L&T Switchgear* Business IS NOW

Lauritz Knudsen#

Electrical & Automation

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ABOUT US

Lauritz Knudsen Electrical & Automation, formerly known as L&T Switchgear, is a leading player in the electrical industry owing to its 70+ years of strong legacy and commitment to the nation's growth. The brand is dedicated to providing a wide range of electrical and automation products and solutions to vital sectors of the economy, including industries, utilities, infrastructure, buildings, and agriculture. Our extensive portfolio includes low-voltage and medium-voltage switchgear, automation solutions, tailored software, and services.

With manufacturing operations in Ahmednagar, Vadodara, and Coimbatore, we adhere to global standards of excellence. Our operations are supported by well-equipped, in-house design and development centers, as well as tooling facilities, ensuring precision in manufacturing.

We proudly operate six Switchgear Training Centers (STCs) across Pune, Lucknow, Coonoor, Vadodara, Delhi, and Kolkata. These centers offer tailor-made classroom courses and lab learning experiences for technicians, customers, engineers, professionals, and students.

With a deep national presence and one of the largest electrical distribution networks, comprising over 1500 partners across the country, we are committed to driving excellence and delivering superior products and solutions that power India's growth journey.

Index

AC Rotary Switches

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.

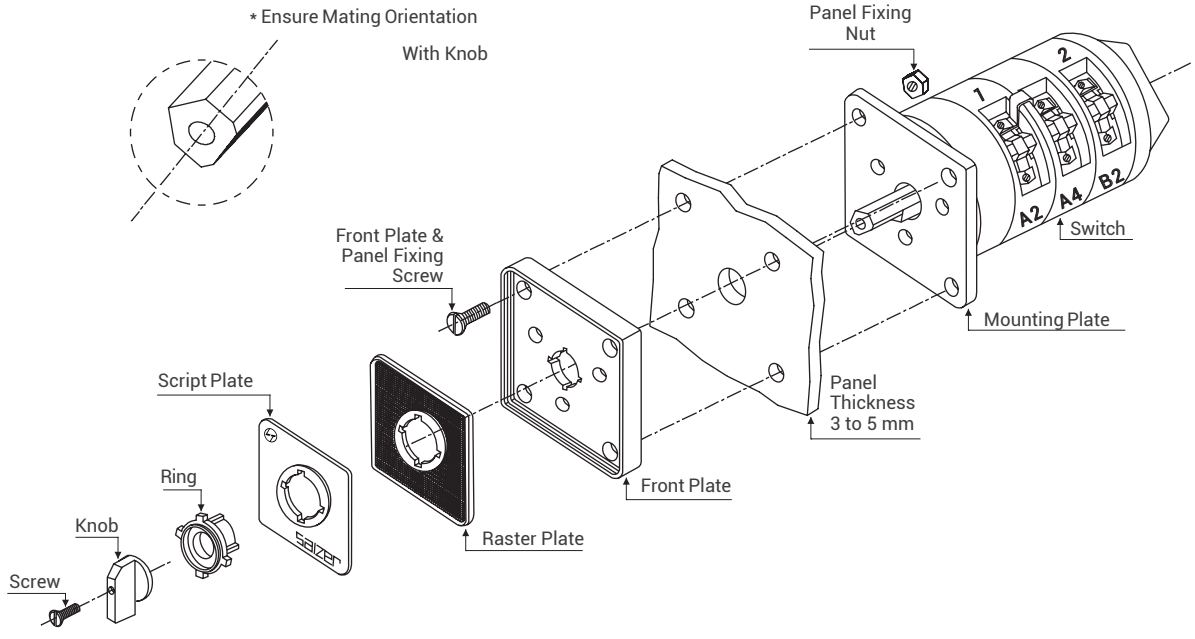
The wide option such as type of knob, front plate color and customized marking on the marking plate eliminates the need of separate label on the panel.

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.

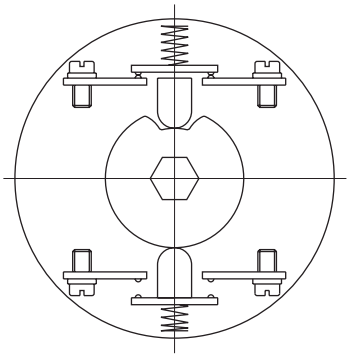
Advanced manufacturing processes for cam switch components under stringent quality conditions ensures durability, reliability and enhanced life.

Installation Procedure

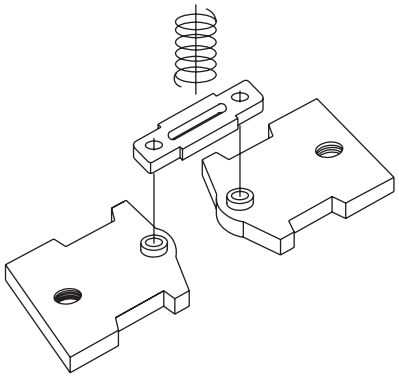
Cam Operated Rotary Switch



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 AgCdOO	perating temp:	-15°C to 55°C
Insulation:	Glass filled polyamide with high tracking index	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

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 (Ue)		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 (Uimp)		kV	4	4	6	6	6	6	6	6	6	6	6	6
Rated Operational Current (Ie) AC21/ AC1		A	6	10	16	20	25	32	40	63	80	100	125	200
Rated Uninterrupted Current (Ith)		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	10
	max	mm^2	1.5	1.5	4	4	4	6	10	16	25	35	50	70
Fine Strand	min	mm^2	0.7	0.7	1	1	1	1.5	2.5	2.5	6	10	10	10
	max	mm^2	1.5	1.5	2.5	2.5	2.5	4	6	10	16	25	35	50
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	125	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

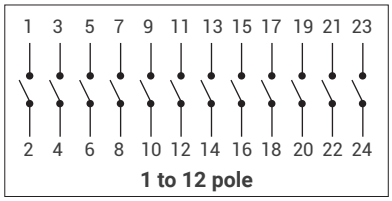
Conformance to standards :
European : IEC-60947-1 : 1988
IEC-60947-3 : 1990
IEC-60947-5 : 1992
Canadian : CSA 22.2 No.14-2010
American : UL 508 (2009)

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

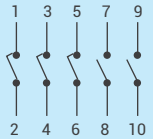
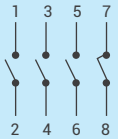


1 to 12 pole

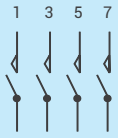
Stayput

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	61012	-	-	6
Feasible Ampere Rating : 6, 10, 16, 25, 32, 40, 63, 80, 100,125, 200 & 400 Amps				

Isolators with Preclose Contact

90 Degree		 4 to 5 pole	 61194
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

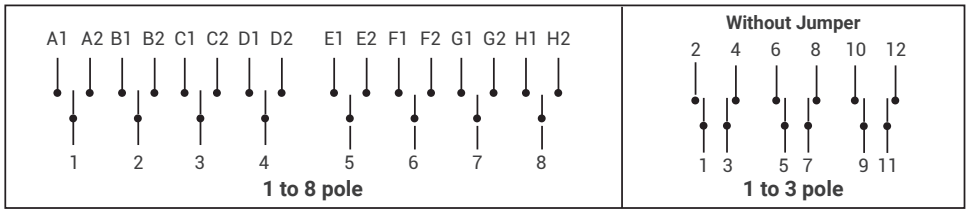
45 Degree Spring Return to OFF		 1 to 4 pole
Description		**Programme code**	**No. of Stages**
1 Pole Spring Return		61351	1
2 Pole Spring Return		61352	1
3 Pole Spring Return		61353	2
4 Pole Spring Return		61354	2
Feasible Ampere Rating : 6, 10, 16, 25, 32, 40 & 63 Amps			

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

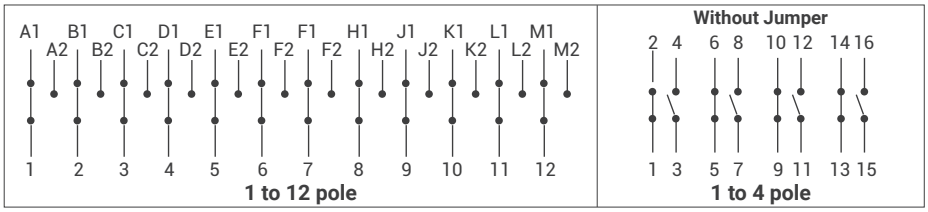
45 Degree Spring Return to 0			Spring Return from 1 to 0	
				
Description	**Programme code**	**No. of Stages**	**Description**	**Programme code**
1 Pole	61625	1	1 Pole	61364
2 Pole	61362	2	2 Pole	61365
3 Pole	61363	3	3 Pole	61369
Feasible Ampere Rating : 6, 10, 16, 25, 32, 40, 63, 80, 100, 125, 200 & 400 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	-	-
FeasibleAmpere Rating : 6, 10, 16, 25, 32, 40, 63, 80, 100, 125, 200 & 400 Amps			FeasibleAmpere 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 Applicable : 6, 10, 16, 25, 32, 40 & 63 Amps		

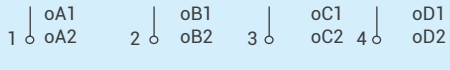
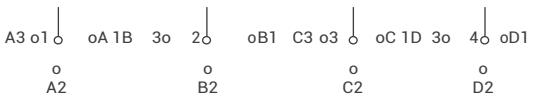
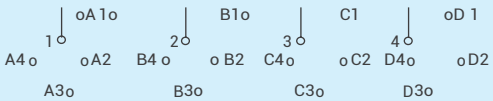
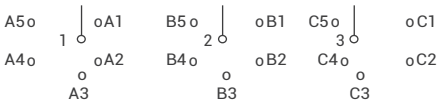
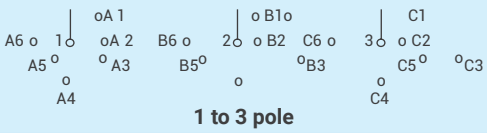
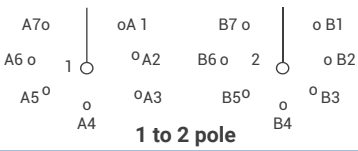
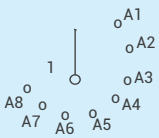
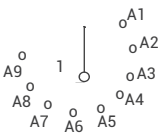
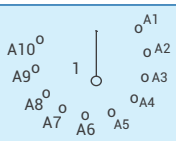
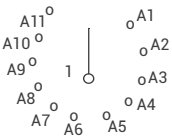
Stayput Without Jumper

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	

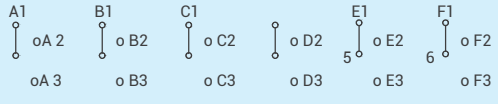
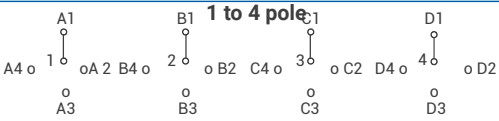
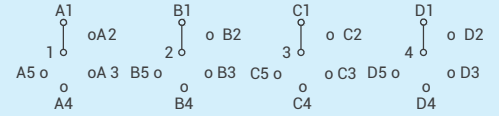
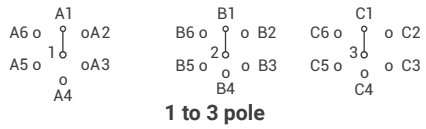
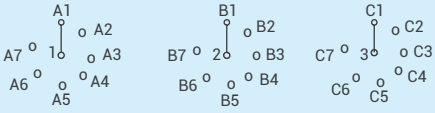
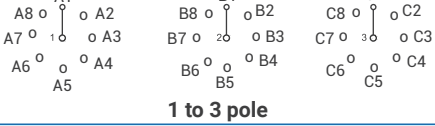
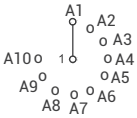
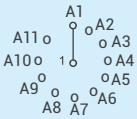
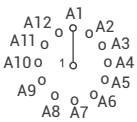
Multistep (Pole-Way) Switches with OFF

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.

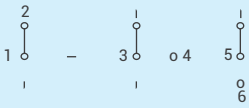
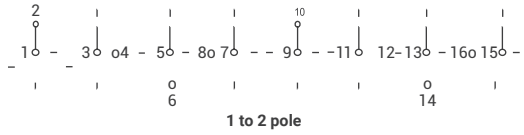
Application : Typical usage tap changing switch for Transformer / Stabilizer and other special application circuits.

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°		6
61068	1 Pole-11 Way	 11 Way- 30°		6
Feasible ampere ratings : 6, 10, 16, 25, 32, 40, 63, 80, 100, 125 & 200 Amps				

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 W - 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 W - 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 W - 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 W - 60°	 1 to 3 pole	3
61072	2 Pole-6 Way			6
61092	3 Pole-6 Way			9
61053	1 Pole-7 Way	 7 W - 45°	 1 to 3 pole	4
61073	2 Pole-7 Way			7
61093	3 Pole-7 Way			11
61054	1 Pole-8 Way	 8 W- 45°	 1 to 3 pole	4
61074	2 Pole-8 Way			8
61094	3 Pole-8 Way			12
61055	1 Pole-9 Way	 9 W - 30°		5
61056	1 Pole-10 Way	 10 W - 30°		5
61057	1 Pole-11 Way	 11 W - 30°		6
61058	1 Pole-12 Way	 12 W - 30°		6

Multistep Switches Without Jumper

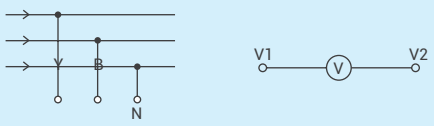
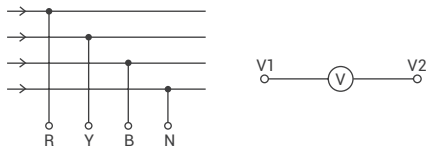
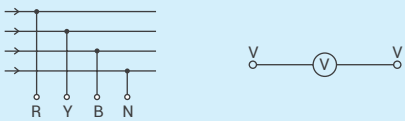
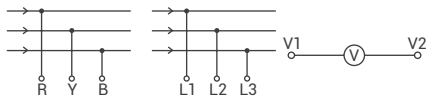
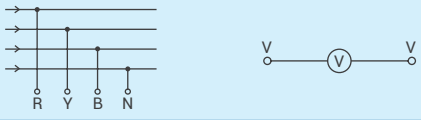
61649	1 Pole-3 Way without OFF without Jumper	 3 Way - 60°		2
61650	1 Pole-4 Way without OFF without Jumper	 4 Way - 90°	 1 to 2 pole	2
61670	2 Pole-4 Way without OFF without Jumper			4
Feasible Ampere Ratings : 6, 10, 16, 25, 32, 40, 63, 80, 100, 125 & 200 Amps				

Instrumentation Selector Switches

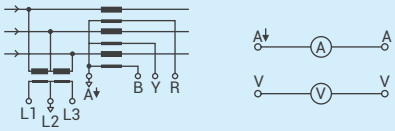
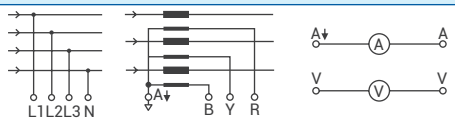
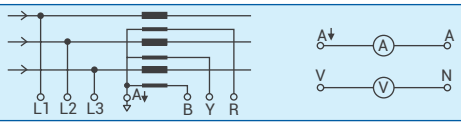
Instrumentation switches can be used for below application

- 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

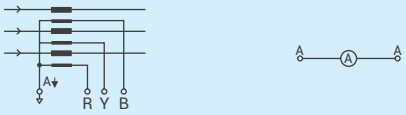
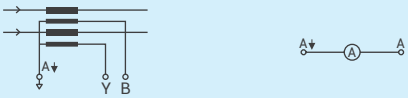
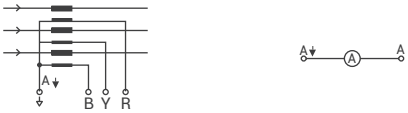
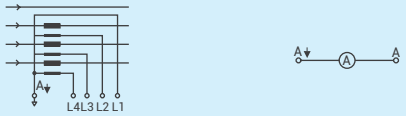
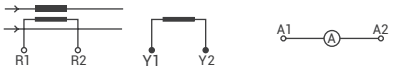
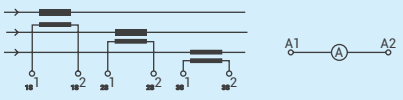
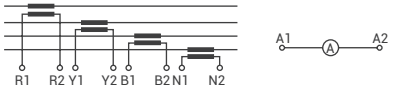
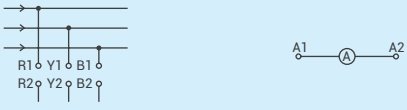
Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61312	3 Ph Line to Line			2
61313	3 Ph Line to Line & Line to Neutral			3
61314	3 Ph Line to Line Line to Neutral &without OFF			3
61317	3 Ph Line to Line & L1 to N			3
61318	3 Ph Line to Line 2 Sources			4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

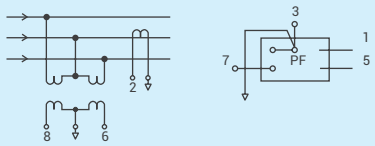
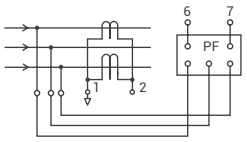
Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61336	3 Voltages Line - Line & 3 Currents			5
61337	4 Voltages & 3 Currents			6
61338	3 Voltages Line to Neutral & 3 Currents			5
Feasible Ampere Ratings : 6, 10, 16, 25 & 32 Amps				

Instrumentation Selector Switches

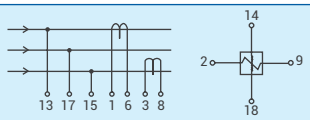
Ammeter Selector Switches

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 with OFF			5
61330	2 Pole-4 Transformer with 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				

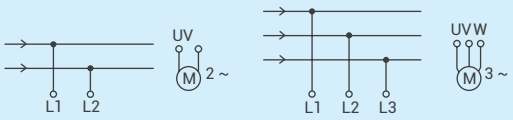
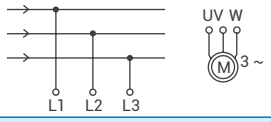
Wattmeter Switch

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

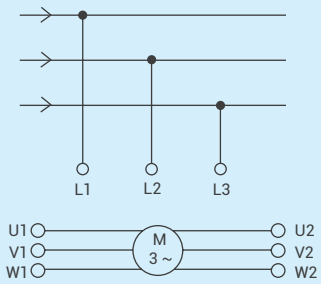
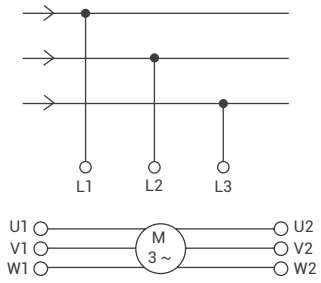
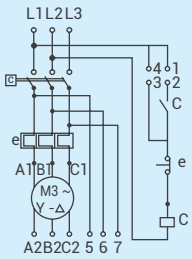
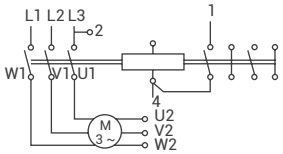
Motor Control Switches

These switches directly operate the motor withAC3 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

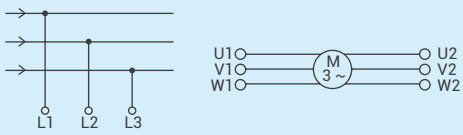
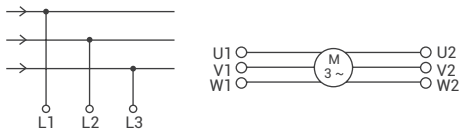
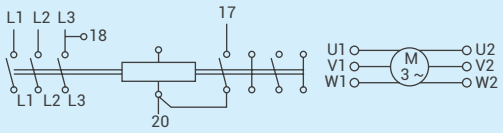
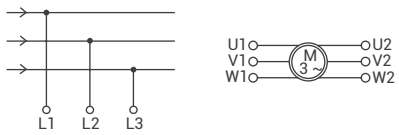
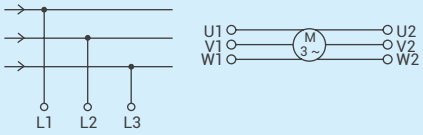
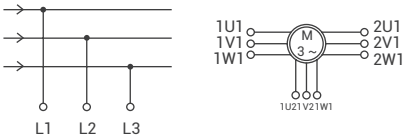
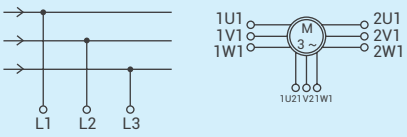
Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61210	2 Pole			2
61211	3 Pole			3
61253	3 Pole Spring Return	 Spring Return to "0"		3
Feasible ampere rating : 6, 10, 16, 20, 25 and 32				

Motor Switches / Star-Delta Switches

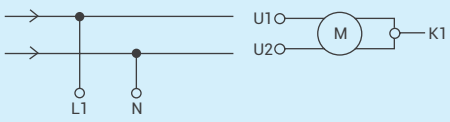
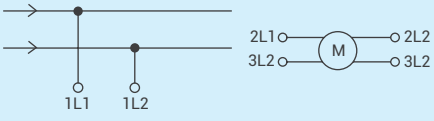
Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61200	OFF-STAR-DELTA			4
61201	Spring Returnfrom STAR to OFF			4
61203	Standard			5
61239	Star Delta with Sequence Locking & LMD Contacts			3
61240	For use with Contactors			4
Feasible Ampere Rating : 6, 10, 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				

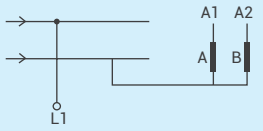
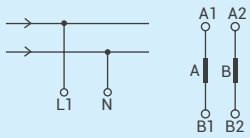
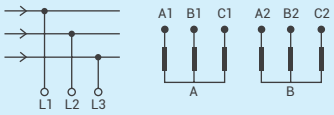
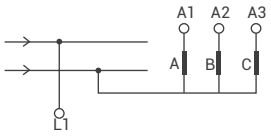
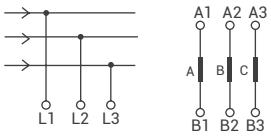
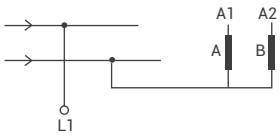
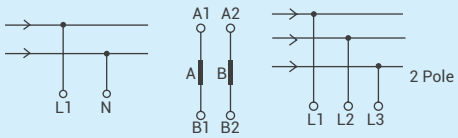
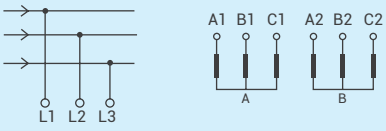
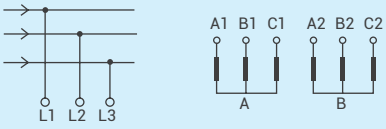
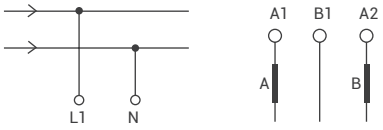
Motor Switches - Start & Run Switches

Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61208	Split-phase Start	Spring return from start to "0" 		2
61209	Split-phase Start Reversing	Spring return from start 		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.

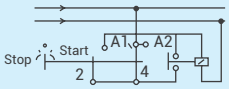
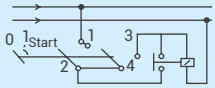
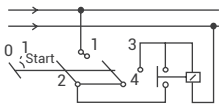
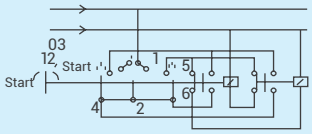
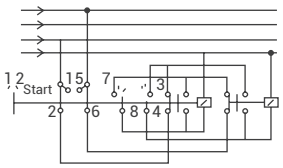
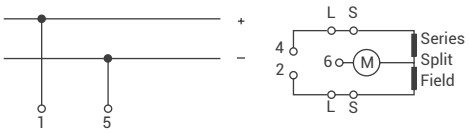
Applications: In Railway coaches for controlling the Battery supply, in Dept of Telecommunication panels and special application circuits.

Prog No.	Description	Script Plate Marking	Connecting Diagram / Terminal Marking	No. of Stages
61109	2 Gang with OFF 1 Pole	2 Gang  60°	 1Pole	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 energies 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 Returnfrom START to RUN	 spring return from start to "1"		1
61701	Without Jumper			
61307	STOP-START Switchwith Spring Return to run for 2 units	 spring return from start		2
61707	Without Jumper			
61366	Contactor Control with Spring Returnto OFF	 spring return to "0"		2
61271	Motor VoltageControl Switch			2
Feasible Ampere Rating : 6, 10, 16, 25, 32, 40 & 63 Amps				

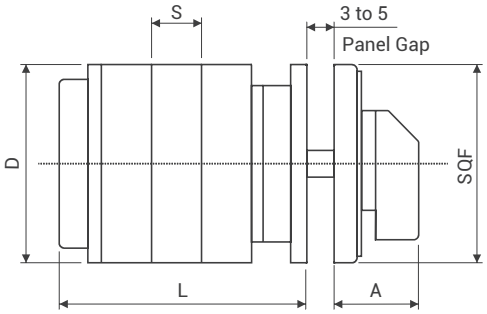
Mounting Feasibility

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 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

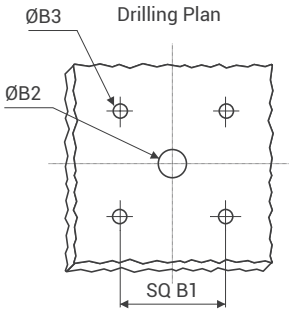
B03 (Front Mounting)

IP55 protection from front



Length L = No of Stages of Prog x S + W

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



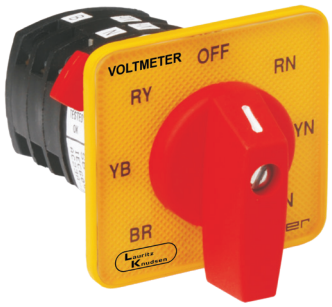
- Standard 4 Hole front panel mounting
- Knob / Handle operable
- Suitable for all switching angles and Spring Return Switches
- Front assembly in 4 different Colors, Yellow / Red, Grey /Black, Black/ Black and aluminium finish

Quote B13 for next bigger size front plate

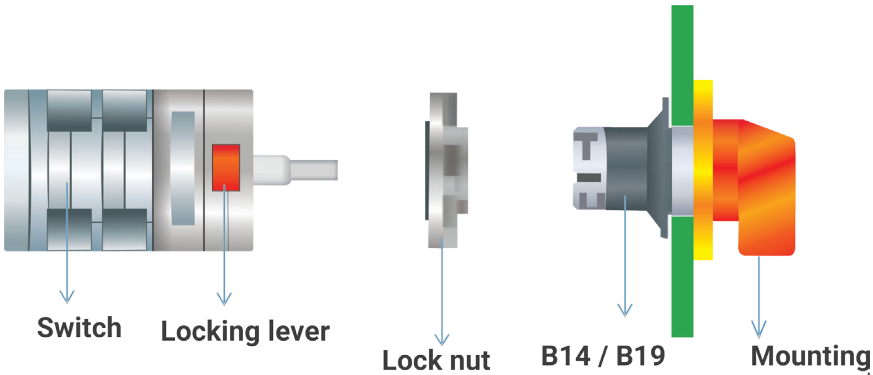
Type	A	B1	B2	B3	D	F	S	W	Max
S6/S10/TP6/TP10/SL6/SL10 (48x48 mm) - B13	28	36	12	4.5	38	48	9.5	18.5	12
S16/TP16/RT16/TP20/RT20	28	36	12	4.5	58	48	12	26	21
S25/S32/RT25/RT32	35	48	12	5.5	64	64	15	27	18
S40/S63/RT40/RT63	44	68	15	5.5	95	88	21	33	12
S80/S100/S125	44	68	15	5.5	118	88	26	40	10
S200	44	68	15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

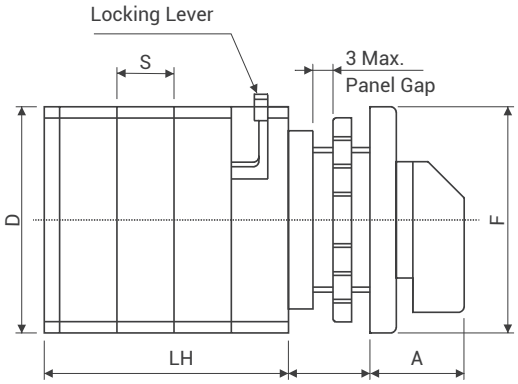
Mountings

B19/B14 (Single Hole Mounting (22.5 mm cutout))

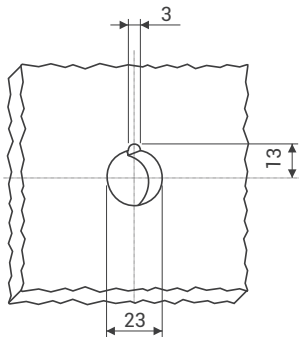


IP65 protection from front





Length L = No of Stages x S + W



Drilling Plan

- 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

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

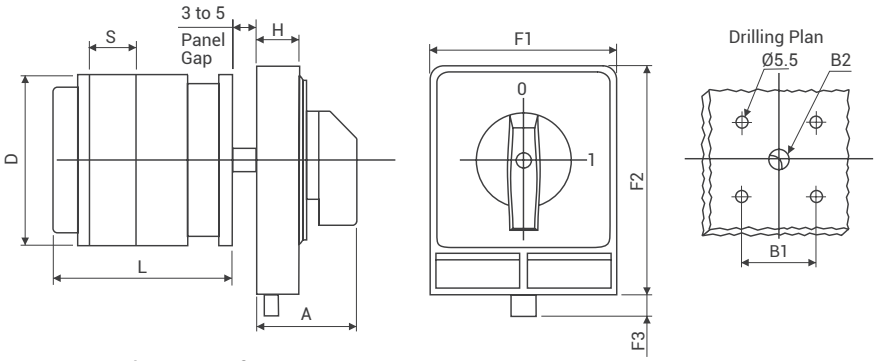
Type	Code	A	D	F	S	H	W	Max
S6/S10/TP6/TP10	B19	25	38	32	9.5	13.5	28.5	10
	B14	27	38	48	9.5	13.5	28.5	10
S16/TP16/RT16/TP20/RT20	B19	32	58	48	12	13	36	8
S25/S32/RT25/RT32	B19	32	64	48	15	13	37	6

All dimensions are in mm

Mountings

B30 (Front Mounting with rectangular Padlock)

IP55 protection from front



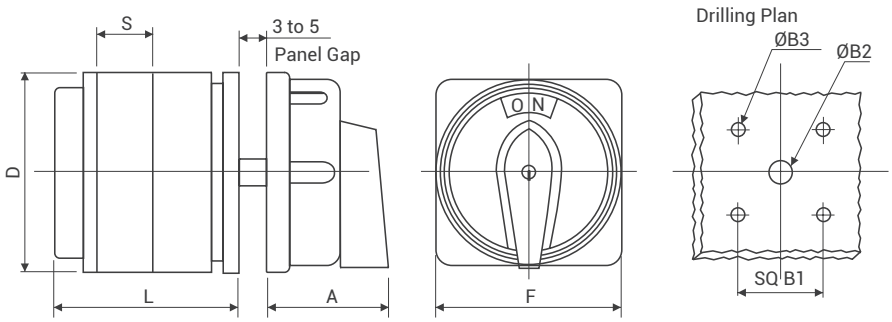
Length L = No of Stages x S + W

- Four hole mounting padlockable mounting
- Secure with max four padlocks in OFF position
- Prevents switching only
- Unauthorised personnel
- Suitable for switches with 90^{O} switching angle
- Available in Yellow/Red only

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 (Pad Lockable Mounting)

IP55 protection from front



Length L = No of Stages x S + W

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

- 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^{O} switching angle

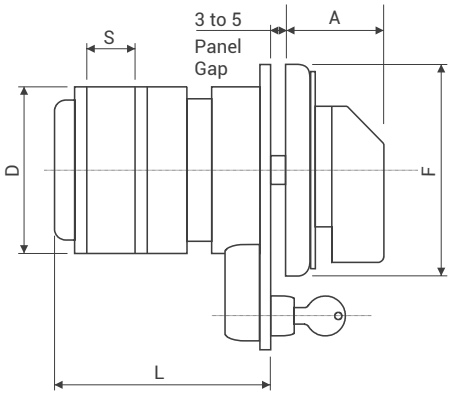
Type	A	B1	B2	B3	D	F	S	W	Max
S16/TP16/RT16/ TP20/ RT20	44	36	12	4.5	58	65	12	26	6
S25/S32/RT25/RT32	44	36	12	4.5	64	65	15	27	6
S40/S63/RT40/RT63	48	68	15	5.5	95	95	21	33	6
S80/S100/S125	48	68	15	5.5	118	95	26	40	6
S200	48	68	15	5.5	99	95	32	40	6
S400	48	68	15	5.5	99	95	64	40	3

All dimensions are in mm

Mountings

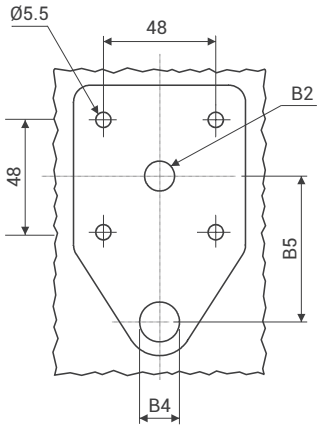
B63 (Key Lockable Type)

IP40 protection from front



Length L = No of Stages x S + W

Drilling Plan



- Knob / Handle operatable Switch with key lockable assembly prevents switching by unauthorized personnel
- Key lock / Key removable only in OFF position by default, key lockable and removable in any other position to be specified
- Lock assembly can also be provided on any side
- Common key for all Switches

Type	A	B2	B4	D	F	B5	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

All dimensions are in mm

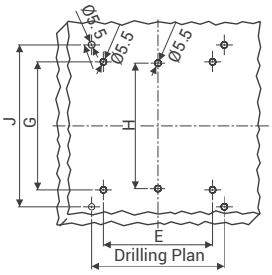
Mountings

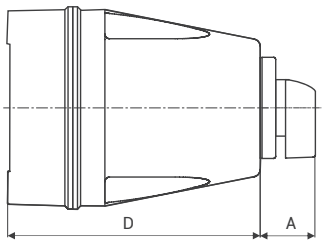
B17 (ABS Enclosure)

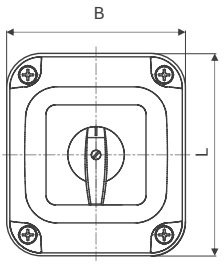
IP55

- 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

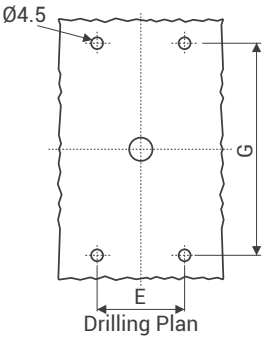
LR/HR Model

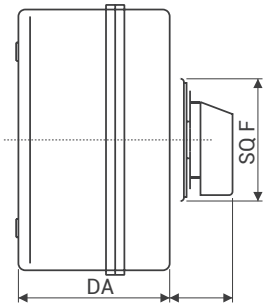


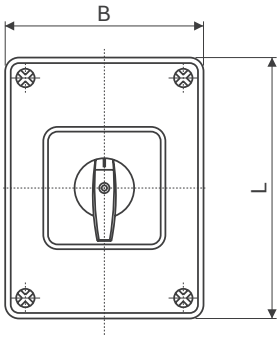




SM, M







IPQuote B31 (B17 Enclosure and B33 Round Padlock) only for Isolator ON/OFF Switches55

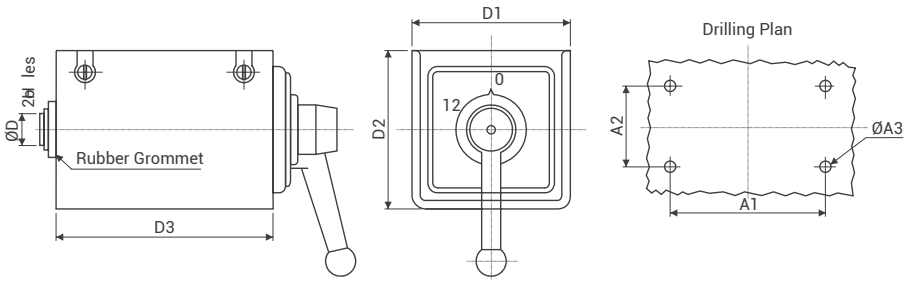
Type	Box	Type	L	B	D	E	G	Stages A
S6/S10/TP6/TP10	SM	28	125	100	72	80	115	4
S16/TP16/RT16	SM	28	125	100	72	80	115	3
S16/TP16/RT16	M	28	175	125	90	105	155	4
S25/S32/RT25/RT32	SM	35	125	100	72	80	115	2
S25/S32/RT25/RT32	M	35	175	125	90	105	155	4
S40/S63/RT40/RT63	M	44	175	125	90	105	155	2

Type	Code	A	L	B	D	E	G	H	I	J	Stages A
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 are in mm

Mountings

B17 (Metal Enclosure)

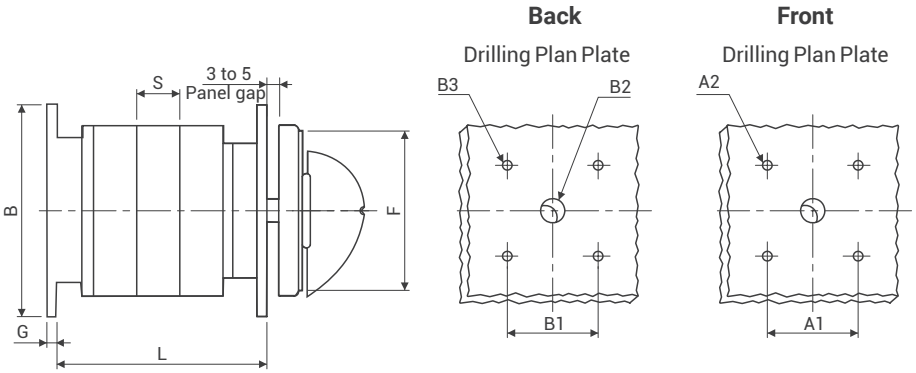


Isolators by default with knob only

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

Type	A1	A2	A3	D1	D2	Max	D3
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)



Length L = No of Stages x S + W

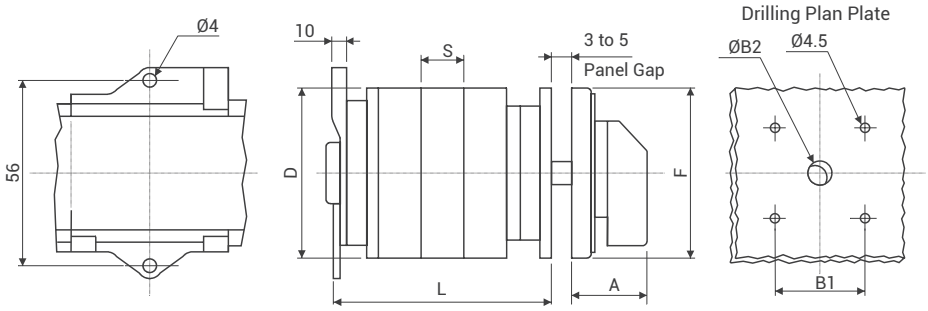
- Four hole base mounted on rear side of the panel
- Knob / Handle operable
- Can also be used for panel / door mounting

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 are in mm

Mountings

B21 (DIN Rail Mounting)



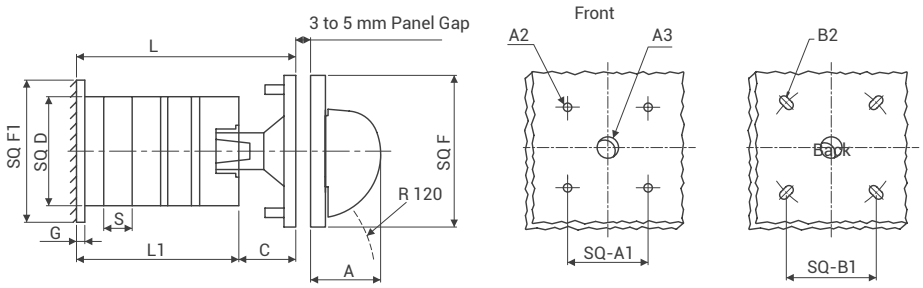
Length L = No of Stages x S + W

- 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)

