L&T SWITCHGEAR
SAFE & SURE

C-POWER

Air Circuit Breakers

LARSEN & TOUBRO

About us

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

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

It offers a complete range of products including controlgear, powergear, motor starters, energy meters, wires and host of other accessories. Most of our product lines conform to international standards, carry CE markings and are KEMA certified.

Switchgear Factory, Mumbai

Switchgear Factory, Ahmednagar

C-POWER

Air Circuit Breakers

L&T's Air Circuit Breakers (ACBs) are specially designed for extreme tropical conditions and have a proven track record more than 30 years. Presently more than 3,00,000 Air Circuit Breakers supplied by L&T are being used for diverse applications. The **C-POWER** Air Circuit Breakers provide technologically driven solutions to meet customer needs.

Complete selectivity
Unique feature of Icu=Ics=Icw for 1 second across the entire range. This ensures complete selectivity for system with time based discrimination.

Perfect for Indian conditions
Inherent design to perform in extreme tropical conditions. Typical site conditions like high ambient temperature, humidity and dusty environment are best handled by **C-POWER** ACBs without compromising on performance and safety.

Optimal compactness
Designed to ensure
- Low inherent temperature rise
- Adequate interface clearances

Widest choice of over current protection releases
- Advance micro-controller based with option of communication & metering-SR71
- Micro processor based releases-SR21i/SR18/SR18G
- Thermo-magnetic release-DN1

Elegant design & rugged construction
- Common door cutout for entire range
- Left aligned cutout for all ratings
- Uniform height and depth for ACBs up to 4000 Amp

Range to meet every customer's need
Various options to choose from
- Breaking capacity from 35kA to 100kA
- 3 Pole or 4 Pole configuration
- Fixed or Drawout version
- Auto or Manual reset mechanism
- Independent manual or stored energy type manual or electrically operated mechanism
- Different terminal orientations : Flat, Horizontal and Vertical

User friendly features

- **Front accessible** over current release settings, telescopic racking handle and various racking interlocks; no need to open the panel door
- Unique '**Maintenance position**' in drawout type ACBs to facilitate maintenance & inspection without removing ACB from the panel
- **Multitap CTs** for enhancing protection range for example: 3200A. ACB can be set to have a thermal protection from 800A
- **Wide variety** of Amperemetric and Voltmetric releases
- **Fully rated neutral pole** for the entire range
- Lockable **sliding shutters** to prevent unauthorized access to "TRIP" and "CLOSE" push buttons
- Can be used as an **ON / OFF Load Isolator**
- Extendable **Electrical Life:**
  - By replacing the arcing contacts at site, for all ratings
  - Without changing pole assembly
- **Programmable SICs:** Auxiliary contacts in drawout ACBs are programmable for only Service, Only Test, Test and Service, and All Positions
- Unique gasket for **IP54 protection**
- Protection releases are easily **interchangeable** at site
- Facility for site conversion of **manually operated** ACBs to **electrically operated** ACBs

Safety

- "CE" marked for C, S & H ranges
- Superior quality engineering grade plastics used for insulation purpose; conforms to **Glow wire test** (Ref: IEC 60695-2-1)
- In-built **mechanical anti-pumping** for electrically operated ACBs prevent auto reclosing of ACB on fault
- In-built **rating error preventor** in drawout ACBs ensure correct rating of drawout porton in corresponding cradle
- **Safety shutters** prevent accidental contact with live cradle terminals
- Variety of **Safety Interlocks** (Refer to page no. 14)
- Easily removable **arc chutes** without use of any tool
- Operating voltage ranges from **10% Un to 110% Un** for shunt release ensures intentional tripping even at high voltage drops during short circuit

Conformance to standards

- IEC - 60947 (Part 1 & 2)
- IS/IEC - 60947 (Part 1 & 2)
- IEC 60695 - 2 - 1
- BS EN 60947 - 2

