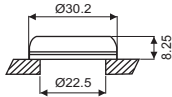

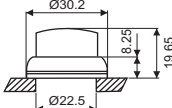

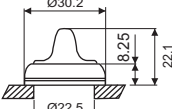

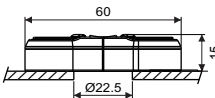
eg. **EMNRFD1 + EC1C** makes complete assembly of flush head actuator with 1 NO Block



Brass Metal Collar Push Button

Note * - In 2 position selector actuator, for operating style  replace 6th digit from K to R and for operating style  replace 6th digit from K to T


Gen Next Illuminated Push Button Actuators

- Snap Mounting with compact contact blocks (EC1C & EC2C)


	Description	Cat. No.	Colour (8 th Digit)	Voltage (9 th , 10 th , 11 th & 12 th Digit)
 	Flush Head	EG03FDL□□□□□	R-Red G-Green Y-Yellow A-Amber	012C - 12 V AC/DC 024C - 24 V AC/DC 030C - 30 V AC/DC 048C - 48 V AC/DC 064C - 64 V AC/DC 110A - 110 V AC 110D - 110 V DC 240A - 240 V AC 220D - 220 V DC
			B-Blue W-White	
 	Projecting Head (Push Function)	EG03PDL□□□□□	R-Red G-Green Y-Yellow A-Amber	012C - 12 V AC/DC 024C - 24 V AC/DC 030C - 30 V AC/DC 048C - 48 V AC/DC 064C - 64 V AC/DC 110A - 110 V AC 110D - 110 V DC 240A - 240 V AC 220D - 220 V DC
			B-Blue W-White	
 	Selector Actuator with LED holder	2 Position	R-Red G-Green Y-Yellow A-Amber B-Blue W-White	012C - 12 V AC/DC 024C - 24 V AC/DC 030C - 30 V AC/DC 048C - 48 V AC/DC 064C - 64 V AC/DC 110A - 110 V AC 110D - 110 V DC 240A - 240 V AC 220D - 220 V DC
		Non Spring Return EG03SKL□□□□□		
		Spring Return EG03SIL□□□□□		
		3 Position		
		Non Spring Return EG03SLL□□□□□		
		Spring Return EG03S JL□□□□□		
 	Twin Touch with Led Holder	EG03TDL□□□□□	Y- Yellow A-Amber	012C - 12 V AC/DC 024C - 24 V AC/DC 030C - 30 V AC/DC 048C - 48 V AC/DC 064C - 64 V AC/DC 110A - 110 V AC 110D - 110 V DC 240A - 240 V AC 220D - 220 V DC

Note* : 1) In 2 position selector actuator, for operating style  replace 6th digit from K to R and for operating style , replace 6th digit from K to T.
2) Assembly comes with LED holder. Please order contact block EC1C and EC2C separately.

Gen Next Modular Contact Blocks

	Description	Cat. No.	Colour	Voltage
	'NO' Block	EC1C	—	—
	'NC' Block	EC2C	—	—

Spares for Gen Next Series

	Description	Cat. No.	Colour (8 th Digit)	Voltage (9 th , 10 th , 11 th & 12 th Digit)
	LED Holder for Gen Next illuminated actuator series	EG08HOL□□□□□	R-Red G-Green Y-Yellow A-Amber	012C - 12 V AC/DC 024C - 24 V AC/DC 030C - 30 V AC/DC 048C - 48 V AC/DC 064C - 64 V AC/DC 110A - 110 V AC 110D - 110 V DC 240A - 240 V AC 220D - 220 V DC
			B-Blue W-White	

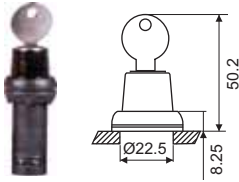






Note : Gen Next Modular Contact Blocks (EC1C and EC2C) can be used only with Gen Next Push Button Actuator



Gen Next Integral Actuator

- With inbuilt contact arrangement
- Contact rating 6A @ 240AC

	Description	Cat. No.	Contact Configuration (3 rd Digit)	Colour (4 th Digit)
 	Flush Head	EE□□FD1	1 - 1 NO 2 - 1 NC	R-Red G-Green Y-Yellow W-White B-Blue A-Amber C-Black
			3 - 1 NO + 1 NC 4 - 2 NO 5 - 2 NC	
 	Projecting Head Push Function	EE□□PD1	1 - 1 NO 2 - 1 NC	R-Red G-Green Y-Yellow W-White B-Blue A-Amber C-Black
			3 - 1 NO + 1 NC 4 - 2 NO 5 - 2 NC	
 	Mushroom Head Push - Turn	EE□□MH1	1 - 1 NO 2 - 1 NC	R-Red G-Green Y-Yellow C-Black
			3 - 1 NO + 1 NC 4 - 2 NO 5 - 2 NC	
 	Mushroom Head Push - Function	EE□□MD1	1 - 1 NO 2 - 1 NC	R-Red G-Green Y-Yellow C-Black
			3 - 1 NO + 1 NC 4 - 2 NO 5 - 2 NC	
 	Symmetric Head Actuator	2 Position	1 - 1 NO 2 - 1 NC	R-Red G-Green W-White C-Black
		 Non Spring Return EE□□SK1	3 - 1 NO + 1 NC (Left NO) 4 - 2 NO 5 - 2 NC 6 - 1 NO + 1 NC (Right NO)	
		 Spring Return EE□□SI1		
		3 Position		
		 Non Spring Return EE□□SL1	3 - 1 NO + 1 NC (Left NO) 4 - 2 NO 5 - 2 NC 6 - 1 NO + 1 NC (Right NO)	
		 Spring Return EE□□SJ1		
		 Spring Return L. H. EE□□SM1		
		 Spring Return R. H. EE□□SN1		
 	Lever Head	2 Position	1 - 1 NO 2 - 1 NC	R-Red G-Green W-White C-Black
		 Non Spring Return EE□□LK1	3 - 1 NO + 1 NC (Left NO) 4 - 2 NO 5 - 2 NC 6 - 1 NO + 1 NC (Right NO)	
		 Spring Return EE□□LI1		
		3 Position		
		 Non Spring Return EE□□LL1	3 - 1 NO + 1 NC (Left NO) 4 - 2 NO 5 - 2 NC 6 - 1 NO + 1 NC (Right NO)	
		 Spring Return EE□□LJ1		
		 Spring Return L. H. EE□□LM1		
		 Spring Return R. H. EE□□LN1		


