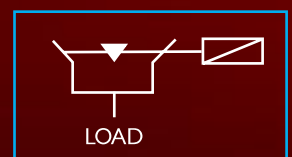


# INSTALINE

## Automatic Transfer Switch



## Automatic Transfer Switch

### CONSTRUCTION

The Switch comprises of three/four symmetrical poles coupled with the Main Operating Mechanism. The switching mechanism is quick make, quick break type. Load terminals are given on the Lower side but can also be provided on the upper side.

#### Contact Mechanism

The contact system is housed in a frame made of Polyester reinforced glass material. Each pole has two independent set of Moving contact assemblies for Main & standby supply and one Fixed contact assembly for the common outgoing load terminals. The Moving assemblies are mechanically operated by Cams when rotated by the Main Operating Mechanism. Moving Contacts make on to Fixed Contacts under constant pressure with backup spring. Main Contacts are made of Silver-Tungsten to ensure anti-weld characteristics. The Arc Chute plates placed in the path of contact, efficiently quench the Arc and there by enhance the life of the contacts.

#### Main Operating Mechanism

The main mechanism independently actuates two sets of Cam linkages, which in turn operate the two independent moving contact assemblies.

The closing command is through a Solenoid Coil supplied with 220V AC. The operating mechanism always responds by closing on the main supply side and not on to standby supply side, when both supplies are present.

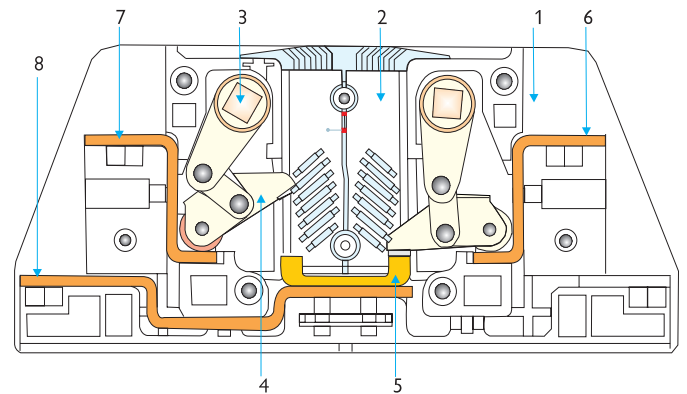
The tripping coil, when energised, is used to bring the ATS to OFF / Neutral position.

Closing on to the standby supply is achieved through the selective coil. The energisation of selective coil, disengages the

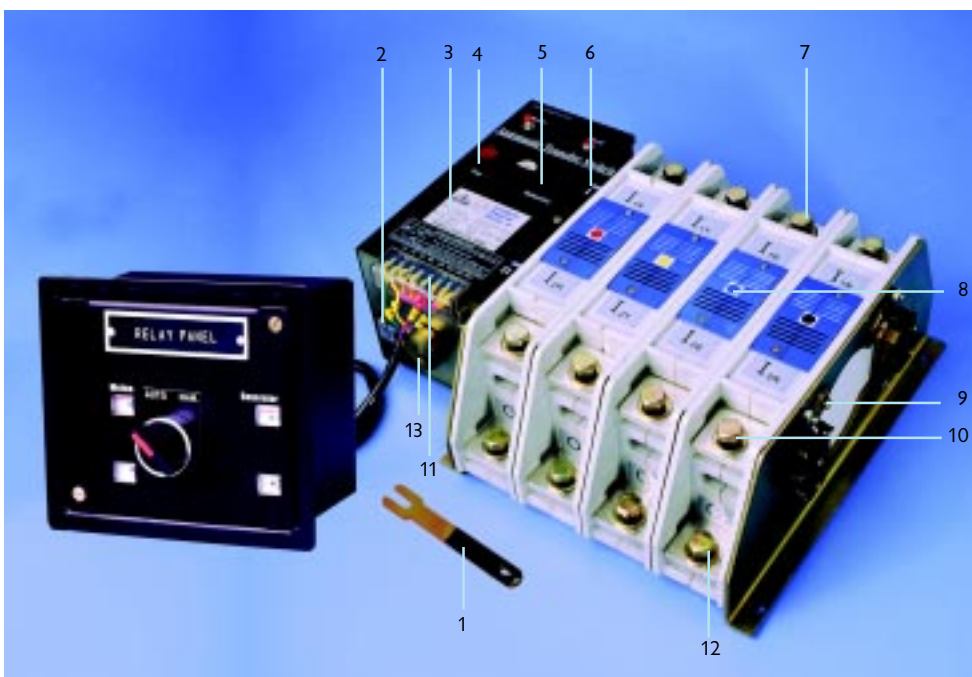
main mechanism and prevents closing on to the main supply. The solenoid coil can then close the second set of moving contacts on to the standby supply.