Product Certification

Technical Data Sheet




Rating (A)			**400**	**630**		**800**				**1000**				**1250**				**1600**				**2000**				**2500**			**3200**			**4000**		**5000**	**6300**
Type Designation			**E**	**E**	**S1**	**E**	**S1**	**C**	**H**	**E**	**S1**	**C**	**H**	**E**	**S1**	**C**	**H**	**E**	**S1**	**C**	**H**	**E**	**S1**	**C**	**H**	**S1**	**C**	**H**	**S1**	**H0**	**H1**	**H0**	**H**	**C**	**C**
Rated current (A) at 50°C	I_n		400	630		800				1000				1250				1600				2000				2500			3200			4000		5000	6300
Rated operational voltage (V), 50/60Hz	U_e*		415	415		415				415				415				415				415				415			415			415		415	415
Rated insulation voltage (V), 50/60Hz	U_i		1000	1000		1000				1000				1000				1000				1000				1000			1000			1000		1000	1000
No. of poles			3	3	3/4	3	3/4			3	3/4			3	3/4			3	3/4			3	3/4			3/4			3/4			3/4		3/4	3/4
Rated ultimate short circuit breaking	I_{cu}	380/415/500V	50	50	50	50	50	50	65	50	50	50	65	50	50	50	65	50	50	50	65	50	50	55	75	60	60	75	60	75	100	75	100	95	95
capacity 50/60Hz (kA rms)		660/690V	-	-	-	-	-	35	50	-	-	35	50	-	-	35	50	-	-	35	50	-	-	40	65	-	40	65	-	65	85	65	85	Δ	Δ
Rated service short circuit breaking	I_{cs}	380/415/500V	50	50	50	50	50	50	65	50	50	50	65	50	50	50	65	50	50	50	65	50	50	55	75	60	60	75	60	75	100	75	100	95	95
capacity 50/60Hz (kA rms)		660/690V	-	-	-	-	-	35	50	-	-	35	50	-	-	35	50	-	-	35	50	-	-	40	65	-	40	65	-	65	85	65	85	Δ	Δ
Rated short time		0.5 sec	50	50	50	50	50	50	65	50	50	50	65	50	50	50	65	50	50	50	65	50	50	55	75	60	60	75	60	75	100	75	100	95	95
withstand capacity	I_{cw}**	1 sec	50	50	50	50	50	50	65	50	50	50	65	50	50	50	65	50	50	50	65	50	50	55	75	55	60	75	60	75	100	75	100	95	95
50/60Hz (kA rms)		3 sec	-	-	-	-	-	35	50	-	-	35	50	-	-	35	50	-	-	35	50	-	-	50	65	-	55	65	-	70	85	70	85	Δ	Δ
Rated making capacity	I_{cm}	380/415/500V	105	105	105	105	105	105	143	105	105	105	143	105	105	105	143	105	105	105	143	105	105	121	165	132	132	165	132	165	220	165	220	209	209
50/60Hz (kA peak)		660/690V	-	-	-	-	-	73.5	105	-	-	73.5	105	-	-	73.5	105	-	-	73.5	105	-	-	84	143	-	84	143	-	143	187	143	187	Δ	Δ
Rated impulse withstand voltage of main circuit (kV)	U_{imp}		8	8	12	8	12	12	12	8	12	12	12	8	12	12	12	8	12	12	12	8	12	12	12	12	12	12	12	12	12	12	12	12	12
Rated impulse withstand voltage of aux. circuit (kV)	U_{imp}		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Typical opening time (ms)			40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Typical closing time (ms)			60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
Utilization category			B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Suitability for isolation			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fixed			✓	✓	x	✓	x	✓	✓	✓	x	✓	✓	✓	x	✓	✓	✓	x	✓	✓	✓	x	✓	✓	x	✓	✓	x	x	x	x	x	x	x
Draw out			x	x	✓	x	✓	✓	✓	x	✓	✓	✓	x	✓	✓	✓	x	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Manual			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Electrical			x	x	✓	x	✓	✓	✓	x	✓	✓	✓	x	✓	✓	✓	x	✓	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Electrical & Mechanical life (operating cycles) ‡			15000	15000	20000	15000	20000			15000	20000			20000				20000				20000				20000			10000			10000		5000	5000
Electrical life without maintenance			6000	6000	8000	6000	8000	8000	8000	6000	8000	8000	8000	6000	7000	7000	7000	6000	7000	7000	7000	4500	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	2500	2500
Dimensions (in mm)	Fixed	H	385	385	-	385	-	394		385	-	394		385	-	394		385	-	394		385	-	394		-	394		-	Δ		Δ		-	-
		W 3 Pole	316	316	-	316	-	326		316	-	326		316	-	326		316	-	326		316	-	482		-	482		-	Δ		Δ		-	-
		W 4 Pole	-	-	-	-	-	414		-	-	414		-	-	414		-	-	414		-	-	628		-	628		-	Δ		Δ		-	-
		D	423.5	423.5	-	423.5	-	431		423.5	-	431		423.5	-	431		423.5	-	431		423.5	-	431		-	431		-	Δ		Δ		-	-
	Draw out	H	-	-	468	-	468			-	468			-	468			-		468		-	468	468		468			468			468		583	583
		W 3 Pole	-	-	399	-	399			-	399			-	399			-		399		-	399	555		555			555	701		701		913	913
		W 4 Pole	-	-	487	-	487			-	487			-	487			-		487		-	487	701		701			701	909		909		1182	1182
		D	-	-	587	-	587			-	587			-	587			-		587		-	587	587		587			587	587		587		691	691