Gen Next Integral Actuator

	Description	Cat. No.	Contact Configuration (3rd Digit)	Colour (4 th Digit)
	Lock & Key Rotary Type	2 Position	1 - 1 NO 2 - 1 NC	C-Black
		 Non Spring Return EE□□KK1	3 - 1 NO + 1 NC (Left NO) 4 - 2 NO 5 - 2 NC 6 - 1 NO + 1 NC (Right NO)	
		 Spring Return EE□□KI1		
		3 Position		
		 Non Spring Return EE□□KL1	3 - 1 NO + 1 NC (Left NO) 4 - 2 NO 5 - 2 NC 6 - 1 NO + 1 NC (Right NO)	
		 Spring Return EE□□KJ1		
		 Spring Return L. H. EE□□KM1		
		 Spring Return R. H. EE□□KN1		

Note * - In 2 position selector actuator, for operating style  replace 6th digit from K to R and for operating style  replace 6th digit from K to T





Panel Mounted Buzzer Ø 22.5 mm

- IP20 protection
- 80dB at 1 meter








	Description	Electrical Rating	Cat. No.	
	22.5 mm Panel Mounted Buzzer Black colour		Round Type	Square Type
		240 V AC	EG15R00C240A	EG15S00C240A
		110 V AC	EG15R00C110A	EG15S00C110A
		64 V AC/DC	EG15R00C064C	EG15S00C064C
		48 V AC/DC	EG15R00C048C	EG15S00C048C
		30 V AC/DC	EG15R00C030C	EG15S00C030C
		24 V AC/DC	EG15R00C024C	EG15S00C024C
		12 V AC/DC	EG15R00C012C	EG15S00C012C

Gen Next Push Button Stations

- Dimension
- Single Station : 65 x 55 x 33 mm
 - Two Station : 100 x 55 x 53 mm
 - Three Station : 134 x 55 x 53 mm
 - Eight Station: 305 x 55 x 53 mm

	Description	Cat. No.
	Flush Head Actuator - Red with Legend - STOP Contact - 1 'NC'	EP1FAC01
	Flush Head Actuator - Green with Legend - START Contact - 1 'NO'	EP1FAB02
	Two Position Symmetric Head Selector Switch - Black with Legend - OFF / ON Contact - 1 'NO'	EP1FAF08
	Two Position Lock & Key Rotary Switch with Legend - OFF / ON Contact - 1 'NO'	EP1FAF12
	Mushroom Head Actuator 'Push Function' with Legend - STOP Contact - 1 'NC' for Stop	EP1FAC03

Gen Next Push Button Stations

	Description	Cat. No.
	Mushroom Head Actuator 'Push Turn Type' with Legend - STOP Contact - 1 'NC' for Stop	EP1FAC05
	Flush Head Actuator - Green with Legend - START Contact - 1 'NO' (Station One)	EP2FAH0201
	Flush Head Actuator - Red with Legend - STOP Contact - 1 'NC'	
	Flush Head Actuator - Green with Legend - START Contact - 1 'NO' (Station One)	EP2FAH0205
	Mushroom Head Actuator 'Push Turn Type' with Legend - STOP Contact - 1 'NC' (Station Two)	
	LED Indicator 240 V AC - Red (Station One)	EP3FAUI1X0201
	Flush Head Actuator - Green with Legend - START Contact - 1 'NO' (Station Two)	
	Flush Head Actuator - Red with Legend - STOP Contact - 1 'NC' (Station Three)	
	Flush Head Actuator - Green with Legend - FORWARD Contact - 1 'NO' (Station Two)	EP3FAR020102
	Flush Head Actuator - Red with Legend - STOP Contact - 1 'NC' (Station Two)	
	Flush Head Actuator - Green with Legend - REVERSE Contact - 1 'NO' (Station Three)	
	Flush Head Actuator - Green with Legend - UP Contact - 1 'NO' (Station Two)	EP3FAS020102
	Flush Head Actuator - Red with Legend - STOP Contact - 1 'NC' (Station Two)	
	Flush Head Actuator - Green with Legend - DOWN Contact - 1 'NO' (Station Three)	
	All 7 Flush Head Actuators with NO Contact & Mushroom Head Push Turn	EP8F02
	8 Way push button pendant with hanging provision	EP8F04
	Single Station Enclosure Box without Actuator	EP1FAA
	Two Station Enclosure Box without Actuator	EP2FAA
	Three Station Enclosure Box without Actuator	EP3FAA
	Eight Station Enclosure Box without Actuator	EP8FAA

- Note: 1. All Gen next push button stations contains integral Actuators.
2. Only integral actuators can be used for converting Gen next enclosure boxes into Gen Next push button station.
3. For any other combination of actuators/indicators in push button stations please contact nearest branch office.
4. EP8F04 is available in single speed for crane application.