The moving contact mechanism of the main supply and the standby supply are inherently mechanically interlocked through a double throw arrangement, which ensures that at no point of time two supplies are paralleled.

#### Cross Sectional View of Single Pole of ATS



- 1 Frame
- 2 Housing for Arc Chute
- 3 Operating Shaft for Contacts
- 4 Moving Contact
- 5 Fixed Contact
- 6 Main Supply - Incoming Terminals
- 7 Standby Supply - Incoming Terminals
- 8 Common outgoing - Load Terminals

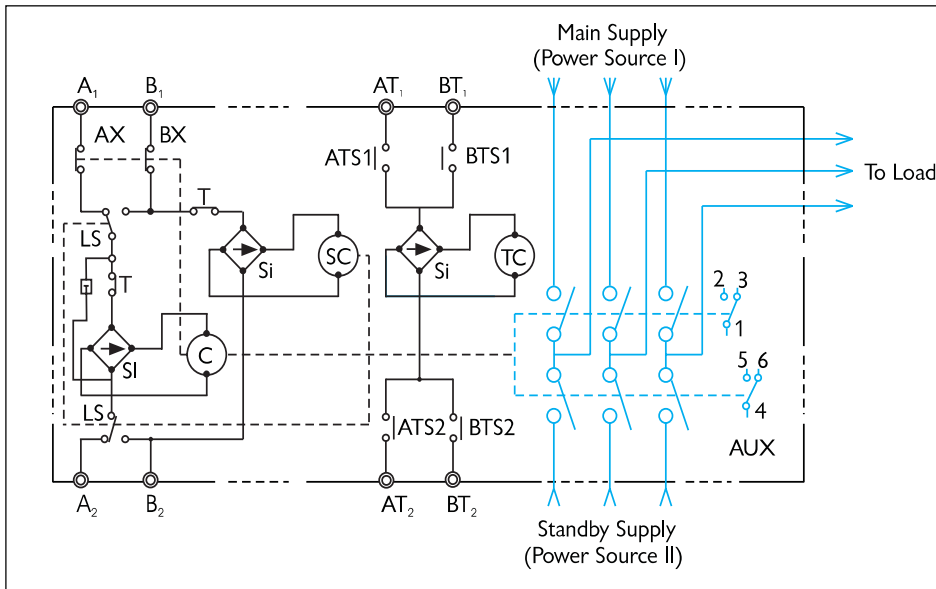


1. Manual Operating Handle
2. Earthing Terminal
3. Name Plate
4. Trip Button
5. Selective Hole
6. On / Off Indicator
7. Main Supply Terminal
8. Arc Extinguishing Chamber
9. Auxilliary Switch
10. Standby Supply Terminal
11. Control Circuit Terminal Block
12. Terminal For Load
13. Actuator For Closing Coil

### OPERATION (AUTOMATIC)

In the event of main supply being available, the ATS can be instantaneously switched ON, by the closing coil C, through terminals  $A_1, A_2$ , from its OFF / Neutral position.