* Please consult us for application at dc voltages & higher operational voltage upto 1000V ac
** Icw values are indicated based on thermal considerations. While selecting a breaker please ensure that Icw requirement for the application is not more than Ics / Icu at the point of installation.

‡ Electrical life = Mechanical life. However, arcing contacts need to be replaced depending upon wear.
Δ Please consult us.

Protection releases

Microprocessor-based, Communication-capable Release - SR71

Salient Features

- Micro-controller based RMS sensing
- Offers comprehensive protection for overload, short circuit, instantaneous, earth fault and neutral overload
- High resolution backlit LCD display
- Intelligent Pre-trip alarm to prevent system shutdown
- Password protected setting and commands
- MODBUS RTU protocol
- Intrinsic RS 485 port
- Total breaker control and monitoring through PC
- LED indication for POWER ON, different faults and Pre-trip alarm
- 2 sets of storable protection setting
- Non-volatile memory to store last 5 trips
- 128 Event recording with time & date stamping
- 3 programmable contacts-1 for micro controller failure, 2 for basic fault annunciation
- 4 relay contacts for indication of exceeding maximum demand, Pre-trip alarm and control on breaker (closing and opening)
- Auto-doubling features to prevent nuisance tripping
- Selectable I^2t based current for short-time and earth fault zones
- Thermal reflectivity enables faster tripping on recurrent overloads
- Intelligent discrimination
- Self-diagnostic and monitoring with tri-colour LED indication
- Conformance to EMC standards