IP55 protection from front



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

- 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

Type	A	A1	A2	A3	B1	F	B	G	C	N	S	W	Max
S16/TP16/ RT16TP20/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

All dimensions are in mm

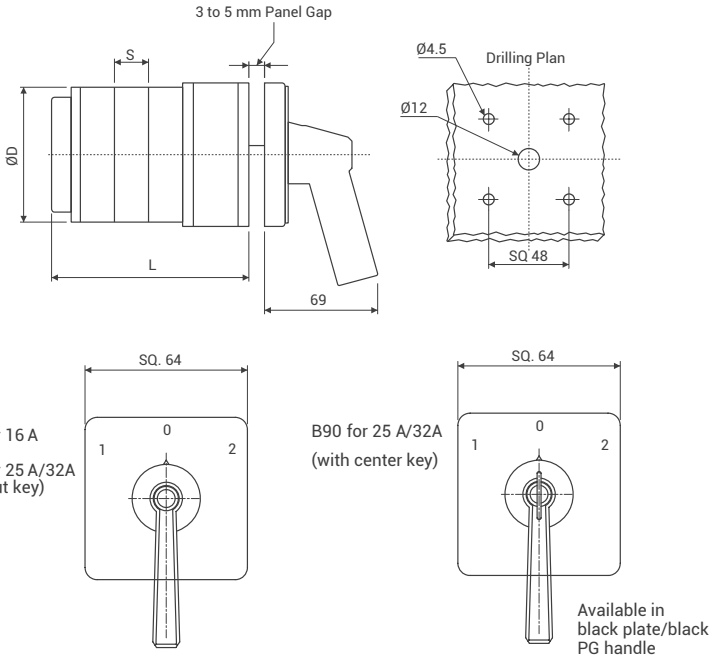
Mountings

B03 (Square Latching Mechanism)

IP55 protection from front

- Standard 4 hole front panel mounting pistol grip handle operable
- Suitable for 45⁰/60⁰ only
- Advanced special star/spring design on latching provides guaranteed spring return operation

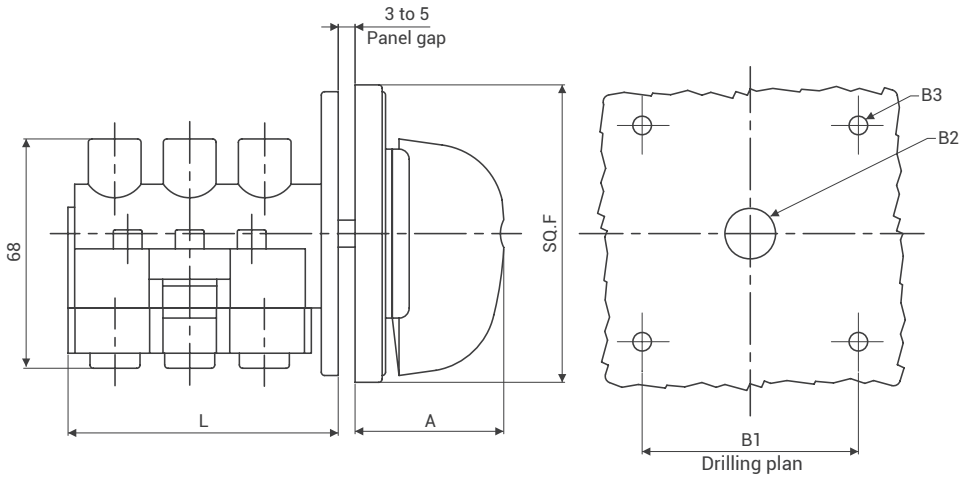
Standard Mounting-Spring Return



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 Selecter Dimensional Details



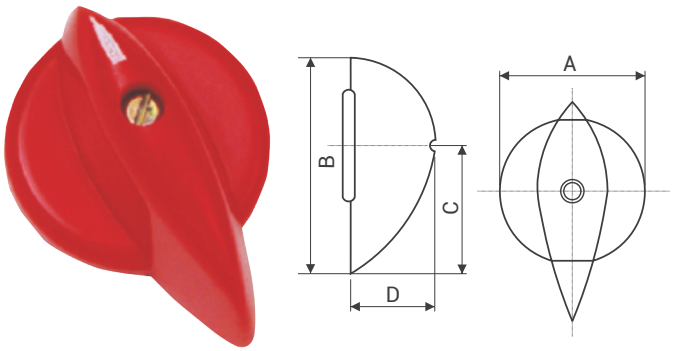
Type	B1	B2	B3	D	F	A	L
PS25 / 32	48	12	4.5	46	64	35	58
PS40 / 63	68	15	5.5	68	88	44	80

All dimensions are in mm

Knobs and Handles

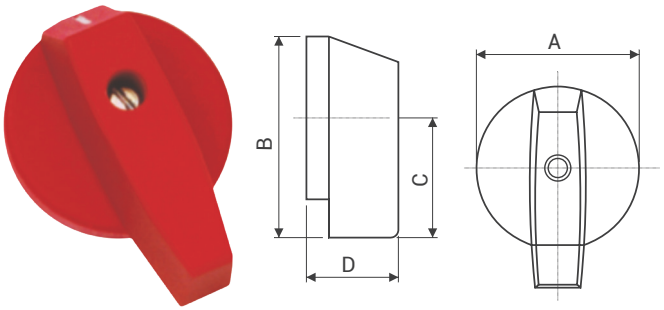
Knobs / Handle Colours ■ RED ■ BLACK

TD - Tear Drop



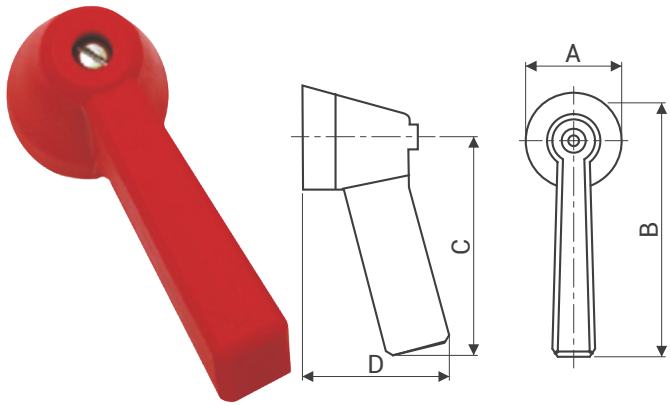
Code - TD	A	B	C	D
S6/S10/TP6/TP10	27	41	25	21
S16/TP16/RT16	27	41	25	21
S25/S32/RT25/RT32	36	51	31	25
Above S40	50	70	42	33

FL - Flag Knob



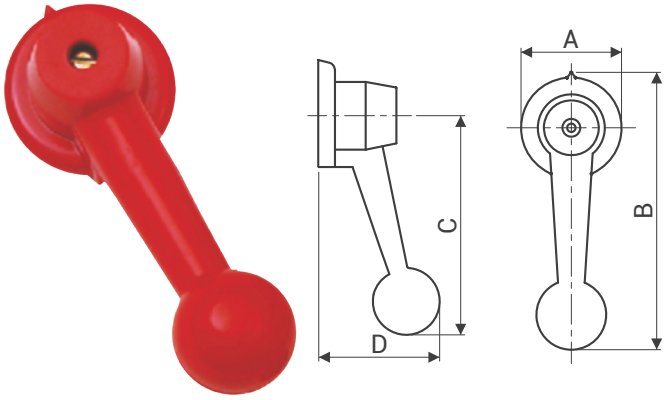
Code - FL	A	B	C	D
S6/S10/TP6/TP10	17	23	13.75	19
S16/TP16/RT16	27	38	24	23
S25/S32/RT25/RT32	36	50	35	25
Above S40	50	69	44	33

PG - Pistol Grip Handle



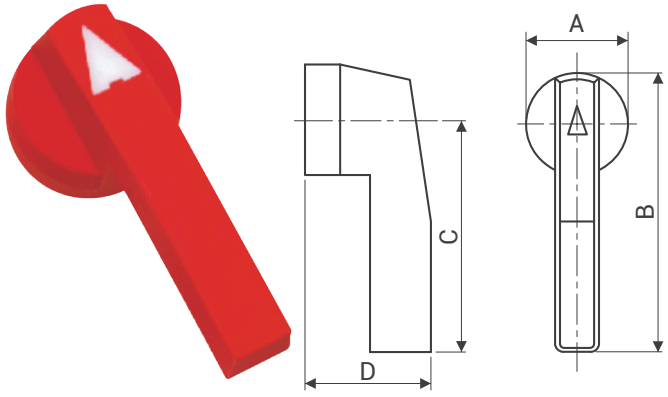
Code - PG	A	B	C	D
S16/TP16/RT16/TP20/RT20	36	102	82	56
S25/S32/RT25/RT32	36	102	82	56
S40/S63	36	102	82	56

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

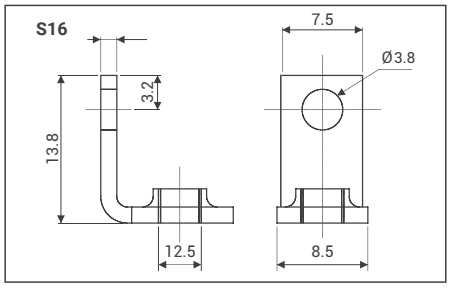


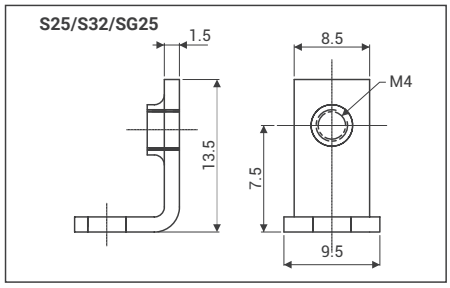
Code-LV	A	B	C	D
S80/S100/S125	50	115	90	45
S200/S400	50	115	90	45

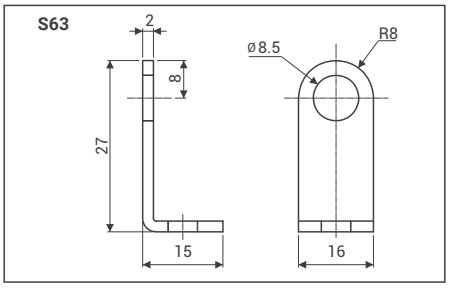
All dimensions are in mm

Accessories

Extended Terminals

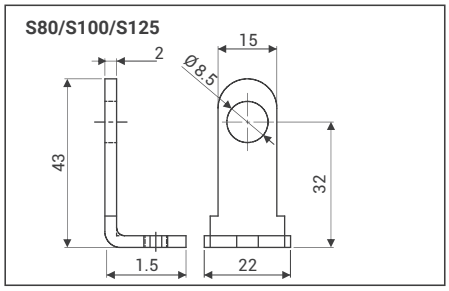


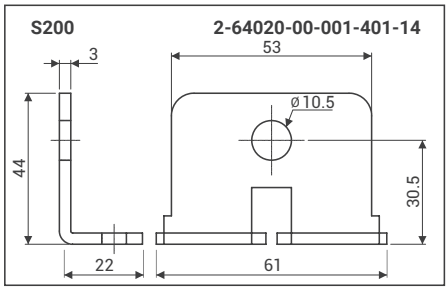




Supplieda s optional for S40 and S63 on request

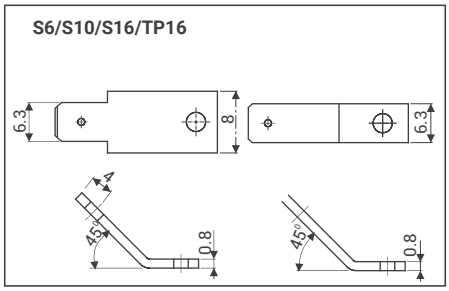
Extended Terminals - Always mounted on Switch





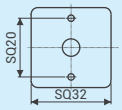
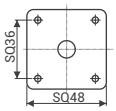
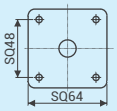
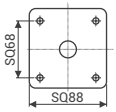
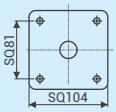
Always mounted on switch

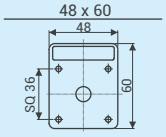
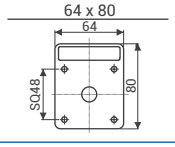
Push on Terminals



Mating terminal socket code no : 1653

Front Plate

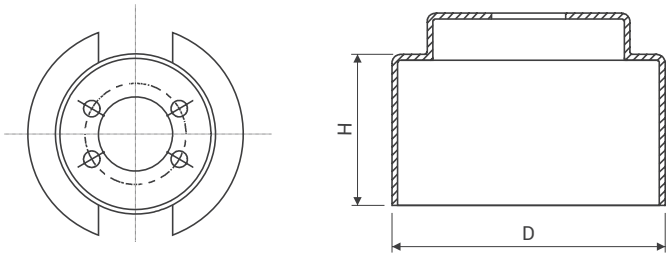
Standard Style	Frame Size	Bigger Style
Current Ratings 6/10 Amps		**Current Ratings** ---
16/20 Amps		6/10 Amps
25/32 Amps		16/20 Amps
S40 Amps & above		25/32 Amps
–		S40 Amps & above

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

All dimensions are in mm

Protection Covers (Shrouds)

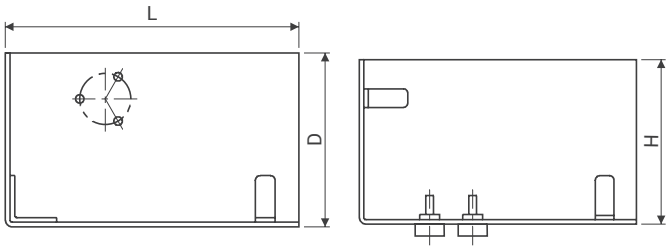
S-Series



Type	ØD	H	
		2 Stage	3 Stage
S6/S10	$43^{\pm 0.2}$	25	34.5
S16/S25/S32	$69^{\pm 0.2}$	35	50
S40/S63	$95^{\pm 0.2}$	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:

(a) Number of operating positions of switch handle.

(b) Total number of Contacts required.

(c) 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.

d) The latching angle (angle between positions) Standard latching / switching angles are 60^0, 90^0, 45^0 & 30^0. Spring return are also possible for 45^0 & 90^0 switching angle.

(e) 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.

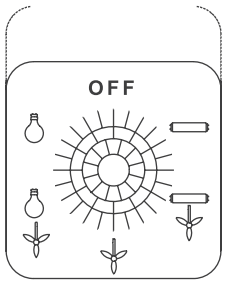
(f) Fill up the programme sheet by marking 'X' at places where contacts have to Close (NC). Also ensure to specify the Ampere Rating, Mounting Style, Switching angle, Script Plate markings, Terminal marking & Lockable Position (If any).

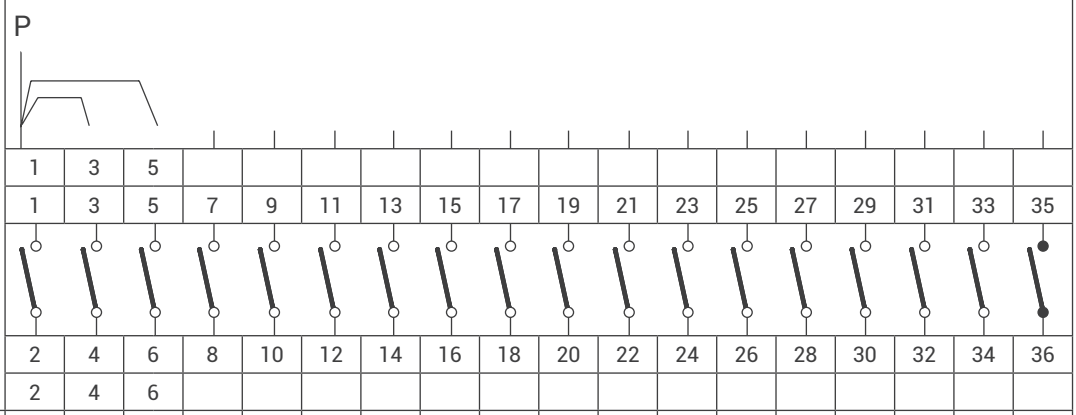
For example, refer the sample customized programme sheet of a bedroom switch having 3 contacts controlling a tube-light, fan & night lamp.

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 are in mm

Front Plate	Programme Number	73037





	Switching Angle 60°																		
	Switching Positions ↓																		
	OFF	1																	
		2																	
		3																	
		4																	
	TUBE	5	X																
		6																	
		7																	
		8																	
	TUBE & FAN	9	X	X	X														
		10																	
		11																	
		12																	
	FAN	13																	
		14																	
		15																	
		16																	
	FAN & LAMP	17		X	X	X													
		18																	
		19																	
		20																	
	NIGHT & LAMP	21			X														
		22																	
		23																	
		24																	

X Locked Position	X Contact Closed	X—X Contact Closed Without Interruption	Spring Return

1	SwitchType	S 16	2	Mounting Form	BO3	3	Stop	with	without
									X

4	Front Plate	Type: SO	Colour: Yellow	7	Optional Extras
5	Marking				
6	Handle	Type: Tear Drop	Colour: Red	Customer	Date
Customer Code No.					

All dimensions are in mm

Ordering Code for Rotary Switches

	1. Programme Code					2. Type	3. Ampere	4. Mounting			5. Knob		6. Colour	
Example for : 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 06
Changeovers with OFF	Page 07
Changeovers without OFF	Page 08
Multistep Switches with OFF	Page 09
Multistep Switches without OFF	Page 10
Instrumentation Switches	Page 11
Motor Control Switches	Page 13
Gang Switches	Page 16
Control Switches	Page 17

2. Type Selection

Type	Code
S-Series (6 to 400A)	S
Touch Proof (6 to 16A)	T
RearAccessTermination (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
RearMounting with Door Interlock

5. Knob / Handle Selection

Code - TD

Tear Drop

Code - FH

Flag Knob

Code - PG

Pistol Grip

Code - BG

Ball Grip

Code - LV

Aluminum Foil with Black Knob

6. Color Combination Selection Table

Code - YR

Yellow Front Plate
Red Knob

Code - GB

Grey Front Plate
Black Knob

Code - BB

Black Front Plate
Black Knob

Code - AB

Aluminum Foil with
Black Knob

Breaker Control Switches (TNC)

Under this 3 types are widely used

a) Spring return

b) Lost Motion contact (LMD)

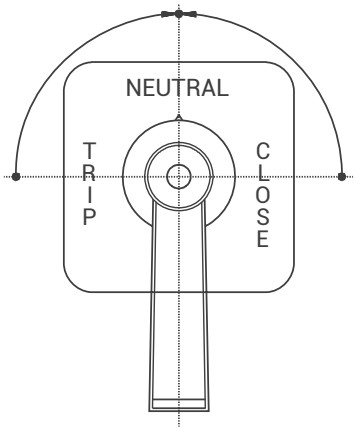
c) Sequence Locking (Two consecutive movement in one direction arrested)

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

a) 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.

b) 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.

c) 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.

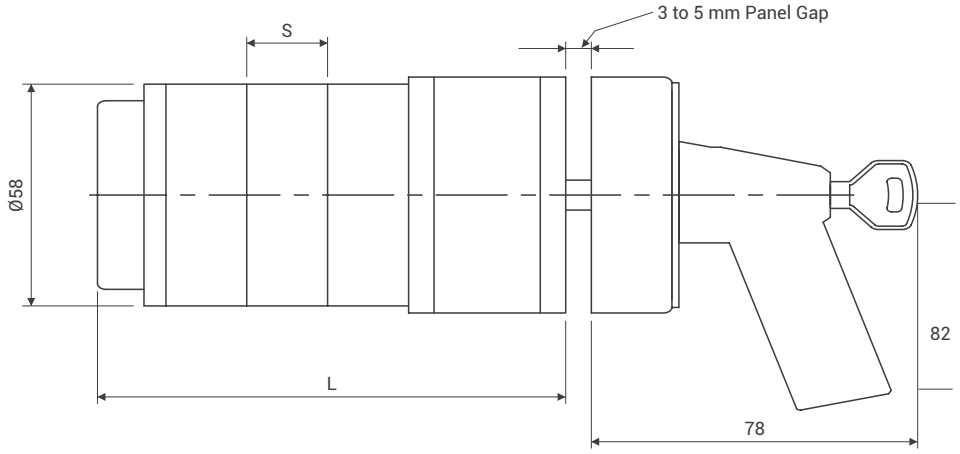
As indicated, all the above feature models can also be supported with external lock & key arrangement with key lockable and removable only at NEUTRAL position. Handle shall not be turned when the key is in lock condition.

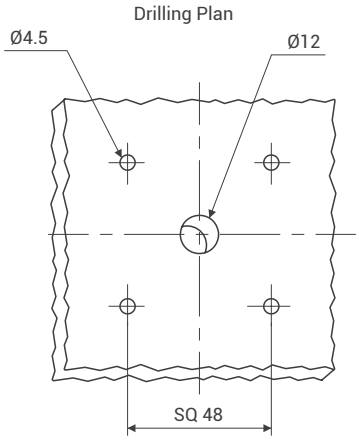
Description		**Unit**	**S25**	**S32**
Rated Operational Voltage	Ue	V AC	690	690
		V DC	250	250
Resistance to Surge Voltage	Uimp	kV	6	6
Rated Uninterrupted Current	Ith	A	32	40
Rated Operational Current Pilot Duty AC15	**Ie**			
220-240 V AC		A	8	14
380-440 V AC		A	5	6
Short Circuit Protection HRC Fuse 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

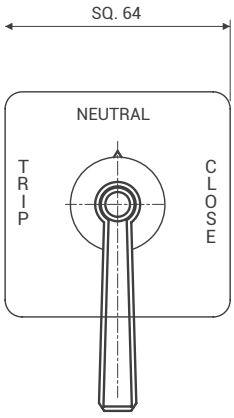
Voltage	No. of Contacts in series	S32/SG32				S32/SG32			
		Resistive Amps	Inductive L/R Amps			Resistive Amps	Inductive L/R Amps		
			10 msec	20 msec	40 msec		10 msec	20 msec	40 msec
50 V	1	20	20	15	6	25	25	18	8
	2	-	-	20	14	-	-	25	18
	3	-	-	-	20	-	-	-	25
125 V	1	3	2.5	1.5	1.0	5	3	2	1.2
	2	20	15	10	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

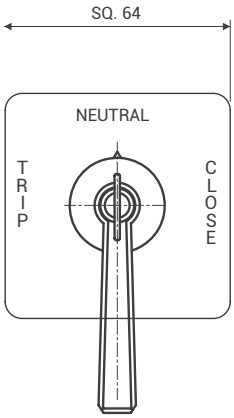




B03



B90



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

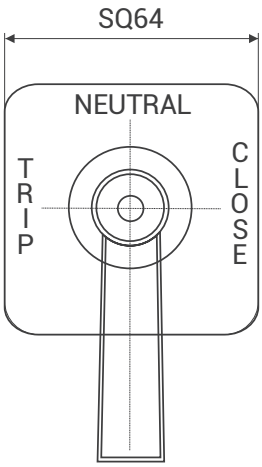
Shorter handle length also available on request

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

All dimensions are in mm

Breaker Control Switch Ordering Code

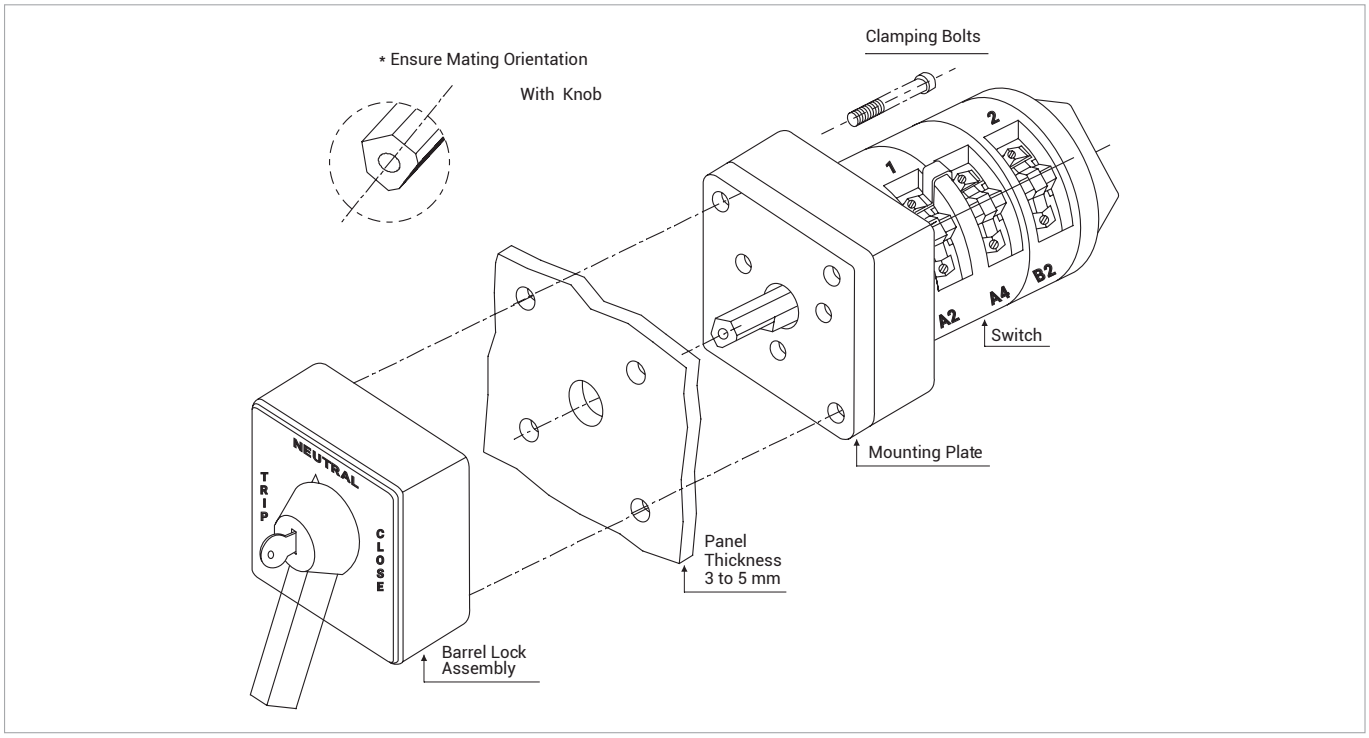


Rating	Contact Arrangement	Mounting Type	Cat. No.
25A	1Trip + 1Close	Standard	73257SEB03PGGB
25A	1Trip + 1Close	Standard	73257SEB03PGYR
25A	1Trip + 1Close	Barrel Lock	73257SEB90PGBB
25A	2Trip + 2Close	Standard	72009SEB03PGBB
25A	2Trip + 2Close	Standard	72009SEB03PGYR
25A	2Trip + 2Close	Standard	72009SEB03PGGB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

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

Construction Diagram

Breaker Control Switch



All dimensions are in mm

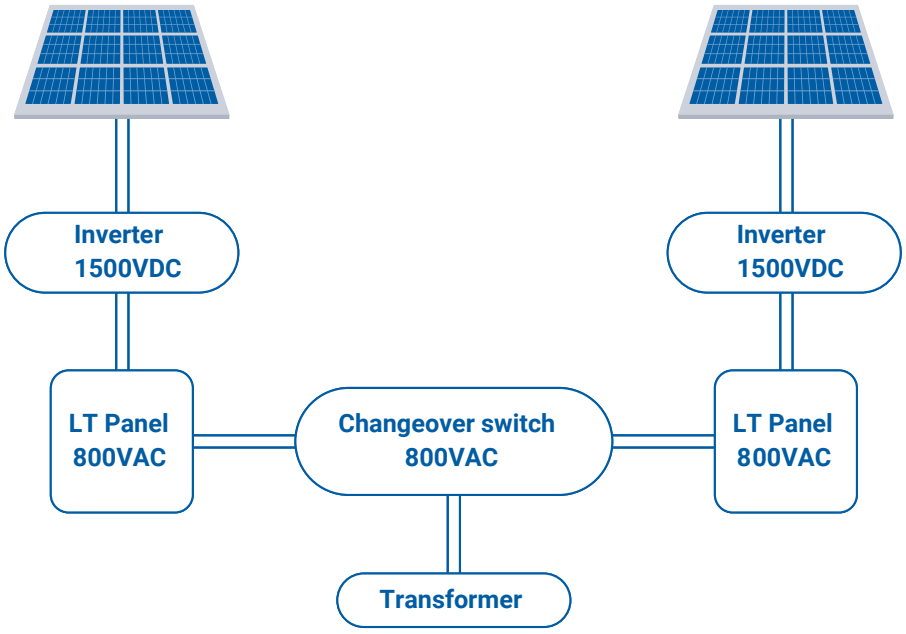
800V AC Solar Changeover Switch

800VAC solar changeover switch is a manual switch which helps to toggle between two sources with a supply voltage of 800VAC. It is a 3-position switch available in 63A & 125A.

800VAC Solar changeover switch

Application

It is used in solar application to change power between two source i.e from grid to solar panelor vice versa.



Features

- Rated operational voltage 800VAC.
- 3 C/O Contacts are rated for 800Vac & conforms to IS/IEC 60947-3
- The switch has polyamide glass-filled material which has excellent track resistance forinsulation to prevent flashover between phases in the most severe conditions.
- Special contact design and configuration which makes the switch highly reliable towithstand high short circuit currents.

Specifications: - 125A & 63A solar changeover switch

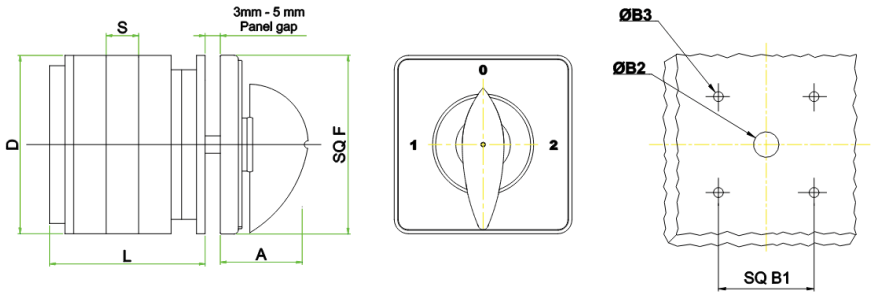
PARAMETER		UNIT	S125	S63
Rated Operational voltage (Ue)		V	800	800
Rated frequency		Hz	50	50
Rated impulse withstand voltage (Uimp)		Kv	6	6
Rated Operational current (Ie) AC23A		A	125	63
Rated Insulation Voltage		V	1250	1000
Rated Fuse short Circuit Current		KA	25	20
Fuse size (Type gG/gM)		A	125	63
Single / Multiple	Min	mm^2	10	4
	Max	mm^2	50	16
Terminal Cross Section		Metric	2XM5	M5
Terminal tightening Torque		Nm	2.5	2

Contact sequence Details

Position						
1 (800Vac)	X		X		X	
OFF						
2 (800Vac)		X		X		X

Front Mounting:

1.For 63A

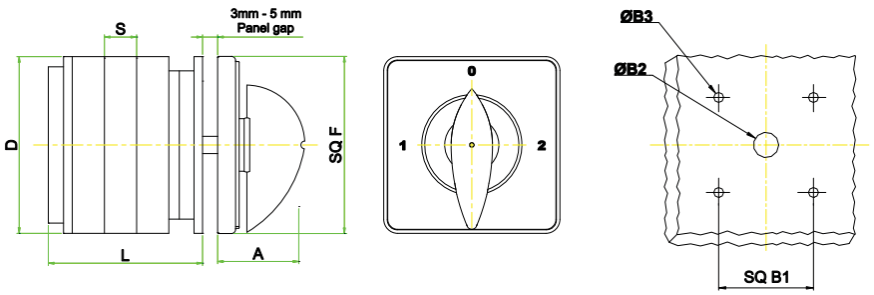


TYPE	A	B1	B2	B3	D	F	S	L
S63	44	68	15	5.5	95	88	21	159

2. For 125A

FRONT MOUNTING

DRILLING PLAN



TYPE	A	B1	B2	B3	D	F	S	L
S125	44	68	15	5.5	118	88	26	196

Coding Details:

Code	Descriptions
74236SIB03TDYR.	63A 3 POLE 2 WAY WITH OFF 800VAC
74236SLB03TDYR.	125A 3 POLE 2 WAY WITH OFF 800VAC

DC Rotary Switches

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

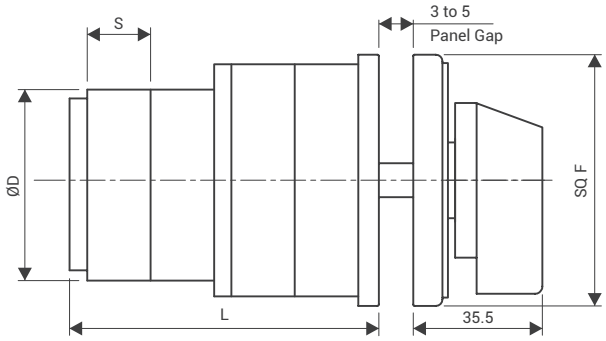
Applications:

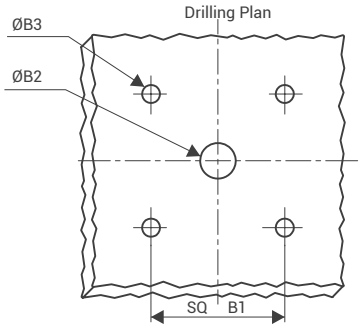
- D40R - Railway coaches lighting & fan circuits switching
- All DC power circuits - Railways, Telecommunications & Power plants
- Battery charging equipment

DC Ratings	Description		Unit	Rated Operational Current Ie				
				Switch Type				
				D16	D25	D32	D40	D63
Rated on Interrupted Current (I th)			A	20	32	40	50	80
DC 22A L/R 2m sec								
Rated	110 V	250 V	A	16	25	32	40	63
No of Series Contacts	1	2						
AC Ratings	Ac3 Rating 3 Phase	380-440V	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	mm^2	1.5	1.5	1.5	1.5	1.5
		[Flex] max	mm^2	4	4	6	10	16
	Tightening Torque		Nm	0.8	1.2	1.2	2	2
	Maximum Contact Stages			10	10	10	6	6

Description	Unit	D100	D200	D300	D400	D500
Duty Rating - DC22 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

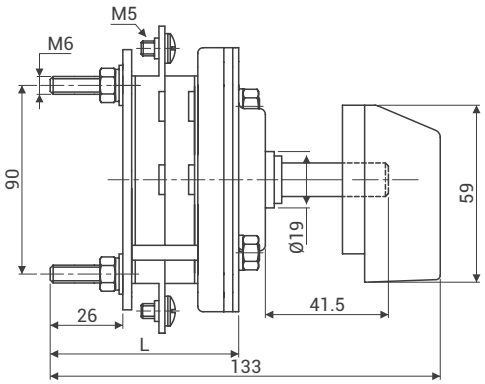


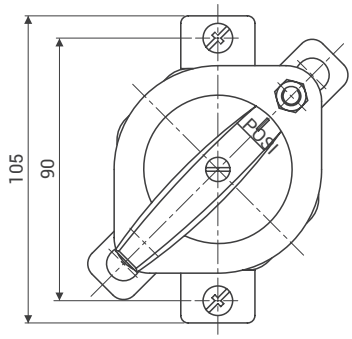


Type	B1	B2	B3	D	F	S
D16	48	12	5.5	50	64	12
D25/D32	48	12	5.5	50	64	15
D40/D63	68	15	5.5	70	88	21

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

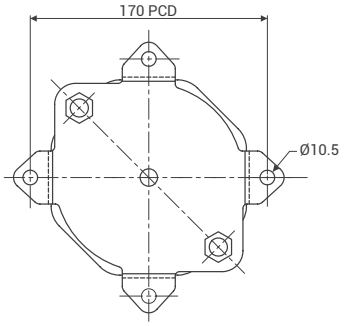


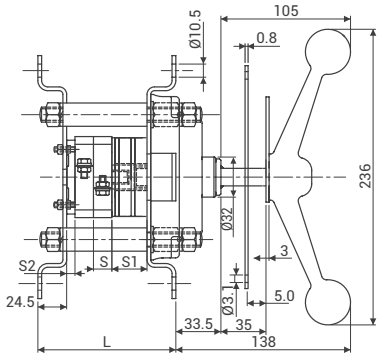


Type	S	S1	S2	Length L							
				1	2	3	4	5	6	7	8
D40	10	30.5	15	55.5	65.5	75.5	85.5	95.5	105.5	115.5	125.5

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

D100

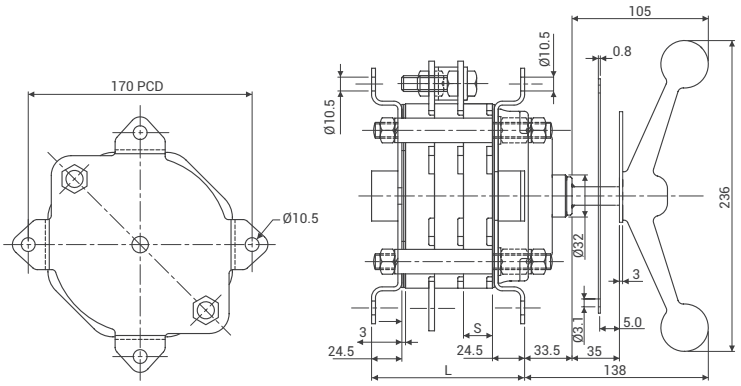




Type	S	S1	S2	Length L						
				1	2	3	4	5	6	7
D100	32	32	15	112	144	176	208	240	272	304

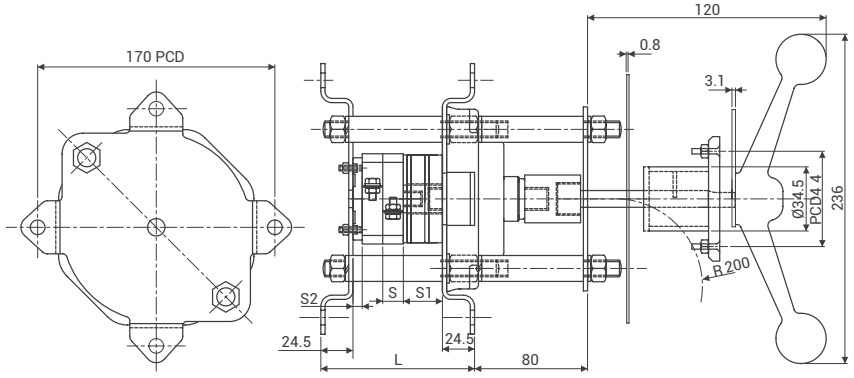
All dimensions are in mm

D200-D500



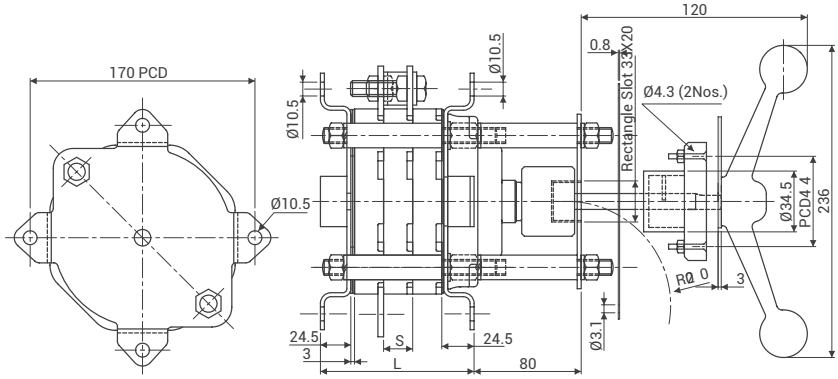
Type	S	Length L				
		3	4	5	6	7
D200-D500	22	117	139	161	183	205

D100 with Door Interlock



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

D200-D500 with Door Interlock



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

All dimensions are in mm

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

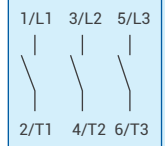
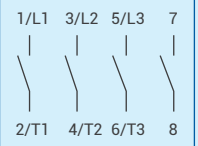
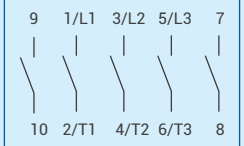
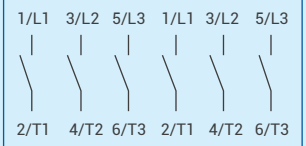
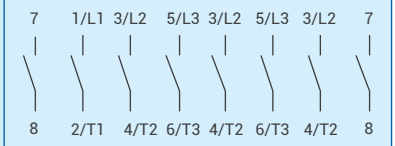
Technical Data