If the ATS is ON at the standby supply position, then it is first tripped by the trip coil TC, through terminals  $BT_1 - BT_2$ . This ensures that the two sources of supply are not paralleled. A suitable external control circuit will ensure this, as shown in circuit diagram for Automatic Instantaneous Changeover mode.



The Auxiliary Switches AX or BX, disconnect the closing coil C, once the ATS is ON, thereby the power consumption of the coil C is zero, when the ATS is closed.

To switch the ATS to standby supply, the selective coil SC is first energised. Then the closing coil C is powered through limit switches LS and terminals  $B_1, B_2$ .

The Trip Coil TC, can be energised through  $AT_1 - AT_2$  or  $BT_1 - BT_2$  to switch off the main supply or standby supply.

### OPERATION (IN EMERGENCY)

In an emergency, the ATS can be operated manually, but as an off-load switch only.

#### Close on to Main Supply

A manual handle rotates the operating shaft by  $45^\circ$  in anticlockwise direction, to achieve closure, under off-load conditions.

#### Close on to Standby Supply

Closure on to standby supply side is achieved, when the "selective" mode is continuously pressed and the manual handle rotates the operating shaft by  $45^\circ$  in anticlockwise direction.

#### Trip

Tripping can be achieved manually by pressing momentarily through the "Trip Button".