	Parameter		Screen Abbreviation	Details	Factory Settings
Overload (Phase)	Current Settings (A), Ir = In x		PICKUP	0.4 to 1.0 In in steps of 0.05 In	1.0 In
	Time Delay, Tr (sec) at 6 x Ir		TMS-tr	0.5-1-2-4-6-12-18-24-30	30 sec
	Pre-trip Alarm Settings		PREALAR	0.5 to 0.95 Ir in steps of 0.05 Ir	0.95 Ir
	Thermal Reflectivity		THM-MEM	ON / OFF	OFF
	Function		FUNC	Enable / Disable	
Neutral Fault	Current Settings (A), In = Irx		PICKUP	0.5-1.0	1.0 Ir
	Time Delay (sec)		DELAY	Same as 'Overload (Phase)'	30 sec
Short Circuit	Current Settings (A), Is = In x		PICKUP	2 to 10 In in steps of 0.5 In	10 In
	Time Delay, Ts (msec) at 10 x In	I^2t OFF	DELAY	20-100-200-300-400	400 msec
		I^2t ON	DELAY	20-100-200-300-400	400 msec
	Pre-trip Alarm Settings		PREALAR	0.5 to 0.95 Is in steps of 0.05 Is	0.95 Is
	I^2t		I^2t	ON / OFF	
	Cold-load Pickup		COLDPIC	Enable / Disable	Disable
	Cold-load Pickup Delay		CP_DLY	0.1 to 10 sec in steps of 0.1 sec	0.1 sec
Instantaneous	Function		FUNC	Enable / Disable	Enable
	Current Settings (A), Ip = In x		PICKUP	2 to 16 In in steps of 0.1 In	16 In
Earth Fault	Function		FUNC	Enable / Disable	Enable
	Current Settings (A), Ig = In x		PICKUP	0.1 to 0.6 in steps of 0.05 In for I^2t ON	0.6 In
				0.1 to 0.6 in steps of 0.01 In for I^2t OFF	
	Time Delay (sec), Td		DELAY	100 to 400 msecs in steps of 100 msec for I^2t ON	3 sec
				0.1 to 5 sec in steps of 100 msec for I^2t OFF	
	Pre-trip Alarm Settings		PREALAR	0.5 to 0.95 Ig in steps of 0.05 Ig	0.95 Ig
	I^2t		I^2t	ON / OFF	OFF
	Cold-load Pickup		COLDPIC	Enable / Disable	Disable

Note: Both Protection Groups 1 & 2 carry the same factory settings.

Additional Protections

Parameter		Screen Abbreviation	Details	Factory Settings
Under Current	Function	FUNC	Enable / Disable	Disable
	Current Setting (A) x In	PICKUP	15% to 80% in steps of 5% In	0.8 In
	Time Delay (secs)	DELAY	1 to 255 in steps of 1 second	1 second
	Trip / Alarm	MODE	Either / Both	Alarm
Current Unbalance	Function	FUNC	Enable / Disable	Disable
	Current Setting (A) x In	PICKUP	10% to 95% in steps of 5% In	0.2 In
	Time Delay (secs)	DELAY	1 to 10 in steps of 5 secs	2.0 secs
Over Voltage#	Function	FUNC	Enable / Disable	Disable
	Voltage Setting (V) Vs = Vn x ..	PICKUP	105% to 150% in steps of 5% Vn	1.2 Vn
	Time Delay (secs)	DELAY	0.1 to 100 in steps of 0.1 secs	5.0 secs
	Reset Voltage	RSTSET	85% to 98% in steps of 1% Vs	0.95 Vs
	Trip / Alarm	MODE	Either / Both	Alarm
Under Voltage#	Function	FUNC	Enable / Disable	Disable
	Voltage Setting (V) Vn x ..	PICKUP	45% to 65% in steps of 5% Vn	0.6 Vn
	Time Delay (secs)	DELAY	0.1 to 5 in steps of 0.1 secs	1 second
	Reset Voltage	RSTSET	102% to 115% in steps of 1% Vs	1.02 Vs
	Trip / Alarm	MODE	Either / Both	Alarm
Under Frequency#	Function	FUNC	Enable / Disable	Disable
	Frequency Setting (Hz)	PICKUP	45 to 50Hz for 50Hz in steps of 0.01Hz	48.0Hz
			57 to 60Hz for 60Hz in steps of 0.01Hz	59.0Hz
	Time Delay (secs)	DELAY	0.1 to 100 secs in steps of 0.1 Second	0.2 secs
	Drop Off Frequency	DRPOFF	0.02 to 0.10Hz in steps of 0.1Hz	0.1Hz
	Trip / Alarm	MODE	Either / Both	Alarm
Over Frequency#	Function	FUNC	Enable / Disable	Disable
	Frequency Setting (Hz)	PICKUP	50 to 55Hz for 50Hz in steps of 0.01Hz	52.0Hz
			60 to 62Hz for 60Hz in steps of 0.01Hz	61.0Hz
	Time Delay (secs)	DELAY	o.1 to 100 secs in steps of 0.1 second	0.2 secs
	Drop Off Frequency	DRPOFF	0.02 to 0.10Hz in steps of 0.1Hz	0.1Hz
	Trip / Alarm	MODE	Either / Both	Alarm
Reverse Power#	Function	FUNC	Enable / Disable	Disable
	Settings (kW)	PICKUP	0.02 to 0.4 in steps of 0.01 Pn	0.2 Pn
	Time Delay (secs)	DELAY	1 to 100 in steps of 0.1 secs	2.0 secs
	Trip Alarm	MODE	Either / Both	Alarm
Phase Sequence#	Function	FUNC	Enable / Disable	Disable
	Settings	PICKUP	123 - 132	123
	Time Delay (secs)	DELAY	0 to 5 in steps of 0.5 secs	2 secs
	Trip / Alarm	MODE	Either / Both	Alarm
Breaker Failure	Function	FUNC	Enable / Disable	Disable
	Time Delay (secs)	DELAY	0.05 to 2 secs in steps of 0.01 secs	1.0 second
Maximum Demand Exceed	Function	FUNC	Enable / Disable	Disable
	Settings (kW)	PICKUP	40 kW - 1600 kW	100 kW
	Step	DELAY	10 kW - 1000 kW	10 kW
i -Discrimination		*i* -Discrimination		Disable