UL Standard	UL508
European Standard	IEC60947-1&3, EN60947-3

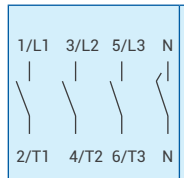
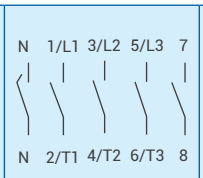
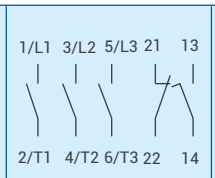
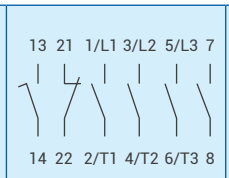
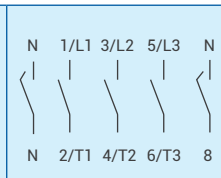
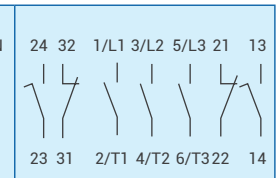
Data	Measure	Switch Code	LB116	LB120	LB225	LB232	LB240	LB263	LB4080	LB4100	LB4125
Rated Operational Voltage, U_e											
IEC/EN	Volts	V	690	690	690	690	690	690	690	690	690
UL	Volts	V	600	600	600	600	600	600	600	600	600
Main Switch: Isolating Voltage upto	Volts	V	750	750	750	750	750	750	750	750	750
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											
AC22	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 60Hz											
AC-23A IEC/EN											
3 Phase, 3 Pole	230(240)V	kW	7.5	7.5	11	15	22	30	37	45	55
	400(415)V	kW	11	11	15	18.5	30	37	45	55	75
	690V	kW	15	15	22	22	45	45	90	90	90
AC-3IEC/EN											
3 Phase, 3 Pole	230(240)V	kW	4	5.5	7.5	11	15	22	30	37	45
	400(415)V	kW	5.5	7.5	11	11	18.5	22	37	45	55
	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 Rating, Class J	Amp	A	-	-	45	45	70	70	125	125	125
Fuse Rating, RK5	Amp	A	20	20	-	-	-	-	-	-	-
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

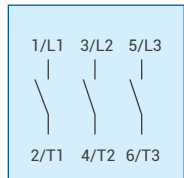
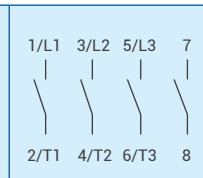
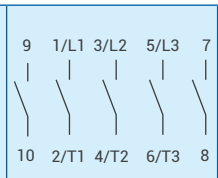
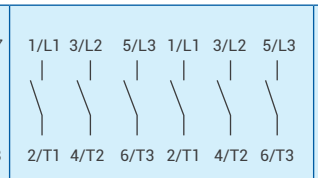
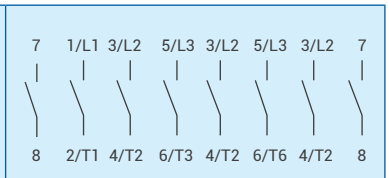
				
3 Pole	3 Pole + 1 Main Module	4 Pole + 1 Main Module	6 Pole	8 Pole
32300	32400	32500	32600	32800
32309	32409	32509	32609	32809

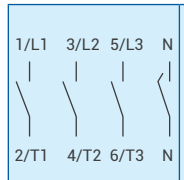
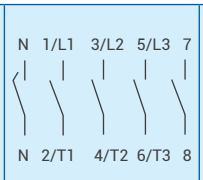
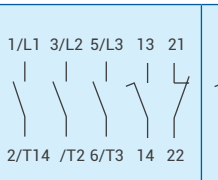
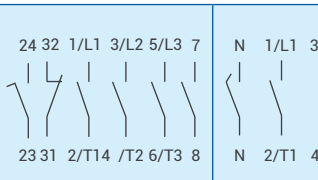
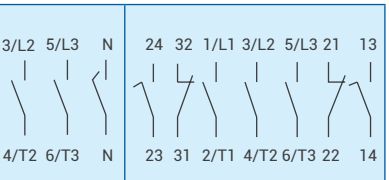
LB116, LB120 Available upto 5 Pole only

					
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

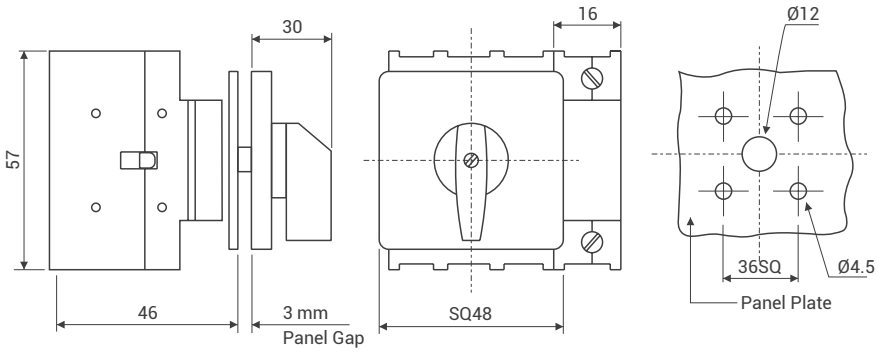
				
3 Pole + 1 Neutral Module	4 Pole + 1 Neutral Module	3 Pole + 1 Auxillary Module	4 Pole + 1 Auxillary Module	3 Pole + 2 Neutral Module
32309	32409	32509	32609	32809

				
32319	32419	32329	32429	32339	32349

Front Mounting

B03

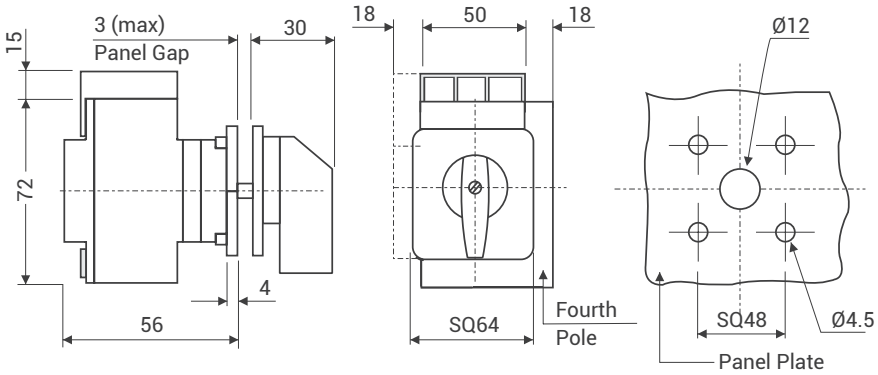
16 A-20 A



- 4 Hole front panel mounting
- Degree of protection : Front IP55
- Fifth Pole can be fitted on the other side of the switch

B13

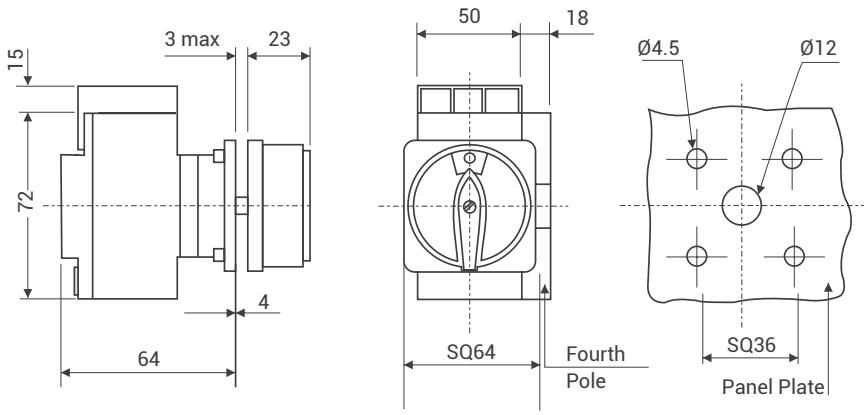
25 A-63 A



- 4 Hole front panel mounting
- Degree of protection : Front IP55
- Fifth Pole can be fitted on the other side of the switch

B33

25 A-63 A



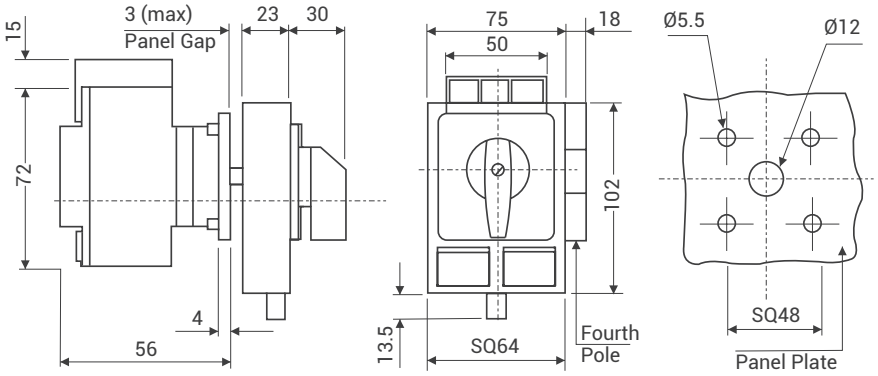
- 4 Hole front panel mounting
- Degree of protection : Front Ip65
- Switch with round padlocking device to prevent from being switched ON by unauthorized lpersonnel
- Max 3 padlocks
- Fifth Pole can be fitted on the other side of the switch

All dimensions are in mm

Front Mounting

B30

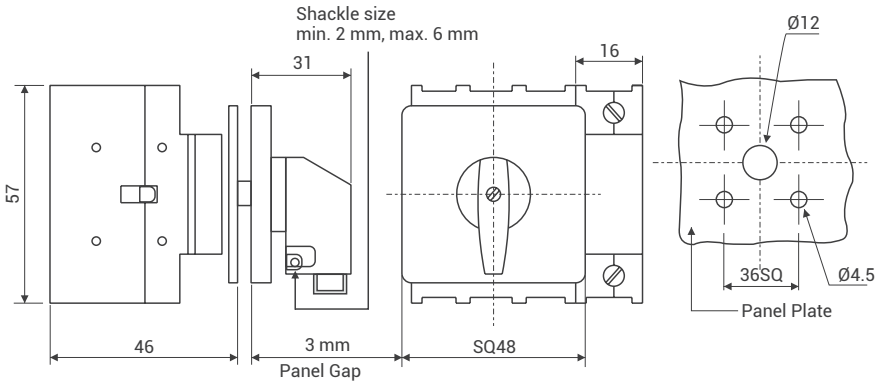
25 A-63 A



- 4 Hole front panel mounting
- Degree of protection : Front IP55
- Fifth Pole can be fitted on the other side of the switch
- Switch with rectangular padlocking device to prevent the switch from being switched ON by unauthorized lpersonnel
- Max 4 padlocks

B40

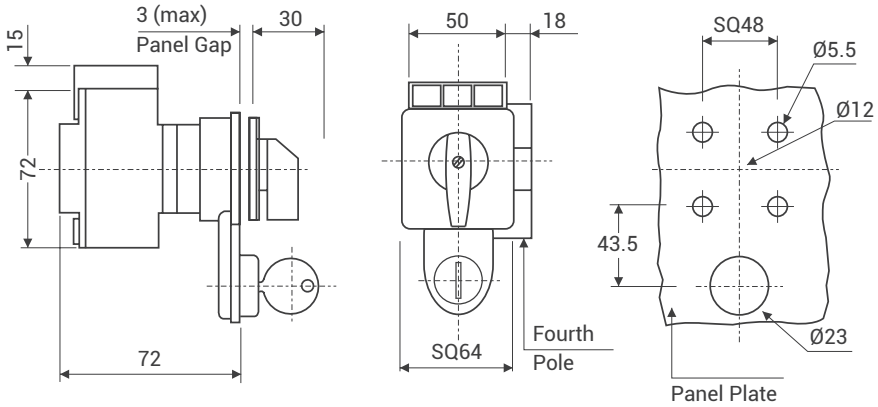
16 A-20 A



- 4 Hole, front panel mounting
- Degree of protection : Front IP55
- Switch with padlockable lflag knob
- Maximum 1 padlock

B63

25 A-63 A

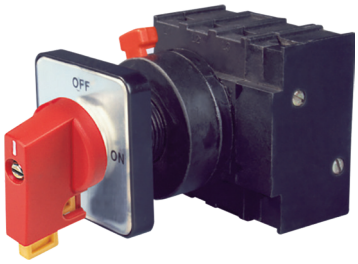


- 4 Hole front panel mounting
- Degree of protection : Front IP55
- Knob operated, keylock, key removable in OFF position (other options on request)
- Fifth Pole can be fitted on the other side of the switch

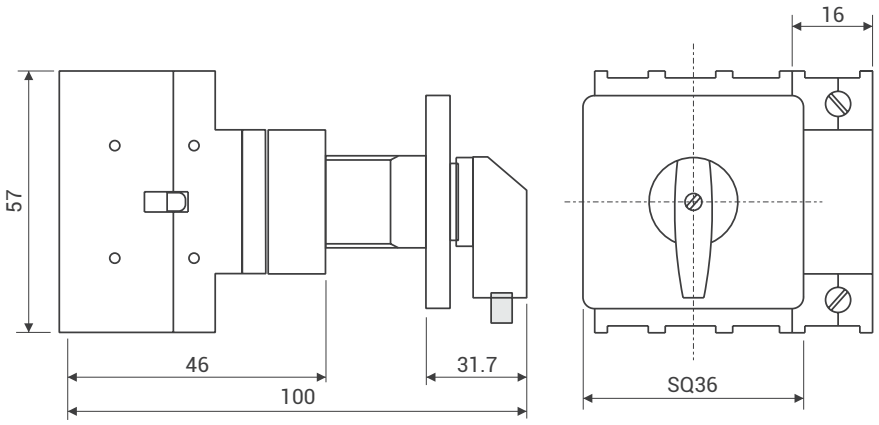
All dimensions are in mm

Front Mounting

B19



16 A-20 A



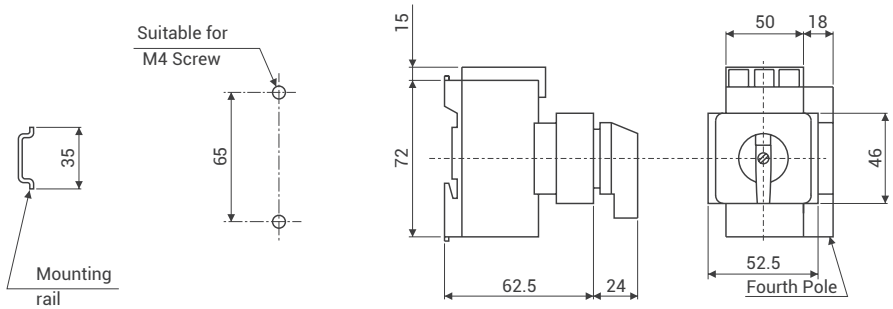
- lDia 22.5 mm, single hole panel mounting
- Degree of protection : Front IP55
- Switch with padlockable flag knob
- Maximum 1 padlock

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

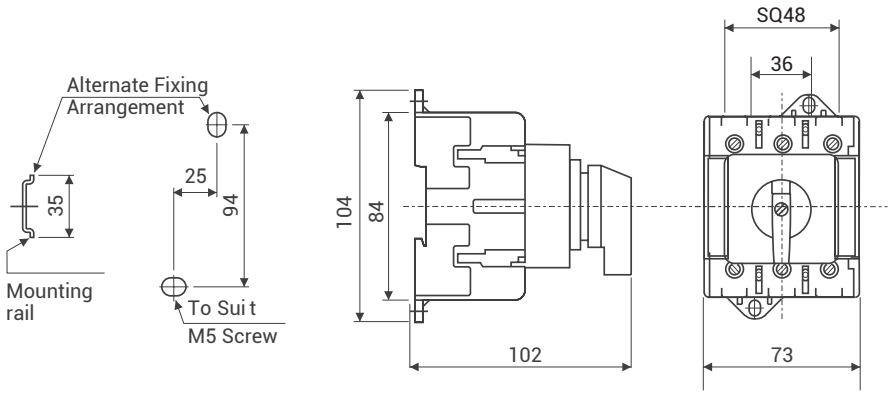
Rear Mounting

B23

25 A-63 A



80 A-125 A



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

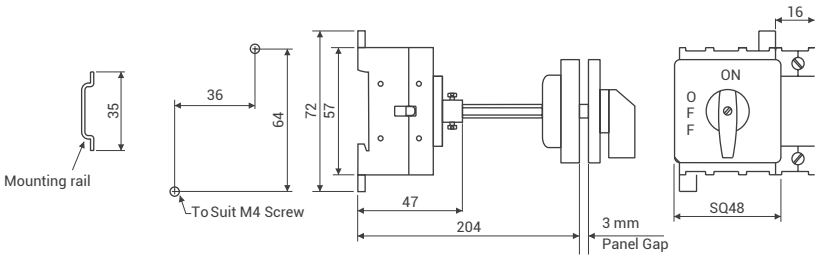
All dimensions are in mm

Rear Mounting

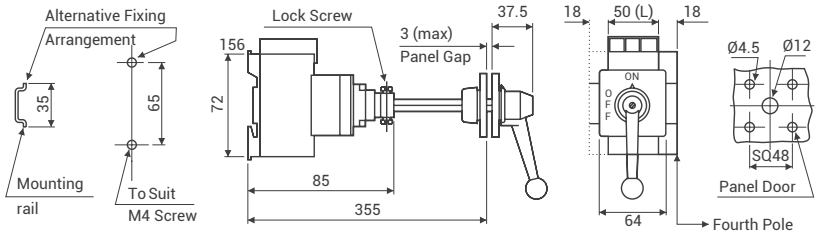
MB42

- 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

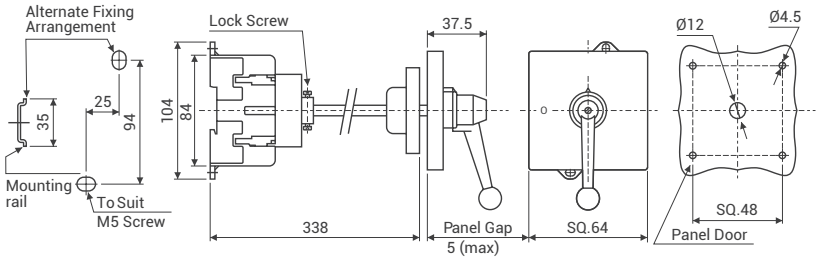
16 A-20 A



25 A-63 A



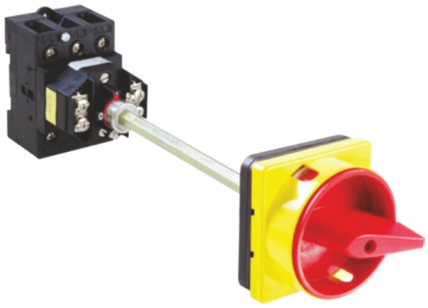
80 A-125 A



All dimensions are in mm

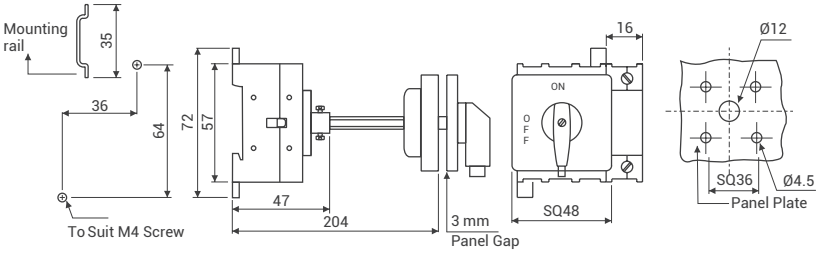
Rear Mounting

MB34

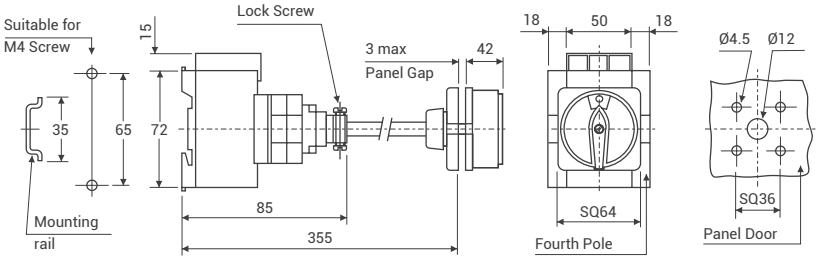


- 2 Hole rear mounting or snap mounting on DIN EN50022 rail (35 mm) can be operated from the front (door) coupled with door mechanism
- Door interlock (Door openable only in OFF position)
- Degree of protection : Front IP65
- Rigid metal shaft / switch assembly
- Switch with round padlocking device to 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
- Adjustable mounting by cutting the metal shaft to appropriate length, to suit panel height
- Specific length of shaft can be offered on request

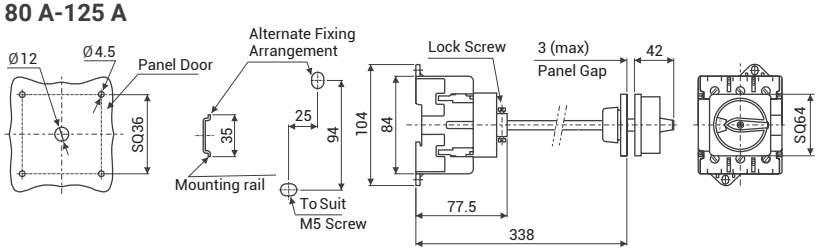
16 A-20 A



25 A-63 A



80 A-125 A

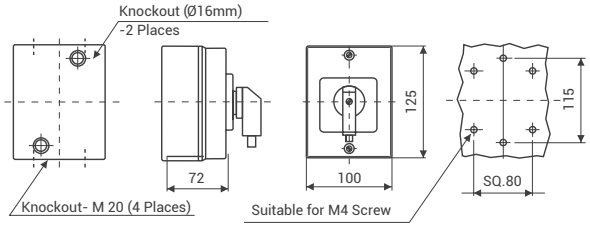


Plastic Enclosure Mounting

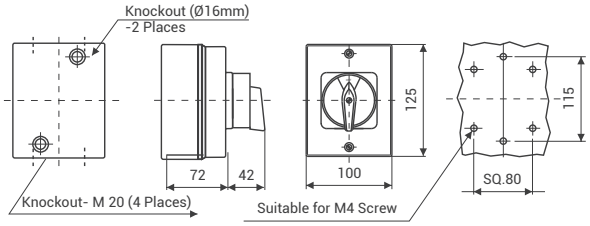
B31SM

- 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

16 A-20 A



25 A-32 A

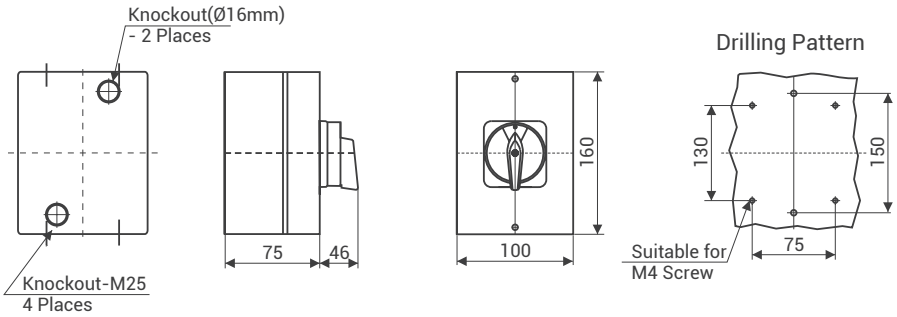


All dimensions are in mm

Plastic Enclosure Mounting

B31M

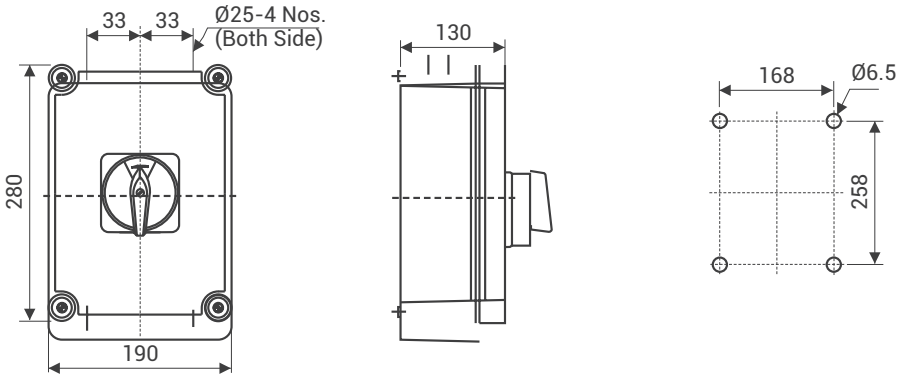
25 A-63 A



- 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



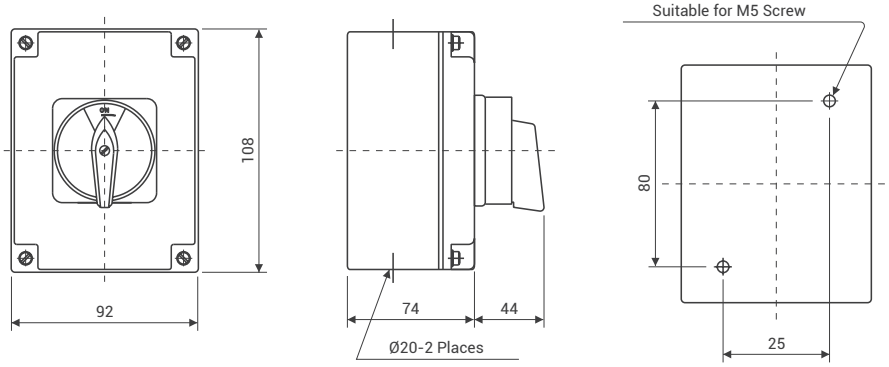
- Switch mounted in ABS / polycarbonate (optional) enclosure
- Door interlock-cover cannot open in ON condition
- Tested for Nema Ratings 1, 2, 3, 3R, 4, 4x,12 & 13 asper UL50 & Nema 250
- Degree of protection : IP65
- Switch rear mounted for easy connection
- Leech Handle (Max.1 padlock) to prevent 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 are in mm

Metal Enclosure

AB31S

Upto 25 A

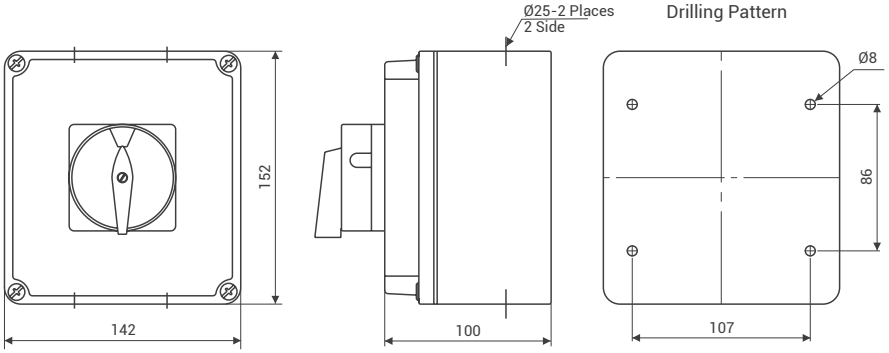


Caution : Open the cover only in 'OFF' position

- 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

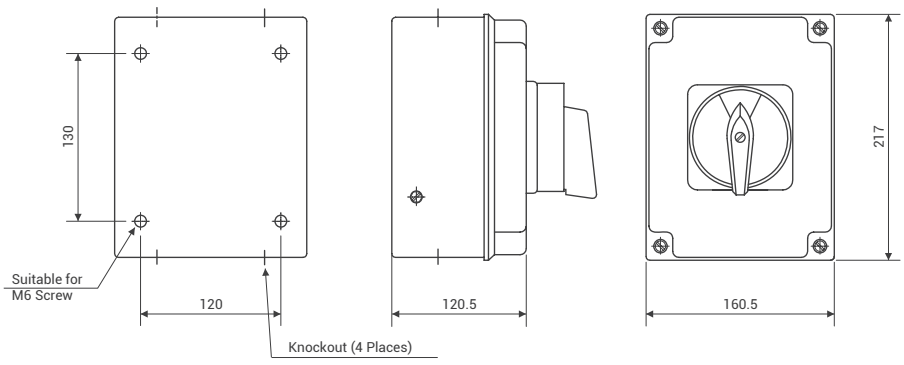
32 A to 40 A



- 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



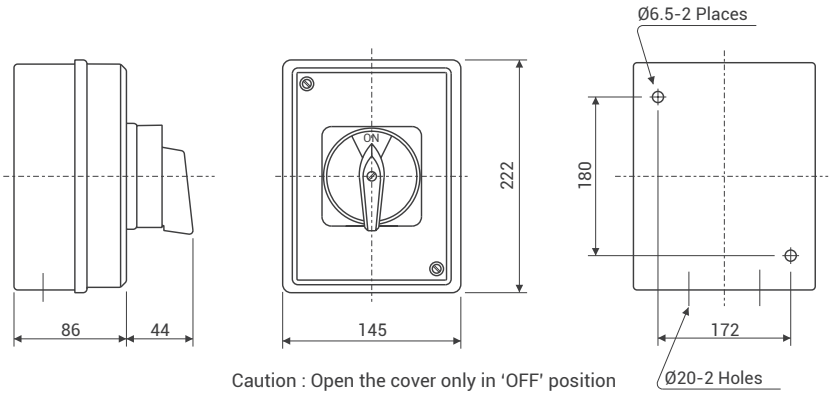
- Switch mounted in aluminium enclosure
- Round padlocking device (max. 3 padlocks) to prevent the Switch from being made ON by unauthorized personnel
- Degree of protection : IP65
- Red / Yellow-handle colour for Main / Emergency switches
- Enclosure colour : Dark grey base and light grey cover
- Door Interlock

All dimensions are in mm

Metal Enclosure

SB31M

32 A - 63 A

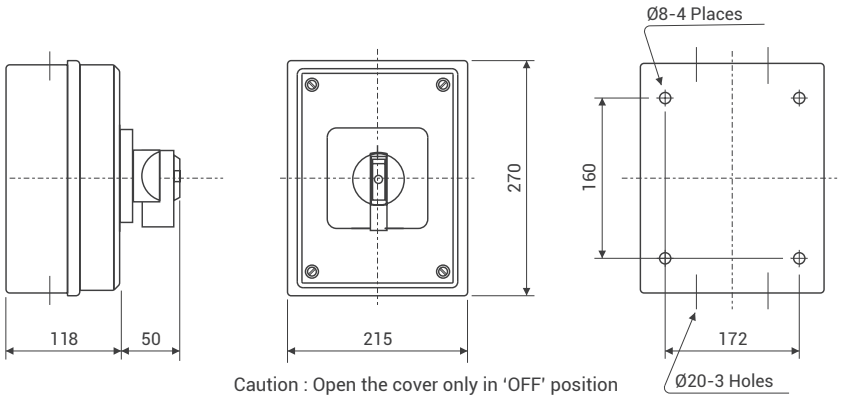


Caution : Open the cover only in 'OFF' position

- 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



Caution : Open the cover only in 'OFF' position

- 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
- l6 Pole / 8 Pole can be offered in SB31XL

All dimensions are in mm

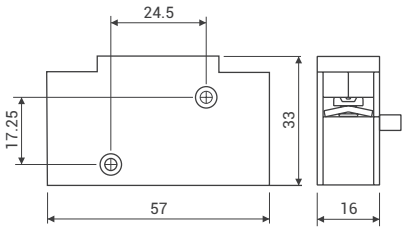
Accessories

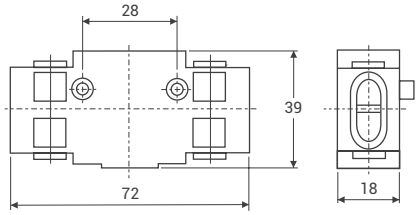
Add on Main Pole (16 A-63 A)

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

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

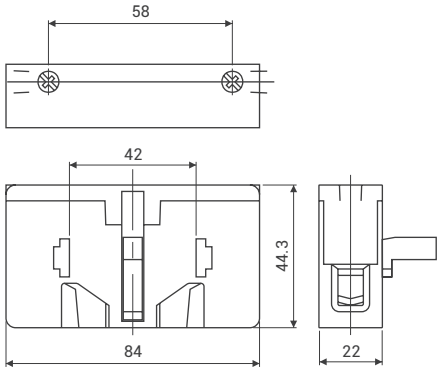




Add on Main Pole (80 A-125 A)

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)

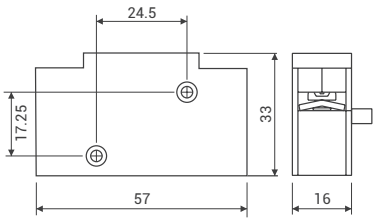
- Early make late break contact
- Can be fitted on either side of the switch

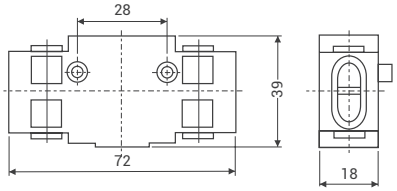
Applications

To be used as Neutral Conductor to the switch.

For Switch Code	Code for 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

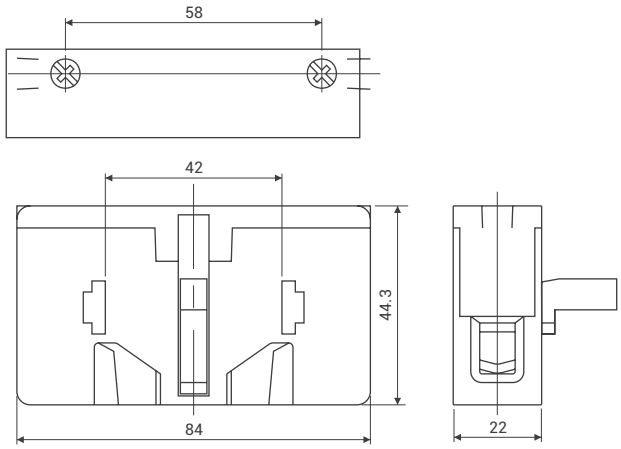




All dimensions are in mm

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

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



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

Applications

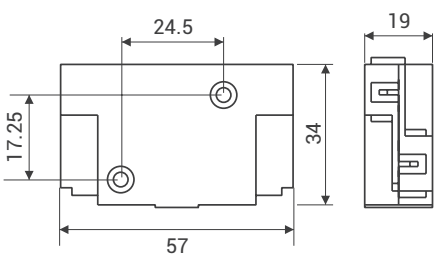
To be used as Neutral Conductor to the switch.

Add-on Auxiliary Pole

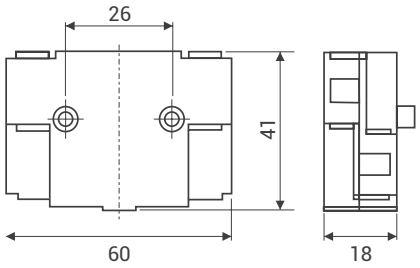
For Switch Code	Code for Front Mounting Switch 1NO+1NC	Code for Rear Mounting Switch 1NO+1NC	Code for 2 NO Front Mounting Switch	Code for 2 NO Rear Mounting Switch
LB116	FAC116	RAC116		
LB120				
LB225	FAC216	RAC216	LB263 FA2NO	LB263 RA2NO
LB232				
LB240				
LB263				
LB4080	FAC416	RAC416	LB4125 FA2NO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

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

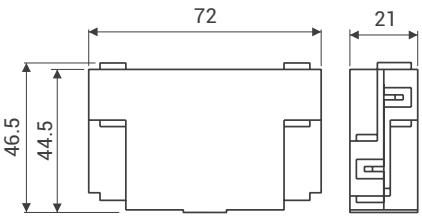
LB116-LB120



LB225-LB263



LB4080-LB4125



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.

Rating

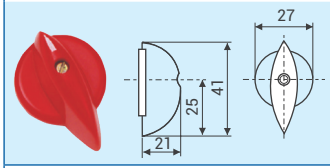
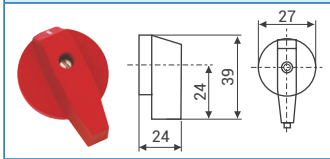
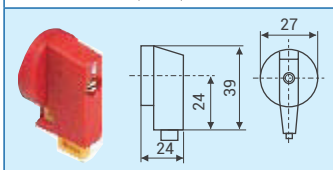
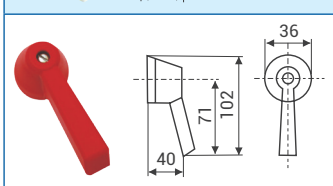
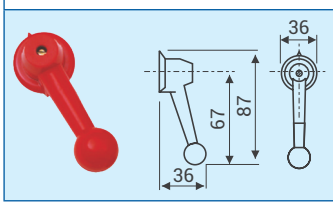
IEC / EN	16A, 500V	
AC-15	220-240V	6A
	380-440V	4A

Terminal Cross Section

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

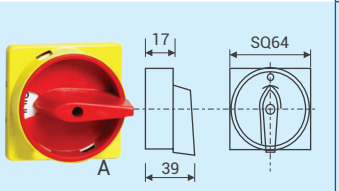
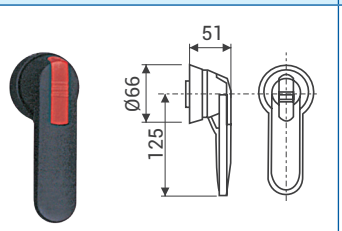
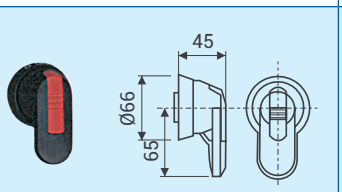
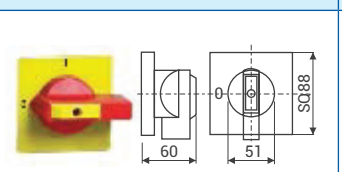
All dimensions are in mm

Knobs & Handles

	Code	Type
	TD	Tear Drop Knob
	FL	Flag Knob
	FP	Flag Knob Padlockable
	PG	Pistol Grip Handle
	BG	Ball Grip Handle

TD	A	B	C	D
TD[1]	27	41	25	21
TD	36	52	31	25

FL	A	B	C	D
FL[1]	27	39	24	24
FL	36	50	27	25

	Code	Type
	RD	Round Knob, Padlockable
	RH	Roll Handle, Padlockable
	SH	Short Handle Padlockable
	LH	Leech Handle Padlockable

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	FP	FP	RD	RD	RD	RD	-	-	-
AB31M, SB31M	-	-	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.