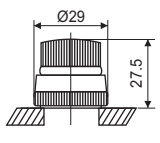

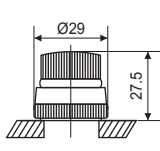

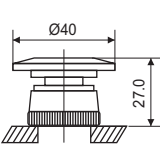

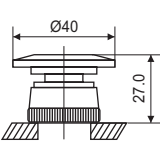

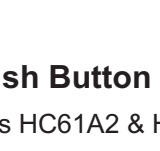

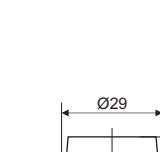
Standard Series

TEEKAY Series

- Pre assembled actuators with 1 NO (HC61A2) or 1 NC (HC61B2) contact blocks with single row clip


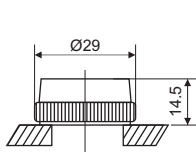

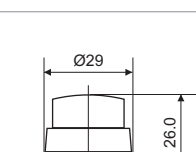

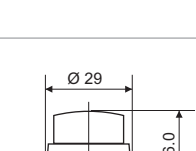
	Description	Cat. No.	Colour (4 th Digit)
 	Flush head Push Button with 1 NC Block	TD1□AB2	1-Red 2-Green 3-Black 4-Yellow 5-White/Opal 6-Blue 7-Orange
 	Flush head Push Button with 1 NO Block	TD1□AA2	1-Red 2-Green 3-Black 4-Yellow 5-White/Opal 6-Blue 7-Orange
 	Projecting head Push Button with 1 NC Block	TD4□AB2	1-Red 2-Green 3-Black 4-Yellow 5-White/Opal 6-Blue 7-Orange
 	Projecting head Push Button with 1 NO Block	TD4□AA2	1-Red 2-Green 3-Black 4-Yellow 5-White/Opal 6-Blue 7-Orange
 	Symmetrical head 2 position selector switch (NSR) with 1 NC Block	TK63AB2	3-Black
 	Symmetrical head 2 position selector switch (NSR) with 1 NO Block	TK63AA2	3-Black

TEEKAY Series

	Description	Cat. No.	Colour (4 th Digit)
 	Symmetrical head 2 position selector switch (SR) with 1 NC Block	TI63AB2	3-Black
 	Symmetrical head 2 position selector switch (SR) with 1 NO Block	TI63AA2	3-Black
 	Mushroom Head Push Turn Actuator with 1 NC	TH5□AB2	1-Red 2-Green 3-Black 4-Yellow
 	Mushroom Head Push Turn Actuator with 1 NO	TH5□AA2	
 	Mushroom Head Push Function Actuator with 1 NC	TD5□AB2	1-Red 2-Green 3-Black 4-Yellow
 	Mushroom Head Push Function Actuator with 1 NO	TD5□AA2	

Standard Push Button & Selector Actuators Ø 22.5 mm

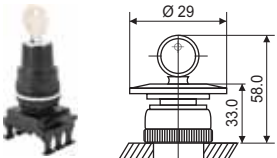






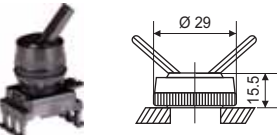

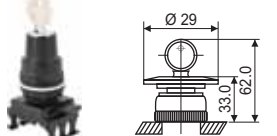

- Contact blocks HC61A2 & HC61B2



	Description	Cat. No.	Colour (6 th Digit)
 	Flush Head	HD15C□	1-Red 2-Green 3-Black 4-Yellow 5-White/Opal 6-Blue 7-Orange 8-Colorless
 	Projecting Head 'Push Function'	HD45C□	1-Red 2-Green 3-Black 4-Yellow 5-White/Opal 6-Blue 7-Orange 8-Colorless
 	Projecting Head 'Push - Push Function'	HF45C□	1-Red 2-Green 3-Black 4-Yellow 5-White/Opal 6-Blue 7-Orange

Standard Push Button & Selector Actuators Ø 22.5 mm

	Description	Cat. No.	Colour (6 th Digit)	
	Mushroom Head Ø 40 mm 'Push Function'	HD55C□	1-Red 2-Green 3-Black 4-Yellow	
	Mushroom Head 'Push Turn'	HH55C□	1-Red 2-Green 3-Black 4-Yellow	
	Mushroom Head With Lock & Key	HQ55C□	1-Red 2-Green 3-Black 4-Yellow	
	Mushroom Head 'Push Pull'	HG55B□	1-Red 2-Green 3-Black 4-Yellow 6-Blue	
	Twin Touch	HD15G□	3-Black 4-Yellow 5-White/Opal 6-Blue 7-Orange 8-Colourless	
	Symmetric Head	2 Position	1-Red 2-Green 3-Black 5-White/Opal	
		Non Spring Return		 HK65C□
		Spring Return		 HI65C□
		3 Position		
		Non Spring Return		 HL65C□
		Spring Return		 HJ65C□
		Spring Return from L. H.		 HM65C□
Spring Return from R. H.	 HN65C□			
	Lever Head	2 Position	1-Red 3-Black 5-White/Opal	
		Non Spring Return		 HK75C□
		Spring Return		 HI75C□
		3 Position		
		Non Spring Return		 HL75C□
		Spring Return		 HJ75C□
		Spring Return from L. H.		 HM75C□
Spring Return from R. H.	 HN75C□			

Standard Push Button & Selector Actuators Ø 22.5 mm

	Description	Cat. No.	Colour (4 th Digit)
	Lock & Key Rotary Type	2 Position	3-Black
		Non Spring Return 	
		Spring Return 	
		3 Position	
		Non Spring Return 	
		Spring Return 	
		Spring Return from L. H. 	
		Spring Return from R. H. 	
	Tip Head	2 Position	1-Red 2-Green 3-Black 4-Yellow 5-White/Opal
		Non Spring Return 	
	Lock & Key Push Turn	2 Position	3-Black
		Non Spring Return 	

Note * In 2 position selector actuator, for operating style  replace 2nd digit from K to R and for operating style  replace 2nd digit from K to T
 ** For Lock & Key, Key removable position Left, Right or Both

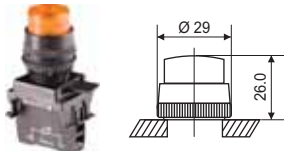
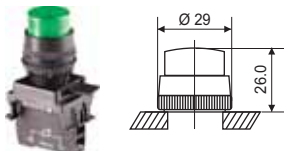
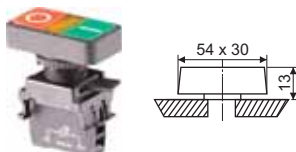
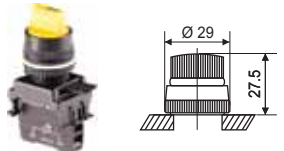