Requires SR71-PM module

Metering

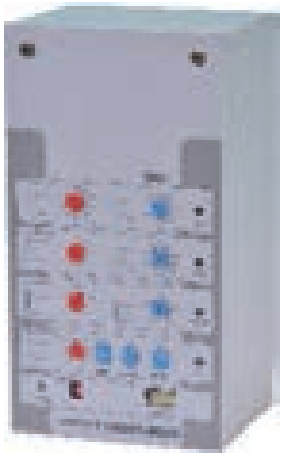
Parameter	Screen Abbreviation	Details
Current	I	Phase, Earth and Neutral
	Imax	Maximum running Current per Phase
	%Load	Percent Loading
Voltage#	V	Phase-Neutral
	Vph-Vph	Phase-Phase
Frequency#	F	System Frequency
Power Factor#	PF	System Power Factor
Power#	kW	Active Power per Phase and Total (kW)
	kVAr	Reactive Power per Phase and Total (kVAr)
	kVA	Apparent Power per Phase and Total (kVA)
	kW	Maximum Demand (kW)
Energy#	kWh	Total Active Energy (kWh)
	kVArh	Total Reactive Energy (kVArh)
	kVAh	Total Apparent Energy (kVAh)
Harmonic-Current	I1HAR	R-Phase Current Harmonics
	I2HAR	Y-Phase Current Harmonics
	I3HAR	B-Phase Current Harmonics
Harmonic-Voltage#	V1HAR	R-Phase Voltage Harmonics
	V2HAR	Y-Phase Voltage Harmonics
	V3HAR	B-Phase Voltage Harmonics
Display		High Resolution Backlit LCD

Requires SR71-PM module

Additional Features

Parameter		Details
LED Indications	Auxiliary Power ON	✓
	Overload	✓
	Short Circuit	✓
	Instantaneous	✓
	Earth Fault	✓
	Neutral Fault	✓
	Trip	✓
	Alarm	✓
Auxiliary Supply		24V DC
Digital Inputs		4 Nos.
Output Relays		3 Internal + 4 External Relays
		240V AC / 5A, 30V DC / 5A (resistive load)
Rating Plug	In Multiplier	630-800-1000-1250-2000-3200-5000
Communication	Protocol	MODBUS RTU
	Link used	RS 485
Maintenance Indication		I^2t based
Event Records		Pickup, Alarm, Trip, Date, Time and Cause of Event
Trip Records		Last 5 records with date and time stamping, voltage and current readings in all phases
Testing	Self-Diagnostic Test	✓
	Relay Module	4 Relay Outputs
Supplementary Modules	Power Supply Module	24V DC Output
	Communication Module	MODBUS RTU
No. of Storable Settings		2