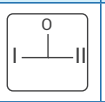
All dimensions are in mm

Changeover Switches

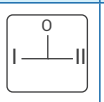
EB-DG Changeover Switches

Switching Programme

Code : 31153 3 Pole Changeover

	R	Y	B	R	Y	B
						
I	X	X	X			
0						
II				X	X	X

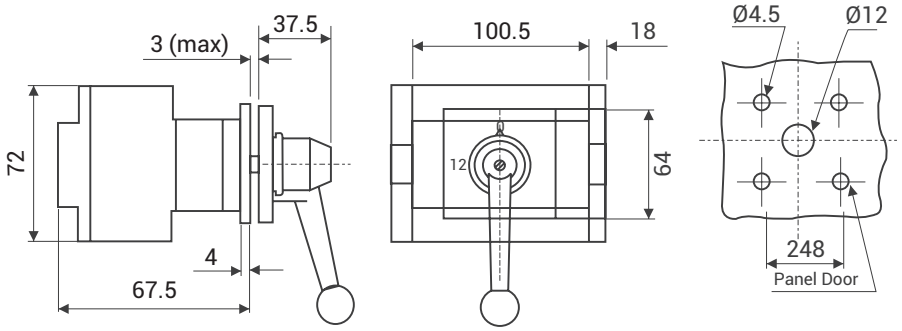
Code : 31154 4 Pole Changeover

	R	Y	B	N	R	Y	B	N
								
I	X	X	X	X				
0								
II					X	X	X	X

- 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

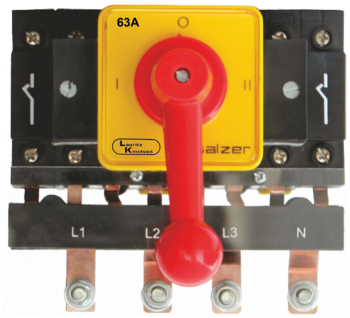
B 13

25 A-63 A, Front Mounting

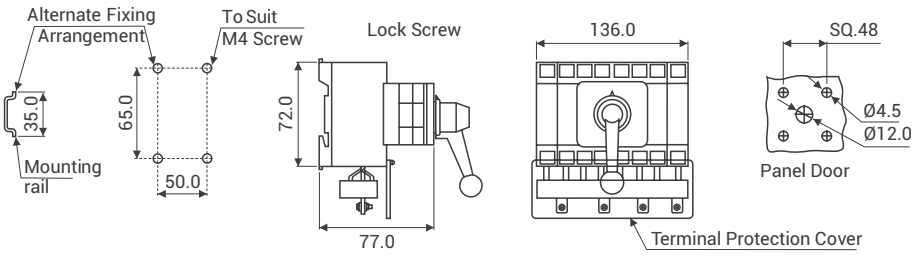


- 4 Hole front panel mounting
- Degree of protection : Front IP55

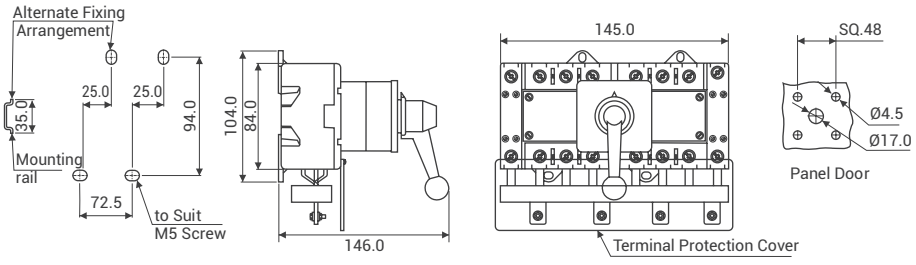
B 21



25 A-63 A, Rear Mounting

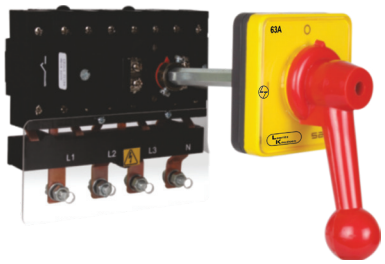


80A - 125A, Rear Mounting

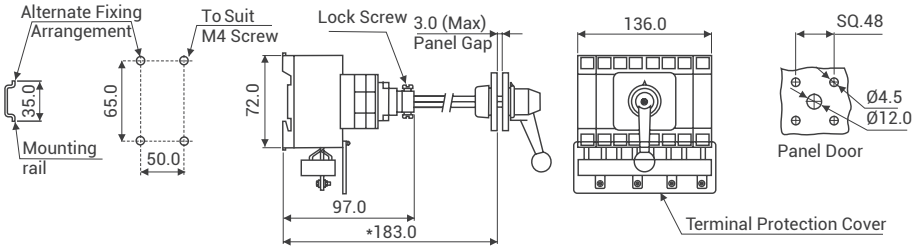


All dimensions are in mm

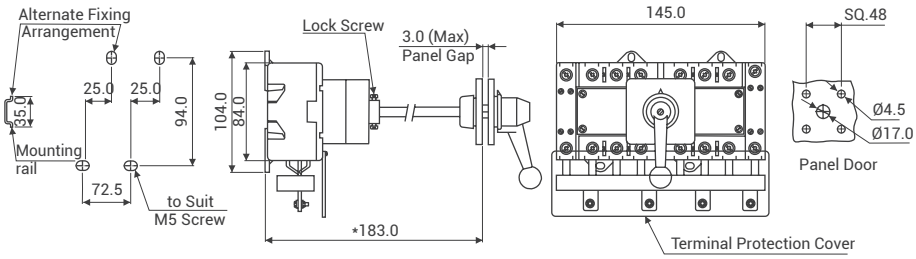
MB42



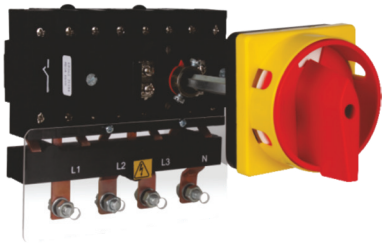
25 A-63 A, Rear Mounting



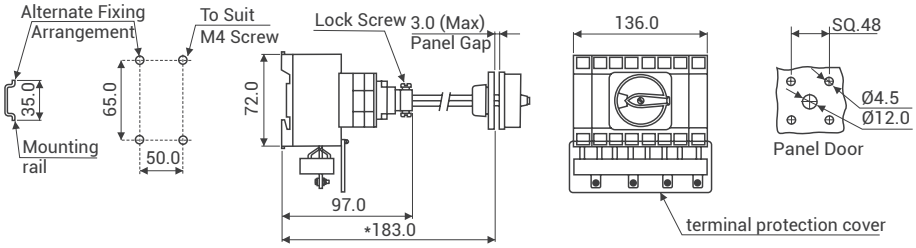
80A - 125A, Rear Mounting



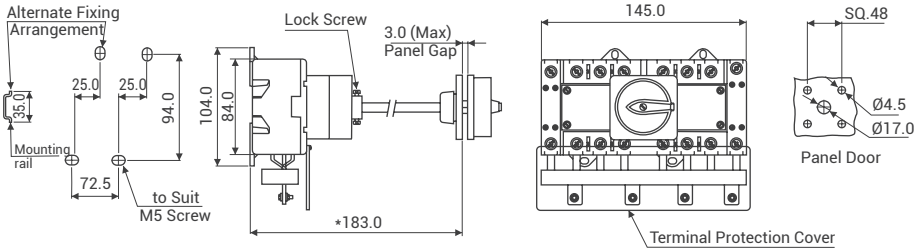
MB34



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

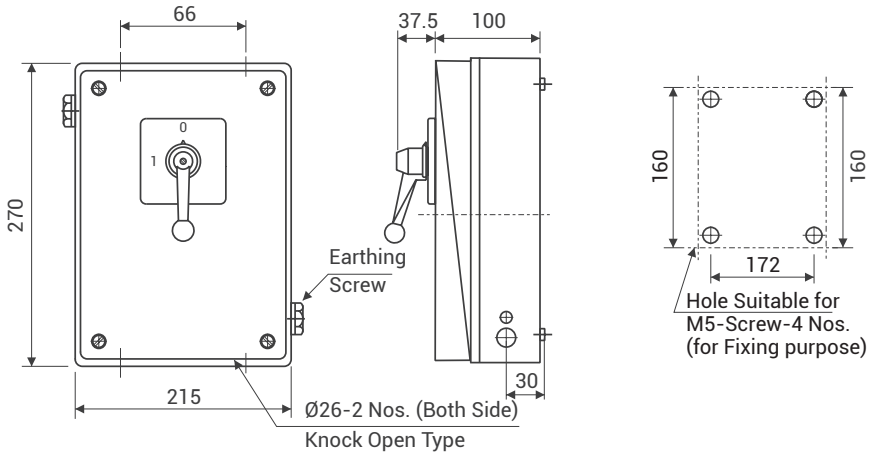
All dimensions are in mm

Enclosure Changeover Switches

- 25A - 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 lead only in OFF position for safety
- Colour : Yellow front plate and Red ball grip handle

SB31

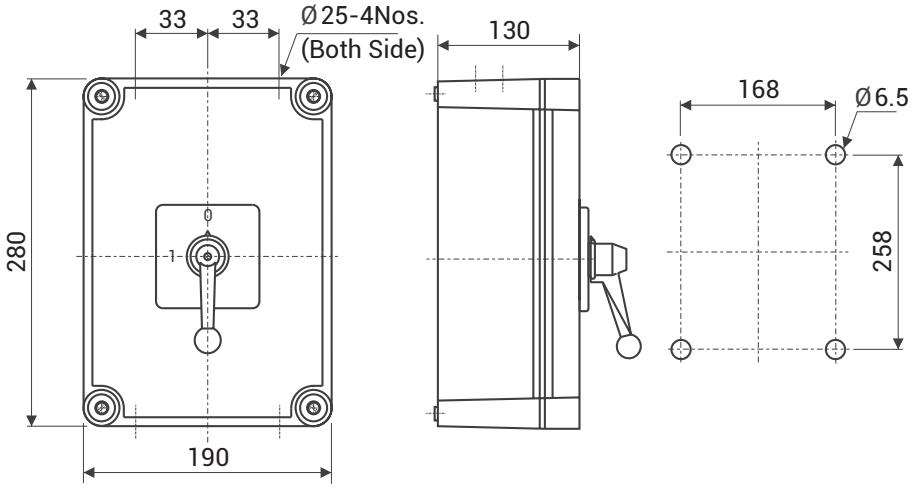
25A-63A



- 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

63A

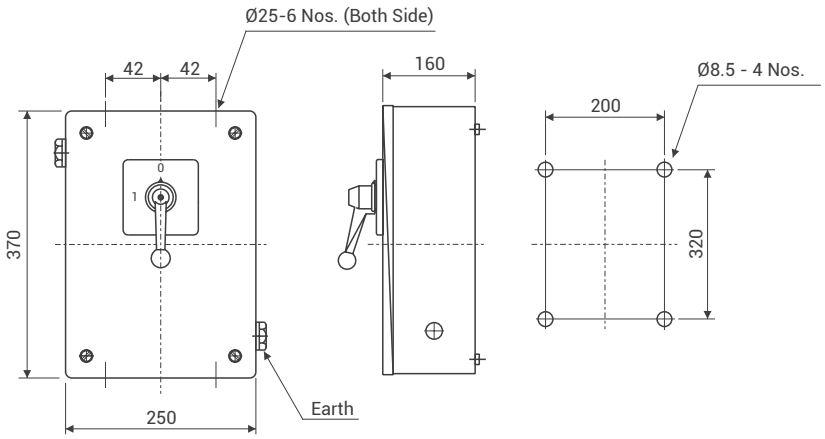


- Switch mounted in grey ABS / Polycarbonate optional enclosure with IP65 protection and interlock provided to open the lid in OFF position

All dimensions are in mm

SB31XL

80A-125A



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

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 are in mm

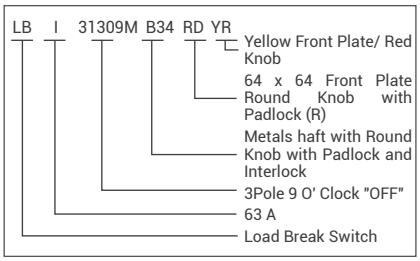
Ordering code for load break switches

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

Example

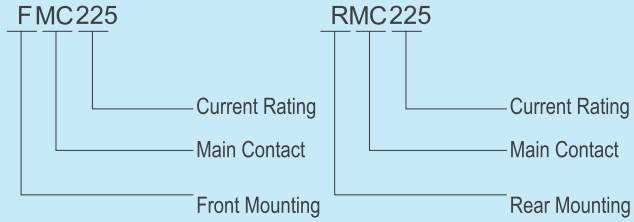
- LB Switches, 25 A, 3P, 9 O'clock, 4 hole front mounting, yellow front plate, red tear drop knob
- LB Switches, 63 A, 3P, 9 O'clock, 4 hole front mounting, with metal shaft, yellow front plate, red round knob
- LB Switches 40 A, 3P, 12 O'clock OFF in B31SM enclosure, grey front plate, black round knob
- EB-DG Changeover Switch, 63 A, 3P, metal enclosure with interlock, yellow front plate, red ball grip handle

- LB E 31309 B13 TD YR
- LB I 31309 MB34 RD YR
- LB G 31300 B31SM RD GB
- EB I 31153 SB31 BG YR

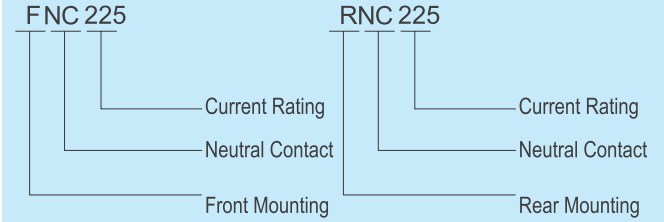


Accessories

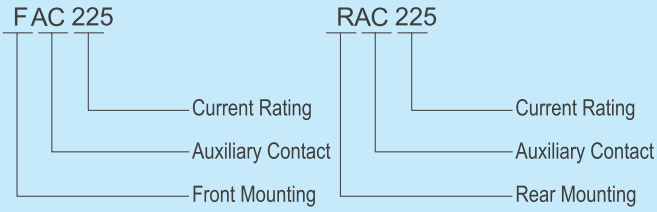
ADD ON MAIN POLE (16A TO 125A)



ADD ON NEUTRAL POLE (16A TO 125A)



ADD ON AUXILIARY POLE (16A TO 125A)



ADD ON 2NO (25A TO 125A)

FA 2NO	RA 2NO
Front Mounting 2NO	Rear Mounting 2NO

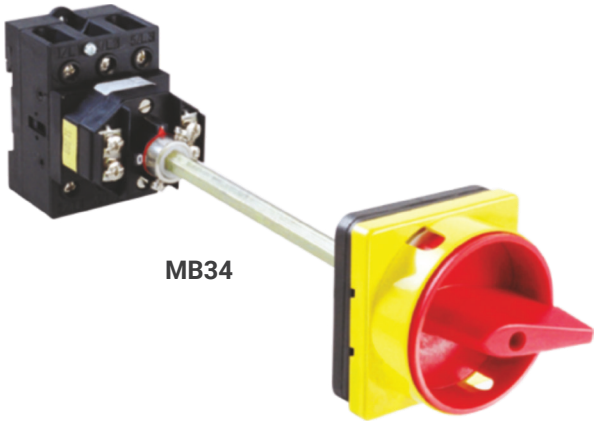
Rating Selection Table

Ampere (A)	Code (X)
16	C
20	D
25	E
32	F
40	G

Ampere (A)	Code (X)
63	I
80	J
100	K
125	L

*** **Note :** Please contact nearest our branch office.

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



MB34

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 B31 SM	**LBX32300B31SMRDYR**			**LBX32400B31SMRDYR**		
Switch in ABS Enclosure - in B31 M	**LBX32309B31MRDYR**			**LBX32409B31MRDYR**		
Switch in SS Enclosure - in B31L with Round Plate	**LBX32309SB31LRDYR**			**LBX32409SB31LRDYR**		
Switch in SS Enclosure - in SB31L with Leech Handle	**LB32309SB31LLHYR**			**LB32409SB31LLHYR**		
Auxiliary Contact	**FRONT/REARMOUNTING**					
Add-on Contact Additional Pole	**FRONT/REARMOUNTING**					

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**

MB42 Mounting

Rating Selection Table

Ampere (A)	Code (X)
25	E
32	F

Ampere (A)	Code (X)
40	G
63	I

*Available in 6 Pole & 8 Pole
*** Please contact nearest our branch office.

Cable Ducts

Facilitates systematic Wiring

Enhances aesthetics and clarity

Permits faster connections, addition and fault tracing of wires

Avoids bunching and tapping

Provides complete electrical insulation marked

Cable Ducts

Features

- Manufactured from specially 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 Compliants & 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 compounded high

Material Specification

- Material : High impact, self extinguishing, warpproof 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/cm^2
- Izod Impact strength - 7 kg.cm/cm

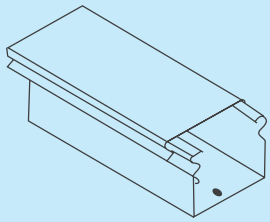
Electrical Properties

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

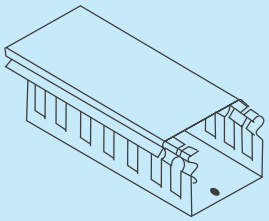
Thermal Properties

- Flammability - UL 94 VO

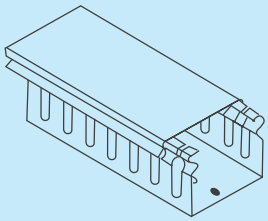
Slotting Styles (A & B Types)



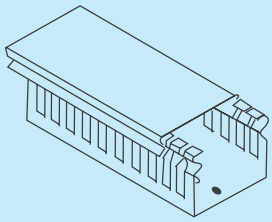
Unslotted
(US)



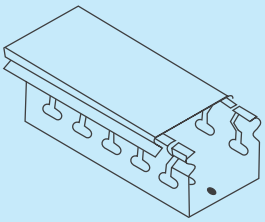
Standard Slotted
(S)



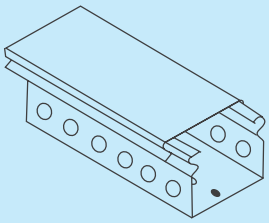
Straight Slotted
(L)



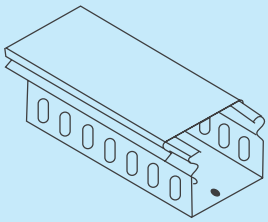
Thin Slotted
(T)



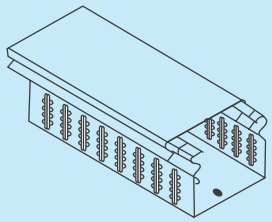
Horizontal Slotted
(H)



Circular Slotted
(C)

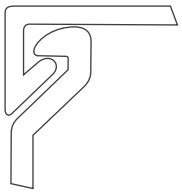


Oblong Slotted
(O)

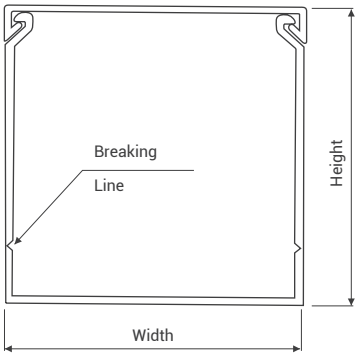


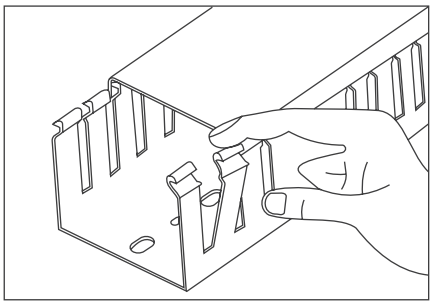
Multiple Slotted
(M)

B Type



Non slip cover design of minimum encumbrance and maximum grip





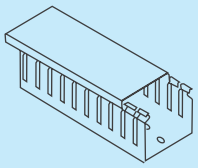
Snap-off side wall fingers permit enlarging slot for any size of wire or wire bundles. Requires no tools for cutting.

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 mm² OD 3.18 mm (16 AWG)	2.5 mm² OD 3.53 mm (14 AWG)	4 mm² OD 4.01mm (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

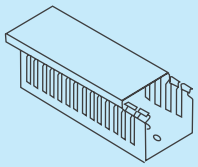
Cover Standard Pack		
Cover Code for B type	Size (with in mm)	Cover Standard Pack Total Length Inmtrs
BC25	25	50
BC30	30	50
BC40	40	50
BC45	45	50
BC50	50	50
BC60	60	50
BC72	72	50
BC80	80	50
BC100	100	50
BC125	125	50
BC150	150	50

All dimensions are in mm

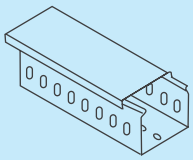
Sloting Style



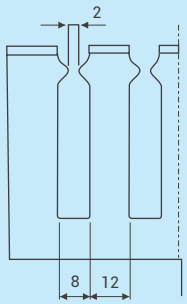
Standard Slot (S)



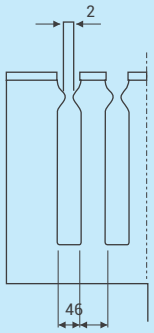
Thin Slot (T)



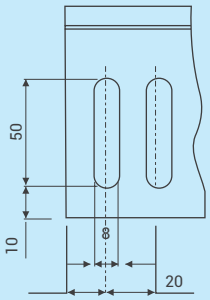
Oblong Slot (O)



Standard Slot



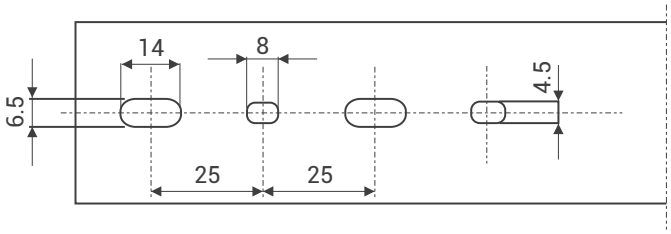
Thin Slot



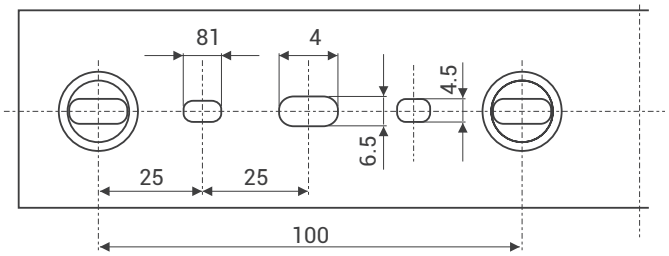
Oblong Slot

Bottom Slotting Style

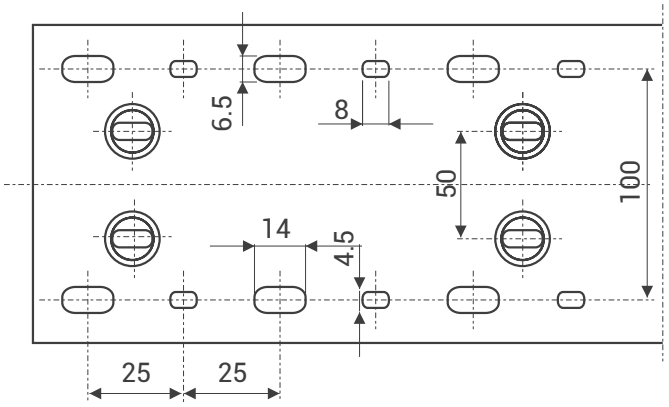
Duct Width: 25mm, 30mm



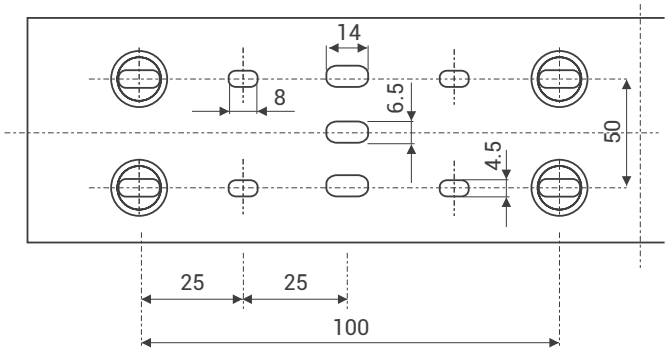
Duct Width: 40mm, 50mm, 60mm, 72mm and 75mm



Duct Width: 150mm



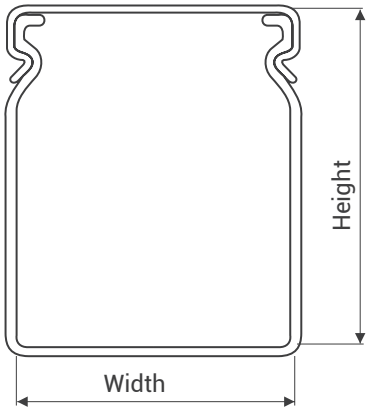
Duct Width: 80mm, 100mm and 120mm



All dimensions are in mm

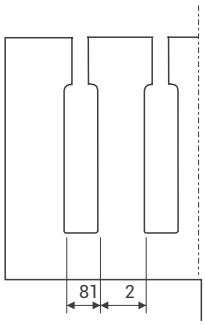
A Type

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

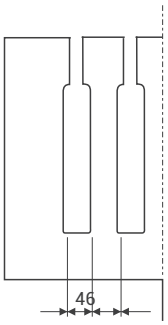


Channel with Cover Height X Width (mm)	Cable Housing Capacity (nos)			Available Slotting Styles	Standard Pack Channel with Cover	
	1.5 mm² OD 3.53 mm (16AWG)	2.5 m² OD 3.53 mm (14AWG)	4 mm² OD 4.01 mm (12AWG)		1 mtrs	2 mtrs
A15 x 15	11	9	7	H	100	48
A15 x 25	19	15	12	H	100	48
A25 x 25	31	25	20	S, O, T	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

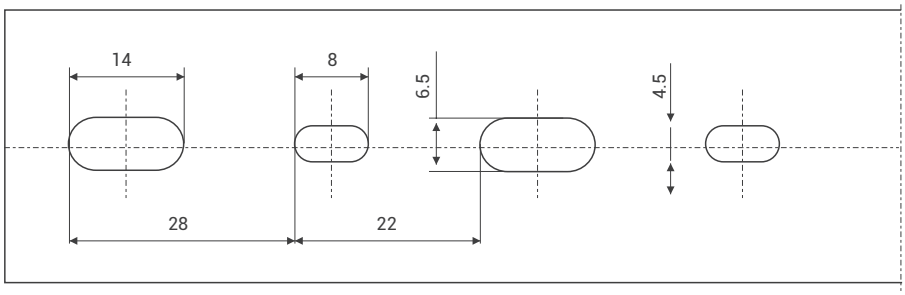
Note: All sizes are available in unslotted (us) style.



Standard Slot



Thin Slot



Bottom Mounting Slots for All Sizes

Cover Standard Pack		
CoverCode 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

All dimensions are in mm

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 D2863	Min. 29	Min. 40
Temperature index	Temperature index at which normal Oxygen content (21%) of Air will support combustion of wiring duct material	ASTM D2863	> 200°C	> 200°C
Maximum Smoke density rating (SDR)	Indicates the visibility under fire	ASTM D2843	< 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}

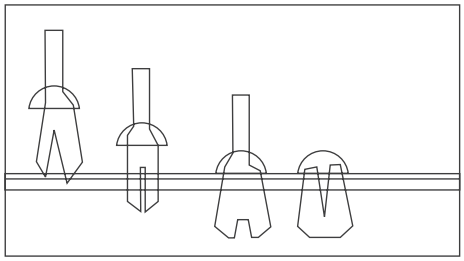
HFFR: (Halogen Free Fire Retardent Cable Ducts)

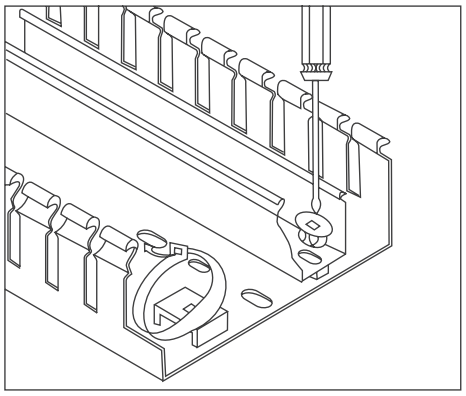
HFFR Cable ducts are made from specially formulated compound, which does not release significant amount of toxic gases or corrosive gases when ignited in a fire. These wiring ducts are free from halogens such as fluorine, chlorine, bromine, iodine, and/or astatine. These are tested and confirms to EN 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 Metrorails
- Outdoor Panels, data centres and power generation facilities

Accessories





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
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

Every effort as to the correctness or sufficiency of the information and data contained in the catalogue is made. We however cannot accept any liability for the accuracy or completeness of the information and data provided. No claims in this regard shall consequently be accepted.

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

Timing Devices & Supply Monitors

Timers and supply monitoring devices find their use in a wide variety of applications in the industry. E&A'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 mAto 30A. 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)	IEC61000 - 4 - 11	Ed. 2.0 (2004 - 03) Class B
Conducted emission	CISPR14 - 1	Ed. 5.0 (2005 - 11) Class B
Radiated emission	CISPR14 - 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) 5g
Repetitive shock	IEC 60068 - 2 - 27	Ed. 4.0 (2008 - 02) 40g, 6ms
Non-repetitive shock	IEC 60068 - 2 - 27	Ed. 4.0 (2008 - 02) 30g, 15ms

Time Switches

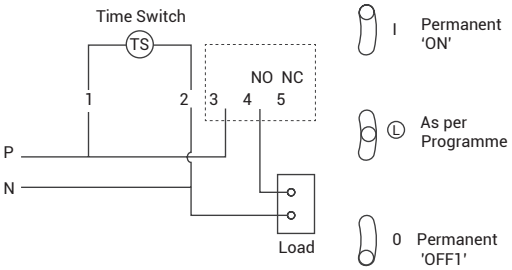
Analog Time Switch

Type FM/1

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

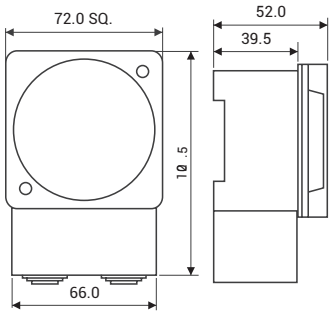
	Product Description	Cat. No.
FM1 / Quartz Daily	110 - 240 V AC Base/DIN Mounting1	**J648B1**

Connection Diagrams

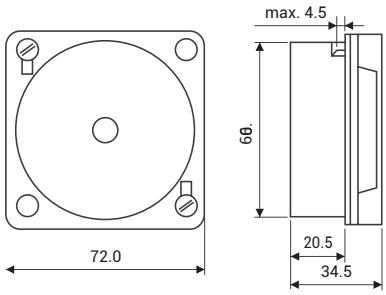


Overall Dimensions

Base/DIN Mounting



Flush Mounting



Time Switches		FM1 / QT
Supply voltage & frequency		110 - 240 V AC, 50/60 Hz
Power consumption		2VA
Accuracy		±1.5 Sec / day at 20°C
Switching contact		1 C/O contact - AgCdO
Contact rating	Resistive	16A @ 250 V AC
	Inductive (cosø = 0.6)	8A @ 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)

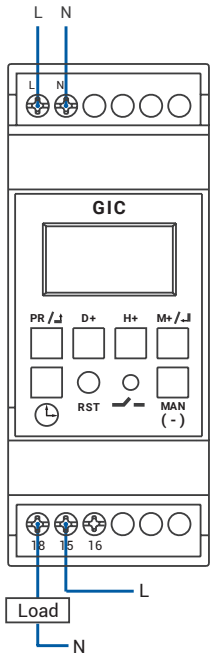
Crono, Crono Pro & Pulse

- 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 at 20° ambient temperature
- 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**
Crono (Pro)	110 - 240 V AC 2 C/O Base/DIN 25 ON/OFF	**WT2DCDS**
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**

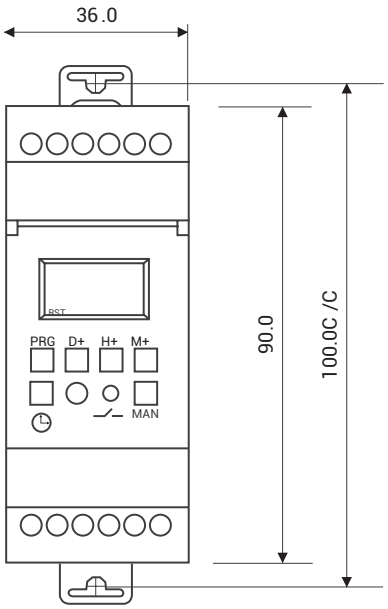
* For bell and Siren Application

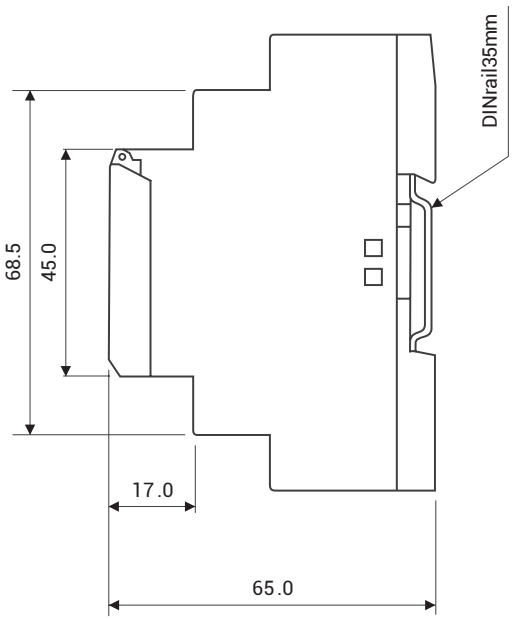
Connection Diagrams



67DDT0, 67DDT9, 6GHDT0, 69HDT0

Overall Dimensions





Crono & Pulse

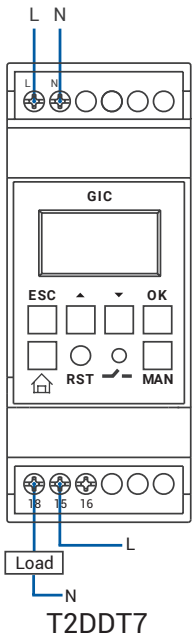
Cat.No.		Crono			Crono Pro	Pulse		
		67DDT0	6GHDT0	69HDT0	WT2DCDS	67DDT9	6GHDT9	69HDT9
Supply voltage (⏚)		110 to 240 V A C (-20% to + 10%) 50/60 Hz	24 V DC	12 V DC	110 to 240V A C (-20% to + 10%) 50/60 Hz	110 to 240 V A C (-20% to + 10%) 50/60 Hz	24 V DC	12 V DC
Power consumption (Max.)		6 VA						
Battery backup		Approx 6 years running reserve						
LED indication		Red LED for Relay status						
Clock format		EitherAM / 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 › 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 › Auto program run › ON - Continuous ON › OFF-ContinuousOFF		
Contact arrangement		1 C/O (SPDT)			2 C/O	1 C/O		
Contact rating:	Resistive	16A (NO) and 5 A (NC) @ 240 V AC / 24 V DC						
	Incandescent lamps	1000 W						
	Inductive load (Cos Ø = 0.6)	6A @ 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)		110gms (approx)						
Certification		CE cULus LISTED RoHS Compliant						

Astro Mini & Astro Pro

- 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

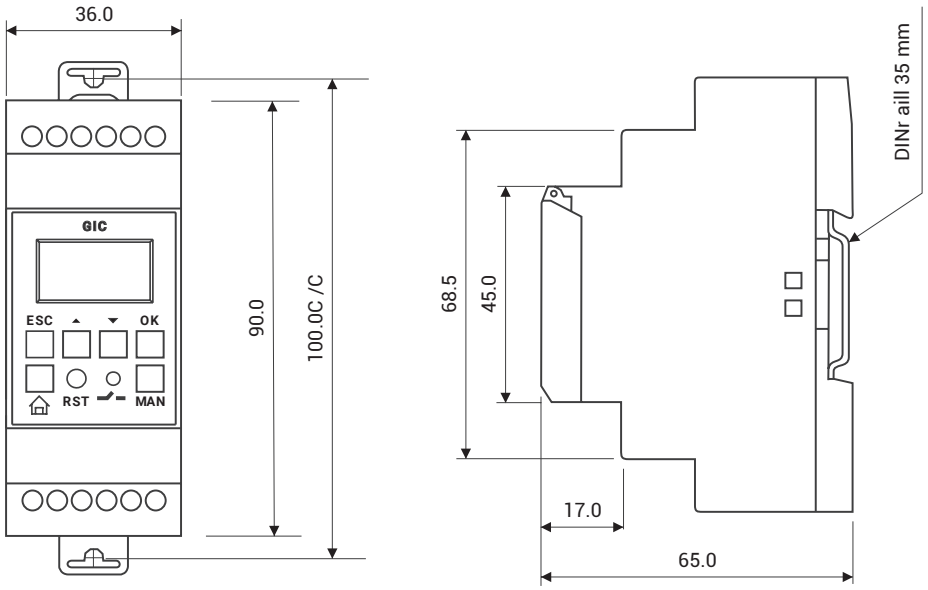
	Description	Cat. No.
	Astro Mini, 110 - 240 V AC 1 Phase 2 Wire (50/60 Hz), 1 C/O (SPDT)	**T2DDT7**
Astro Pro	Astro Mini, 110 - 240 V AC 1 Phase 2 Wire (50/60 Hz), 2 C/O (SPDT)	**AS2DCDS**

Connection Diagrams



T2DDT7

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.

Astro Mini & Astro Pro

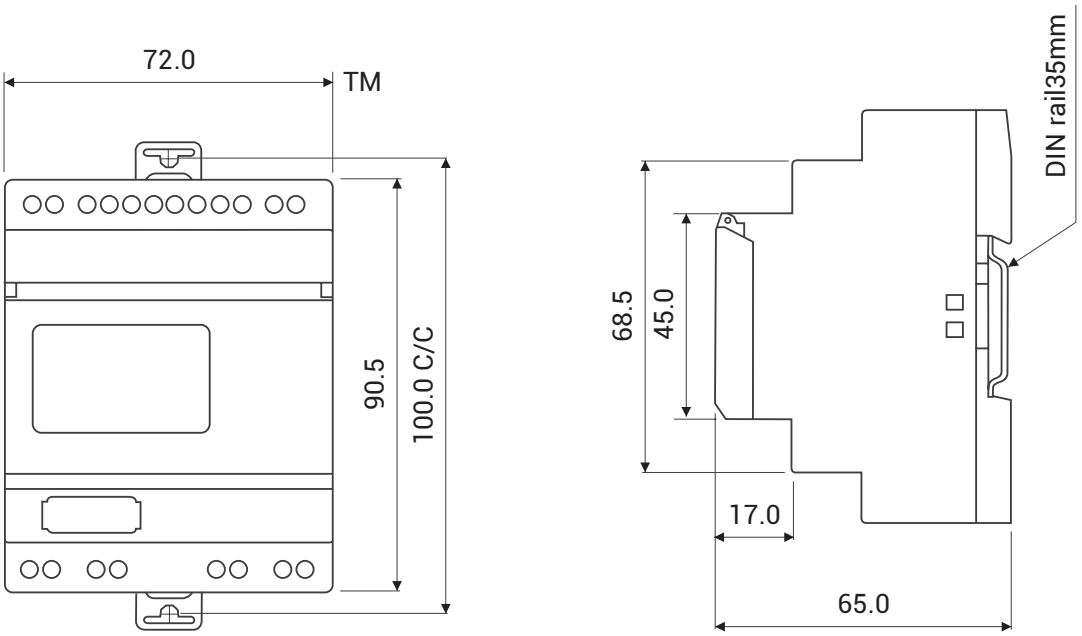
Cat. No.		T2DDT7	AS2DCDS
Supply voltage (⏚)		110 to 240 V AC (-20% to +10%) 50/60 Hz	
Power consumption (Max.)		6 VA	
Battery backup		Approx 6 years running reserve	
LED indication		Red LED for Relay Status	
Clock format		Either AM / PM 12 h or 24 h Clock	
Reset		Programs and clock are reset to default	
Modes		Auto ON, Auto OFF, Auto › 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)	2 C/O
Contact rating	Resistive	16A (NO) and 5 A (NC) @ 240 V AC / 24 V DC	
	Incandescent lamps	1000 W	
	Inductive load (Cos Ø = 0.6)	6A @ 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 RoHS Compliant	

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

Description	Cat. No.
Astro time switch, 110 - 240 V AC (50-60 Hz), 3 Phase 4 Wire (P-N), 3 NO (SPST)	**T3DDT0**

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 ± 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.