### TECHNICAL INFORMATION

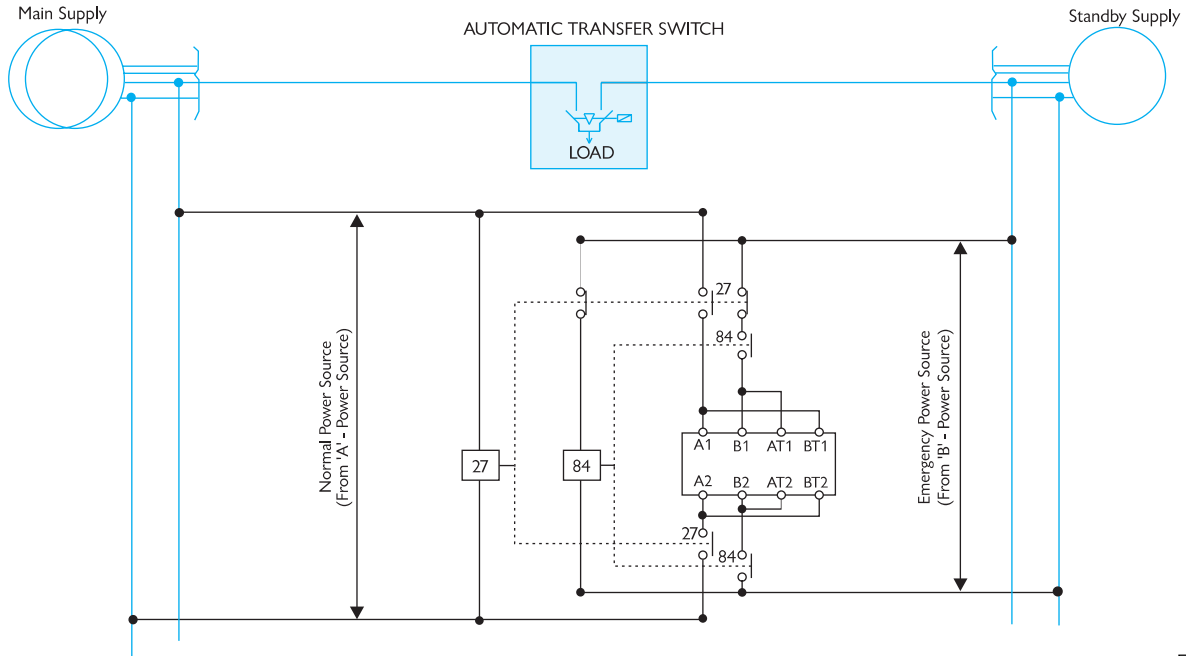


Frame Size		TNFO1		TNFO2		TNFO3	
Rated Operational Current $I_e$	A	100	160	200	315	400	630
No. of Poles		3P / 4P	3P / 4P	3P / 4P	3P/4P	3P / 4P	3P / 4P
Rated Insulation Voltage $U_i$	V	1000	1000	1000	1000	1000	1000
Rated Operational Voltage $U_e$	V	440V AC / 125V DC		440V AC / 125V DC		440V AC / 125V DC	
Rated frequency	Hz	50	50	50	50	50	50
Class		PC	PC	PC	PC	PC	PC
Utilization Category		AC 33A	AC 33A	AC 33A	AC33A	AC 33A	AC33A
Dielectric Strength	KV	5	5	5	5	5	5
Rated Impulse withstand Voltage $U_{imp}$	KV	10	10	10	10	10	10
Rated making capacity at 440V ( $\cos\phi = 0.35$ )	A	1000	1600	2000	3150	4000	6300
Rated breaking capacity at 440V ( $\cos\phi = 0.35$ )	A	800	1280	1600	2520	3200	5040
Rated short time withstand current (1 sec)	$KA_{rms}$	5	7	10	12	12	15
Fuse protected S/C withstand current	$KA_{rms}$	80	80	80	80	80	80
Rated Short circuit making capacity	$KA_{rms}$	12.5	17.5	25	30	30	37.5
Mech. Life (No. of ops.)		2,50,000	2,50,000	2,50,000	2,50,000	2,50,000	2,50,000
Elect. Life (No. of ops.)		50,000	50,000	50,000	50,000	50,000	50,000
Switching frequency (ops. per Hr)		150	150	150	150	150	150
Terminal Position		Front	Front	Front	Front	Front	Front
Terminal Capacity - Cu (cable)	$mm^2$	35	70	95	185	240	—
Al (cable)	$mm^2$	50	95	150	240	300	—
Busbar	mm	—	—	—	—	40 x 5 x 2	40 x 8 x 2
Weight 3P Kg		8.3	8.7	10.5	11.0	18.0	19.5
4P Kg		9.3	9.7	11.5	12.0	21.0	22.5
Mounting		Vertical	Vertical	Vertical	Vertical	Vertical	Vertical
<b>Coil</b>							
Operating Voltage	V	200 / 220	200 / 220	200 / 220	200 / 220	200 / 220	200 / 220
Operating Current	A						
Main Coil 3P / 4P		3.0 / 3.5	3.0 / 3.5	4.0 / 4.5	4.0 / 4.5	8.0 / 10.5	8.0 / 10.5
Trip Coil		0.5	0.5	0.5	0.5	0.7	0.7
Operating Time	(ms)						
Main Power Source	Make	55	55	55	55	60	60
	Break	20	20	20	20	25	25
Standby Power Source	Make	80	80	80	80	90	90
	Break	20	20	20	20	25	25