Microprocessor Based Release - SR21i



Salient Features

- Self-powered
- True RMS sensing
- Zone selective interlocking on short circuit and ground faults reduces dynamic and thermal stress on the system
- Self-diagnostic and self-correcting facility to monitor its own performance
- Facility for default protection setting
- Switchable thermal memory takes care of residual heat in case of repetitive overloads
- Multi-state LED to indicate
  - Power ON condition
  - Test mode
  - Microprocessor unhealthy condition
- Individual fault annunciation through LEDs
- On load testing release possible through 'TEST' button (without tripping the breaker)
- AN1 module for remote fault indication through LEDs with changeover contact for each kind of fault
- Direct tripping of breaker-reliable tripping with minimum time delay test kit available for testing the release (SRT-2)
- Realistic hot and cold curves which take into account integrated heating effect
- Conformance to EMI/EMC standards

Type of Protection	Setting Range	
	Pick-up Current	Time Delay
Long Time	Ir - 0.5 to 1.0 times In Steps : 0.50, 0.60, 0.65, 0.70, 0.75, 0.80, 0.85, 0.9, 0.95, 1.00	0.2 to 30 sec. at 6 times Ir Steps : 0.2, 0.5, 1, 1.5, 2, 3.5, 6, 12, 17, 30 Sec
Short Time	2 to 10 times In Steps : 2, 3, 4, 5, 6, 7, 8, 9, 10	20 ms to 600 ms Steps : 20, 60, 100, 160, 200, 260, 300, 400, 500, 600 ms
Instantaneous	2 to 16 times In Steps : 2, 3, 4, 6, 8, 10, 12, 14, 16, MAX (infinity)	-
Ground Fault	0.2 to 0.6 times In Steps : 0.2, 0.3, 0.4, 0.5, 0.6	100 to 400 ms Steps : 100, 200, 300, 400 ms & infinity

In 3 phase, 4 wire system, Neutral CT is required for ground fault protection.

Protection releases

Microprocessor Based Release - SR18 & SR18G

Salient Features

- Self-powered
- True RMS sensing
- Comprehensive protection
  - SR18; Long Time and Short Time
  - SR18G; Long Time, Short Time and Ground fault protection
- True Hot & Cold characteristics
- Switchable thermal memory takes care of residual heat in case of repetitive overloads
- Facility to have default protection settings
- Suitable for 800A to 6300A
- Multi-state LED to indicate
  - Power ON condition
  - Test mode
  - Microprocessor unhealthy condition
- Individual fault annunciation through LEDs
- On load testing of release possible through 'TEST' button (without tripping the breaker)
- Test kit (SRT-2) available for testing the releases
- Direct tripping of breaker-Reliable tripping with minimum time delay
- Conformance to EMI/EMC standards

Type of Protection	Setting Range	
	Pick-up Current	Time Delay
Long Time	Ir - 0.5 to 1.0 times In Steps : 0.50, 0.60, 0.65, 0.70, 0.75, 0.80, 0.85, 0.9, 0.95, 1.00	2.5 sec at 6 times Ir
Short Time	2 to 10 times Ir Steps : 2, 3, 4, 5, 6, 7, 8, 9, 10	20 to 600 ms Steps: 20, 60, 100, 160, 200, 260, 300, 400, 500, 600 ms
Instantaneous	6 & 12 In	-
Ground Fault*	0.2 to 0.6 times In Steps : 0.2, 0.3, 0.4, 0.5, 0.6	100 to 400 ms Steps : 100, 200, 300, 400 ms & OFF

* Available in SR18G release only
In 3 phase, 4 wire system, Neutral CT is required for ground fault protection.

Thermo-magnetic Over Current Release Type - DN1

DN1 is CT-operated thermo-magnetic release, which offers reliable protection against overload, short circuit and ground faults.