Astro

Cat. No.		T3DDT0
Supply voltage (Un)		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		3 NO
Contact rating		8A (Res.) @ 240 V AC and 5A (Res.) @ 30 V DC
Power reserve (For clock only)		6Years
Utilization category	AC-15	Ue Rated voltage (V): 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		Settable UV:0-220 V and OV:130-330 V
Trip time for UV/OV		5-16 seconds
Recovery time		1-4 seconds
Mounting		Base/DIN rail
Dimension (in mm)		72 x 90 x 67
Weight (unpacked)		208 gms (approx)
Certification		CE cULus LISTED

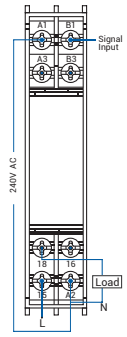
Timers

Micon 175

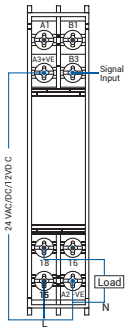
- Compact 17.5 mm wide
- Multiple timing ranges
- Low power consumption
- LED indication for power and relay status
- DIN rail and base mountable
- Integrated dual voltage selection

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
MultifunctionTimer	0.1 sec - 100 hrs	12 - 240 V AC/DC	1 C/O	1CMDT0
			2 C/O	1CMDTF
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
Forward Pause Reverse	ON time :6 sec-60 min	12 - 240 VAC / DC	2 C/O	1CZDTF
	Pause time :0.1 sec-200 sec			

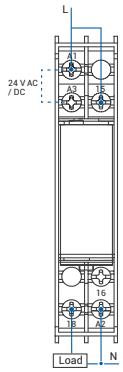
Connection Diagrams



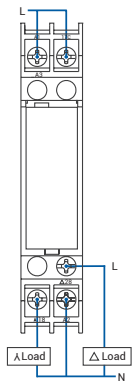
12RDT4
(for 240 V AC)



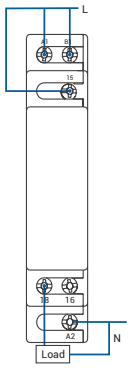
12RDT4 (24VAC/DC)
15DDT4 (12V DC)



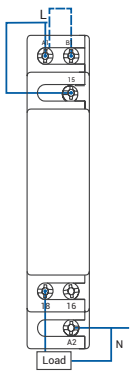
12ODT4, 12WDTC,
11ODT4, 15ODT4



12SDT0



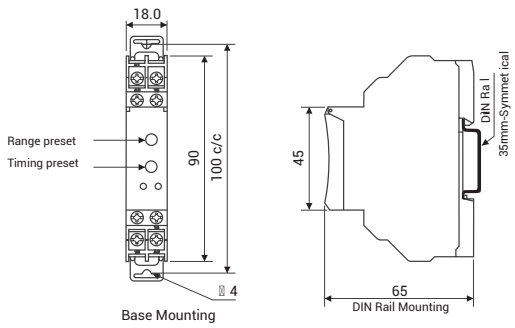
1CMDT0

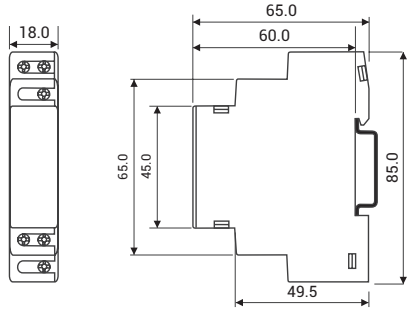


1CJDT0

Mode:
- Asymmetric OFF - ON - Do not link between A1 & B1
- Asymmetric ON - OFF - Link between A1 & B1

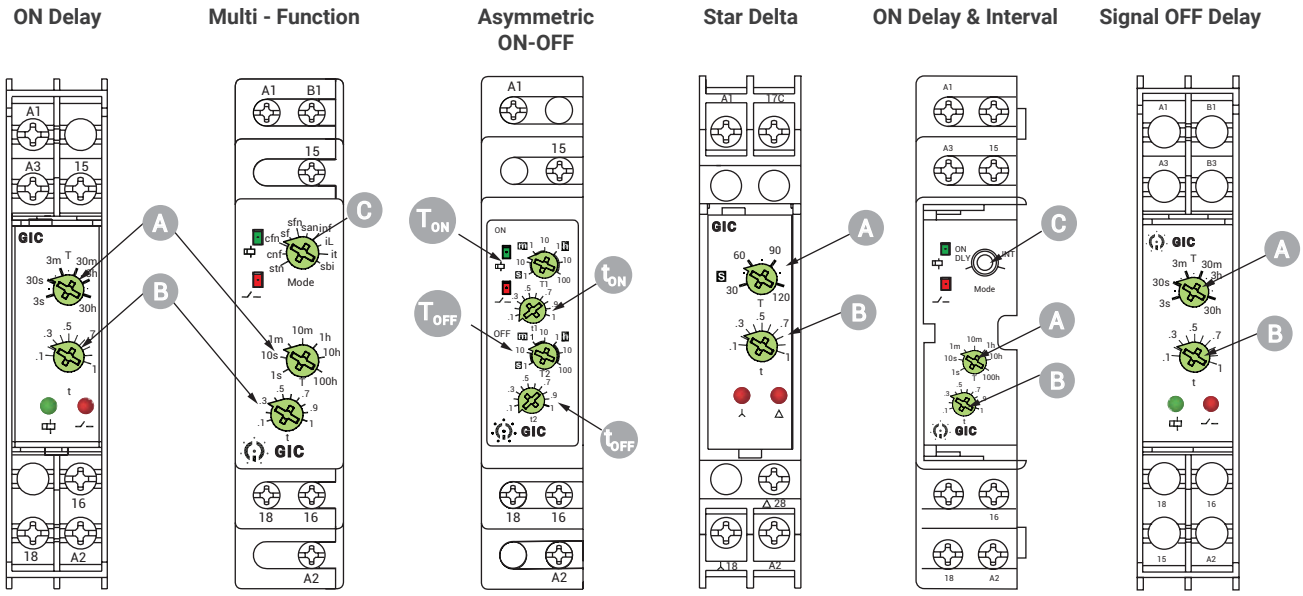
Overall Dimensions





1CMDT0, 1CJDT0

Front Facia - Micon 175



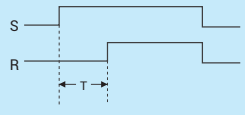
A	Main Time Range Knob (t)
B	Multiplication Factor Knob (t) of T
C	Mode Selection Knob
T_{ON}	ON Time Range Knob (T1)
T_{OFF}	OFF Time Range Knob (T2)
t_{ON}	ON Time Multiplication Factor Knob, (t1) of T1
t_{OFF}	OFF Time Multiplication Factor Knob (t2) of T2

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	CE								

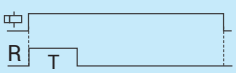
Timing Diagrams

ON Delay

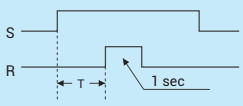


S = Supply
R = Relay

Interval

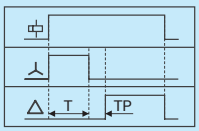


One Shot

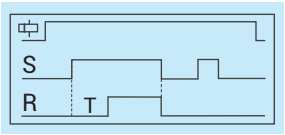


S = Supply
R = Relay

Star Delta Timer

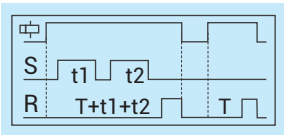


Functional Diagrams For 1CMDT0



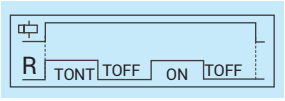
SIGNAL ON DELAY [stn]

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.



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.



CYCLIC ON/OFF [cnf]

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

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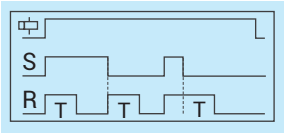

IMPULSE ON/OFF [inf]

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

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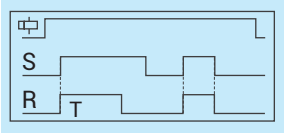
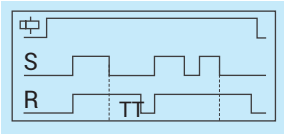
CYCLIC OFF/ON [cfn]

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.



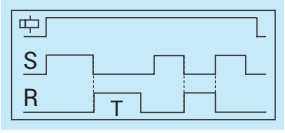
LEADING EDGE IMPULSE [iL]

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.



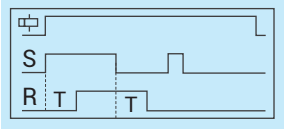
SIGNAL OFF DELAY [sf]

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.



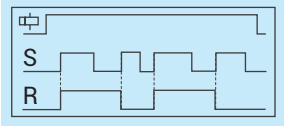
TRAILING EDGE IMPULSE [it]

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.



SIGNAL OFF/ON [sfn]

On application of input signal to the timer, the preset delay time period (T) tarts. 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.

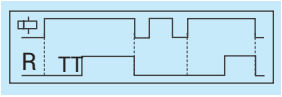


LEADING EDGE BISTABLE [sbi]

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.

Derived Modes

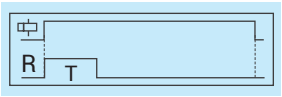
Select mode, 'Signal ON Delay' and short the connection between A1 - B1 before power ON Select mode, 'Accumulative Delay ON Signal' and keep the connection between A1 - B1 open.



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.

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.

Micon 175

Cat. No.	1CMDT0	1CMDTF	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	2 CO	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	CE RoHS Compliant		

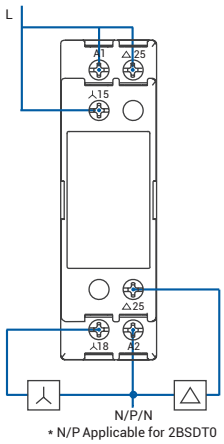
Cat. No.	12SDT0	14SDT1S	1CZDTF
Timer description	Star delta timer		Forward Pause Reverse Timer
Nominal supply (Ur)	240 V AC, 50/60 Hz	240 - 415 VAC, 50/60 Hz	12 - 240 VAC / DC
Limits	-20% to 10% of Ur		-15 % to +10 %
Power consumption	8 VA		5 VA
Contact arrangement	Star - 1 NO, Delta - 1NO		2 C/O Potential free contacts
Contact rating	240 VAC / 28 V DC @ 5 A (resistive)		8A (Res.) @ 240 V AC, 5A at 24 VDC
Mechanical life	5 x 10^6 operations (At no load & max switching frequency)		10,000,000 Operations min
Electrical life	1x 10^5 operations		50,000 Operations min.
Status indication on front panel	Red LED 1: Star ON, Red LED 2: Delta ON		RED LED for both Relay.
Timing range	3 s to 120 s	3 s to 30 s	6 seconds to 1 hr
Pause time	60 ms		0.1 seconds to 200 seconds
Reset time	150 ms (max)		
Setting accuracy	±5% of Full scale		+/- 5% of full scale
Repeat accuracy	±1%		+/- 1%
Degree of protection	IP20 for terminals, IP40 for enclosure		IP - 20 for Terminal, IP - 40 for Housing
Mounting	Base/DIN rail		
Dimensions	17.5 (W) x 65.0 (H) x 90.0 (D) mm		18 x 90 x 66 (in mm)
Weight (unpacked)	75 gms (approx)		72 gms
Certification	CE RoHS Compliant		

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)

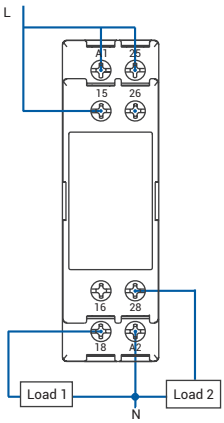
Type	Timing Range	Voltage	Contact Arrangement	Cat. No.
ON Delay	0.1 sec - 10 hrs	24 - 240 V AC/DC	2 C/O	2AODT5
Star Delta Timer	3 sec - 120 sec	24 - 240 V AC/DC	1 NO (Star)+1 NO (Delta)	2ASDT0
		240 - 415 V AC		2BSDT0
MultifunctionTimer	0.1s - 120 days	24 - 240 V AC/DC	2 C/O (1 Inst+1 Delayed)	2A8DT6
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 - 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

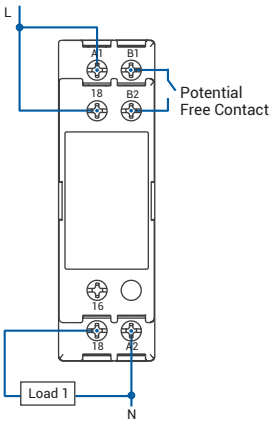


* N/P Applicable for 2BSDT0

2ASDT0, 2BSDT0

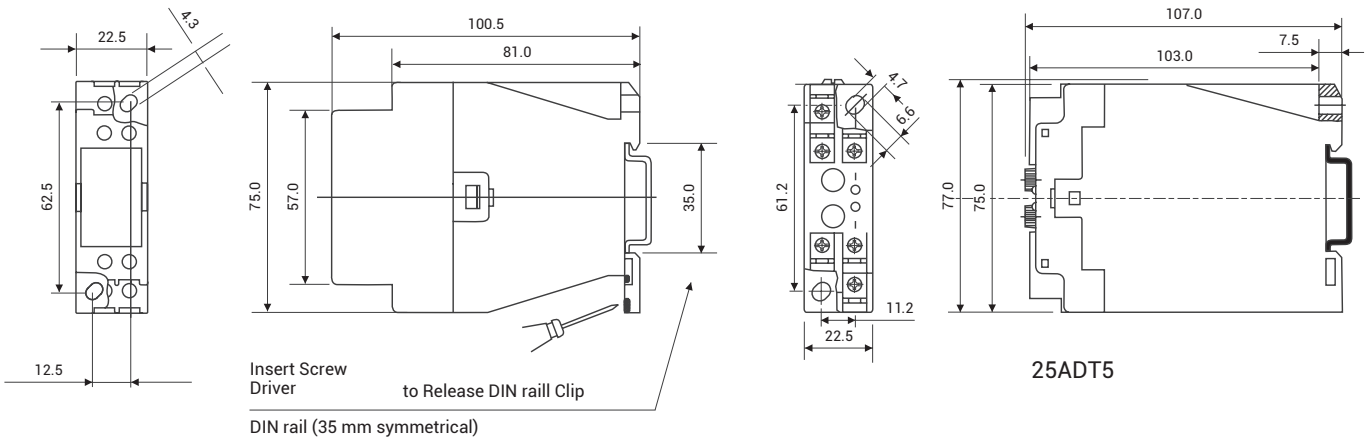


2A0DT5, 2AADT5, 2A5DT5, 2B5DT5, 2A6DT6, 2B6DT6, 23GDT0,



2ANDT0

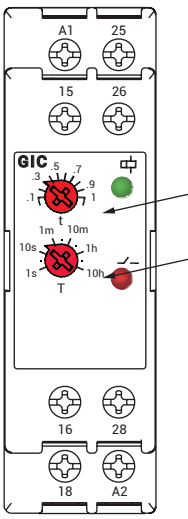
Overall Dimensions



25ADT5

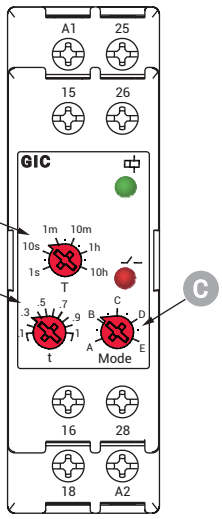
Front Facia - Micon 225

ON Delay



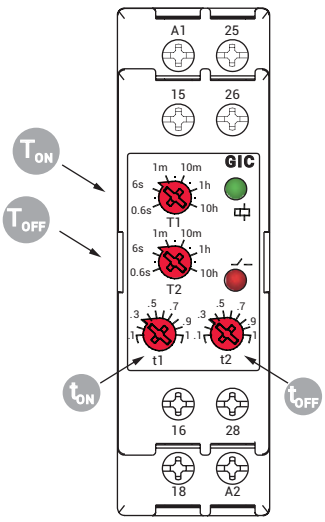
2A0DT5,

Multi - Function



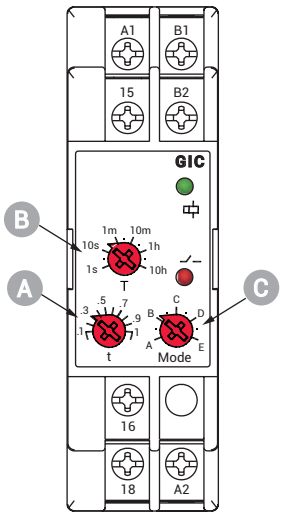
2A5DT5, 2B5DT5,
2A6DT6, 2B6DT6

Asymmetric ON-OFF



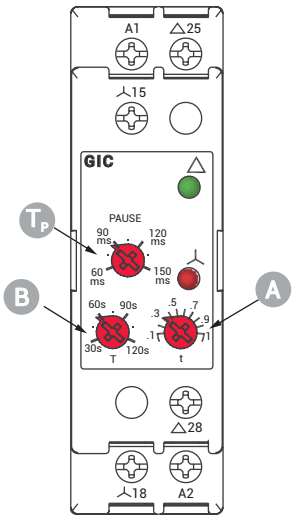
2AADT5,

Signal based Multi Function



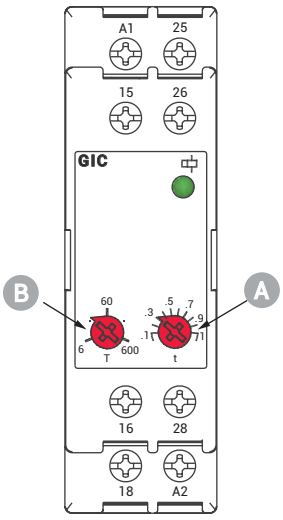
2ANDT0

Star Delta



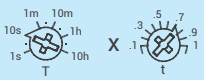
2ASDT0,
2BSDT0

True OFF Delay



23GDT0

- **A** MainTime 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

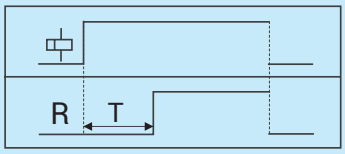
The timing duration of timer is adjusted through 'T' and 't' knobs.  = 7 secs

Micon 225

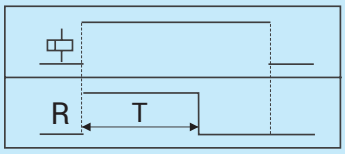
Cat. No.		2A5DT5	2ASDT0	2BSDT0	23GDT0
Functions		Multi-function with 5 modes	Star - Delta		True OFF delay
Supply voltage (⏚)		24 - 240 V AC/DC	24 - 240 V AC/DC	240 - 415 V AC	24 - 240 VAC/DC
Supply variation		-20% to +10% (of ⏚)			
Supply frequency		50/60 Hz			
Power consumption (Max.)		4 VA	4 VA	7 VA	2.5 VA
Setting accuracy		±5% of full scale			±10% of full scale
Repeat accuracy		+1%			
Initiate time		Max. 100 ms			
Reset time		Max. 200 ms			
Set time (Ts)		0.1 s - 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		5A (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			

Micon 225

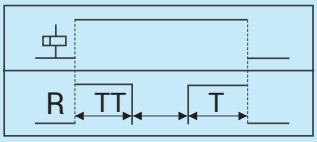
2A5DT5, 2B6DT6



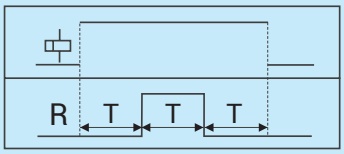
ON DELAY



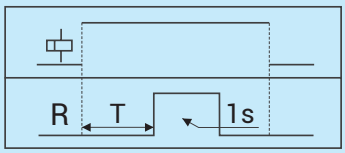
INTERVAL



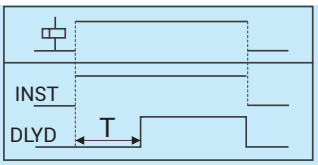
CYCLIC ON/OFF



CYCLIC OFF/ON



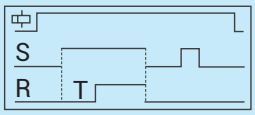
ONE SHOT



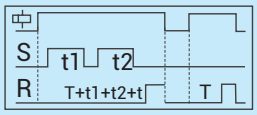
ON DELAY (1 INST. + 1 DLYD.)*

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

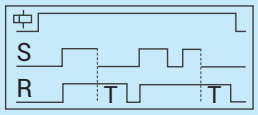
2ANDT0



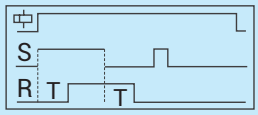
SIGNAL ON DELAY



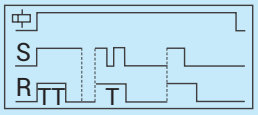
ACCUMULATIVE ON DELAYS



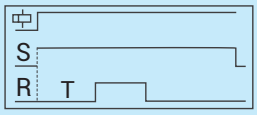
SIGNAL OFF DELAY



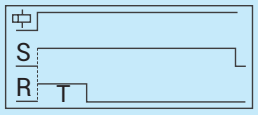
SIGNAL OFF/ON DELAY



LEADING EDGE IMPULSE

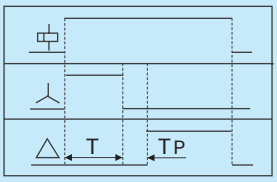


ON DELAY



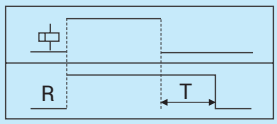
INTERVAL

2ASDT0, 2BSDT0



STAR - DELTA

23GDT0

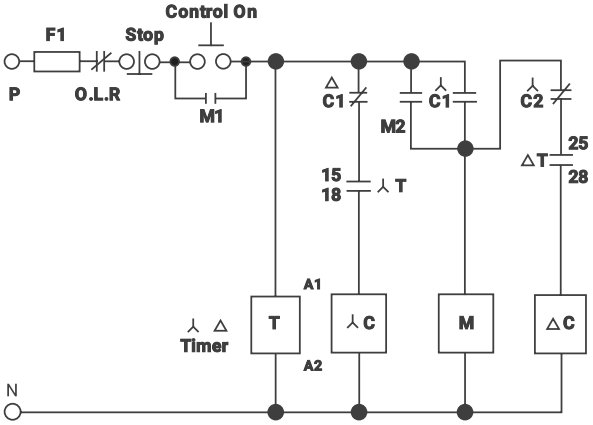


TRUE OFF DELAY

Star delta connection

Recommended Star - Delta Control Circuit:

(Belowcircuit is for STAR - DELTATimer 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) $\curlywedge_C$ - 'NO' Contact
7) $\curlywedge_{C1}$ - 'NO' Contact of Star Contactor
8) $\curlywedge_{C2}$ - 'NO' Contactor Star Contactor
9) Δ_C - Delta Contactor
10) Δ_{C1} - 'NC' Contactor Delta Contactor
11) $\curlywedge_T$ - Star Contact of Timer ($\curlywedge$ - Δ)
12) Δ_T - Delta Contact of Timer ($\curlywedge$ - Δ)

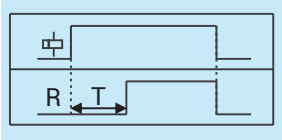
Micon 225

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.

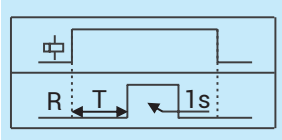
Operating Modes / Functions of Timers

⊕: SUPPLY, S: SIGNAL, R: RELAY OUTPUT,
T: SET TIME, TP : PAUSE TIME, T_{ON} : ON TIME, T_{OFF}: OFF TIME, T_1,T_2,T_3: POWER DOWN REGION



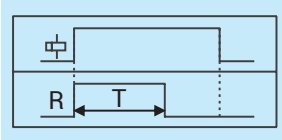
ON DELAY(DELAYON ENERGIZATION):

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.



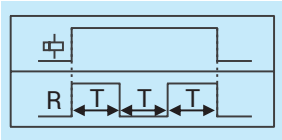
ONESHOT (PULSE):

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



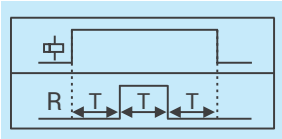
INTERVAL (IMPULSE ON):

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



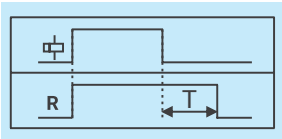
CYCLIC ON/OFF (SYMMETRIC):

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.



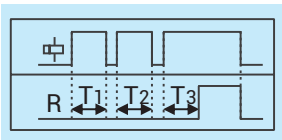
CYCLIC ON/OFF (SYMMETRIC):

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.



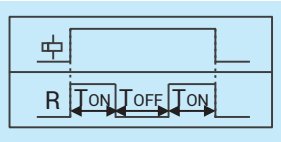
TRUE OFF DELAY(POWER OFF DELAY):

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



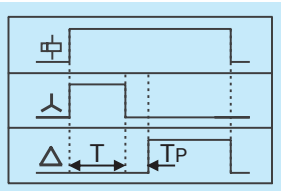
ON DELAY RETENTIVE(NO VOLT):

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.



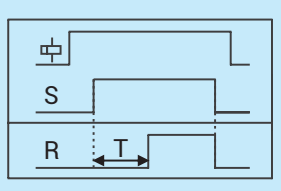
ASYMMETRIC ON-OFF / CYCLIC ON-OFF (ASYMMETRIC):

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.



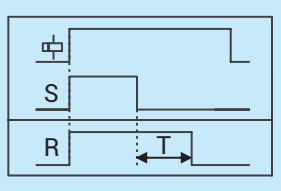
STAR DELTA:

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:

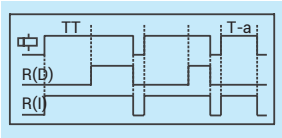
On application of inputs signal the output relay energizes instantly. On removal of input signal to the timer, the preset delay time period starts. On completion of the preset time, the output is switched OFF.

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 instantaneous
- Wide Input Signal & Supply range - 24-240 V AC/DC
- Wide Timing Range - 0.1 s to 120 days

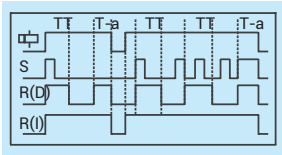
Functional Diagrams

⏚: 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



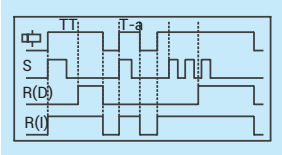
ON DELAY (Non Signal Based)

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



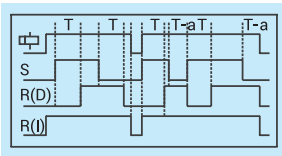
CYCLIC ON/OFF

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.



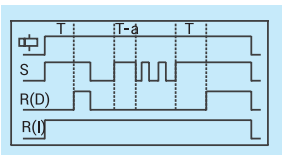
SIGNAL ON DELAY TYPE 1

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.



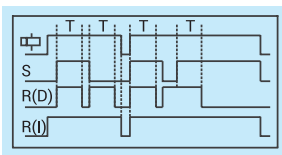
SIGNAL ON/ OFF Delay

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.



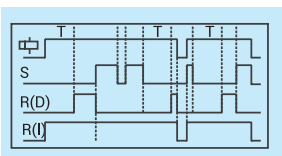
SIGNAL ON DELAY

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.



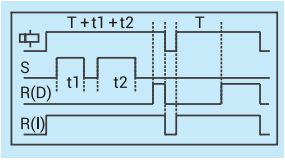
IMPULSE ON/OFF

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.



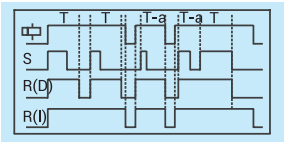
INVERTED SIGNAL ON DELAY

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.



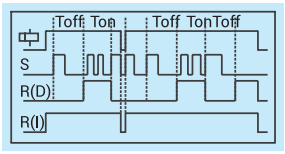
ACCUMULATIVE DELAY ON SIGNAL

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'.



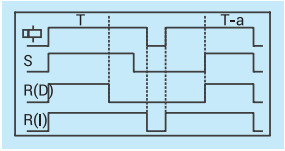
INTERVAL

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



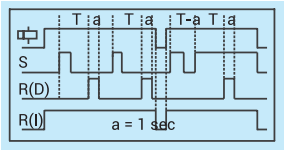
DELAYED IMPULSE

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'.



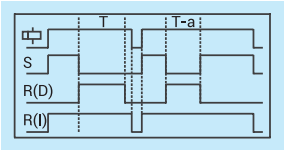
LEADING EDGE IMPULSE

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.



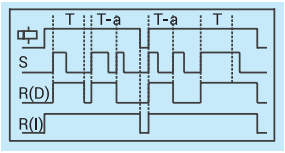
ONE SHOT

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.



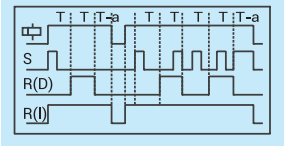
TRAILING EDGE IMPULSE

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

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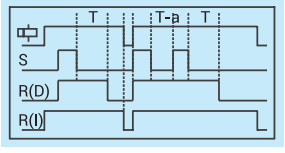


SIGNAL OFF DELAY

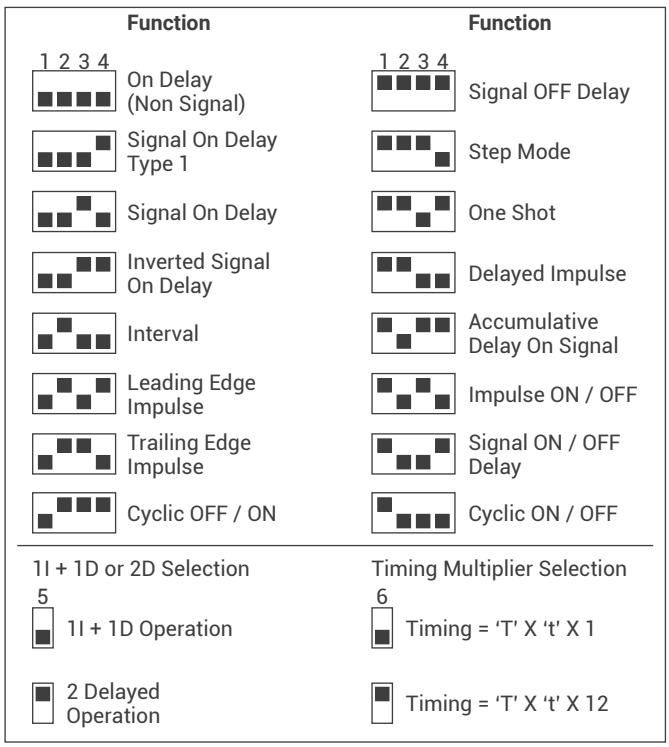
Signal OFF Delay: When the supply is applied and signal is closed, output is switches ON. When signal is opened, the preset timing commences and output is switches OFF at the end of time duration 'T'. If signal is closed during timing period, then timing stops and restarts when signal.

Micon 225 Signal Based Multi - Function Timer

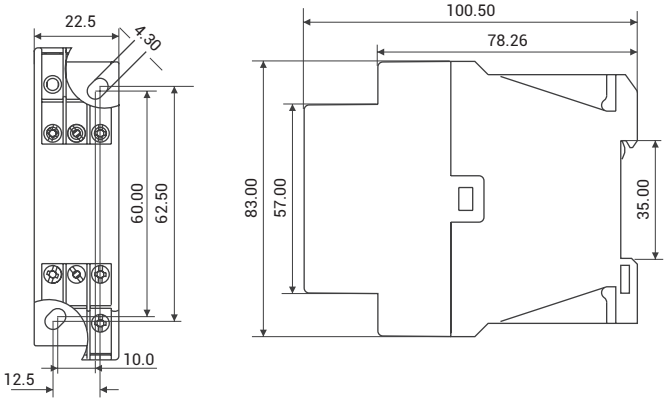
Cat. No.		2A8DT6
Description		Multi-function timer with 16 timing functions (refer page 111)
Supply Voltage (⏚)		24-240 V AC / DC
Supply Variation		- 20% to +10% (of ⏚)
Frequency		50/60 Hz
Power Consumption (Max.)		3 VA
Signal Voltage	Low Range (B1L-A2)	24-60 V AC/DC
	High Range (B1H-A2)	85-265 V AC, 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		±5% of Full scale
Repeat Accuracy		±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:

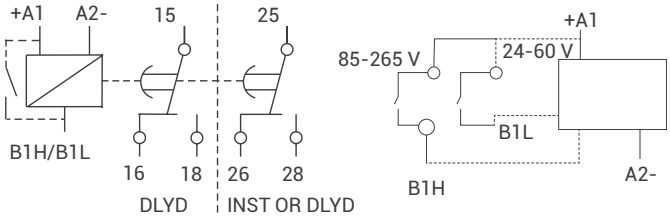
Operating Mode & timing can be selected by using DIP switches



Mounting Dimension (mm)



Connection Diagram



Motor restart control Timer

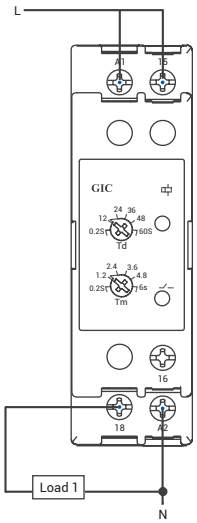
- Single phase motor restart control timer with memory time
- Under voltage trip and ON delay

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

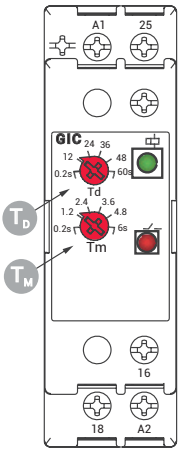
The timer is used for instantaneous or delayed motor startup after a short-time power failure (max. 6 sec). The start occurs immediately if power supply is disrupted for less than 0.2 sec. If the power failure lasts longer, the relay activates its memory for a time that can be set to 0.2 to 6 sec, after 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.

Connection Diagram



22LDT0, 23LDT0

Front Facia

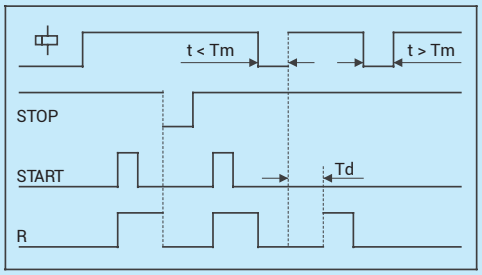


22LDT0, 23LDT0

T_D Delay Time Setting Knob

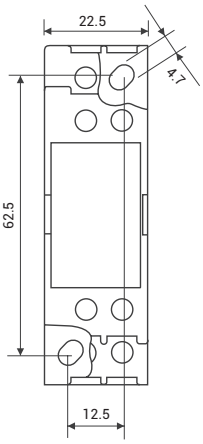
T_M MemoryTime Setting Knob,

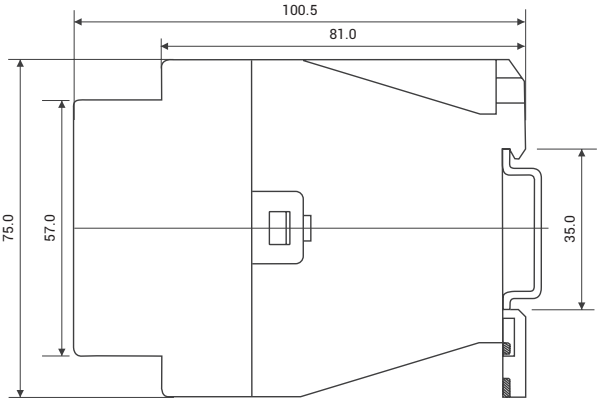
Timing Diagrams



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

Overall Dimensions





Motor restart control Timer

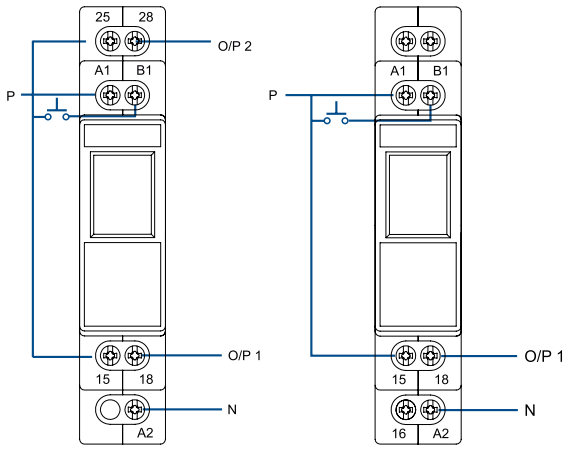
Cat. No.		22LDT0	23LDT0
Nominal supply (Ur)		240 V AC, 50/60 Hz	110 V AC, 50/60 Hz
Limits		-20% to +10% of Ur	
Power consumption		4 VA	
Contact arrangement		1 C/O	
Timing ranges		Memory time TM: 0.2 to 6 s, Delay time Td: 0.2 to 60 s	
Trip voltage		176 V AC (±6 V)	80 V AC (±6 V)
Hysteresis		4 V AC to 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		$1x10^7$ operations	
Electrical life		$1x10^5$ 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		CE cULus LISTED	

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	Description
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

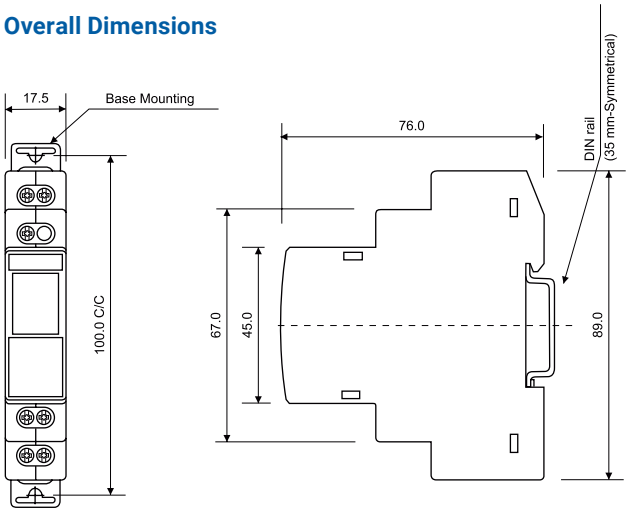
Connection Diagram



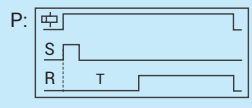
V0DDTD
V0DDTD1

V0DDTS
V0DDTS1

Overall Dimensions

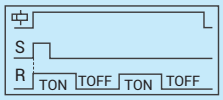


Timing Diagrams for V0DDTS & V0DDTD

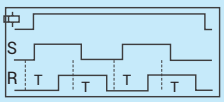


ON DELAY

SIGNAL OFF DELAY (E)

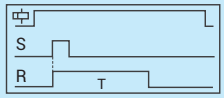


CYCLIC ON/OFF
{ON Start, (Sym, Asym)} (C)

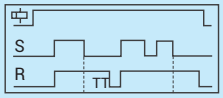


SIGNAL OFF/ON (G)

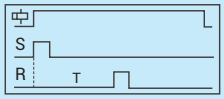
CYCLIC ON/OFF
{OFF Start, (Sym, Asym)} (B)



INTERVAL (F)



SIGNAL ON/OFF (D)



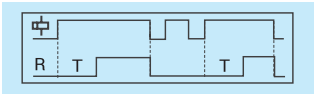
ONE SHOT OUTPUT (H)

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.

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	8A @ 240 V AC / 24 V DC (Resistive)	
Repeat accuracy	±0.5%of selected range	
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	1. ON Delay (A) 2. Cyclic OFF / ON (Sym, Asym) (B) 3. Cyclic ON / OFF (Sym, Asym) (C) 4. Signal ON / OFF (D)	5. Signal OFF Delay (E) 6. Interval (F) 7. Signal OFF / ON (G) 8. One Shot Output (H)
Timing range	h:m 9:59 / m:s 9:59 / hr 999 99.9 / min 999 99.9 / sec 999 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 LISTED	

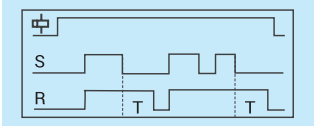
Timing Diagram For V0DDTS1 & V0DDTD1

⏚ : Supply Voltage, S: Input Signal, R: Relay Output
T: Preset Time, T: Preset ON Time, T: Preset OFF Time



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.

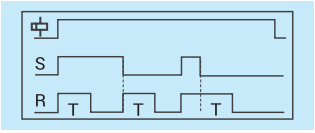


SIGNAL OFF DELAY [9]

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.

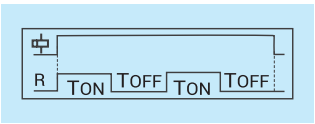
CYCLIC OFF/ON {OFF Start, (Sym, Asym)} [1]

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.



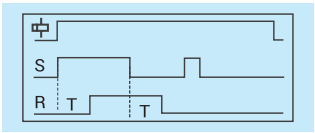
IMPULSE ON/OFF [A]

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.



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.



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 periodmstarts again and the output is switched ON when the preset time duration is complete

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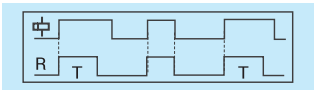
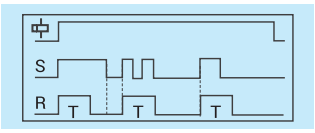


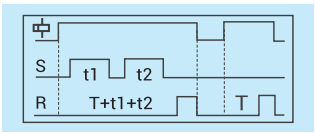
IMPULSE ON ENERGIZING [3]

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



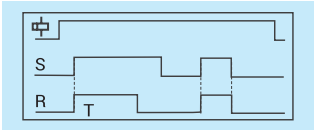
LEADING EDGE IMPULSE1 [C]

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.



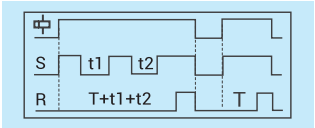
ACCUMULATIVE DELAY ON SIGNAL [4]

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)



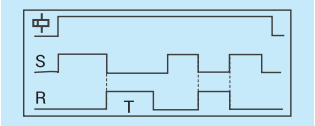
LEADING EDGE IMPULSE2 [d]

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.