3 P - Three Pole, 4 P - Four Pole

### CIRCUIT DIAGRAM

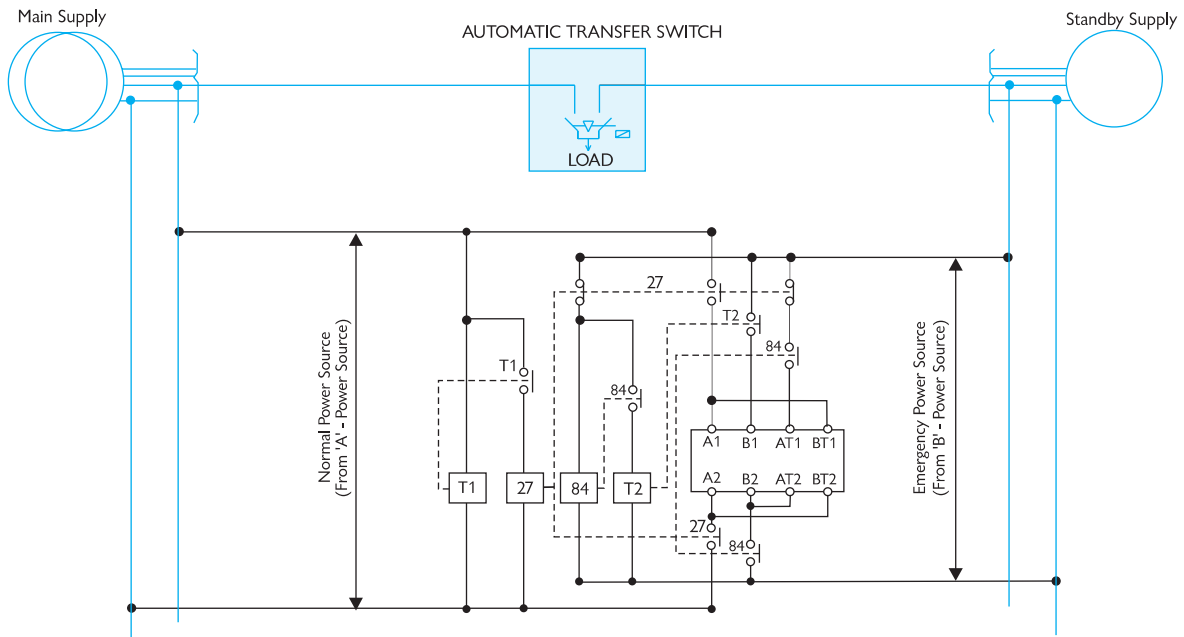
#### AUTOMATIC INSTANTANEOUS CHANGEOVER



Automatic Changeover from Main to Standby supply and vice-versa can be achieved instantaneously by employing voltage relays **27** & **84** added externally suitable for operation between 85% to 110% on 220V AC . The operating time from main supply to standby supply is 100 m sec. & 75 m.sec vice-versa.

In the event of the main supply being restored, the ATS automatically transfers the load from standby supply to main supply.