Protection

Overload Protection
- Continuous & individual phase adjustable dial settings from 75% to 100% of CT tap
- Inverse Time Characteristics

Short Circuit Protection
- Two taps available to select operating threshold

Ground Fault Protection
- Offered with auxiliary earth fault release (20% to 50% In)

Salient Features

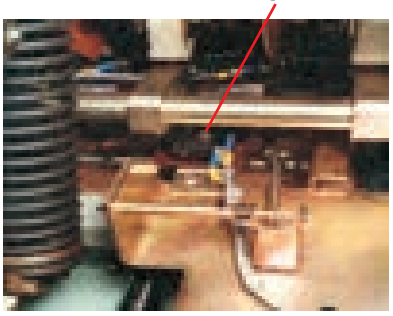
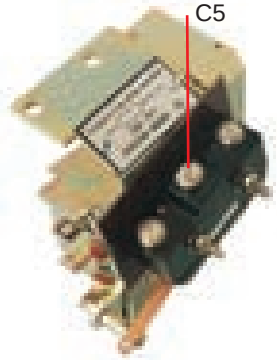
- True RMS sensing
- Ambient temperature compensated from -5°C to 50°C
- Wide range of overload & short circuit settings possible with multitap CTs
- Each phase can be individually adjusted for overload & short circuit settings
- Fixed minimum impulsion time of 25 ms on short circuit to prevent nuisance tripping due to transients
- Trip test facility available

Accessories

Locks/Interlocks

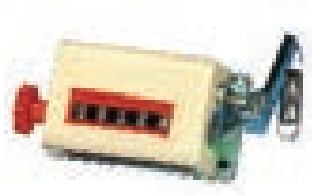
Type	Data
Lockable Trip Push Button (LTPB) 	Mounted in place of normal trip push button. With this, ACB can be locked in trip condition. For interlocking, LTPBs are offered in the following combinations: • 4 different types of keys i.e. AA, BB, CC and DD suitable for 2 incomers and 1 bus coupler schemes • Combination of L, M, N, LM and MN locks, which are suitable for three incomer and two bus coupler schemes • Combination of K, L, MN, KL, LM and MN locks, which are suitable for four incomer and three bus coupler schemes • Combination of J, K, L, M, N, JK, KL, LM and MN locks, which are suitable for five incomer and four bus coupler schemes
View of the Cradle  Door Interlock Racking Inerlock Locking in 'Isolated' Position	**Locking in Isolated Position (LIP)** The facility of locking the ACB in Isolated position is available in Drawout ACBs. This is useful to achieve interlocking between Main & Standby source. Similar lock is available as **LOCK IN ANY POSITION.** **Door Interlock** This ensures: • Unless the panel door is closed, breaker cannot be racked in or out • Unless the breaker is in Isolated Position, it is not possible to open the panel door **Racking Interlock** This ensures that breaker cannot be racked in/out unless the ACB is in tripped/open condition.
Mechanical Interlock 	It is possible to provide 'Mechanical Interlock' between two breakers of the same or different ratings in vertical or horizontal configurations. Mechanical interlock is available for ACBs up to 4000A. Mechanical interlocking for ACBs in vertical configuration can be provided by links or by flexible cables. Same for horizontal configuration can be provided by flexible cables.

Signaling

Type	Data
C1 	**Common indication of tripping due to overload, short circuit and ground faults.** • Provided by micro-switch C1 fitted inside the ACB • Available as an option in all releases
C2 	**Separate indication of tripping due to overload, short circuit and ground faults.** • For release type DN1, this is provided by micro-switch C1 & C2 (C2 fitted inside release) • Available through in-built fault indicators in SR18, SR18G, SR21i & SR71 releases
AN1-Annunciator Module 	**Remote indication of tripping due to overload, short circuit and ground faults.** • Can be used with releases type SR18/SR18G/SR21i • Individual fault indication provided by three separate LEDs for - Long time faults - Short time fault/instantaneous fault - Ground fault one potential free contact rated 5A at 230V AC available for each type of fault • Flush mounting on panel (H-W-D=92mm x 46mm x 105mm) • Operating voltage: 240V AC/110V DC/220V DC (other Voltages available on request)
C5 	**Indication for operation of shunt release or under voltage release.** • Provided by micro-switch C5 fitted on the shunt release