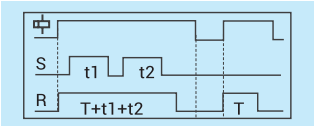
ACCUMULATIVE DELAY ON INVERTED SIGNAL [5]

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).



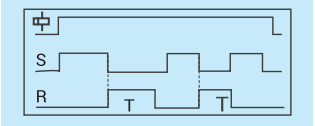
TRAILING EDGE IMPULSE1 [E]

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



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).



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

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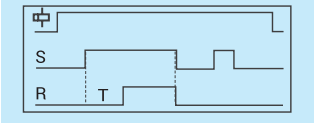

SIGNAL ON DELAY [7]

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

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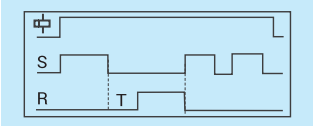
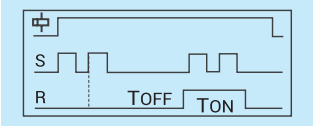


INVERTED SIGNAL ON DELAY [8]

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.



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'.

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	$2x10^7$	
Electrical life	$1x10^5$	
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 9:59 m:s 9:59 hr 999 99.9 min 999 99.9 sec 999 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	CE cULus LISTED	

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

B □ □ □ □ □

Timing Ranges (SR)
- 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

Timing Ranges (SR)
- x 0.15 sec - 3.0hrs
- Y 0.3 sec - 6.0 hrs
- Z 0.6 sec - 12.0hrs

Voltage
- 3 110 VAC50 Hz
- 4 240 VAC 50 Hz
- C 110 VAC 60 Hz
- D 240 V AC60 Hz

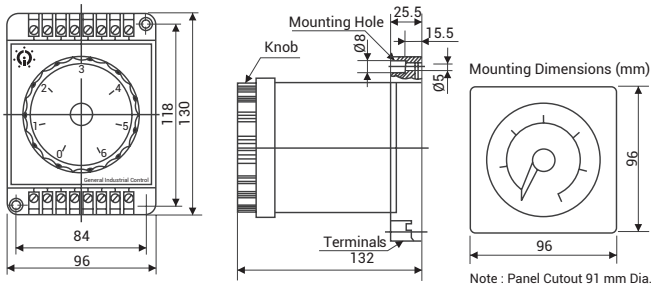
Contact
- 1 1 Inst + 1 Del C/O
- 2 1 Inst + 2 Del C/O

Mounting
- B Base Mounting
- F Flush (Door) Mounting

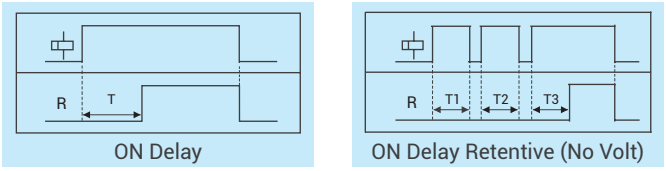
Delay
- 1 Standard ON delay
- 2 With 'NO VOLT'

Overall Dimensions

Base Mounting



Timing Diagrams



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) 6A (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

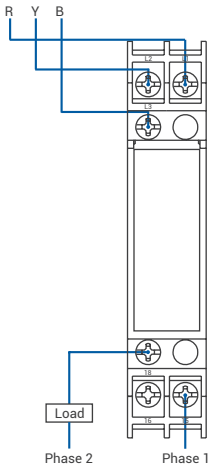
Supply Monitors

SM 175

- Compact 17.5 mm width module
- 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 and changed in settings - during run time for better security
- Adjustable time delay
- 1 C/O configuration

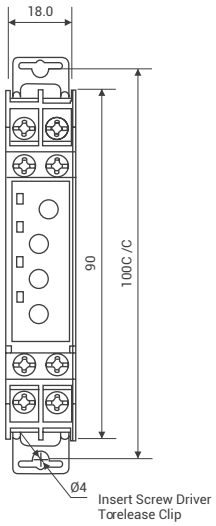
Type	Supply Monitoring Type	Time Delay	Assymetry	Voltage & Contact Arrangement	Cat. No.
SM175 (3 Ph, 3W)	Phase loss + Phase Sequence Monitoring	ON Delay 500 msec & OFF Delay 100 msec	–	208 - 480 V AC, 1 C/O (Steps of 208 - 220 - 380 - 400 - 415 - 440 - 480 V AC)	MK21D5
		ON Delay 500 msec & OFF Delay 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 ⏚, OV: 2% to 20% of ⏚)	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 ⏚, OV: 5% to 25% of ⏚)	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

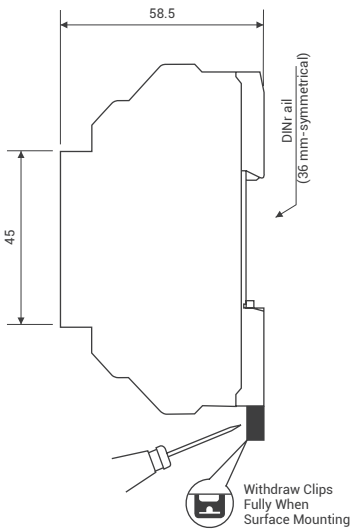
Connection Diagrams



MC21D5, MK21D5, MG21DF, MD21DF, MG21DH, MA21DN

Overall Dimensions

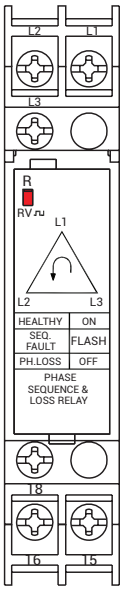




Front Facia Supply Monitor

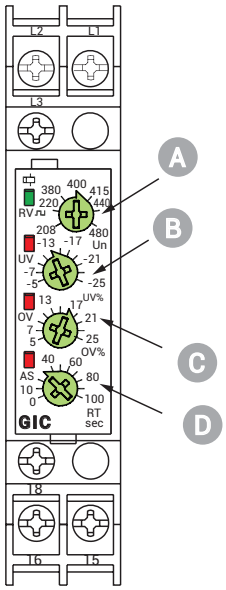
SM 175

Phase Sequence Phase Loss Relay

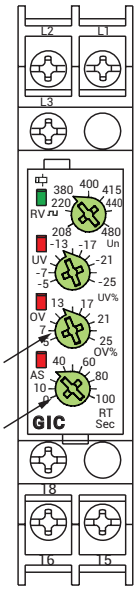


MC21D5,
MK21D5

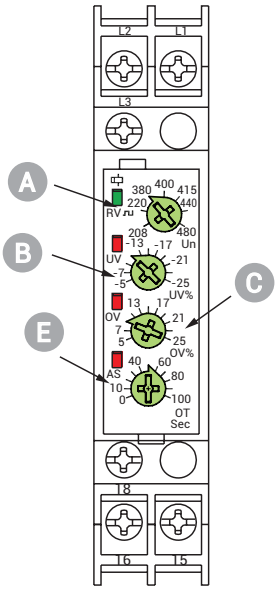
Phase & Voltage Monitoring Relay



MG21DF

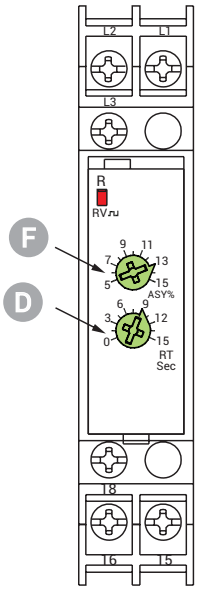


MD21DF



MG21DH

Phase Sequence Unbalance Relay



MA21DN

A	Reference Voltage Knob (Un)
B	Under Voltage Knob (UV)
C	Over Voltage Knob (OV)
D	Release Time Knob (RT)
E	OperateTime Knob (OT)
F	Asymmetry Seeking Knob (Asy)

Supply Monitor

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 Setting accuracy ±10% of Full scale	Operate time		500 ms fixed		5 s fixed	5 s fixed	(<0.5 to 100) s	5 s fixed
	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			$3x10^6$ operations					
Electrical life			$1x10^5$ 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			CE cULus LISTED					

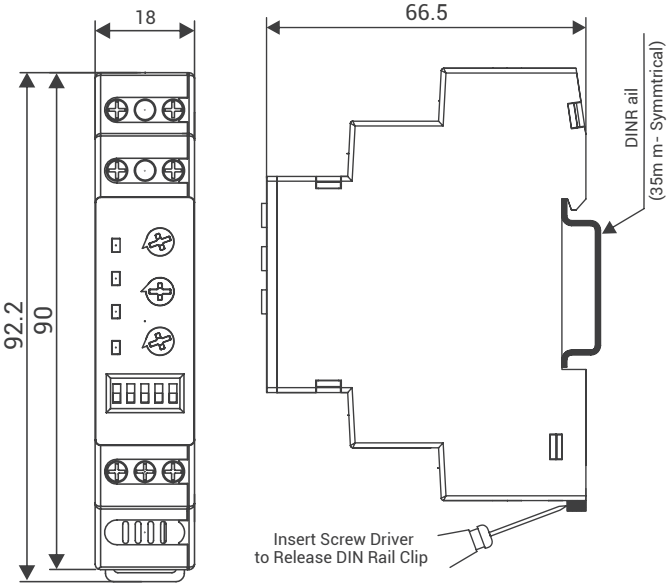
Supply Monitor

SM 175

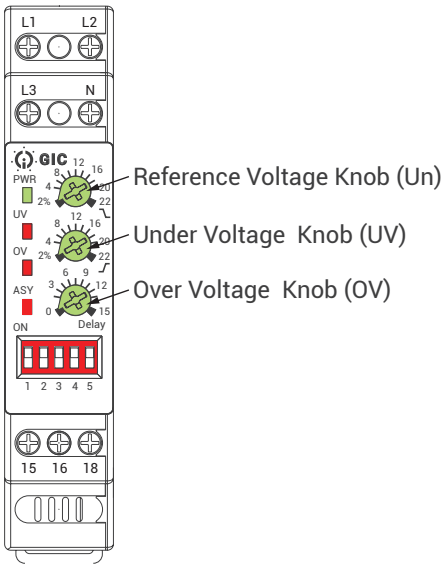
- Compact 17.5 mm Width module
- Protection against Phase loss, Phase Sequence, Phase Asymmetry, Under Voltage & Over Voltage
- Multi-Voltage: Three Phase Three Wire operating at 208-480 VAC or Three Phase Four Wire operating at 120-277 VAC
- Selectable Under Voltage / Over Voltage, Asymmetry and Phase Sequence
- LED Indication for all Faults & change in dip switch settings during runtime for better security
- Adjustable ON/OFF Time Delay in seconds /minutes
- 1 C/O Configuration

Type	Supply Monitoring Type	Time Delay	Assymetry	Voltage & Contact Arrangement	Cat. No.
SM175 (3P 3W, 3P 4W)	Phase loss + Phase Sequence + Under Voltage + Over Voltage (UV:-2% to -22% of 中, OV: 2% to 22% of 中)	Selectable ON delay (0 to 15 Sec), Selectable OFF delay (0 to 15 sec)	Phase Asymmetry (10% fixed)	208 to 4807 VAC (3P, 3W), 1 C/O 120 to 277 VAC (3P, 4W), 1 C/O	MAG03D0424
	Phase loss + Phase Sequence + Under Voltage + Over Voltage (UV:-5% to - 25% of 中 /60% of 中 (Fixed), OV: 5% to 25% of 中 /110% of 中 (Fixed))			415 VAC (3P, 3W), 1 C/O	MAG03D0425
	Phase loss + Phase sequence + Under Voltage + Over Voltage (UV: 0-5% to - 25% /80% of 中 (Fixed), OV: 110% of 中 (Fixed))	Selectable ON delay (0 to 15 sec/min), Selectable OFF delay (0 to 15 sec/min)	Phase Asymmetry (10% fixed / 5% to 25% Selectable)	240 VAC (3P, 4W), 1 C/O	MAG03D0426

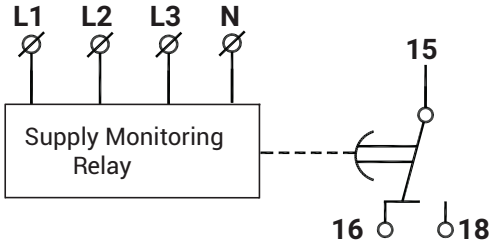
Overall Dimensions



Front Facia



Connection Diagrams



SM 175

Cat. No.			MAG03D0424	MAG03D0425		MAG03D0426
Parameters						
Supply Voltage (⏚)			208 to 480 VAC (3P, 3W) 120 to 277 VAC (3P,4W)	415 VAC (3P, 3W) / 240 VAC (3P, 4W)		
Supply Variation			+/- 23% (of ⏚)			
Frequency			47 to 63 Hz			
Reference Voltage			Settable	Fixed		Fixed
Trip Settings	Phase Loss		Yes	Yes		Yes
	Phase Sequence		Yes	Selectable		Selectable
	Phase Asymmetry		10% Fixed	10% Fixed		10% Fixed / 5% to 25% Settable
	Under Voltage		2% to 22% (of ⏚)	5% to 25%(of ⏚) / 60% (of ⏚) Fixed		5% to 25%(of ⏚) / 80% (of ⏚) Fixed
	Over Voltage		2% to 22% (of ⏚)	110% (of ⏚) Fixed / 5% to 25% (of ⏚)		110% (of ⏚) Fixed
	Hysterisis (Phase Asy.)		2.7% Fixed			
	Hysterisis (UV/OV)		2% Fixed	2% to 12% Settable		2.7% Fixed
Power Consumption (Max.)			16 VA @ 415 VAC			
Time Delay	ON Delay		(0 to 15 Sec) settable / 5 sec (selectable DIP switch)			(0 to 15) settable sec / min
	Trip Time (OFF Delay)		5 sec / (0 to 15 Sec) settable (selectable DIP switch)			(0 to 15) settable sec / min
			100ms max for Phase loss & Phase Sequence			
Output	Relay Output		1 C/O			
	Contact Rating		5A @ 250 VAC / 30 VDC (Resistive)			
	Electrical Life		$5X10^4$			
	Mechanical Life		$1X10^7$			
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			
LED Indications on front plate	Conditions		Respective fault condition will be indicated by LED immediately & Relay will be tripped after specified trip time only.			
		Power LED/ RV (Green)	Green LED	UV	OV	Blink : ASY ON: REV
	Power ON	ON	ON	OFF	OFF	OFF
	Phase reverse	ON	ON	OFF	OFF	ON
	Asymmetry	ON	ON	OFF	OFF	BLINK
	UV	ON	ON	ON	OFF	OFF
	OV	ON	ON	OFF	ON	OFF
	B Phase Loss	Slow BLINK	BLINK	OFF	OFF	OFF
	Voltage Int.	OFF	ON	BLINK	BLINK	BLINK
	*Above mentioned LED status are considering single fault at a time. In case of multiple faults LED will glow according to their fault status.					
OperatingTemperature StorageTemperature			- 20°C to +60°C - 25°C to +70°C			
Humidity (Non Condensing)			95% (Rh)			
Enclosure			Flame Retardant UL 94-V0			
Dimension (W x H x D) (in mm)			18 X 90 X 66.5			
Weight (unpacked)			72 g			
Mounting			Base / DIN rail			
Degree of Protection			IP 20 for Terminals, IP 30 for Enclosure, IP 40 for Front side			
Certification			CE			

Supply Monitor

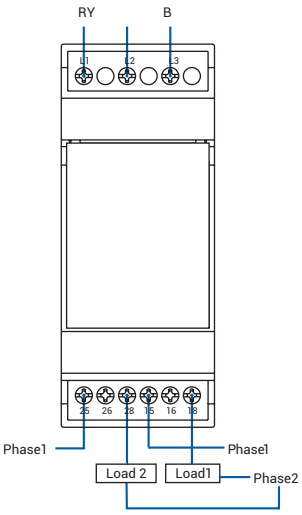
SM 301 [Fail Safe Type]

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

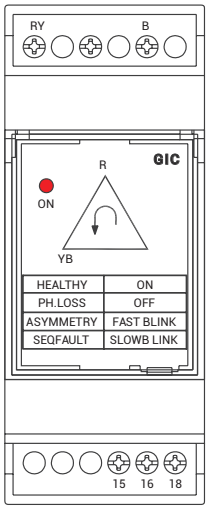
Type	Supply Monitoring Type	Time delay	Asymmetry	Voltage & Contact Arrangement	Cat. No.
SM301 (3Ph, 3W)	Single Phasing Preventor (SPP*) Fail Safe Type	ON Delay 2 sec and OFF Delay 7 sec	65 V AC Asymmetry	415 V AC, 1 C/O	MA51BC
				415 V AC, 2 C/O	MC21B5
			40 V AC Asymmetry	415 V AC, 1 C/O	MA51BK

Connection Diagram



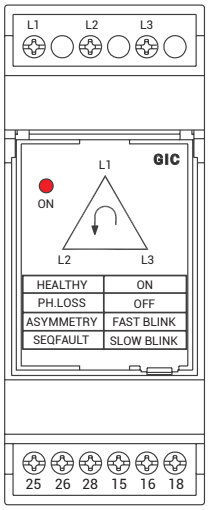
MA51BC, MA51BK
(1 CO), MC21B5 (2 CO)

Front Facia



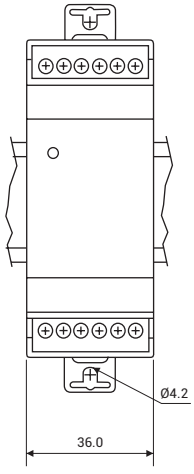
MA51BC

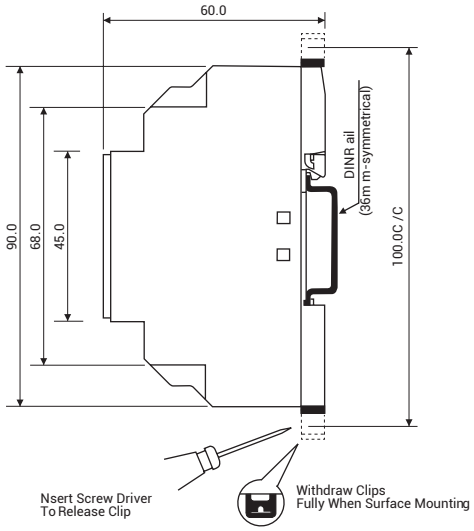
Front Facia



MC21B5

Overall Dimensions





All dimensions are in mm

Supply Monitor

SM 301

Cat. No.		MA51BC	MC21B5	MA51BK
Supply voltage (⏚)		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		5A (Res) @ 250 V AC/28 V DC		
Electrical life		$1x10^5$ operations		
Mechanical life		$3x\ 10^6$ 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		CE		

Supply Monitor

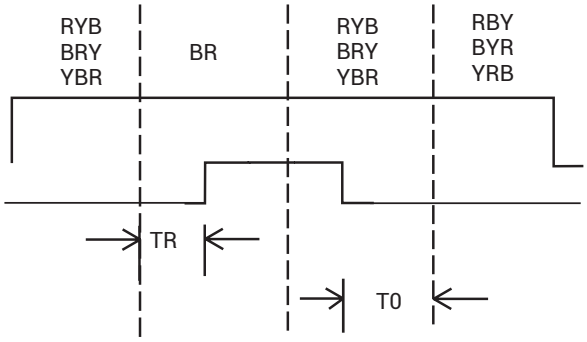
SM 301 (Non Fail Safe Type)

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

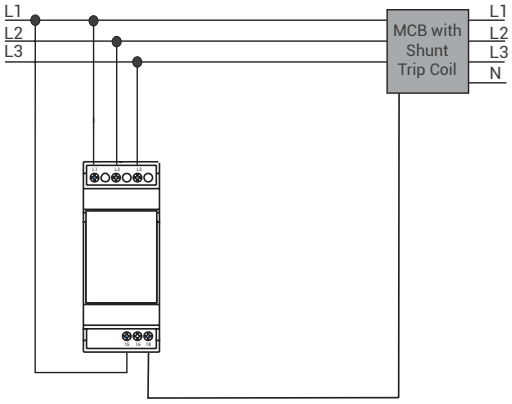
Type	Supply Moitoring Type	Time Relay	Asymmetry	Voltage & Contact Arrangement	Cat.No.
SM301 (3Ph, 3W)	Single Phasing Preventor (SPP*) Non Fail Safe Type	OFF Delay 500 msec and Recover Delay 2 Sec	30% Fixed	415 VAC, 1 C/O	**MA59B5**

Wave form

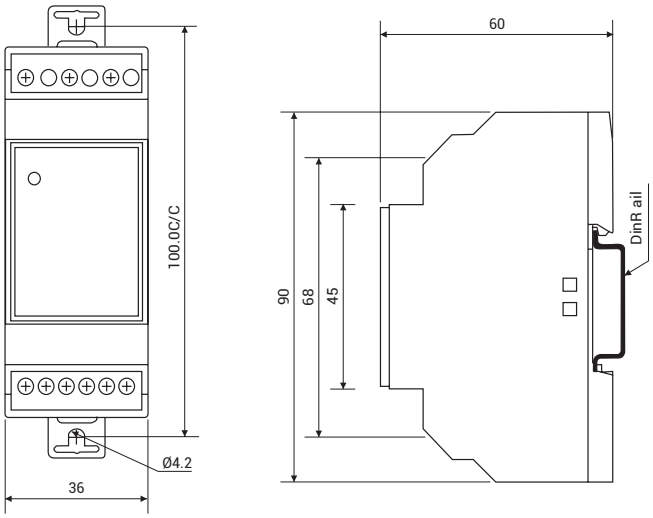


T0: RECOVER TIME
TR: TRIP TIME

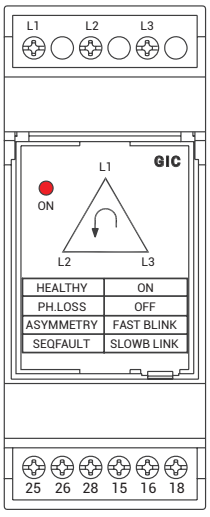
Connection Diagram for (Non Fail Safe Type)



Overall Dimensions



Front Facia



All dimensions are in mm

Technical Specification

Cat. No.:			MA59B5
Functions			Phase and Voltage Control
Supply Voltage (⏦)			3-Phase 3-Wire, 415 V AC
Supply Tolerance			-25% to +10% of (⏦)
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 Monitor

SM 500

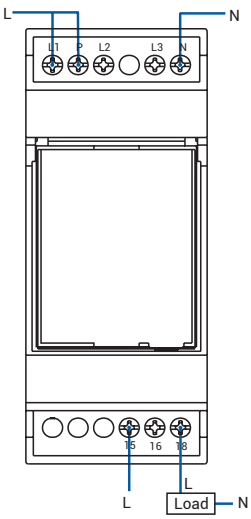
Three Phase Four Wire Voltage Monitoring

- 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

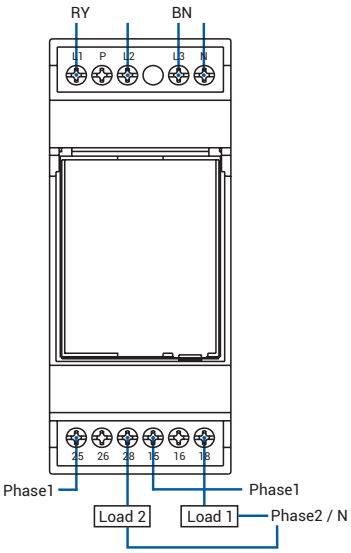
Type	Supply Monitoring Type	Time delay	Asymmetry	Voltage & Contact Arrangement	Cat. No.
SM500 (3 Ph / 1 Ph, 4W)	Selectable Under Voltage + Selectable Over Voltage	Selectable ON Delay (0 to 15 min)	-	240 V AC, 1 C/O	MD71B9
		Selectable ON Delay (0 to 15 sec)	-		MD71BH
		Selectable OFF Delay (0 to 15 sec)	-		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

Single Phase

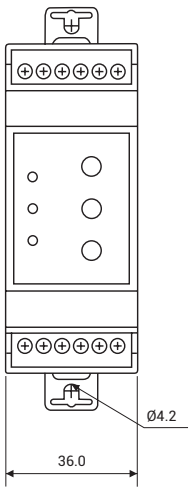


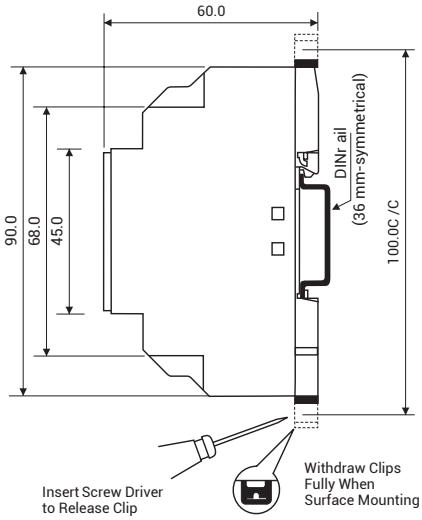
Three Phase



MD71BH, MD71B9, MG71BF, MG73BH, MG73B9, MG73BF

Overall Dimensions





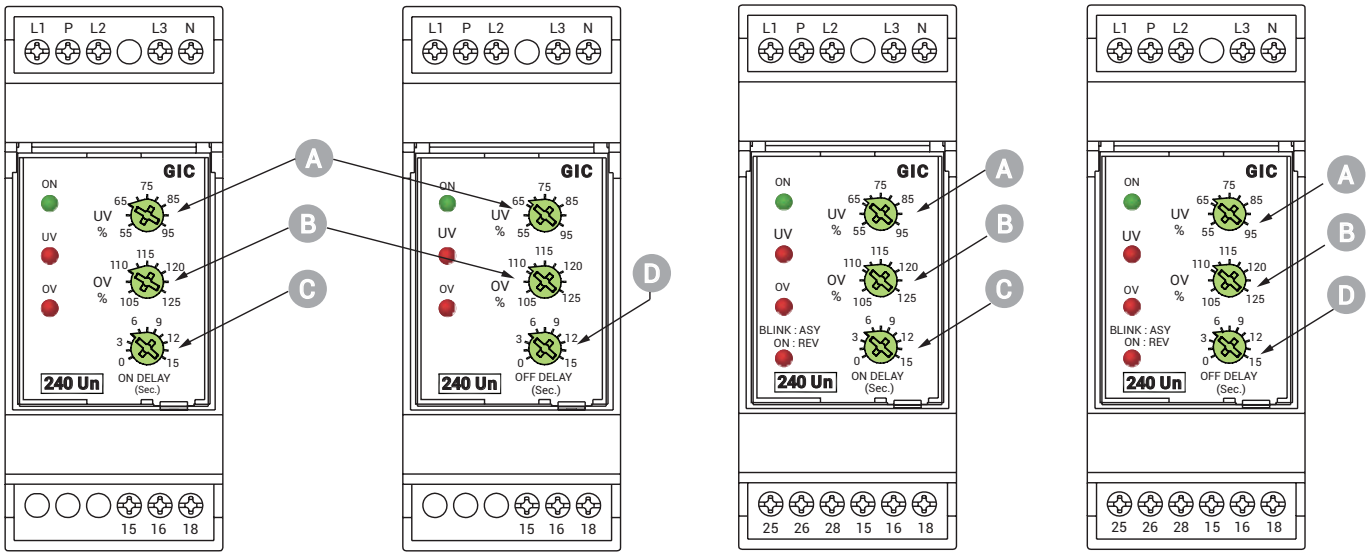
All dimensions are in mm

Supply Monitor

Front Facia

Supply Monitoring: SM 500

Phase & Voltage Control



MD71BH, MD71B9 | MD71BF | MG73BH, MG73B9 | MG73BF

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

All dimensions are in mm

Supply Monitor

SM 500

Cat. No.:		MD71B9	MD71BH	MD71BF	MG73B9	MG73BH	MG73BF
Function		Phase and Voltage control					
Supply voltage (⏦)		1-Phase 240 VAC;3-Phase 4-Wire 240 VAC					
Frequency		50/60 Hz					
Power consumption		5 VA (Max.)					
Trip levels	Under voltage	55% to 95% of (⏦)					
	Over voltage	105% to 125% of (⏦)					
	Asymmetry	N. A.			10%		
Setting accuracy		±5% of full scale					
		Note:Voltage setting are with respectto neutral					
Time delay setting accuracy ± 10% offullscale	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		5A (Res.) @ 250 V AC					
Mechanical life		3x 10^6 Operations					
Electrical life		1x 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 Monitor

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

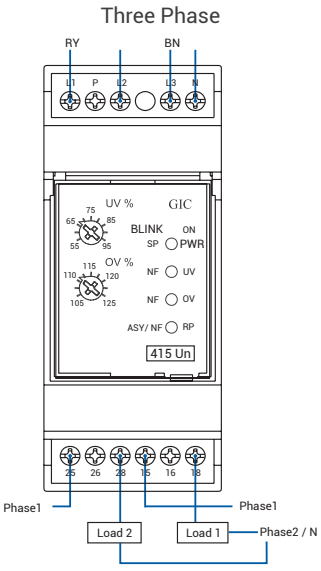
Functional Description:

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

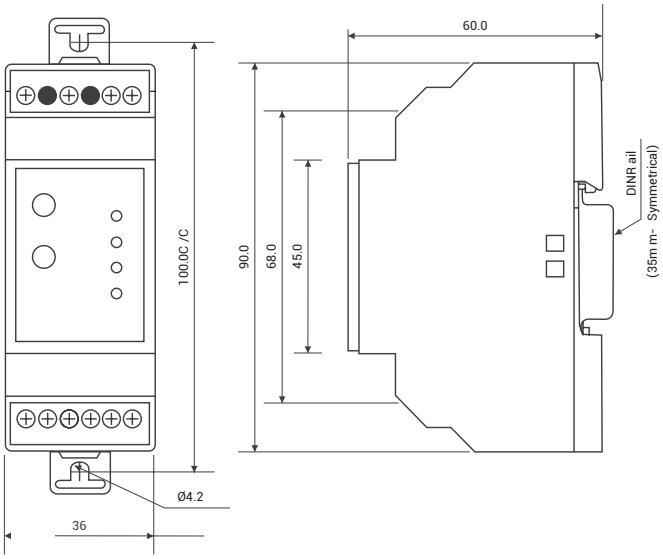
1. All phases are present and phase voltage are within the over & under voltage trip levels set on the device.
2. Neutral is present.
3. Phase Sequence is ok.
4. Phase to phase asymmetry is less than value mentioned in technical specification.

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.

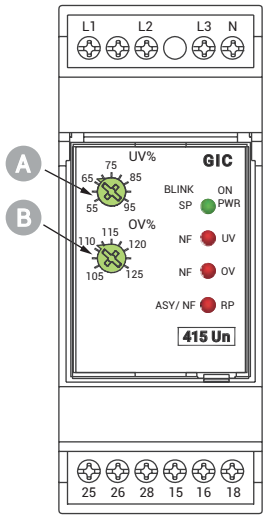
Connection Diagram:



Overall Dimensions



Front Facia



A Under Voltage Knob (UV)

B Over Voltage Knob (OV)

All dimensions are in mm

Supply Monitor

SM 500

Cat. No.		**MAC04D0100**			
Function		Phase, Neutral and Voltage Control			
Supply voltage (⏚)		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	5A (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 Monitor

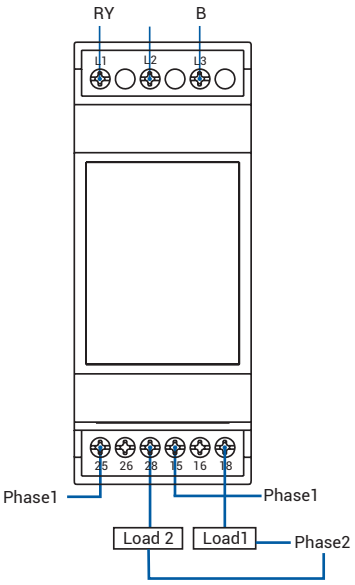
SM 501

Three Phase Three Wire UV + OV & Single Phasing Protection

- Protects against Phase loss, Phase reversal and Phase-Phase unbalance & Under / Over voltage faults
- Can be configured for 3 phase 3-wire system
- 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

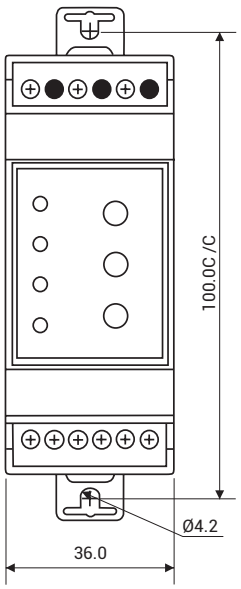
Type	Supply Monitoring Type	Time delay	Asymmetry	Voltage & Contact Arrangement	Cat. No.
SM501 (3Ph, 3W)	SPP + Under Voltage (80% of ⏚)	Selectable ON Delay and OFF Delay 15 sec	Selectable Asymmetry (5% to 17%)	415 VAC, 2 C/O	MB53BM
	Single Phasing Preventor + Selectable Under Voltage + Selectable Over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

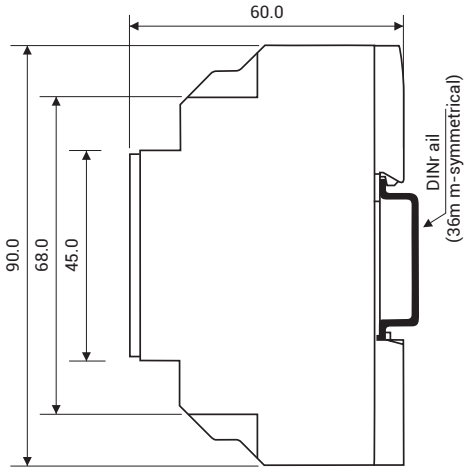
Connection Diagram



MB53BM, MG53BI, MG53BH,
MG53BF, MG53BO,
for 220 VAC : MG63BH, MG63BF

Overall Dimensions



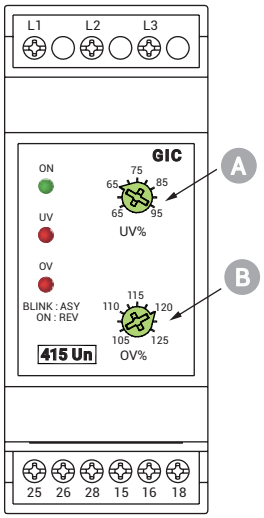


All dimensions are in mm

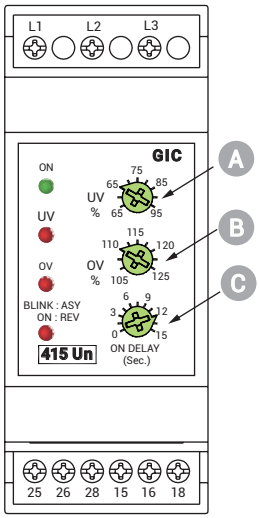
Supply Monitor

Front Facia

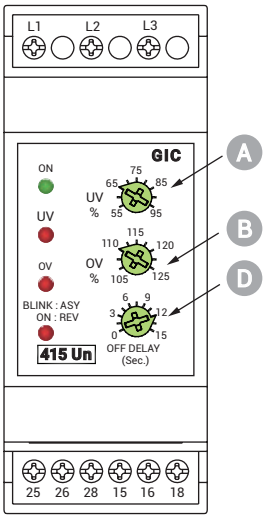
Supply Monitoring: SM 501



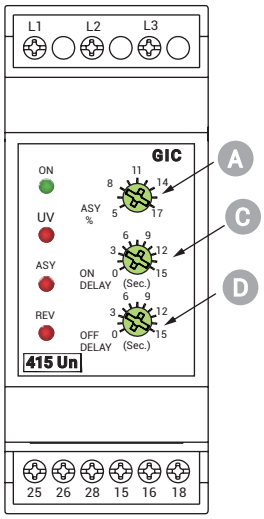
MG53BI



MG53BH



MG53BF, MG53BO



MB53BM

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

All dimensions are in mm

Supply Monitor

SM 501

Cat. No.			MG53BH	MG53BF	MG53BI	MG53BO	MB53BM	MG63BH	MG63BF
Supply voltage (⏚)			3 Phase 3 Wire, 415 VAC					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 fullscale						
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		5A (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			3x 10^6 operations						
Electrical life			1x 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 Monitor

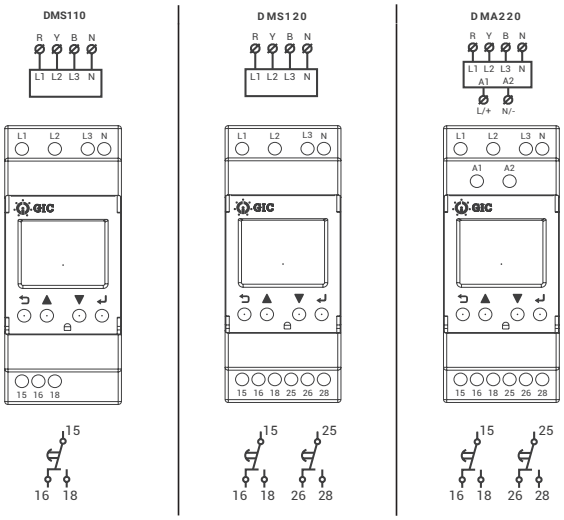
SM 800

Digital Voltage Monitoring Series

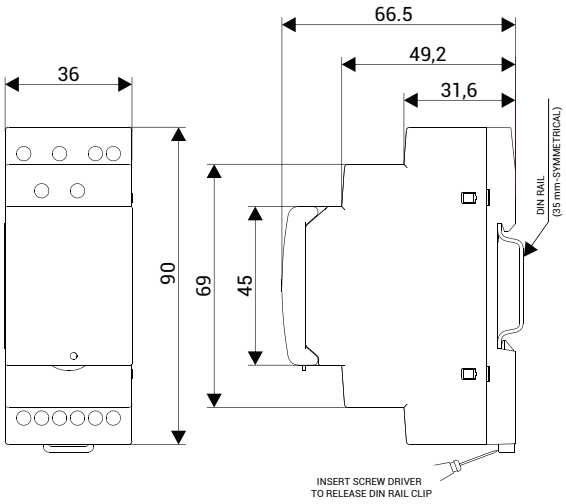
- Protects against Phase loss, Phase reversal and Phase-Phase unbalance & Under / Over voltage faults
- Can be configured for 3 phase 3-wire system
- Adjustable ON delay & Trip time delay
- LED indications for power ON, UV, OV and phase faults
- DIN rail and base mountable
- Compact 2M size
- Voltage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

Type	Supply Monitoring Type	Time delay	Asymmetry	Voltage & Contact Arrangement	Cat. No.
SM800 (3ph /3W, 4W)	Single Phasing Preventor + Selectable Under Voltage + Selectable Over Voltage + Netural Loss (Applicable for 3P4W)	Power ON Delay (0 to 999 sec), OFF Delay (0.1to 999 sec) & ON Delay (0.5 to 999 sec)	Voltage 5 to 99 VAC (Default 60 V) Percentage 2 to 50% (Default 10%)	145-500 VAC (Line Voltage) 1 C/O	DMS110
				145-500 VAC (Line Voltage), 2 C/O	DMS120
				85-300 VAC/DC (Auxiliary Supply) (P-N), 2 C/O	DMA220

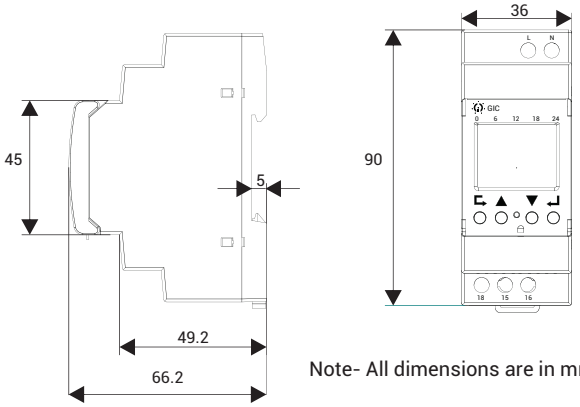
Connection Diagram



Overall Dimensions



Mounting Diagram



Note- All dimensions are in mm

All dimensions are in mm

Supply Monitor

SM 800

Function	Phase and Voltage control	
Supply voltage	145 - 500 VAC (Line Voltage) (L1, L2 & L3)	85 - 300 VAC/DC (P - N) A1-A2
Frequency	45 - 65 Hz	
Power consumption	<6VA	
Trip levels	Phase voltage: 90 to 288 VAC	Phase voltage: 50 to 288 VAC
	Line voltage: 155 to 500 VAC	Line voltage: 85 to 500 VAC
Setting accuracy	Voltage:+/- 5V Frequency:+/- 0.3 Hz	
Time delay setting accuracy ± 10% of full scale	Time: +/- (2% of setting +100msec) for UV, OV & Asymmetry +/- (2% of setting + 500msec) for UF & OF	
Contact arrangement	1 C/O Relay 1: 15(Pole), 16(NC),18(NO)	1 C/O + 1 C/O Relay 1: 15(Pole), 16(NC), 18(NO) & Relay 2: 25(Pole), 26(NC), 28(NO)
Contact rating	5A (Resistive)@ 240 VAC / 30 VDC	
Mechanical life	$3x10^7$ Operations	
Electrical life	$1x10^5$ Operations	
Operating temperature	-10°C to + 60°C	
Humidity (Non-condensing)	95% RH (Without condensation)	
Max.operating altitude	2000 meters	
Degree of Protection	IP-20 for Enclosure & Terminals, IP-40 with Front Facia for Dust cover	
Enclosure	UL94-00	
Mounting	Base/Din	
Dimensions in mm (W x H x D)	36 x 90 x 66.5 mm	
Weight (Unpacked)	132 g Approx.(Unpacked)	
Certifications	CE & RoHS	

Supply Monitor

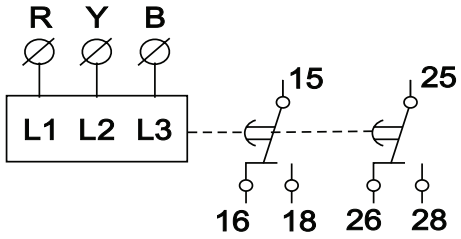
SM 600

Measuring and Monitoring Relay

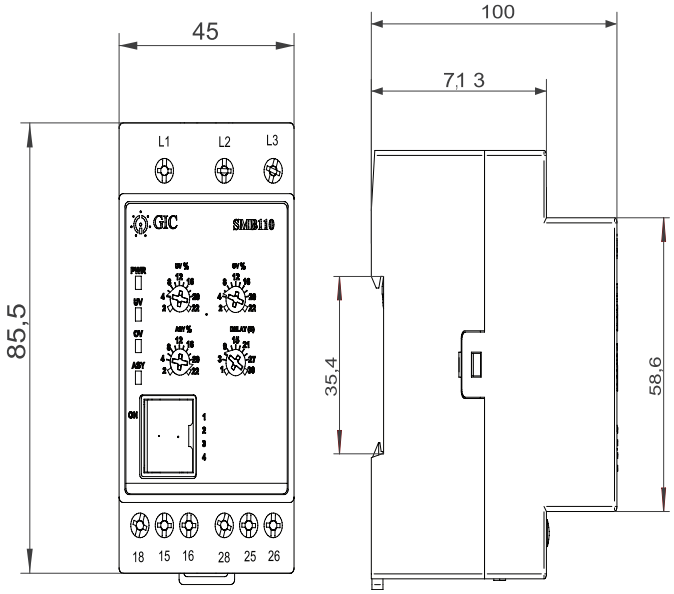
- Monitors own supply and detect fault conditions on one or more phases.
- Protection against phase loss, phase sequence, phase asymmetry, under voltage, Over voltage and 3 phase interruption
- Adjustable trip settings for UV, OV, and phase asymmetry through potentiometer.
- Led indication for supply and fault condition.
- Suitable for railway applications.