#### AUTOMATIC TIME-DELAYED CHANGEOVER

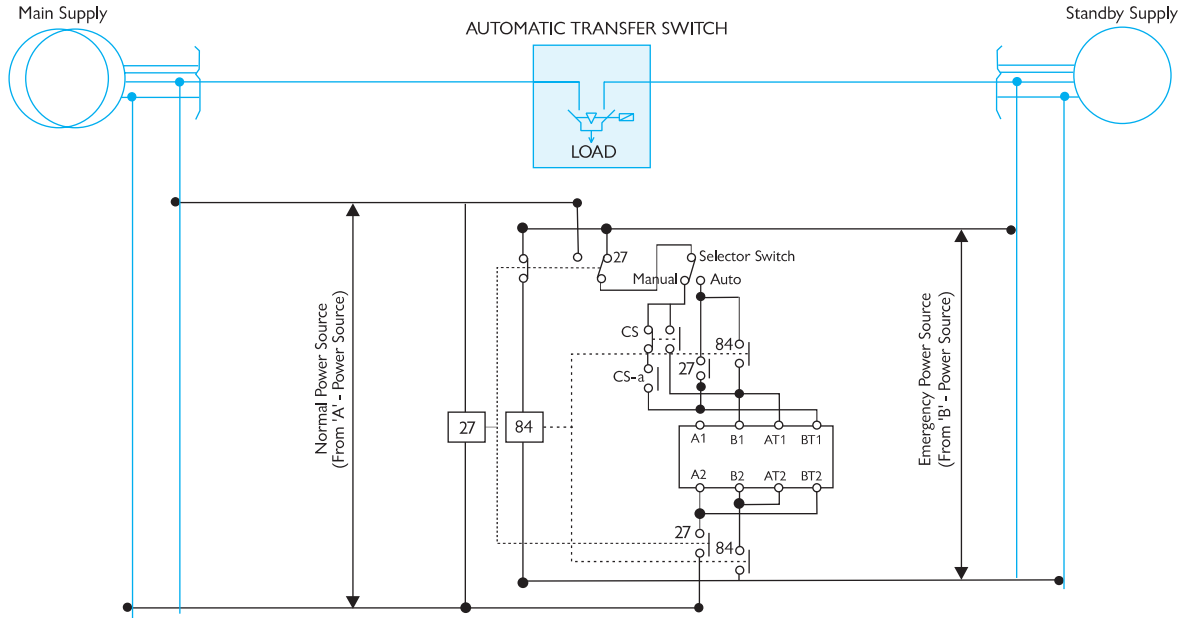


By employing timers T1 & T2, along with the Voltage Relays **27** & **84**, time delay feature can be added.

Time delay helps to eliminate initial fluctuation period of the Supply when switched, and also when adequate voltage buildup is necessary, before connecting the loads.

### CIRCUIT DIAGRAM

#### AUTOMATIC / MANUAL CHANGEOVER (WITH REMOTE COMMAND)



A dual facility to switch ON/OFF from one power source to another either in Automatic or in Manual mode depending upon the application is also available.

A selector switch with Auto / Manual facility, in addition to **27** & **84** have to be employed for a manual changeover.

For a remote transfer, CS (1 NO + 1 NC) & CS-a (1NO) need to be incorporated.

### UTILIZATION SCOPE

Auto Transfer Switch is a self-acting equipment containing the transfer switching devices and other necessary devices for monitoring supply circuits and for transferring one or more load circuits from one supply to another.

The operating sequence of ATS consists of an automatic transfer of a load from the normal supply to an alternate supply in the event of a monitored supply deviation and automatically returning the load to the normal supply when it is restored. The transfer may be with or without a predetermined time delay and may include an off position.

In case of both the normal and the alternate supplies being present, the ATS shall assume the normal supply position, which is termed as 'preferred supply'.

The various utilization categories show the most popular applications of Auto Transfer Switch, as per IEC-947-6-1.

Nature of current	Utilization Category		Typical applications
	Frequent Operations	Infrequent operations	
Alternating Current	AC-31A	AC-31B	Non-inductive or slightly inductive loads Motor loads or mixed loads including motors, resistive loads and up to 30% incandescent lamp loads
	AC-33A	AC-33B	
	AC-35A	AC-35B	Electric discharge lamp loads Incandescent loads
	AC-36A	AC-36B	
Direct Current	DC-31A	DC-31B	Resistive loads Motor loads or mixed loads including motors Incandescent lamp load
	DC-33A	DC-33B	
	DC-36A	DC-36B	

### THREE POLE - BASIC UNIT



Current Rating (A)	Cat. No.
<b>OPEN EXECUTION</b>	
100	ATA3O#0100SXXX
160	ATA3O#0160SXXX
200	ATA3O#0200SXXX
315	ATA3O#0315SXXX
400	ATA3O#0400SXXX
630	ATA3O#0630SXXX
<b>IN ENCLOSURE</b>	
100	ATA3E#0100SXXX
160	ATA3E#0160SXXX
200	ATA3E#0200SXXX
315	ATA3E#0315SXXX
400	ATA3E#0400SXXX
630	ATA3E#0630SXXX

### FOUR POLE - BASIC UNIT



Current Rating (A)	Cat. No.
<b>OPEN EXECUTION</b>	
100	ATA4O#0100SXXX
160	ATA4O#0160SXXX
200	ATA4O#0200SXXX
315	ATA4O#0315SXXX
400	ATA4O#0400SXXX
630	ATA4O#0630SXXX
<b>IN ENCLOSURE</b>	
100	ATA4E#0100SXXX
160	ATA4E#0160SXXX
200	ATA4E#0200SXXX
315	ATA4E#0315SXXX
400	ATA4E#0400SXXX
630	ATA4E#0630SXXX

Replace # with : D - for tripping Voltage 24 Vdc.; A - for tripping Voltage 220 V a.c.  
To complete Cat. No., replace suffix code (XXX) from Add On Feature Table.