- Note :**
1. Actuators & Selector Actuators with black ABS collar are offered as Standard eg. : **HD15 C1**
 2. Actuators (except Mushroom Head Push - Pull & all types of twin touch Actuators) are also available with chrome plated ABS & Brass collar
 - For Chrome plated ABS Collar replace 5th digit C by A eg. : **HD15 A1**
 - For Brass Chrome plated ABS Collar replace C by B eg. : **HD15 B1**
 3. For Non-Illuminated Actuator / Selector Actuator at least 1 NO or NC Block required to make a complete Assembly
 eg. HD15C1 + HC61A2 makes complete assembly of flush head actuator with 1 NO Block



Standard Illuminated Actuators With LED

- Illuminated Actuators Pre-assembled with LED Holder
- Contact blocks HC61A2 & HC61B2



	Description	Cat. No.	Colour (4 th Digit)	Voltage (5 th , 6 th , 7 th & 8 th Digit)
	Flush Head	EAL□□□□FD1	R-Red G-Green Y-Yellow A-Amber	012C - 12 V AC/DC 024C - 24 V AC/DC 048C - 48 V AC/DC 064C - 64 V AC/DC 110A - 110 V AC 110D - 110 V DC 240A - 240 V AC 220D - 220 V DC
			B-Blue W-White	

Standard Illuminated Actuators With LED

	Description	Cat. No.	Colour (4 th Digit)	Voltage (5 th , 6 th , 7 th & 8 th Digit)	
	Projecting Head (Push Function)	EAL□□□□PD1	R-Red G-Green Y-Yellow A-Amber	012C - 12 V AC/DC 024C - 24 V AC/DC 048C - 48 V AC/DC 064C - 64 V AC/DC 110A - 110 V AC 110D - 110 V DC 240A - 240 V AC 220D - 220 V DC	
			B-Blue W-White		
	Projecting Head (Push - Push Function)	EAL□□□□PF1	R-Red G-Green Y-Yellow A-Amber	012C - 12 V AC/DC 024C - 24 V AC/DC 048C - 48 V AC/DC 064C - 64 V AC/DC 110A - 110 V AC 110D - 110 V DC 240A - 240 V AC 220D - 220 V DC	
			B-Blue W-White		
	Twin Touch	EAL□□□□TD1	Y-Yellow A-Amber	012C - 12 V AC/DC 024C - 24 V AC/DC 048C - 48 V AC/DC 064C - 64 V AC/DC 110A - 110 V AC 110D - 110 V DC 240A - 240 V AC 220D - 220 V DC	
	Selector Actuator with Gen Next LED	2 Position Non Spring Return 	EAL□□□□SK1	R-Red G-Green Y-Yellow A-Amber	012C - 12 V AC/DC 024C - 24 V AC/DC 048C - 48 V AC/DC 064C - 64 V AC/DC 110A - 110 V AC 110D - 110 V DC 240A - 240 V AC 220D - 220 V DC
		2 Position Spring Return 	EAL□□□□SI1	B-Blue W-White	
		3 Position Non Spring Return 	EAL□□□□SL1	R-Red G-Green Y-Yellow A-Amber	
		3 Position Spring Return 	EAL□□□□SJ1		
		3 Position Spring Return from L. H. 	EAL□□□□SM1	B-Blue W-White	
		3 Position Spring Return from R. H. 	EAL□□□□SN1		

Note* : 1) In 2 position selector actuator, for operating style  replace 10th digit from K to R and for operating style  replace 10th digit from K to T.
 2) Assembly comes with LED holder. Please order contact block HC61A2 and HC61B2 separately.
 3) For Illuminated Actuators / Selector Actuators at least 1 LED Holder is required for electrical connection.

Standard Modular Contact Blocks

	Description	Cat. No.	Colour (4 th Digit)	Voltage (5 th , 6 th , 7 th & 8 th Digit)
	'NO' Block	HC61A2	-	-
	'NC' Block	HC61B2	-	-
	LED Holder for Standard series	EHL□□□□□	R-Red G-Green Y-Yellow A-Amber B-Blue W-White	012C - 12 V AC/DC 024C - 24 V AC/DC 048C - 48 V AC/DC 064C - 64 V AC/DC 110A - 110 V AC 110D - 110 V DC 240A - 240 V AC 220D - 220 V DC

Standard Push Button Stations (in ABS Engineering plastic body)






Dimension • Single Station : 74 x 70 x 48.5 mm • Two Station : 107 x 70 x 48.5 mm
 • Three Station : 140 x 70 x 48.5 mm

	Description	Cat. No.
	Mushroom Head Actuator 'Push Function' with Legend - STOP Contact - 1 'NC' for Stop	JAE10000
	Mushroom Head Actuator 'Push Turn Type' with Legend - STOP Contact - 1 'NC' for Stop	JAF10000
	Mushroom Head Actuator with Lock and Key on Yellow Cover, with legend - STOP, Contact - 1 'NC' for Emergency Stop	JAG10000
	Push Button Station with Push Pull Emergency Switch, Red with 1 NC	TJ51B2
	Flush Head Actuator - Red with Legend - STOP Contact - 1 'NC'	JAA10000
	Flush Head Actuator - Green with Legend - START Contact - 1 'NO'	JAB20000
	Illuminated Actuator - Red with Legend - OFF Contact - 1 'NC' Bulb Holder with Bulb 240 VAC	JAC50000
	Illuminated Actuator - Green with Legend - ON Contact - 1 'NO' Bulb Holder with Bulb 240 VAC	JAD60000
	Two Position Symmetric Head Selector Switch - Black with Legend - OFF / ON Contact - 1 'NO'	JAH20000
	Two Position Lock & Key Rotary Switch with Legend - OFF / ON Contact - 1 'NO'	JAI20000
	Flush Head Actuator - Green with Legend - START Contact - 1 'NO' (Station One)	JBB2A100
	Flush Head Actuator - Red with Legend - STOP Contact - 1 'NC' (Station Two)	
	Flush Head Actuator - Green with Legend - START Contact - 1 'NO' (Station One)	JBB2F100
	Mushroom Head Actuator 'Push Turn Type' with Legend - STOP Contact - 1 'NC'	
	Flush Head Actuator - Green with Legend - START Contact - 1 'NO' (Station One)	JBB2G100
	Mushroom Head Actuator 'Locked & Key type' Contact - 1 'NC'	
	Pilot Light 240 VAC Colourless Lens (Station One)	JCZ4B2A1
	Flush Head Actuator - Green with Legend - START Contact - 1 'NO' (Station Two)	
	Flush Head Actuator - Red with Legend - STOP Contact - 1 'NC' (Station Three)	
	Flush Head Actuator - Green with Legend - FORWARD Contact - 1 'NO' (Station One)	JDB2A1B2
	Flush Head Actuator - Red with Legend - STOP Contact - 1 'NC' (Station Two)	
	Flush Head Actuator - Green with Legend - REVERSE Contact - 1 'NO' (Station Three)	
	Flush Head Actuator - Green with Legend - UP Contact - 1 'NO' (Station One)	JEB2A1B2
	Flush Head Actuator - Red with Legend - STOP Contact - 1 'NC' (Station Two)	
	Flush Head Actuator - Green with Legend - DOWN Contact - 1 'NO' (Station Three)	