Type	Supply Monitoring Type	Time delay	Asymmetry	Voltage & Contact Arrangement	Cat.No.
SM 600 (3P, 3W)	Phase loss+ Phase Sequence + Phase Asysmetery + UV + OV+3 phase Interruption	Power ON delay (5s Fixed), ON delay (1-30 sec or Fixed), OFF delay (0.1 - 30 sec or Fixed)	Voltage +_ 1% of set value	500V -1000V AC 2 C/O	**SMB110**

Connection Diagram



Mounting Dimension



Cat No.		SMB110
Supply voltage		500-1000V line voltage
Supply frequency		45-65Hz
Power consumption		Max 40VA at 750V, 50Hz
Triplevels	Under voltage	Settable -2% to -22% of Vref
	Over voltage	Settable 2% to 22 % of Vref
	Asymmetry	30% supply voltage
Setting Accuracy		± 1%
Led Indications	Green	Power ON
	UV	Under Voltage
	OV	Over Voltage
	Blink	Phase Asymmetry
	ON	Phase reverse
Contact arrangement		2 C/O
Contact rating		8A @250VAC/24VDC (resistive)
Utilization category	AC-15	3A @240VAC
	DC-13	0.22A @125VDC & 0.1A @250VDC
Mechanical life		$1x10^7$ operations
Electrical life		$1x10^5$ operations
Operating temperature		-25°C to 70°c
Humidity (non-condensing)		95% RH
Max. operating Altitude		<2000 meters
Degree of protection		IP20 for terminals and IP40 for housing
Mounting		Din rail
Dimensions		85.5 x 45 x 100
Weight		Approx. 300 gm
Certifications		CE, ROHS

Insulation Monitor

IMR 520

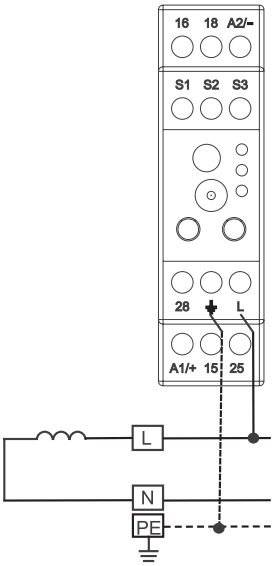
Insulation Monitoring relay

- Threshold Resistance settings from 1K to 100K ohm
- Wide auxiliary supply voltage range 24V-4Vdc
- Monitor supply voltages upto 520V
- Suitable for 1 phase, 3 phase (3 wire and 4 wire unearthed supply system)
- Led indication for Power, Insulation fault and Relay output.
- Test / reset function with manual or remote facility.

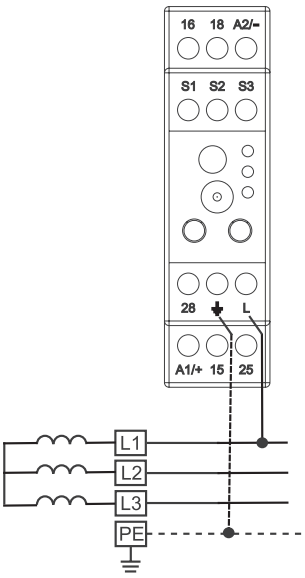
Description	Cat. No.
Insulation resistance monitoring relay for IT systems suitable for system voltage up to 520V. Adjustable from 1-100K Ω with 2C/O	IMR520

Connection Diagram

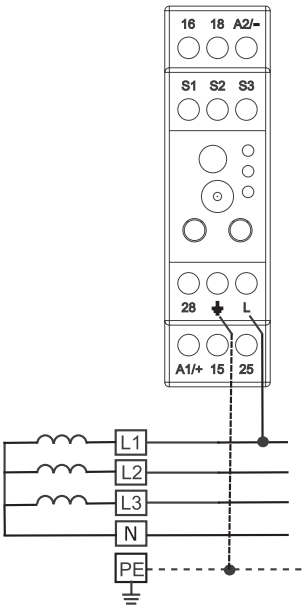
A) 1PH AC SYSTEM



B) 3P 3W AC SYSTEM

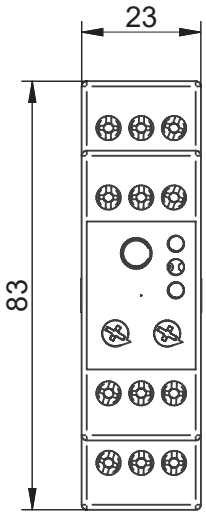


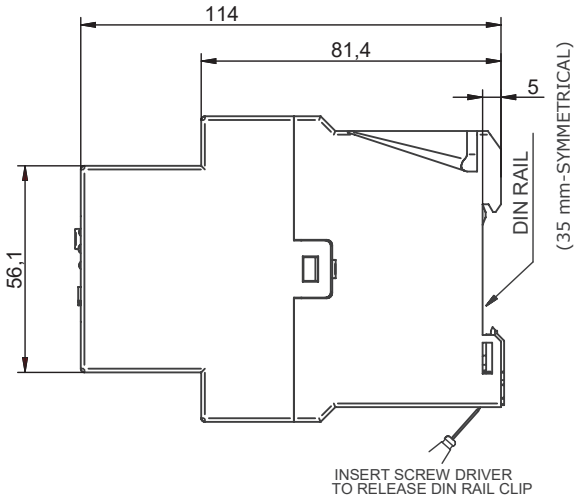
C) 3P 4W AC SYSTEM



Note : Connection of measuring input 'L' to any of the conductors

Mounting Dimension





Cat No.		IMR520
Supply voltage		24 to 240 V AC/DC
Supply variation		-15% to 10%
Supply frequency		13.5 to 440 Hz or DC
Power consumption		3VA @240VAC
Insulation resistance		1-100KΩ
Adjustment resolution		1KΩ
Led Indications	Green	Power On
	Red	Fault status
	Amber	Relay status
Contact arrangement		1 C/O+ 1 NO
Contact rating		NO-5A and NC-3A (@230 VAC/30 VDC)
Mechanical life		$1x10^7$ operations
Electrical life		$1x10^5$ operations
Operating temperature		-25°C to 70°c
Humidity (non-condensing)		95% RH
Max. operating Altitude		<2000 meters
Degree of protection		IP20 for terminals and IP40 for housing
Enclosure		UL 94-00
Mounting		Din rail
Dimensions (mm)		83 x 23 x 114
Weight		Approx 140 gm
Certification		CE, ROHS

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 tim

Phase	Type	Current & Contact Arrangement	Cat. No.
3 Phase	InverseTime 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**
	DefiniteTime 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**
	DefiniteType / Instant Trip	2 - 5A 1 C/O	**17B422PA0**
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**
	DefiniteTime 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 x10^7 Operations																
Electrical life		1x 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)		10A, 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				NA					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

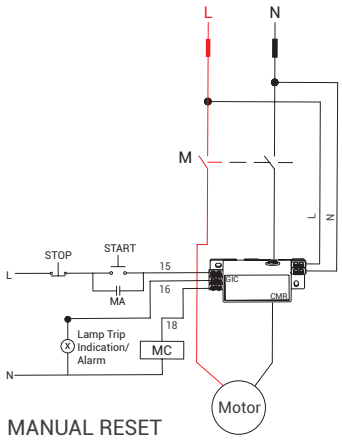
	Cat. No.	Trip Char.	Current
P1	174226B0	Inverse	2 A to 5 A
P2	17A122CB0	Inverse	3 A to 9 A
P3	17A222CB0	Inverse	8 A to 24 A
P4	17A322CB0	Inverse	15 A to 45 A
P5	17B422AA0	Definite	2 A to 5 A
P6	17B122AA0	Definite	3 A to 9 A
P7	17B222AA0	Definite	8 A to 24 A
P8	17B322AA0	Definite	15 A to 45 A
P9	17B422PA0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

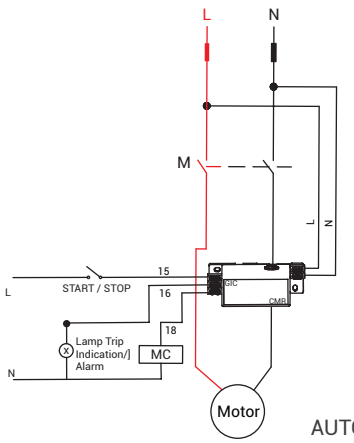
Connection Diagram

Single Phase



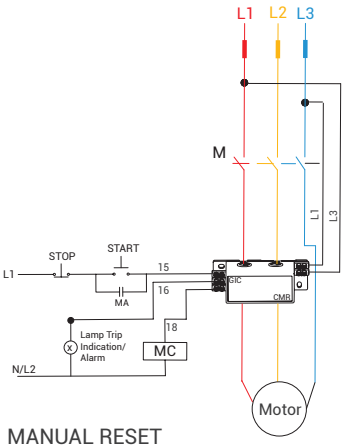
MANUAL RESET

17C122EB0, 17D112DA0, 17C21EB0, 17D212DA0, 17C312EB0, 17D312DA0, 17D412DA0, 17C412EB0



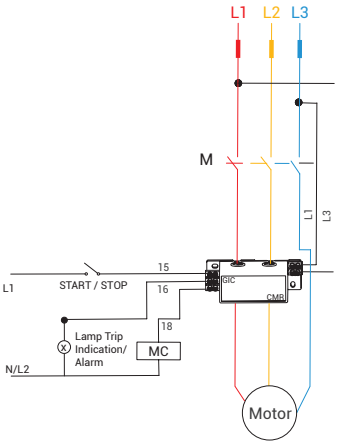
AUTO RESET

Three Phase



MANUAL RESET

17A122CB0, 17B122AA0, 17A222CB0, 17B222AA0, 17A322CB0, 17B322AA0, 17A422CB0, 17B422AA0, 17B422PA0



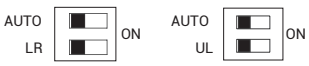
AUTO RESET

MODE Selection:

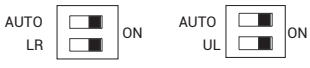
Two position DIP slide switch has been provided on the front facial of the product.

By using these switches following protection / modes can be made On and OFF

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

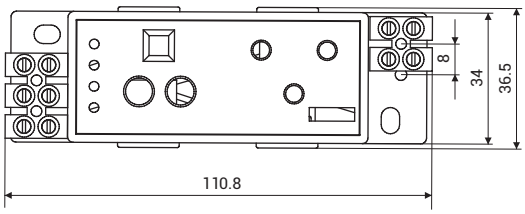


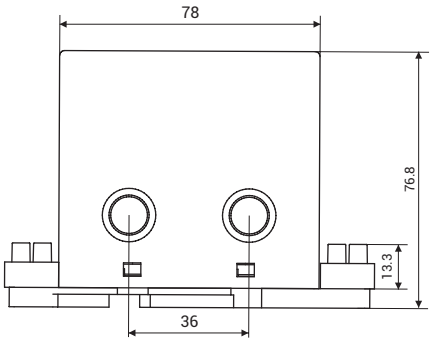
AUTO Reset mode = OFF (Manual ON)
LOCKED Rotor Protection = OFF
Under Load Protection = OFF



AUTO Reset mode = ON
LOCKED Rotor Protection = ON
Under Load Protection = ON

Overall Dimensions



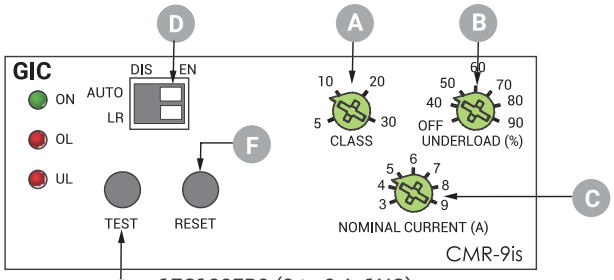


All dimensions are in mm

Supply Monitoring: Current Monitoring Relay

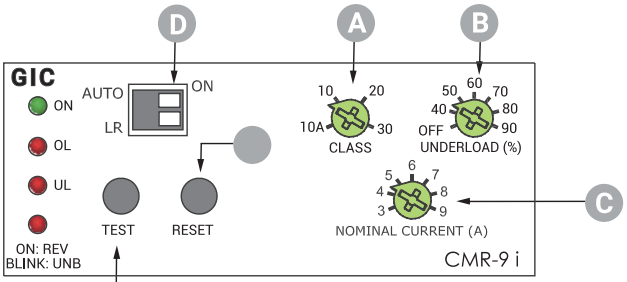
Front Facia

Single Phase

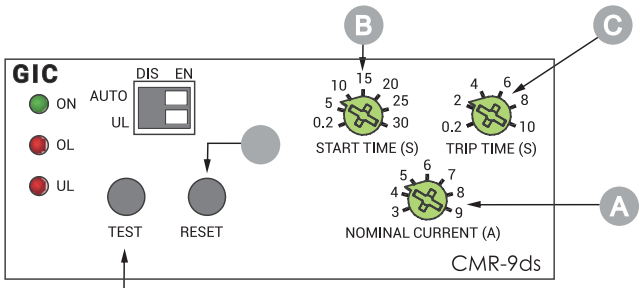


17C122EB0 (3 to 9 A, 1NO),
17C212EB0 (8 to 24 A, 1 NO),
17C312EB0 (15 to 45 A, 1 NO)

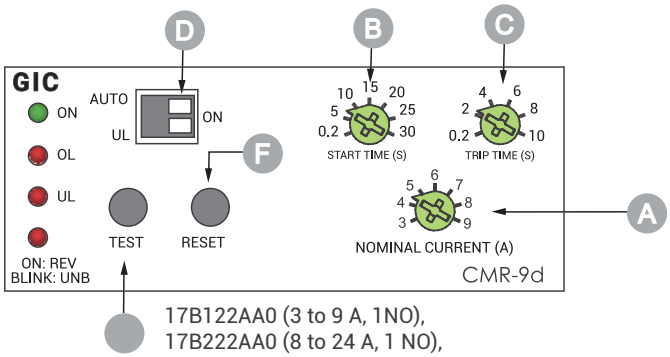
Three Phase



17A122CB0 (3 to 9 A, 1NO),
17A222EB0 (8 to 24 A, 1 NO),
17A322EB0 (15 to 45 A, 1 NO)



17D112DA0 (3 to 9 A, 1NO),
17D21DA0 (3 to 24 A, 1 NO),
17D312DA0 (15 to 45 A, 1 NO)



17B122AA0 (3 to 9 A, 1NO),
17B222AA0 (8 to 24 A, 1 NO),
17B322AA0 (15 to 45 A, 1 NO)

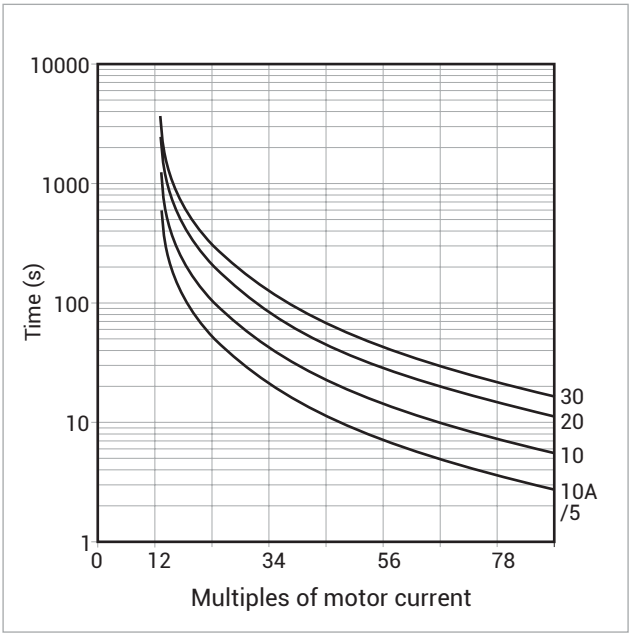
Note:
3 to 9 A range available in steps of 3, 4, 5, 6, 7, 8 and 9 A
8 to 24 A range available in steps of 8, 12, 16, 20 and 24 A
15 to 45 A range available in steps of 15, 21, 27, 33, 39 and 45 A

- A — Class Selection Knob
- B — % of Underload Selection Knob
- C — Nominal Current Knob (A)
- D — Start Time Knob (S)
- E — Trip Time Knob (S)
- F — Class Selection Switch
- G — Test Switch
- H — Reset Switch

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:

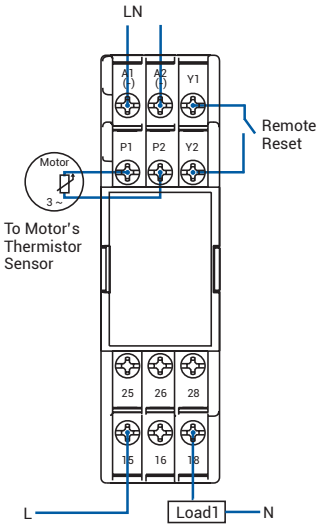


PTC Thermistor Relay Series

- 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

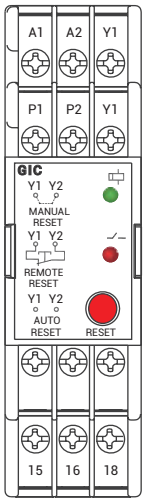
Description	Cat. No.
110-240V AC, Thermistorseries PD225, 1C/O	MJ81BK
220-440V AC, Thermistorseries PD225, 1C/O	MJ91BK
24V AC/DC, Thermistorseries PD225, 2C/O	MJA3BK
110-240V AC, Thermistorseries PD225, 2C/O	MJ83BK
220-440V AC, Thermistorseries PD225, 2C/O	MJ93BK

Connection Diagram

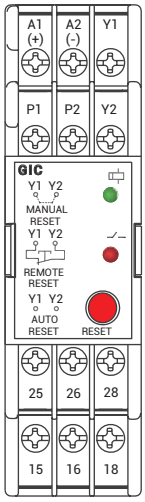


MJ81BK, MJ91BK, MJA3BK, MJ83BK, MJ93BK

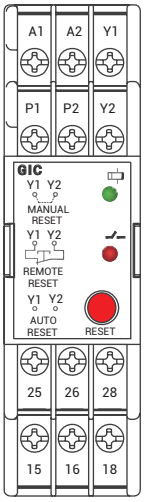
Front Facia



MJ81BK, MJ91BK

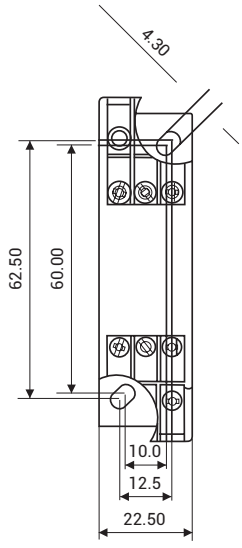


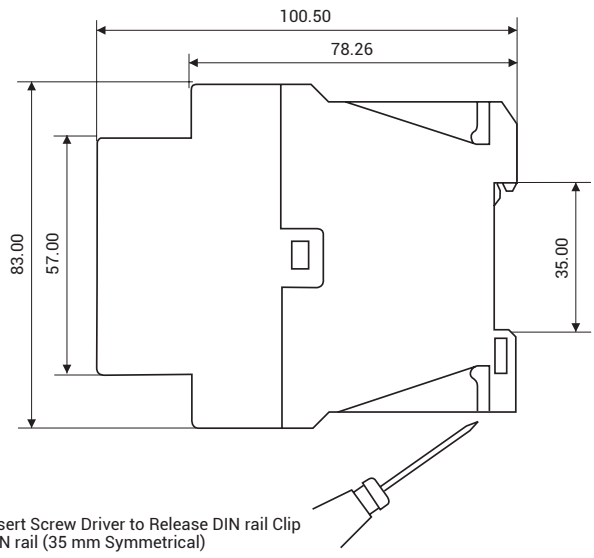
MJA3BK,



MJ93BK, MJ83BK

Overall Dimension





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		2C/O
Contact rating			6A @ 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			3x 10^6 operations		
Electrical life			1x10^5 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 hysterisis			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 Continuous OFF Flashing	Power supply healthy		
			Power fail		
			Sensor open		
	⎍	Continuous ON Continuous OFF Flashing	Relay ON		
			Relay OFF		
			Sensor Short or Cable Short		
	Er-⎍	Continuous ON Continuous OFF	N. A		
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		

Earth Leakage Relay

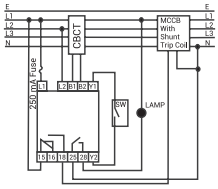
- Monitors, detects and protects power systems from leakage faults
- Wide auxiliary supply range: 110 - 240 V AC/110 V DC, 220 - 415 V AC/220 V DC, 15 V DC
- Wide range of selectable Earth leakage current: 30 mA-30A,
- Configurable Earth leakage Trip time: 0 - 10 s
- Easily configurable operating modes
- 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)

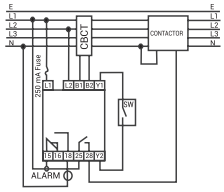
Type	Voltage & Contact Arrangement	Current Range	Cat. No.
Earth Leakage Relay	110-240 V AC, 110 V DC, Manual reset	30mA - 30A	**17G715GF2**
	220-415 V AC, 220 V DC, Manual reset		**17G745GF2**
	15 V DC, Manual reset		**17G755GF2**
	110-240 V AC, 110 V DC, Auto reset		**17G715KF2**
	220-415 V AC, 220 V DC, Auto reset		**17G745KF2**
	15V DC, Auto reset		**17G755KF2**

Connection Diagram (F2 series)

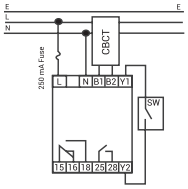
Non Fail Safe Mode with Shunt with Trip Coil



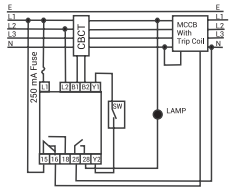
Fail Safe Mode with Contactor



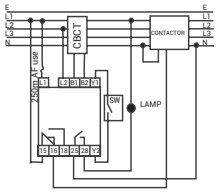
Single Phase Application



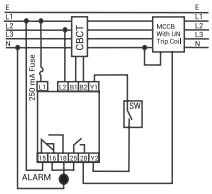
Non Fail Safe Mode with UV Trip Coil



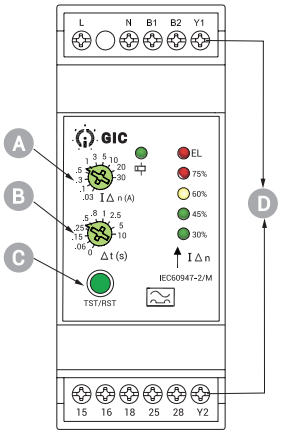
Non Fail Safe Mode with Contactor



Failsafe Mode with Uv Trip Coil



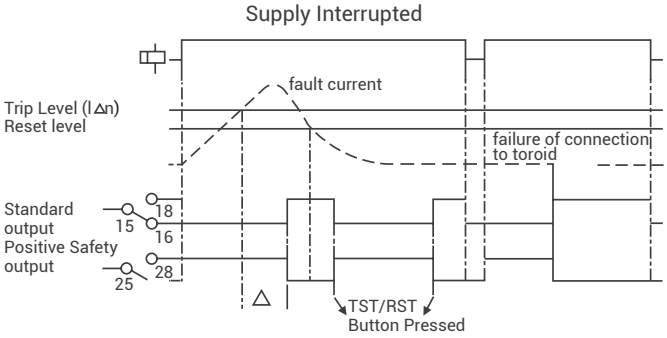
Front Facia



- **A** Earth Leakage Current Selection Knob
- **C** Test Reset Switch
- **B** Trip Time Selection Knob
- **D** External Remote Reset

17G715GF2, 17G715KF2
17G745GF2, 17G745KF2

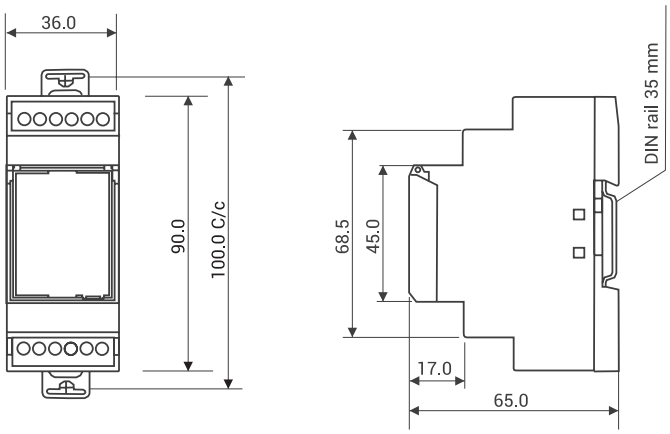
Functional Diagram



In F2 series 1 C/O is with fail safe protection and 1 NO is with non fail safe protection

Overall Dimensions (F2 series)

Base/DIN rail Mounting



All dimensions are in mm

Earth Leakage Relay

Cat. No.		17G715GF2	17G715KF2	17G745GF2	17G745KF2
Supply voltage (⏚)		110 - 240 V AC, 50/60 Hz		240 - 415 VAC, 50/60 Hz	
Supply variation		-20% to +10%			
Power consumption sensitivity		5 VA		10VA	
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), BlinkTest / Reset switch is pressed			
Overall leakage current IΔ 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		1x 10^7 operations			
Electrical life		1x 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 (IΔn)		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			
CBCT for Type A & AC Current		Turns Ratio-1 500:1 Linearity: ±2% over the range of 30 mA to 30 A Characteristics: Type A as per IEC 60947-2.			
CBCT for Type AC Current					
Weight (Unpacked)		150 gms (approx)			
Certifications		CE			

If the trip time is set at '0' sec, then for 5I Δn & 10I Δn, the tripping time will be </- 40 ms for all current ranges

Note : for CBCT Dimensions please refer page number 124

All dimensions are in mm

Panel Mounted Earth Leakage Relay

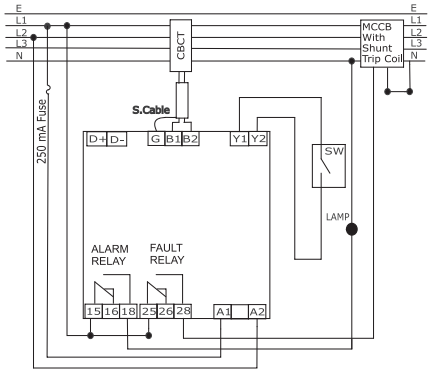
- Flush Mounting Version 96x96 mm with Digital Seven Segment Display
- Monitors, Detects and Protects Power systems from Earth Leakage Fault
- Wide range of selectable Earth Leakage Current: 30 mA - 30 A
- Configurable Earth Leakage Trip time: 0 - 10 s
- Wide Auxiliary Supply Range:110 - 240 VAC / DC & 240 - 415 VAC/DC
- Nano Crystalline CBCT for accurate leakage current measurement
- InstantaneousTrip for 5 times of set value of Leakage current
- Test feature to check complete product functionality
- LED Indication for Relay Status, Earth Leakage Fault &Alarm Condition
- Manual / Remote Reset feature
- Continuous Scrolling display for Set Current and Set time
- 1 C/O (Alarm Relay) + 1 C/O (Fault Relay)
- RS 485 Communication
- Log for maximum trip leakage current

Earth Leakage Relays	Current Range	Type	Voltage & Contact Arrangement	Cat.No.
96 x 96 mm Earth Leakage Relay	30 mA to 30A	Panel mounted (96 x 96 mm) Earth Leakage Relay	110 - 240 VAC/DC, 1C/O (Pre-alarm) + 1C/O (Fault)	17K716QF4N
			110 - 240 VAC/DC, 1C/O (Pre-alarm) + 1C/O (Fault) with RS 485	17K716QF4M
			240 - 415 VAC/DC, 1C/O (Pre-alarm) + 1C/O (Fault)	17K726QF4N
			240 - 415 VAC/DC, 1C/O (Pre-alarm) + 1C/O (Fault) with RS 485	17K726QF4M

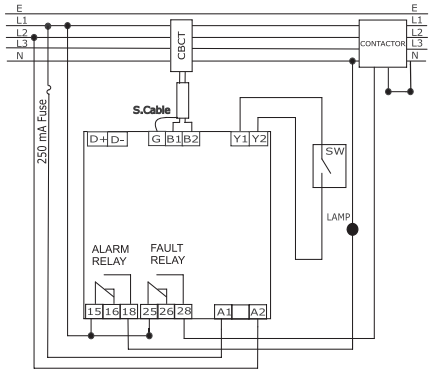
Connection Diagram

Three Phase Application

NON-FAIL SAFE MODE
(SHUNTTRIP COIL/UV TRIP COIL)

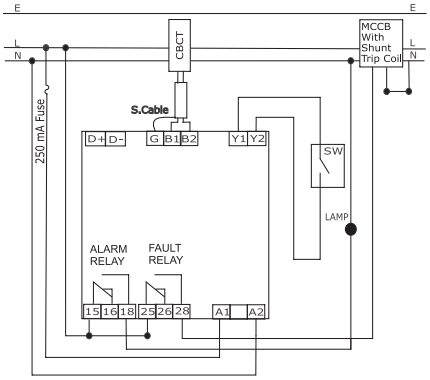


FAIL SAFE MODE (CONTACTOR)

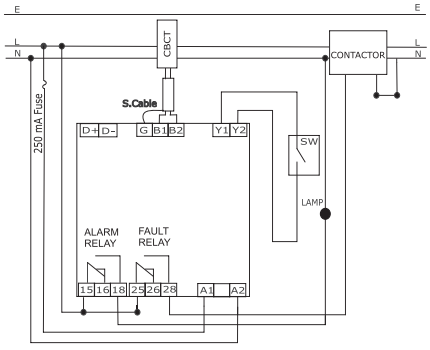


Single Phase Application

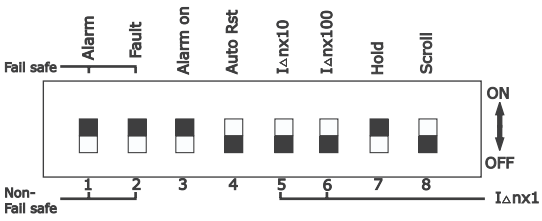
NON-FAIL SAFE MODE
(SHUNTTRIP COIL/UV TRIP COIL)



FAIL SAFE MODE (CONTACTOR)

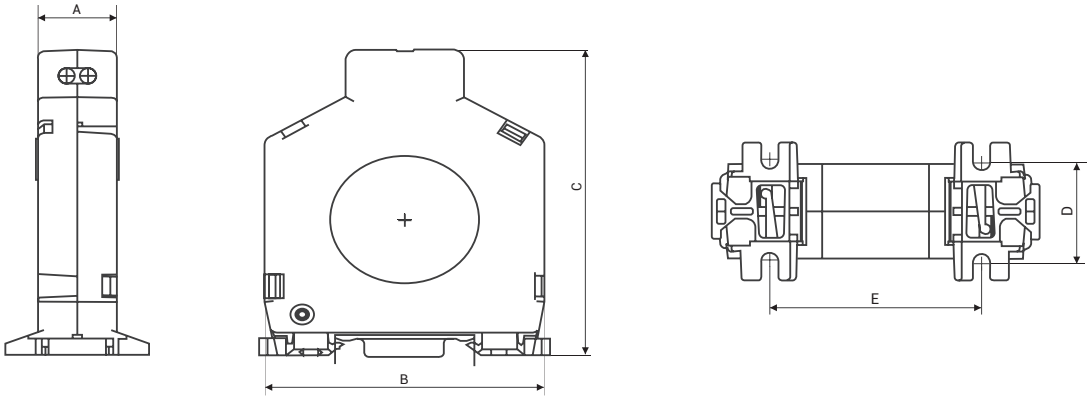


Dip Switch Setting:



A	Fail safe / Non-Fail Safe Selectable
B	4 Digit 7 Segment display
C	LED indication for Power ON, Pre-alarm, Fault
D	Current settings - 30mA to 30A
E	TypeA & AC CBCT design for detecting pulsating DC as well as sinusoidal
F	Pre-alarm Output
G	ELR with Rs485 Port - Available
H	Test to check Health

CBCT Overall Dimensions



CBCT	Cat. No.	Internal Diameter in mm	Weight (in gms)	A	B	C	D	E
CBCT (moulded case) for Type A & AC Current	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
CBCT (moulded case) for Type AC Current	17H7NNRN3	38	110	20	71	91	27	48
	7H7NNVN3	57	185	20	97	117	27	55
	17H7NNSN3	70	240	20	109	133	36	59
	17H7NNTN3	92	250	20	132	155	27	73
	17H7NNUN3	120	255	20	153	176	27	73

CBCT for TypeAC : For applications with sinusoidal alternating current from 30mA to 30 A.
CBCT for Type A and AC : For applications with sinusoidal alternating current (from 30mA to 30A) & pulsating DC current (from 30mA to 3A).
Please contact nearest branch office for requirements of higher dimension CBCTs.

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).

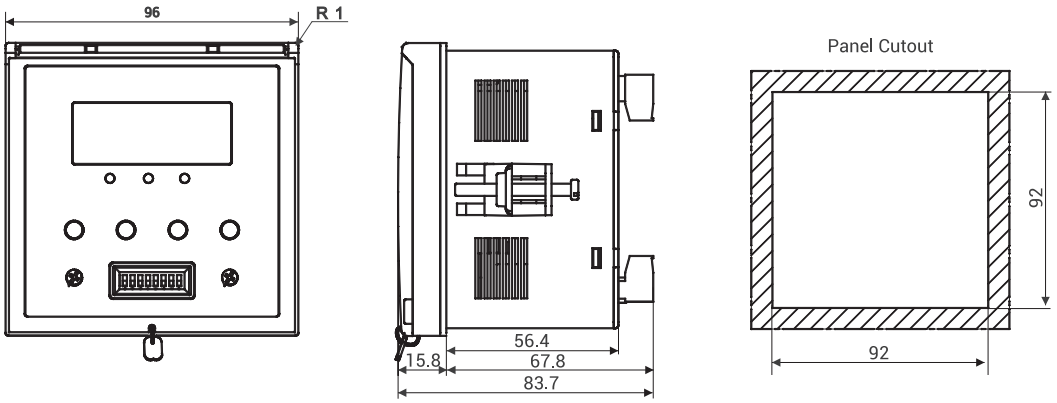
Remote Test / Reset: For Remote Test Reset, connect an external push button switch between Y1 and Y2. For test sequence, press and hold the external push button switch for 1s.

Auto / Reset: Incase 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.

Panel Mounted Earth Leakage Relay

Cat. No.		17K716QF4N	17K716QF4M	17K726QF4N	17K726QF4M
Supply Voltage (⏚)		110 - 240 V AC / DC		240 - 415 V	
Supply Variation		-20 to + 10%			
Frequency		47 - 63Hz			
Power Consumption (Max.)		6 VA			
Leakage Current Range (IΔn)		30 mA to 30 A			
Threshold IΔn (A)	IΔn x 1	0.03 - 0.05 - 0.075 - 0.1 - 0.15 - 0.2 - 0.3 (A)			
	IΔn x 10	0.03 - 0.5 - 0.75 - 1.0 - 1.5 - 2.0 - 3.0 (A)			
	IΔn x 100	0.03 - 5 - 7.5 - 10.0 - 15.0 - 20.0 - 30.0 (A)			
Type Class		'A' True RMS measurement (As per IEC 60947-2 appendix M) upto IΔ1A=IΔ3 A for type A & AC			
Max. Crest Factor		4 (for 30 mA to 30 A)			
Reset Mode		Manual / Auto Reset			
No. of Resets		4	None & 1 to 10 Nos	4	None & 1 to 10 Nos
Clear Auto Reset		After 1 hour of healthy condition or supply interruption or device reset			
Reset Enable		Below 50% of set current threshold in presence of CBCT			
Trip Time (Δt in sec)		0 - 0.06 - 0.15 - 0.25 - 0.5 - 0.8 - 1 - 2.5 - 5 - 10 (sec)			
Test / Reset		Local & Remote (Non Potential free contacts, upto 10 m)			
Setting Accuracy		-20% (Including CBCT Accuracy)			
Repeat Accuracy		±2%			
Output	Relay Output	1 C/O (Alarm Relay) + 1 C/O (Fault relay)			
	Contact Rating	5A (Resistive) @ 240 VAC / 30 VDC			
	Electrical Life	$5x10^4$			
	Mechanical Life	$5x10^6$			
Utilization Category	AC- 15	Rated Voltage (Ue): 120/240 V, Rated Current (Ie): 3.0/1.5A			
	DC- 13	Rated Voltage (Ue): 24/125/250 V, Rated Current (Ie): 2.0/0.22/0.1 A			
Display	Trip Current Hold	Enable / Disable			
	Scrolling Display	Enable / Disable			
LED Indication	Power	Green LED (ON) → Power ON			
	EL / CT	Red LED (ON) → Relay Trip, Yellow (ON) → Alarm Relay			
RS 485 Communication		NA	Available	NA	Available
Operating Temperature StorageTemperature		- 20°C to + 55°C - 20°C to + 70°C			
Humidity (Non Condensing)		95% (Rh)			
Enclosure		Flame Raetardant UL94-V0			
Dimension (W x H x D) (in mm)		96 X 96 X 83.7			
Weight (unpacked) Approx.		275 g			
Mounting		Panel / Flush Mountable			
Pollution degree		II			
Modbus Comunication		NA	Present	NA	Available
Certification		CE			
Degree of Protection		IP20 for Terminals, IP40 for Enclosure			

Mounting Dimensions (mm)



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.