### ADD ON FEATURES

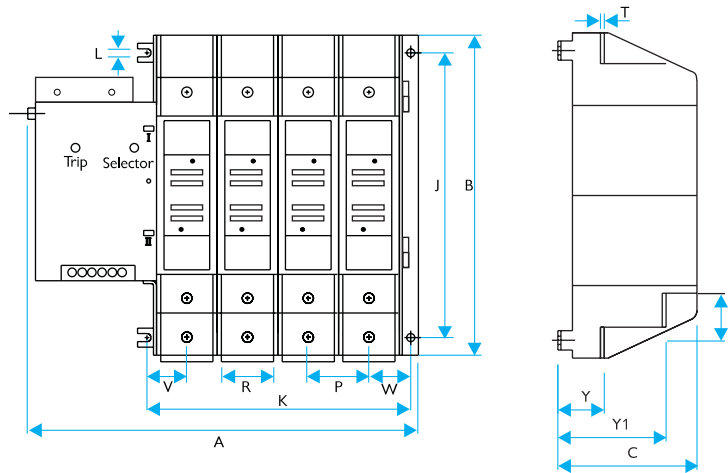
Cat. No.	Features
1st X	R Automatic / Manual (with Remote Command)
2nd X	P Primary Side Protection against Single Phasing, Over Voltage, Under Voltage for 24V d.c. control only
3rd X	T Timer (Range 0.3 sec. to 30 hrs.)

### STANDARD COMBINATIONS FOR LAST THREE SUFFIX CODE

SXXX	Automatic Transfer Switch
SXXT	Automatic Transfer Switch with Time Delay
SXPX	Automatic Transfer Switch with Primary Side Protection Against Single Phasing, Over Voltage,, Under Voltage for 24VDC control only.
SXPT	Automatic Transfer Switch with Time delay and Primary Side Protection against Single Phasing, Over Voltage, Under Voltage for 24VDC.
SRXX	Auto/Manual Transfer Switch - with remote command (for tripping voltage 220VAC only)

**Note : Remote Command 'R', Primary Side Protection 'P' and Timer 'T' can be utilised in conjunction with Voltage Relays.**