Note: All standard push button stations contains base mounted contact blocks.

Standard Push Button Stations (in ABS Engineering plastic body)

Push Buttons Station Enclosure with contact block



	Description		Cat. No.
	All Grey single hole		HF999004
	All Grey & 2 hole of Ø 22.5		HF999005
	All Grey & 3 holes of Ø 22.5		HF999003
   	Base mounted contact block for Push Button Stations	'NO' Contact Block	HC42A2
		'NC' Contact Block	HC42B2
		1 'NO' + 1 'NC' Contact Block	HC42C2
		2 'NO' Contact Block	HC42D2
		2 'NC' Contact Block	HC42E2
		Bulb Holder with Bulb 240 V AC+ 'NO' Contact Block	HC22N1
		Bulb Holder with Bulb 240 V AC+ 'NC' Contact Block	HC22O1

Standard All Purpose Enclosures

 Dimension: 110 x 80 x 65 mm	Description	Cat. No.
	All Grey without hole	HF999000
	All Grey & 1 hole of Ø 22.5	HF999001
 Dimension: 170 x 85 x 80 mm	All Grey & 2 holes of Ø 22.5	HF999002
	4 Station Enclosure (maximum 3 NO/NC per button)	HF999024
 Dimension: 80 x 82 x 85 mm	1 Station Enclosure (maximum 4 NO or NC)	HF999026



Note: Only standard series actuators and contact block (HC61A2 & HC62B2) can be used to convert all purpose enclosure box into standard push button station.

Accessories and Spares for Standard series



Clips for Modular Blocks	Description	Cat. No.
	Second Row Clip (For Vertical Cascading)	HC122030
	Side Row Clip (For Horizontal Cascading)	HC929002

Clips for Modular Blocks	Description	Cat. No.
	First Row Clip	HC922002
	Single Leg Clip	HE102000





Note : First Row Clip is included for all std series Push Button Actuators, Selector Actuators & Mushroom Head Assembly




Shroud (Boot) for Actuator	Cat. No.	Colour
	HH152002	Red
	HH153003	Green
	HH154004	Black
	HH155005	Yellow
	HH150100	Colourless

(For IP67 protection with standard series actuators)

Spare Lens Cap	Colour	Cat. No.	
		Non Illuminated	Illuminated
 	Red	HB103002	HB103103
	Green	HB104000	HB104101
	Black	HB102006	NA
	Yellow	HB105008	HB105109
	White/Opal	HB101004	HB101105
	Blue	HB107010	HB107111
	Orange	HB108012	HB108113
	Colourless	NA	HB100107

Note: It can be used for Gen Next as well as standard series indicator & actuators.

Collar (For Standard series Flush/ Projecting Head)	Cat. No.	Colour
	HB192000	Chrome Plated 'ABS'
	HB196000	Black
	HB326000	Brass
Adaptor Ring (For 30 to 22 mm in Panel Cutout conversion)	HH180000	Gray
	HH182004	Chrome Plated 'ABS'
	HH196006	Black
Blanking Plugs	HH180002	Gray
	HH182009	Black
	HH196010	Chrome Plated 'ABS'
Center Indication Strip (For Twin Touch Actuator)	HB102058	Black
	HB105163	Yellow
	HB108169	Orange
	HB100161	Colourless

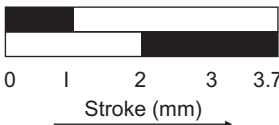
Metal Plates - Spare	Cat. No.
 Small	HH2420122
 Large	HH2420124
 Square	HH2420123

Note: Printing as per customer requirement

Fixing Device	Cat. No.
	HH192000
Plastic Plate	Cat. No.
 Yellow legend plate	HB135000
 Protecting Shroud	HF195004

Product	16mm Gen Next LED Indicators	22.5 mm Gen next LED Indicators	Gen next LED Actuators
Rated Voltage	12 V AC/DC	12 V AC/DC	12 V AC/DC
	24 V AC/DC	24 V AC/DC	24 V AC/DC
	30 V AC/DC	30 V AC/DC	30 V AC/DC
	48 V AC/DC	48 V AC/DC	48 V AC/DC
	63.5 V AC/DC	63.5 V AC/DC	63.5 V AC/DC
	110 V AC/DC	110 V AC, 110 V DC	110 V AC, 110 V DC
	240 V AC	240 V AC, 220 V DC	240 V AC, 220 V DC
Operating Voltage	-20% to +10% of rated voltage		
Type of LED	SMD LEDs		
Available Colours	Red, Green, Yellow, Amber, Blue and White		
Power Consumption	< 0.6 W		
Insulation Resistance	> 100 Ω at 500 V DC		
Dielectric Strength	1.5 kV AC for 60 sec		
Life	1,00,000 burning hours		
Panel cutout required	EIL series - Ø 22.5 mm, Ø 30.5 mm with adapter ring, SIL series - Ø 16 mm		
Overall Dimension	EIL series - Ø 29 X 52 mm (approx), SIL series - Ø 19.9 X 49 mm (approx)		
Operating Temperature	-30°C to 60°C		
Wire Termination Capacity	0.5 mm ² , 1.5mm ²	0.5 mm ² , 1.5 to 2.5mm ²	
Terminal Torque	0.8 Nm		
Degree of Protection	IP65 : Above panel and IP20 : for terminals		
International Approvals	CE	CE, UL	CE