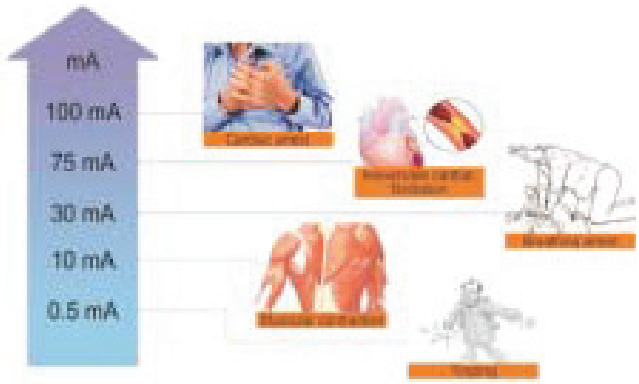
Difference between earth fault and earth leakage

According to IEC60947-2, 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 cable

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.

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

$\bar{I}_r + \bar{I}_y + \bar{I}_b + \bar{I}_n = 0$ 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.

E&A'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, Switch boards

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

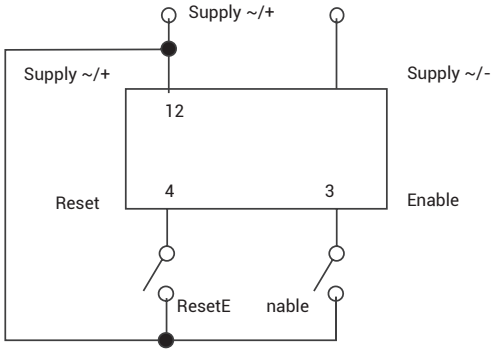
- Wide supply voltage
- Large 6 digit display, easy to read
- Exceptional reliability due to non volatile memory (EEPROM) which can retain the data for 100 years
- Available in 3 different shaped Bezels
- Low power consumption
- Electrical reset and enable

Description	Cat. No.
Digital Hour Meter / Digital Counter (Resettable)	Z☐☐FB☐

Z☐ ☐ FB☐

Voltage		1	Hour Meter	Bezel	
H	10 - 80 V DC	2	Counter	A	Round
7	85 - 265 V AC			B	24 x 48
J	12 - 48 V AC/DC			C	Screw Mount

Connection Diagram



Terminal Description

Pin 1: Supply (~ / +)

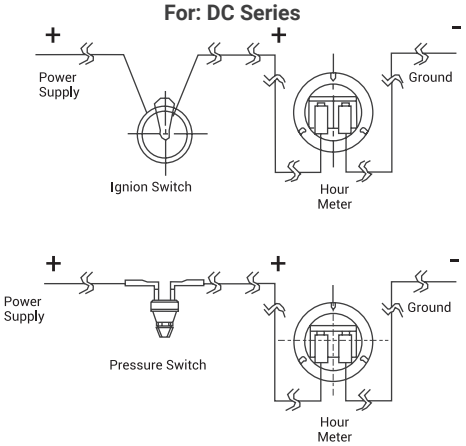
Pin 2: Supply (~ / -)

Pin 3: Enable

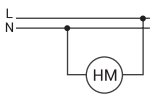
Pin 4: Reset

HM 36 Series

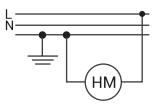
For: DC Series



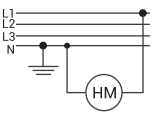
For: AC Series



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.

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

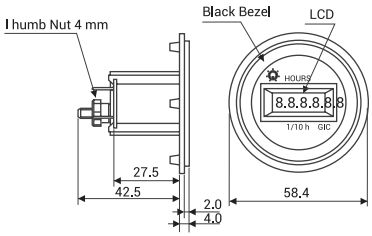
Cup Mount Bezel

Stirrup Mount Bezel

Digital Hour Meter / Digital Counter

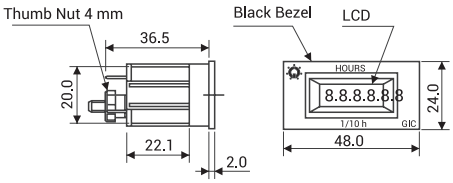
Counter

Round bezel



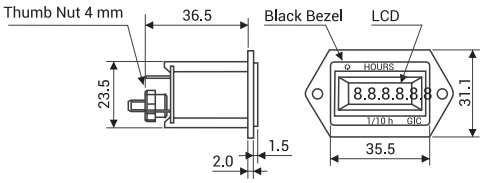
Recommended Panel Cutout:
37.0 (+0.5) mm x 24.6 (+0.5) mm

24x48 bezel



Recommended Panel Cutout:
45.5 (+0.5) mm x 23.0 (+0.5) mm

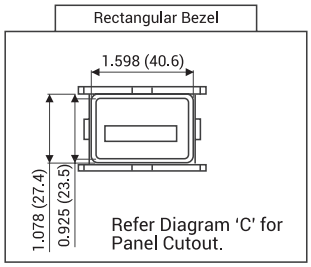
Screw Mount Bezel

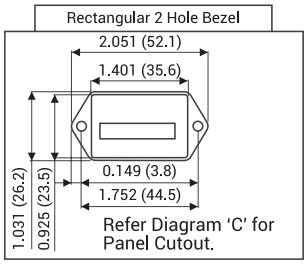


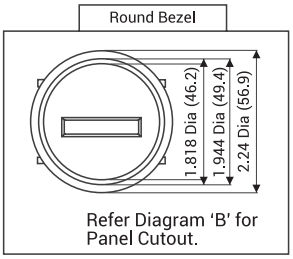
Recommended Panel Cutout:
37.0 (+0.5) mm x 24.6 (+0.5) mm

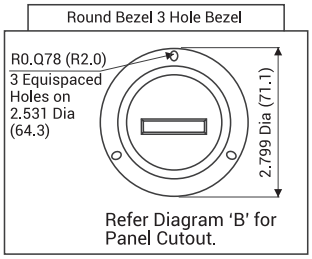
HM 36

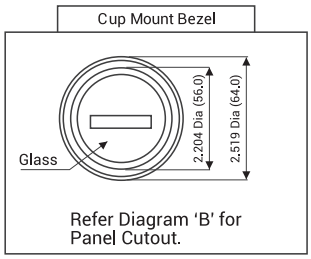
View of Different Bezels :

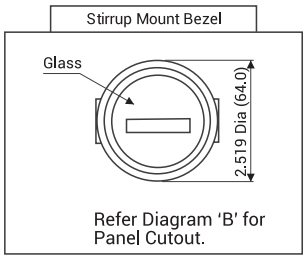


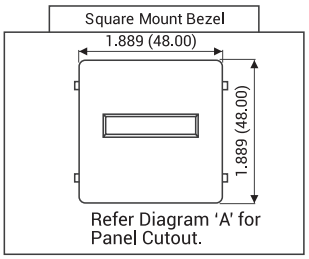












Panel Cutout

Diagram A

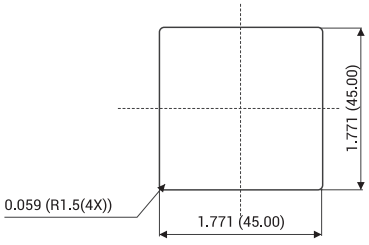


Diagram B

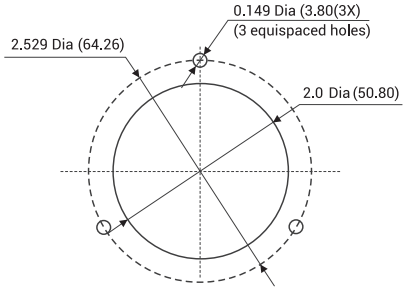
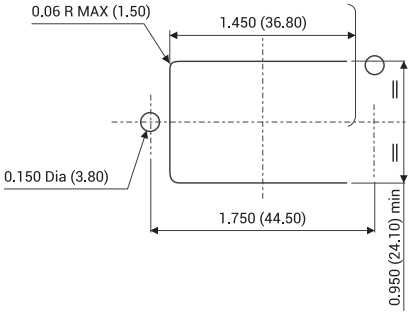


Diagram C



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		30Hz
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	50/60 Hz	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	

Modular Remote Control Units

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 led indicators
- Gen next actuators (illuminated and non-illuminated)
  - A. Plastic
  - B. Metal
- Contact block
- Entegral actuator
- Buzzer
- Push button station
- Spares

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

22 mm Gen Next Pro indicator with SMD Cluster technology have best in class illumination.

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 entegral 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.

Illuminated and non-Illuminated metal push button (Gen next Meta series) are made of zinc alloy which provides unmatched asthetics along with better anti rust and anti corrosive properties. With its inbuilt locking nut, Gen next meta series provides excellent protection against anti rotation and vibration.

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 Pro led indicators

LED Indicators: 22.5 mm

Salient features

- Pro LED Indicator best in class with high bright & uniform illumination
- SMD LED cluster technology
- Inbuilt low voltage glow protection at 25% of rated voltage to avoid false indication due to stray voltages.
- Passes Surge test of 2KV & HV test of 1.5 KV

Applications

- Signaling of Control Panel, Machinery and Industrial applications
- Status indication for power ON /OFF, Alarm condition and machine operation
- Ideal for using in control and monitoring system

LED Indicators: 16 mm

Salient features

- Sleek and compact design with SMD led cluster technology.
- Operating life more than 0.1 million burning hrs.
- Can be assembled in push button stations.
- Passes Surge test of 2KV & HV test of 1.5 KV

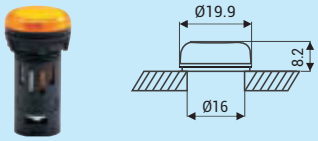
Applications

- Best suited for starter control panels for improved aesthetic.

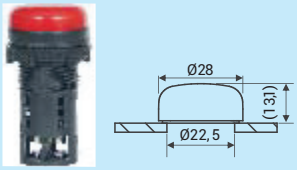
Selection Details

Gen Next LED Indicator

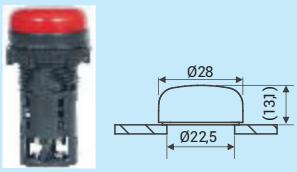
- Surface Mounted Device LED technology
- Low Powerconsumption < 1W
- Surge & Low Voltage Glow Protection (LVGP)

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

Gen Next Pro LED Indicator

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

Gen Next Pro Universal LED Indicator

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

Technical Specification

Product	16mm Gen Next LED Indicators	22.5 mm Gen next Pro LED Indicators
Rated Voltage	12 V AC/DC	12 V AC/DC
	24 V AC/DC	24 V AC/DC
	30 V AC/DC	30 V AC/DC
	48 V AC/DC	48 V AC/DC
	63.5 V AC/DC	63.5 V AC/DC
	110 V AC/DC	110 V AC, 110 V DC
	240 V AC	240 V AC,
		220 V DC
		415 V AC
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	< 1 W
Insulation Resistance	≥ 100 M Ω	
Dielectric Strength	1.5 kV AC for 60 sec	2.5 kV AC for 60 sec
Panel cutout required	EPL series - Ø 22.5 mm, Ø 30.5 mm with adapter ring, SIL series - Ø 16 mm	
Overall Dimension	EPL series - Ø 29 X 52 mm (approx), SIL series - Ø 19.9 X 49 mm (approx)	
Operating Temperature	-30°C to 60°C	-25°C to 65°C
Wire Termination Capacity	0.5 mm^2, 1.5 mm^2	0.5 mm^2, 1.5 to 2.5 mm^2
Terminal Torque	≤1 Nm	≥1 Nm
Degree of Protection	IP65 : Above panel and IP20 : for terminals	
International Approvals	CE	
Rated Insulation Voltage	600VAC	
Rated Impulse Withstand Voltage	>2.5kV	
Vibration Resistance	As per IEC 61373:2010 By ARAI and 5G as per IEC 60068-2-6:2007	As per IEC 61373:2010 By ARAI
Shock Resistance	As per IEC 61373:2010 By ARAI	
Electrical Shock Protection: conditional short ckt current	2.5kV	
Degree of Protection	IP 65 after mounting on panel IP20 at terminals	

Gen Next Actuator (Plastic)

Gen Next Actuator: Non - illuminated

Salient features

- Unique and compact design.
- Screw less, quick and easy assembly.
- Easy Identification for NO/NC blocks.
- Self-wiping contacts.
- IP20 finger-safe screw terminals.
- Special fire-retardant Plastic Housings.

Applications

- Utilized in control panels for start, stop operation
- Spring return and non-spring return operation in control panels

Gen Next Actuator: illuminated

Salient features

- SMD LED Technology
- Snap fit & Easy assembly
- Passes surge test 2 KV & HV test of 1.5KV
- Led Holder is available as a separate accessory

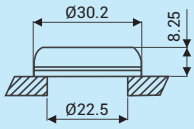
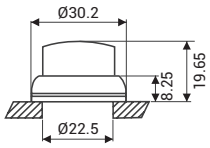
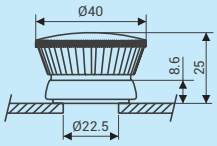
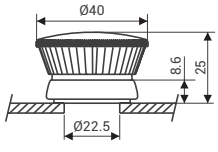
Applications

- Preferable in low light environment
- Controlling and signaling purposes in industrial automation

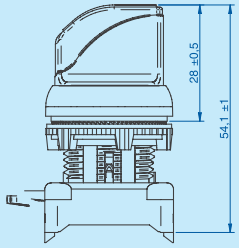
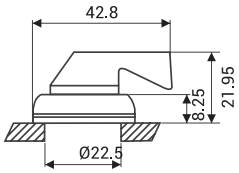
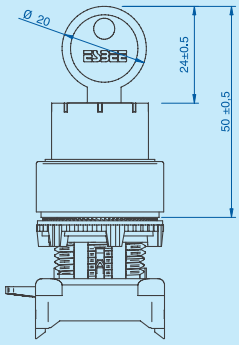
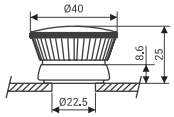
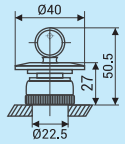
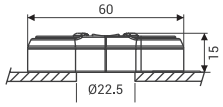
Selection Details

Gen Next Push Button & Actuators Selector Ø 22.5 mm

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

	Description	Cat. No.	Colour (4th Digit)
 	Flush Head	**EMN ☐ FD1**	R-Red G-Green C-Black Y-Yellow W-White B-Blue A-Amber F-Gray
 	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
 	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 (4th Digit)
	Symmetric Head		**2 Position**	R-Red G-Green C-Black W-White
			Non Spring Return **EP09SK00 ☐ 0000**	
			Spring Return **EP09SI00 ☐ 0000**	
			3 Position	
			Non Spring Return **EP09SL00 ☐ 0000**	
			Spring Return **EP09SJ00 ☐ 0000**	
			Spring Return L. H. **EP09SM00 ☐ 0000**	
			Spring Return R. H. **EP09SN00 ☐ 0000**	
 	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**	
			Spring Return R. H. **EMN ☐ LN1**	
	Lock & Key RotaryType		**2 Position**	C-Black
			Non Spring Return **EP09KK00 ☐ 0000**	
			Spring Return **EP09KI00 ☐ 0000**	
			3 Position	
			Non Spring Return **EP09KL00 ☐ 0000**	
			Spring Return **EP09KJ00 ☐ 0000**	
			Spring Return L. H. **EP09KM00 ☐ 0000**	
			Spring Return R. H. **EP09KN00 ☐ 0000**	
 	Push Pull	**EG02MG0 ☐**		R-Red
 	Mushroom Head Lock And Key Actuator	**EG02MQ0R00**		R-Red
 	Twin Touch with Black centre strip	**EG02TD0I**		-

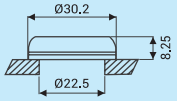
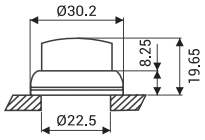
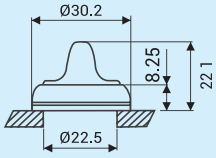
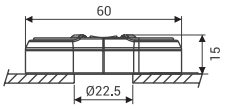

Brass Metal Coller
Push Button

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 Non-Illuminated Actuator
   - For PU Coated ABS Collar replace 7th digit 1 by 2 eg. : EMNPD 2
   - For Brass Metal Collar replace 7th digit 1 by 3 eg. : EMNPD 3 (Please contact nearest branch office for MRP) Illuminated Actuator
   - For PU Coated ABS Collar replace 4th digit 3 by 5 eg. : EG0 5 ***
   - For Brass Metal Collar replace 4th digit 3 by 7 eg. : EG0 7 *** (Please contact nearest branch office for MRP)

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

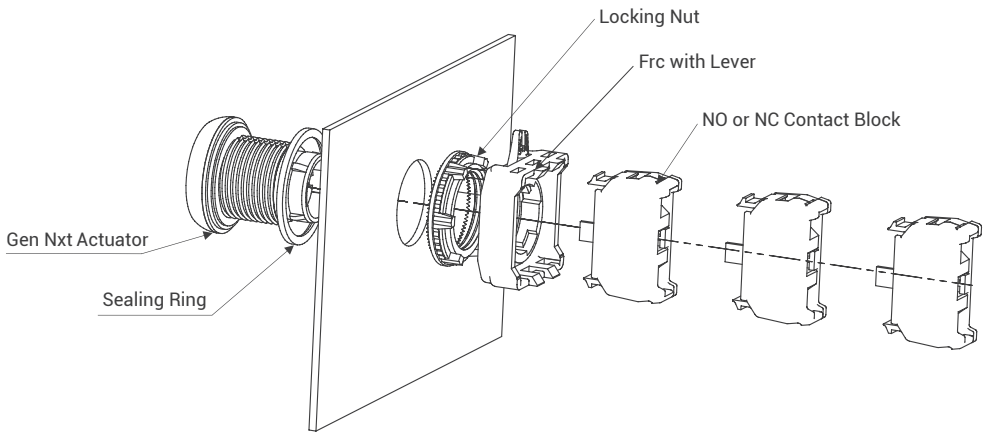
Gen Next Illuminated Push Button Actuators

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

	Description	Cat. No.	Colour (8th Digit)	Voltage (9th, 10th,11th, & 12th 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 **EG03SJL** □□□□□		
 	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 0 1 replace 6th digit from K to R and for operating style 0 1 replace 6th digit from K to T.
2) Assembly comes with LED holder. Please order contact block EC1C and EC2C separately.

Gen Next Actuator



Technical Specification

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

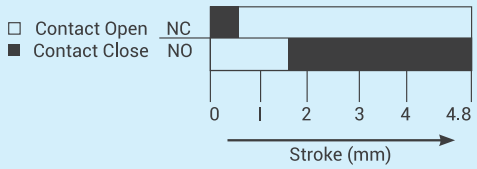
UL Electrical Ratings (UL 508)											
Contact Rating Code Designation,	Thermal Continuous Test Current,	Maximum Current								Maximum VA	
		120 V		240 V	480 V	600 V	2				
AC	Amp	Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
A600	10	60	6	30	3	15	1.5	12	1.2	7200	720

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 mm² **Flexible conductor**
	Rated current Amps	Operations (x106)	Mechanical Life	1 x 10^6 operations
	6	0.5	Rated Insulation Voltage	600 V
	2	1	Dielectric / H. V. Test Voltage	2.5 kV AC for 60 sec
Actuators **Degree of Protection**	IP65 IP67 with rubber / vinyl shroud			
Operational Temperature Limits (without shroud)	Non-illuminated -30°C to + 60°C		Illuminated -30°C 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		
Rated Impulse withstand Voltage	> 2.5 kV			
Vibration Resistance	As per IEC 61373:2010 By ARAI			

Terminals **Suitable for flexible or solid** conductors from 2 x 1 mm²

Disposition of Contacts for Modular Blocks



Gen Next Meta Series

Gen Next Meta: Non illuminated

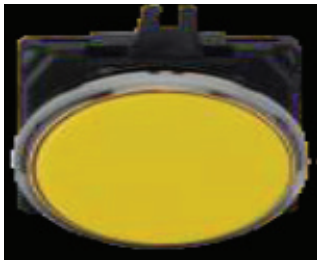
Salient features

- Unmatched asthetics with zinc allow housing
- Excellent anti-rust and anti-corrosive properties
- Protection against water jets and dust
- Vibration protection tested for 5G vibration in X, Y & Z axis

Applications

- Processing industries
- Oil and Gas Industries
- Industrial automation
- Energy management

Gen Next Meta: illuminated



Salient features

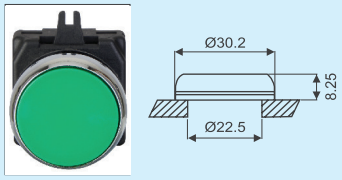
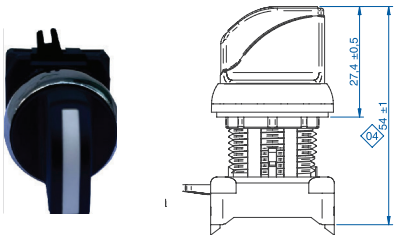
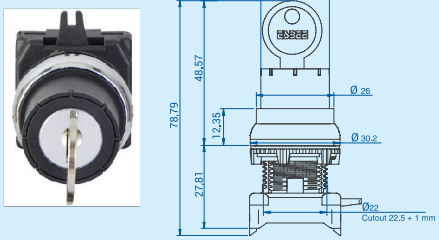
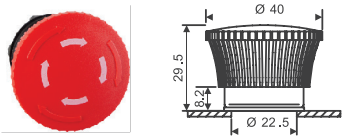
- SMD LED Technology
- Snap fit & Easy assembly
- Led Holder is available as a separate accessory
- Inbuilt LVGP protection.
- IP65 protection

Applications

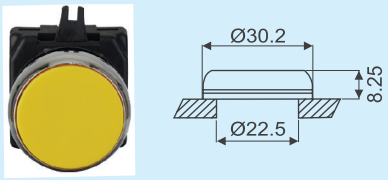
- Preferable in low light environment
- Controlling and signaling purposes in industrial automation

Selection Details

GEN NEXT Meta - Metal Push Button & Selector Actuator [8538]

Description		Cat. No.	Colour
	Flush head	**EM27FD00 ☐ 00**	R-Red
		EM27FD00 ☐ 00	G-Green
		EM27FD00 ☐ 00	C-Black
		EM27FD00 ☐ 00	Y-Yellow
		EM27FD00 ☐ 00	W-White
		EM27FD00 ☐ 00	B-Blue
		EM27FD00 ☐ 00	A-Amber
	Symmetric Head	**2 Position**	C-Black
		Non Spring Return EM27KK00 ☐ 00	
		Spring Return EM27KI00 ☐ 00	
		3 Position	
		Non Spring Return EM27KL00 ☐ 00	
		Spring Return EM27KJ00 ☐ 00	
		Spring Return L.H. EM27KM00 ☐ 00	
		Spring Return R.H. EM27KN00 ☐ 00	
	Lock & Key	**2 Position**	C-Black
		Non Spring Return EM27KK00 ☐ 00	
		Spring Return EM27KI00 ☐ 00	
		3 Position	
		Non Spring Return EM27KL00 ☐ 00	
		Spring Return EM27KJ00 ☐ 00	
		Spring Return L.H. EM27KM00 ☐ 00	
		Spring Return R.H. EM27KN00 ☐ 00	
	Mushroom Head-Push Turn	EM27MH00 ☐ 00	R-Red
		EM27MH00 ☐ 00	G-Green
	Mushroom Head-Push Function	EM27MD00 ☐ 00	R-Red

GEN NEXT Meta Illuminated Push Button Actuator [8531]

Description		Cat. No.	Colour (8 Digit)	Voltage (9, 10, 11 & 12 Digit)
	Illumnated Flush head	EM28FD0☐☐☐☐☐	R-Red	012C-12VAC/DC
			G-Green	024C-24VAC/DC
			Y-Yellow	030C-30VAC/DC
			A-Amber	048C-48VAC/DC
				064C-64VAC/DC
			W-White	110A- 110VAC
			B-Blue	110D- 110VDC
				240A- 240VAC
				220D- 220VDC

Technical Specification

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

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	2				
AC	Amp	Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
A600	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 current	Operations
Amps	(x106)
6	0.5
2	1

Rated Thermal Current	16 Amp with, 2.5 mm² **Flexible conductor**
Mechanical Life	1 x 10^6 operations
Rated Insulation Voltage	600 V
Dielectric / H. V. Test Voltage	2.5 kV AC for 60 sec

Actuators

Degree of Protection IP65
IP67 with rubber / vinyl shroud

Operational Temperature Limits (without shroud)

Non-illuminated	Illuminated
-30°C to + 60°C	-30°C to + 40°C

Rated Insulation Voltage 600 V AC

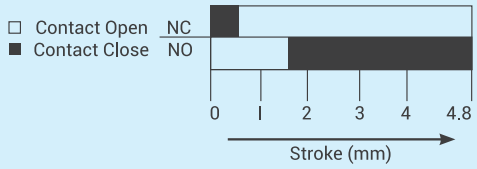
Dielectric / H. V. Test Voltage at 2.5 kV AC for 60 sec

Mechanical Life	Flush Head	5 Lac
	Mushroom Head	1 Lac
	Selector Actuator	1 Lac

Rated Impulse withstand Voltage	> 2.5 kV
Vibration Resistance	As per IEC 61373:2010 By ARAI, also tested for 5G vibration in X, Y & Z axis

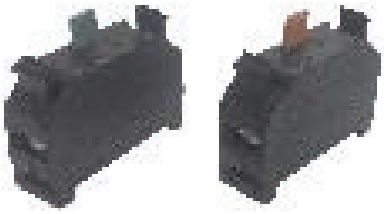
Terminals **Suitable for flexible or solid** conductors from 2 x 1 mm²

Disposition of Contacts for Modular Blocks



Gen Next Modular Contact Blocks

Gen Next Modular Contact Block



Salient features

- Snapfit & easy Assembly
- Screwless quick mounting
- Colour indication to easily descriminate NO and NC

LED Holder for illuminated Actuator

Salient features

- Electrical life more than 0.5 million.
- Inbuilt LVGP (Low Voltage Glow Protection)
- Passes surge test 2kV & HV test of 1.5kV.
- IP 20 terminal protection.

Selection Details

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 (8th Digit)	Voltage (9th , 10th ,11th , & 12th Digit)
	LED Holder for Gen Next illuminated actuator series	EG08HOL □□□□□	R-Red G-Green Y-Yellow A-Amber	012C -12 VAC/DC 024C -24 VAC/DC 030C -30 VAC/DC 048C -48 VAC/DC 064C -64 VAC/DC 110A-110VAC 110D-110VDC 240A- 240VAC 220D- 220VDC
			B-Blue W-White	

Note : Gen Next Modular Contact Blocks (EC1C and EC2C) and LED Holder are same for Gen next and Gen next Meta series

Gen Next Modular Contact Block

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
Rated Insulation Voltage	600VAC
Rated Impulse Withstand Voltage	>2.5kV
Vibration Resistance	As per IEC 61373:2010 By ARAI
Shock Resistance	As per IEC 61373:2010 By ARAI
Electrical Shock Protection: conditional short ckt current	2.5kV
Degree of Protection	IP20: for terminals

Entegral Actuator Series

Gen Next Entegral Actuator

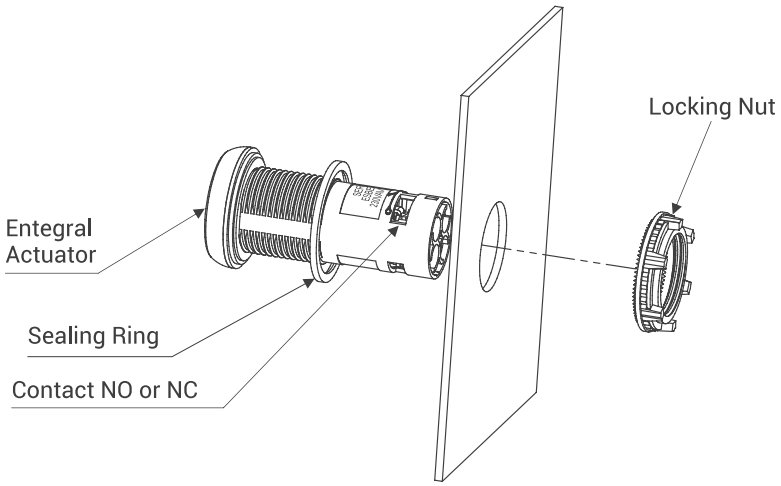
Salient features

- Ready to use solution for OEM & Panel Builders.
- IP 20 terminal protection, IP 65 & IP 67 protection with shroud.
- Current rating of 6A at 240 V AC
- Isolated Terminals for NO+NC application.
- Can be fitted in 30 mm Ø with any additional accessories.

Applications

- Used for controlling the opening and closing of valves in pipelines, process plants, and industrial facilities.
- Integrated into industrial automation systems for controlling the position and movement of various process equipment and mechanisms.

Entegral Actuator



Selection Details

Gen Next *e*ntegral Actuator

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

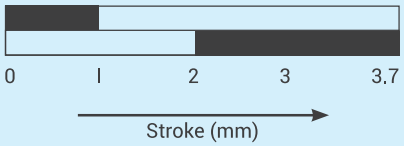
	Description	Cat. No.	Contact Configuration (3rd Digit)	Colour (4th Digit)
	Flush Head	**EE ☐☐ FD1**	1 - 1 NO 2 - 1 NC	R-Red G-Green Y-Yellow W-White B-Blue A-Amber C-Black
			3 - 1 NO + 1 NC 4 - 2 NO 5 - 2 NC	
	Projecting Head Push Function	**EE ☐☐ PD1**	1 - 1 NO 2 - 1 NC	R-Red G-Green Y-Yellow W-White 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	3 - 1 NO + 1 NC (Left NO) 4 - 2 NO 5 - 2 NC 6 - 1 NO + 1 NC (Right NO)	
		Non Spring Return **EE ☐☐ SL1**		
		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**		
		Spring Return **EE ☐☐ LI1**	3 - 1 NO + 1 NC (Left NO) 4 - 2 NO 5 - 2 NC 6 - 1 NO + 1 NC (Right NO)	
		3 Position	3 - 1 NO + 1 NC (Left NO) 4 - 2 NO 5 - 2 NC 6 - 1 NO + 1 NC (Right NO)	
		Non Spring Return **EE ☐☐ LL1**		
		Spring Return **EE ☐☐ LJ1**		
		Spring Return L. H. **EE ☐☐ LM1**		
		Spring Return R. H. **EE ☐☐ LN1**		

Gen Next ℰntegral Actuator

	Description	Cat. No.	Contact Configuration (3rd Digit)	Colour (4th Digit)
	Lock & Key RotaryType	**2 Position**	1 - 1 NO 2 - 1 NC	C-Black
		Non Spring Return **EE☐☐K**	3 - 1 NO + 1 NC (Left NO) 4 - 2 NO 5 - 2 NC 6 - 1 NO + 1 NC (Right NO)	
		 Spring Return **EE☐☐K**		
		3 Position	3 - 1 NO + 1 NC (Left NO) 4 - 2 NO 5 - 2 NC 6 - 1 NO + 1 NC (Right NO)	
		Non Spring Return **EE☐☐K**		
		 Spring Return **EE☐☐K**		
		Spring Return L. H. **EE☐☐K**		
		 Spring Return R. H. **EE☐☐K**		

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

Technical Specification

Product	Gen Next entegral 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
Rated Impulse Withstand Voltage	>2.5kV
Vibration Resistance	As per IEC 61373:2010 By ARAI
Shock Resistance	As per IEC 61373:2010 By ARAI
Electrical Shock Protection: conditional short ckt current	2.5kV
Contact Material	Brass terminals and bimetal rivet
Disposition of contacts	IP 65 after mounting on panel IP20 at terminals
☐ Contact Open ■ Contact Close	

Panel Mounted Buzzer Ø 22.5 mm

Panel Mounted Buzzer

Salient features

- Sound pressure level is greater than 80DB
- Power consumption less than 1W
- IP65 protection when mounted on panel
- Withstand 2KV surge & passes 2.5KV HV test for 60 Seconds.

Applications

- Alert operators on malfunctions, safety hazards in Industrial Machinery

Selection Details

- IP20 protection
- 80dB at 1 meter

	Description	Electrical Rating	Cat. No.
			Round Type
	22.5 mm Panel Mounted Buzzer Black colour	240VAC	EG15R00C240A
		110VAC	EG15R00C110A
		64VAC/DC	EG15R00C064C
		48VAC/DC	EG15R00C048C
		30VAC/DC	EG15R00C030C
		24VAC/DC	EG15R00C024C
		12VAC/DC	EG15R00C012C

Technical Specification

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
Rated Insulation Voltage	600VAC
Vibration Resistance	As per IEC 61373:2010 By ARAI
Shock Resistance	As per IEC 61373:2010 By ARAI
Electrical Shock Protection: conditional short ckt current	2.5kV

Gen Next Push Button Stations

Push Button Station

Salient features

- External Mounting facility.
- High impact material ABS engineering plastic.
- Comply with safety IEC standards with IP65 ingress protection.
- Robust & Maintenance free
- Available range of enclosures: Single, Two, Three & Eight stations

Applications

- Construction /redevelopment sites
- Industrial machinery for manual start, stop and emergency shutdown functions.
- Controlling conveyor belts and material handling systems.

Selection Details

Gen Next Push Button Stations

Dimension

- Single Station : 65 x 55 x 33 mm
- Three Station : 134 x 55 x 53 mm
- Two Station : 100 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 TurnType' with Legend - STOP Contact - 1 'NC' for Stop	EP1FAC05
	Flush Head Actuator - Green with Legend - STARTContact - 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 TurnType' with Legend - STOP Contact - 1 'NC' *(Station One)*	
	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 entegralActuators.
2. Only entegral 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.

Universal Push Button Stations (in ABS Engineering plastic body) [8536]

Dimension

- Single Station : 75 x 75 x 56 mm
- Two Station : 127 x 75 x 56 mm
- Three Station : 160 x 75 x 56 mm

	Description	Cat.No.
	Flush Head Actuator - Red with Laser Marking - STOP Contact- 1 'NC'	EWS1C01AC062
	Flush Head Actuator - Green with Laser Marking - START Contact- 1'NO'	EWS1C01AC063
	Two Position Symmetric Head Selector Switch - Black with Laser Marking - OFF / ON Contact - 1 'NO'	EWS1C01AF064
	Illuminated Actuator - Green with Laser Marking - ON Contact- 1'NO'- 240 VAC	EWS1C01AA070
	Two Position Lock & Key Rotary Switch with Laser Marking - OFF / ON Contact - 1 'NO'	EWS1C01AF065
	Mushroom Head Actuator 'Push Function' with Laser Marking - STOP Contact- 1 'NC' for Stop	EWS1C13AC054
	Mushroom Head Actuator 'Push Turn type' with Laser Marking - STOP Contact- 1 'NC' for Stop	EWS1C13AC051
	"Mushroom Head Actuator with Lock and Key on Yellow Cover, with Laser Marking - STOP, Contact - 1 'NC' for Emergency Stop"	EWS1C13AC066
	Push Button Station with Push Pull Emergency Switch, Red with 1 NC	EWS1C13AC069
	Flush Head Actuator - Green with Laser Marking -START Contact - 1 'NO' (Station One) Flush Head Actuator - Red with Laser Marking -STOP Contact - 1 'NC' (Station Two)	EWS2C01AH045
	Flush Head Actuator - Green with Laser Marking -START Contact - 1 'NO' (Station One) Mushroom Head Actuator 'Push Turn Type' with Laser Marking - TOP Contact - 1 'NC'	EWS2C01AH067
	Flush Head Actuator - Green with Laser Marking -START Contact - 1 'NO' (Station One) Mushroom Head Actuator 'Lock & Key Type' with Laser Marking - STOP Contact - 1 'NC'	EWS2C01AH068
	Pilot Light 240 VAC White (Station One) Flush Head Actuator - Green with Laser Marking - START Contact - 1 'NO' (Station Two) Flush Head Actuator - Red with Laser Marking - STOP Contact - 1 'NC' (Station Three)	EWS3C01AH048
	Flush Head Actuator - Green with Laser Marking - FORWARD Contact - 1 'NO' (Station One) Flush Head Actuator - Red with Laser Marking - STOP Contact - 1 'NC' (Station Two) Flush Head Actuator - Green with Laser Marking - REVERSE Contact - 1 'NO' (Station Three)	EWS3C01BJ055
	Flush Head Actuator - Green with Laser Marking - UP Contact - 1 'NO' (Station One) Flush Head Actuator - Red with Laser Marking - STOP Contact - 1 'NC' (Station Two) Flush Head Actuator - Green with Laser Marking - DOWN Contact - 1 'NO' (Station Three)	EWS3C01AS055

Universal Push Button Stations (in ABS Engineering plastic body) [8538]

Push Buttons Station Enclosure

Dimension

- Single Station : 75 x 75 x 56 mm
- Two Station : 127 x 75 x 56 mm
- Three Station : 160 x 75 x 56 mm
- Four Station : 215 x 75 x 70 mm
- Five Station : 270 x 75 x 71 mm

	Description	Cat. No.
	Enclosure Grey-Black single hole	**EWS1C01AA**
	Enclosure Grey-Black & 2 hole of Ø 22.5	**EWS2C01AA**
	Enclosure Grey-Black & 3 holes of Ø 22.5	**EWS3C01AA**
	Enclosure Grey-Black & 4 holes of Ø 22.5	**EWS4C01AA**
	Enclosure Grey-Black & 5 holes of Ø 22.5	**EWS5C01AA**
	Enclosure Yellow-Black single hole	**EWS1C13AA**
	Enclosure Yellow-Black & 2 hole of Ø 22.5	**EWS2C13AA**
	Enclosure Yellow-Black & 3 holes of Ø 22.5	**EWS3C13AA**
	Enclosure Yellow-Black & 4 holes of Ø 22.5	**EWS4C13AA**
	Enclosure Yellow-Black & 5 holes of Ø 22.5	**EWS5C13AA**

Standard All Purpose Enclosures [8538]

Dimension: 110 x 80 x 65 mm

	Description	Cat. No.
 **Note :** with plastic screws	All Grey without hole	**HF999000**
	All Grey & 1 hole of Ø 22.5	**HF999001**
	All Grey & 2 holes of Ø 22.5	**HF999002**

Note: All series actuators and contact block can be used to convert all purpose enclosure box into standard push button station.

Technical Specification

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 nitrite 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 : 75 x 75 x 56 mm
- Two Station : 127 x 75 x 56 mm
- Three Station : 160 x 75 x 56 mm

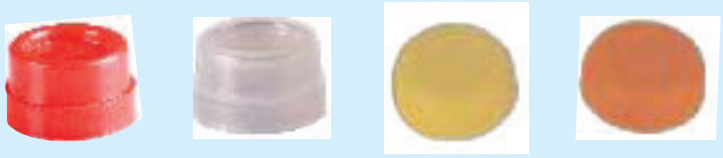
Accessories and Spares for Standard series

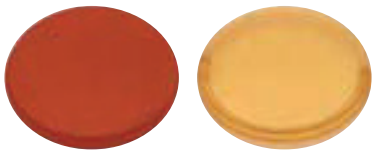
	Description	Cat. No.
Metal Plates - Spare 	Small	**HH2420122**
	Large	**HH2420124**
	Square	**HH2420123**

Note: Printing as per customer requirement

Fixing Device		Cat. No.
		HH192000

Plastic Plate 		Cat. No.
	**Yellow legend plate**	**HB135000**
	Padlock Yellow (for Mushroom head Actuator)	**HF192024**
	Padlock Transparent (for Flush head Actuator)	**HF192025**
	**Protecting Shroud for Emergency Push Button**	**HF195020A**
	Protecting Shroud	**HF195004**

Shroud (Boot) for Actuator	Colour	Gen Next Actuator
		Cat. No.
	White	**HB17101**
	Red	**HB17301**
	Green	**HB17401**
	Black	**NA**
	Yellow	**HB17501**
	Blue	**HB17701**
	Amber	**HB17801**
(For IP67 protection of actuators)	Colourless	**HB190003**

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 actuators.

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

* It can be used to convert Gen Next actuator series to TK3 Ø30 mm mounting.

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Product improvement is a continuous process. For the latest information and special application, please contact any of our offices listed here. Product photographs shown for representative purpose only.

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