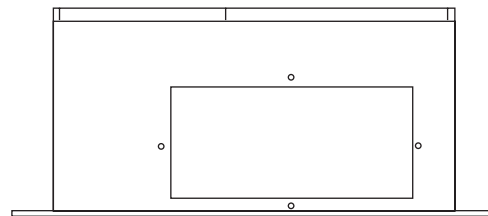
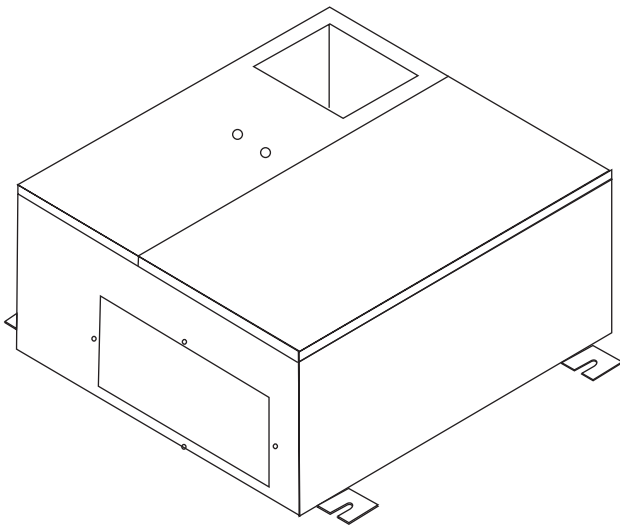
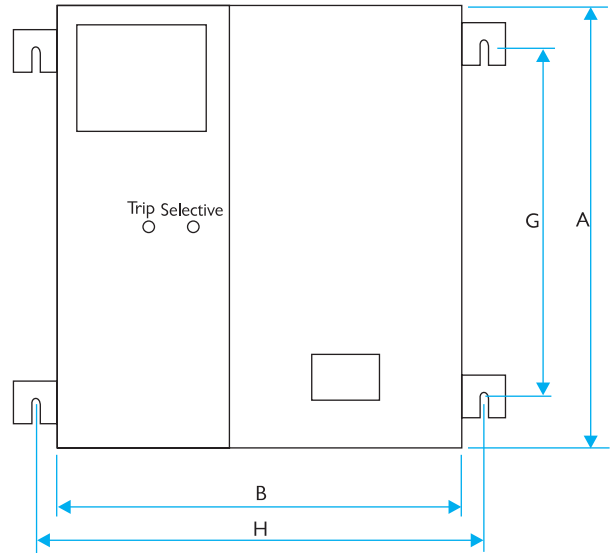
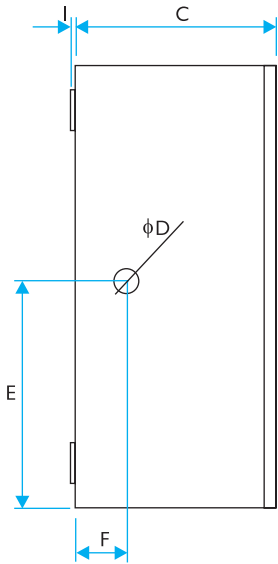
### DIMENSIONS (IN MM) - OPEN EXECUTION



Frame size	Current Rating (A)	No. of poles	Over All Dimensions			Switch Mounting			Connection Terminals						Terminal Bolt Size	Weight		
			A	B	C	J	K	L	P	R	S	T	V	W			Y	Y1
1	100	3P	257	241	119	201	132	ϕ9	38	15	30	3	29	29	40	90	M8x30MM	8.3Kg
	100	4P	295	241	119	201	170	ϕ9	38	15	30	3	29	29	40	90	M8x30MM	9.3Kg
1	160	3P	257	241	119	201	132	ϕ9	38	15	30	4	29	29	40	90	M8x30MM	8.7Kg
	160	4P	295	241	119	201	170	ϕ9	38	15	30	4	29	29	40	90	M8x30MM	9.7Kg
2	200	3P	290	253	119	213	167	ϕ9	48	30	30	5	34	34	40	90	M8x30MM	10.5Kg
	200	4P	338	253	119	213	216	ϕ9	48	30	30	5	34	34	40	90	M8x30MM	11.5Kg
2	315	3P	290	253	119	213	167	ϕ9	48	30	30	5	34	34	40	90	M8x30MM	11.0Kg
	315	4P	338	253	119	213	216	ϕ9	48	30	30	5	34	34	40	90	M8x30MM	12.0Kg
3	400	3P	340	337	144	290	218	ϕ9	60	40	40	5	42	34	38	110	M10x40MM	19.5Kg
	400	4P	400	337	144	290	278	ϕ9	60	40	40	5	42	34	38	110	M10x40MM	21.0Kg
3	630	3P	340	337	144	290	218	ϕ9	60	44	40	7	42	34	38	110	M10x40MM	21.0Kg
	630	4P	400	337	144	290	278	ϕ9	60	44	40	7	42	34	38	110	M10x40MM	22.5Kg



### DIMENSIONS (IN MM) - IN ENCLOSURE



Note :  
 Enclosure Sheet thickness 1.6mm (16 SWG)  
 Cover sheet thickness 2.0 mm (14 SWG)

Rating	A	B	C	D	E	F	G	H	I
100A-315A	550	450	235	$\phi 25$	225	73.5	350	500	4
400A-630A	580	520	250	$\phi 25$	265	65.0	400	570	4