Gen Next Integral Actuator

Product	Gen Next Integral Actuator
Function Type	Push, Push-Push, Push Turn, Selector
Contact	NO, NC, NO+NC, 2 NO, 2 NC
Type	Non-Illuminated
Colour	Red / green / black / yellow / orange / blue / white
Rated Operational Levels	6 A, 230 V AC
Electrical Cycle	5 Lac operations
Mechanical Cycle	10 Lac operations
Operating Temperature	-30°C to 60°C
Operating Force	Max 8 N
Degree of Protection	IP65 : Above panel and IP20 : for terminals
Rated Insulational Voltage	600 V AC
Terminals	Suitable for flexible or solid conductors from 2 x 1 mm ² to 2 x 2.5 mm ²
Contact Material	AgNi / AgCdo
Insulation Resistance at 500 V DC	> 50 m Ω
Contact Resistance	< 20 m Ω
MV drop at 16 ADC	< 200 mV
Disposition of contacts	<div> <div><input type="checkbox"/></div> Contact Open <div><input checked="" type="checkbox"/></div> Contact Close </div>  <p>Stroke (mm)</p>

Gen Next Modular Contact Block

Product	Gen next modular contact block
Electrical cycle	5 Lac operations
Mechanical cycle	10 Lac operations
Operating Temperature	-30°C to 60°C
Operating Force	Max 3.5 N
HV test for 60 sec	2.5 kV
Rated Insulation Voltage	600 V AC
Terminals	Suitable for flexible or solid conductors from 2 x 1 mm ²
Contact Material	AgNi
Rated Thermal Current	16 A with 2.5 mm ² flexible conductors
Insulation Resistance at 500 V DC	> 50 m Ω
Contact Resistance	< 20 m Ω
MV drop at 16 A DC	< 100 mV

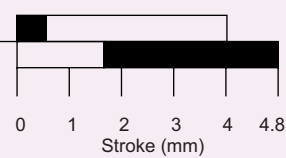
Actuator, Indicators, Modular & Front Connection Blocks

Electrical Ratings (IEC 60947-5-1, 2003)							
Alternating Current	Rated Operating Voltage (50-60 Hz)		V	110	230	440	500
	Rated Operating Current (IEC 60947-5-1)	AC 15	Amp	8	6	3	2
Direct Current	Rated Operating Voltage (50-60 Hz)		V	24	48	110	220
	Rated Operating Current (IEC 60947-5-1)	DC13	Amp	1.5	1.0	0.3	0.2

UL Electrical Ratings (UL 508)											
Contact Rating Code Designation,	Thermal Continuous Test Current,	Maximum Current								Maximum VA	
		120 V		240 V		480 V		600 V			
AC	Amp	Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
A 600	10	60	6	30	3	15	1.5	12	1.2	7200	720

Contact Rating	Thermal Continuous	Maximum Make & Break Current, Amp		Maximum Make & Break at 300 V or less, VA
Code Designation, DC	Test Current, Amp	125 V	250 V	
P 300	5	1.1	0.55	138

Electrical Life at 240 V, 50-60 Hz, AC, utilization category AC15 to IEC 60947-5-1			Rated Thermal Current		16 Amp with, 2.5 mm ² flexible conductor
Rated current			Mechanical Life		1 x 10 ⁶ operations
Amps			Rated Insulation Voltage		600 V
6			Dielectric / H. V. Test Voltage		2.5 kV AC for 60 sec
2					
Operations (x10 ⁶)					
0.5					
1					
Actuators					
Degree of Protection IP65					
IP67 with rubber / vinyl shroud					
Operational Temperature Limits (without shroud)					
Non-illuminated Illuminated					
-30 to + 60°C -30 to + 40°C					
Rated Insulation Voltage 600 V AC					
Dielectric / H. V. Test Voltage at 2.5 kV AC for 60 sec					
Mechanical Life		Flush Head	5 Lac		
		Mushroom Head	1 Lac		
		Selector Actuator	1 Lac		

Terminals		Suitable for flexible or solid conductors from 2 x 1 mm ²
Disposition of Contacts for Modular Blocks		
<input type="checkbox"/>	Contact Open	NC
<input checked="" type="checkbox"/>	Contact Close	NO
		
		Stroke (mm)

Note : IP67 Rubber/ Vinyl Shroud is available for Standard series only.

Panel Mounted 22.5 dia Buzzer

Product	Panel Mounted Buzzer
Rated Voltage	12 V, 24 V, 30 V, 48 V, 63.5 V AC/DC
	110 V AC, 110 V DC, 240 V AC
Limit of Operating Voltage	-20% to +10% of rated voltage
Sound output	80 dB at 1 meter
Operating Temperature	-30°C to 60°C
Surge Test	2 kV
HV Test for 60 sec.	2.5 kV
Degree of Protection	Above Panel : IP55, For terminals: IP20
Contact material	Brass with tin plating
Power Consumption	< 0.6 W
Wire Termination capacity	Min 0.5 mm ² to 2.5 mm ²
Terminal Torque	0.5 Nm
Mode	Continuous
Life	1000 hours

Push Button Stations & General Purpose Enclosures

Degree of Protection: Dust and watertight to IP67 with shroud, IP65 without shroud.

Safety: Fully insulated to house electrical and electronic equipment with respect to protection against electrical shock.

Materials:

Base : Tough, impact resistant, ABS.

Cover : Tough, impact resistant, ABS.

Cover Screws :

- Standard Series : Slotted head, metal screws for Push Button stations and tough, low friction PA6 captive cross slot head screws for all purpose enclosures
- Gen Next series : Half Threaded self tapping cold forged screws with blacodising

Gasket : Oil and acid resistant nitrile rubber.

Terminal Capacity : 1 to 2.5 mm square flexible wire

Mounting : Directly through base, in cover screw cavity, outside gas ketted area with No.4 size, sheet metal screws.

Machining : Machining is easy with normal tools. Enclosures can be drilled, sawed, filed, punched etc. They can be welded with ultrasonic equipment.

Maintenance : Do not need any particular maintenance. If necessary, soap and water can be used for cleaning. If detergent is used, enclosure should be rinsed well with clean water. **Do not use any solvents to clean the enclosures.**

Chemical resistance : ABS products are almost completely resistant to aqueous acids, alkalis and salts. Concentrated phosphoric and hydrochloric acids have little effect. Low KB solvents, alcohols and animal / vegetable / mineral oils produce insignificant changes. Aromatic or chlorinated hydrocarbons and high KB solvents cause marked swelling. Esters, Ketones and Unsaturated alkalis are solvents for ABS and should not be used.

Long term exposure to temperatures above 70°C should be avoided. No significant change in impact strength is noticed upto - 20°C.

Gen Next Push Button Stations

Dimension

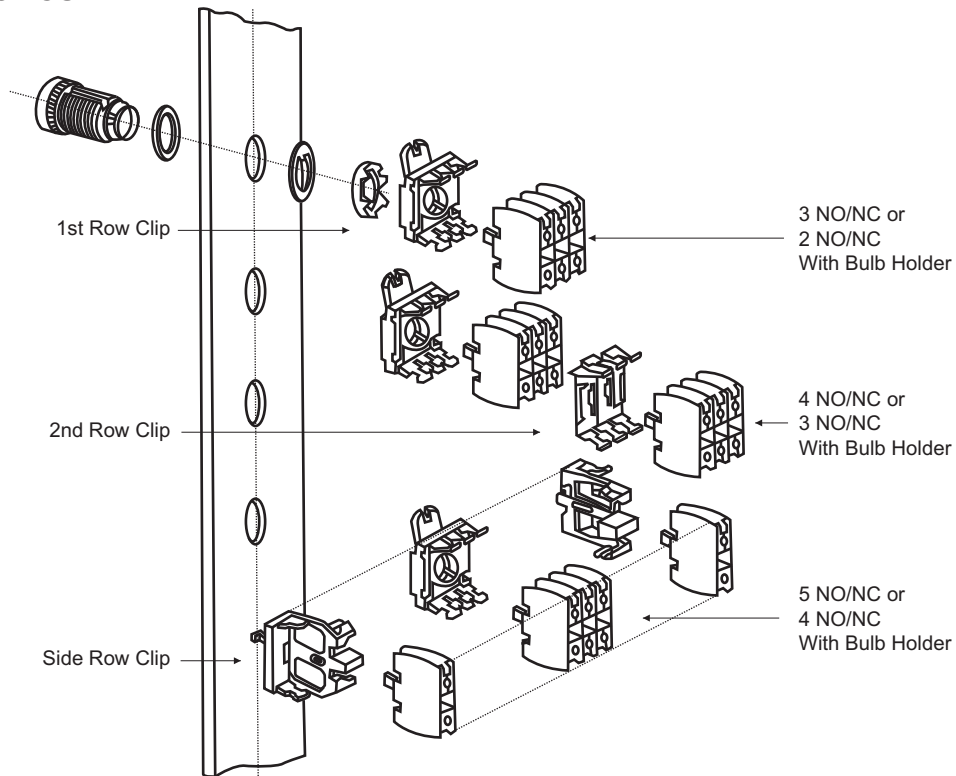
- Single Station : 65 x 55 x 33 mm
- Two Station : 100 x 55 x 53 mm
- Three Station : 134 x 55 x 53 mm
- Eight Station: 305 x 55 x 53 mm

Standard Push Button Stations (in ABS Engineering plastic body)

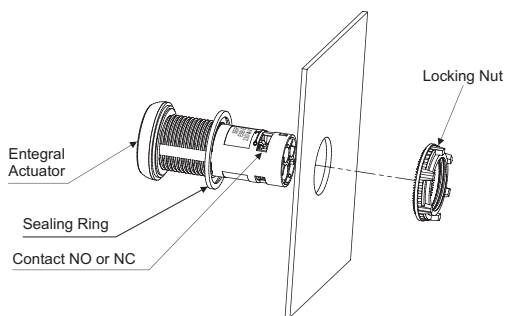
Dimension

- Single Station : 74 x 70 x 48.5 mm
- Two Station : 107 x 70 x 48.5 mm
- Three Station : 140 x 70 x 48.5 mm

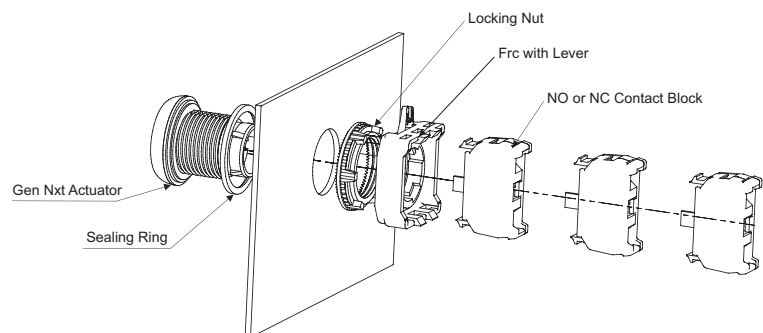
Standard Series



Integral Actuator



Gen Next Actuator



Gen Next series



Standard series



Disclaimer for Rotary Switches, Cable Duct, Load Break Switches, House Wire

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E-mail: stc-pune@Lntebg.com



Lucknow

Larsen & Toubro Limited
Switchgear Training Centre,
C - 6 & 7, UPSIDC
P. O. Sarojinagar, Lucknow - 226 008
Tel: 0522 247 6015 / 97944 54455
Fax: 0522 247 6015
E-mail: stc-lucknow@Lntebg.com



Coonoor

Larsen & Toubro Limited
Switchgear Training Centre,
Ooty-Coonoor Main Road
Yellanaahalli P.O., The Nilgiris - 643 243
Tel. : 0423 251 7107
Fax : 0423 251 7158
E-mail: stc-coonoor@Lntebg.com



Vadodara

Larsen & Toubro Limited
Switchgear Training Centre
Behind L&T Knowledge City,
Near Village Ankhol,
Vadodara - 390019
Tel: 0265 2457805
E-mail: stc-vadodara@Lntebg.com



Delhi

Larsen & Toubro Ltd
Switchgear Training Centre
32, Shivaji Marg,
Near Motinagar Metro Station,
New Delhi - 110015
Tel: 011 41419515 / 41419695 / 41419500
Fax: 011 41419600
E-mail: stc-delhi@Lntebg.com



Kolkata

Larsen & Toubro Limited
Switchgear Training Centre
4th Floor, 3B, Shakespeare Sarani,
Kolkata - 700071
Tel: 033 42005975 / 42005978
E-mail: stc-kolkata@Lntebg.com

Electrical Standard Products (ESP) Offices:

HEAD OFFICE

L&T Business Park,
Tower 'B' / 3rd Floor
Saki Vihar Road, Powai
Mumbai 400 072
Tel: 022-67053229
Fax: 022-67051112
e-mail: cic@LNTEBG.com

BRANCH OFFICES

501, Sakar Complex I
Opp. Gandhigram Rly. Station
Ashram Road
Ahmedabad 380 009
Tel: 079-66304006-11
Fax: 079-66304025
e-mail: esp-ahm@LNTEBG.com

38, Cubbon Road, P. O. Box 5098
Bengaluru 560 001
Tel: 080-25020100 / 25020324
Fax: 080-25580525
e-mail: esp-blr@LNTEBG.com

131/1, Zone II
Maharana Pratap Nagar
Bhopal 462 011
Tel: 0755-3080511 / 05 / 08 / 13 / 17 / 19
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Plot No. 559, Annapurna Complex
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Tel: 0674-6451342 / 2436690 / 2436696
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e-mail: esp-bsr@LNTEBG.com

Aspire Towers, 4th Floor
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Industrial & Business Park
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Fax: 0172-4646802
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L&T Construction Campus
TC-1 Building, II Floor
Mount-Poonamallee Road
Manapakkam
Chennai 600 089
Tel: 044-2270 6800
Fax: 044-22706940
e-mail: esp-maa1@LNTEBG.com

67, Appuswamy Road
Post Bag 7156
Opp. Nirmala College
Coimbatore 641 045
Tel: 0422-2588120 / 1 / 5
Fax: 0422-2588148
e-mail: esp-cbe@LNTEBG.com

Khairasol, Degaul Avenue
Durgapur 713 212
Tel: 0343-2540448 / 2540449 / 2540443
Fax: 0343-2540442
e-mail: esp-dgp@LNTEBG.com

5, Milanpur Road, Bamuni Maidan
Guwahati 781 021
Tel: +91 8876554410 / 8876554417
Fax: 361-2551308
e-mail: esp-ghy@LNTEBG.com

II Floor, Vasantha Chambers
5-10-173, Fateh Maidan Road
Hyderabad 500 004
Tel: 040-67015052
Fax: 040-23296468
e-mail: esp-hyd@LNTEBG.com

Monarch Building, 1st Floor
D-236 & 237, Amrapali Marg
Vaishali Nagar
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Tel: 0141-4385914 to 18
Fax: 0141-4385925
e-mail: esp-jai@LNTEBG.com

Akashdeep Plaza, 2nd Floor
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Jamshedpur 831 003
Jharkhand
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Fax: 0657-2341250
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Skybright Bldg; M. G. Road
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Fax: 0484-4409426
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3-B, Shakespeare Sarani
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Tel: 033-42005982
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A28, Indira Nagar, Faizabad Road
Lucknow 226 016
Tel: 0522-4929905 / 04
Fax: 0522-2311671
e-mail: esp-Lko@LNTEBG.com

No: 73, Karpaga Nagar, 8th Street
K. Pudur
Madurai 625 007
Tel: 0452-2567405 / 2561068 / 2561657
Fax: 0452-2567552
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L&T Business Park,
Tower 'B' / 3rd Floor
Saki Vihar Road, Powai
Mumbai 400 072
Tel: 022-67052874 / 2737 / 1156
Fax: 022-67051112
e-mail: esp-bom@LNTEBG.com

12, Shivaji Nagar
North Ambajhari Road
Nagpur 440 010
Tel: 0712-2260012 / 6606421
Fax: 2260030 / 6606434
e-mail: esp-nag@LNTEBG.com

32, Shivaji Marg
P. O. Box 6223
New Delhi 110 015
Tel: 011-41419514 / 5 / 6
Fax: 011-41419600
e-mail: esp-del@LNTEBG.com

L&T House
P. O. Box 119
191/1, Dhole Patil Road
Pune 411 001
Tel: 020-66033395 / 66033279
Fax: 020-26164048 / 26164910
e-mail: esp-pnq@LNTEBG.com

Crystal Tower,
4th Floor, G. E. Road
Telibandha
Raipur - 492 006
Tel: 0771-4283214
e-mail: esp-raipur@LNTEBG.com

3rd Floor
Vishwakarma Chambers
Majura Gate, Ring Road
Surat 395 002
Tel: 0261-2473726
Fax: 0261-2477078
e-mail: esp-sur@LNTEBG.com

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Door No. 49-38-14/3/2, 1st floor,
NGGO's Colony, Akkayyapalem,
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Larsen & Toubro Limited, Electrical Standard Products

Powai Campus, Mumbai 400 072

Customer Interaction Center (CIC)

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