Accessories

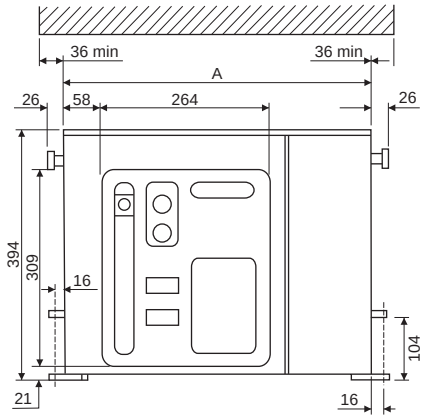
<table>
<tr><th>Type</th><th>Data</th><th>Technical Data</th></tr>
<tr>
<td>Shunt Release
  </td>
<td>• For remote tripping of the breaker
• Shunt release coil is short time rated and is disconnected from the circuit by an auxiliary contact when the ACB trips (Refer to wiring diagram)
• Low power consumption
• Two types available:
- EA for DC application
- EA1 for AC application</td>
<td>
<table>
<tr><th>Type of Release</th><th>Nominal voltage Uc (V) 50Hz</th><th>Power consum-ption at pick up</th><th>Operation Limit</th></tr>
<tr><td>EA1</td><td>240 AC
415 AC</td><td>800 VA
800 VA</td><td>10-130% Uc</td></tr>
<tr><td>EA</td><td>24V DC
48V DC
110 DC
220 DC</td><td>32 W
125 W
45 W
30 W</td><td>65-130% Uc</td></tr>
</table>
Note : Other voltages available on request
</td>
</tr>
<tr>
<td>Undervoltage Release
  </td>
<td>Two types available:
• Type MV With no intentional time delay

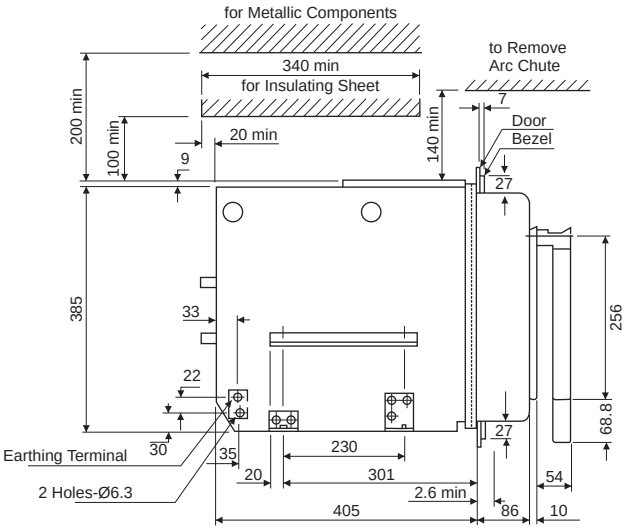
Notes: When undervoltage release is provided, the ACB can be closed only when supply is available to the undervoltage release.</td>
<td>
<table>
<tr><th>Parameter</th><th>Specification</th></tr>
<tr><td>Nominal voltage (Uc)</td><td>240V & 415V: 50Hz
220V & 415V: 60Hz</td></tr>
<tr><td>Pick up (V)</td><td>80% Uc</td></tr>
<tr><td>Drop OFF (V)</td><td>35-65% Uc</td></tr>
<tr><td>Consumption (VA)</td><td>Pick up - 23 VA
Hold on - 10 VA</td></tr>
<tr><td>Watt loss</td><td>6 W</td></tr>
</table>
</td>
</tr>
<tr>
<td>Auxiliary Contacts
  </td>
<td>Two combinations available:
• 2 NO + 2 NC
• 6 NO + 6 NC</td>
<td>
<table>
<tr><th>Electrical circuit</th><th>Voltage (V)</th><th>Rated current (A)</th></tr>
<tr><td>Resistive</td><td>24 to 415 AC
250V AC</td><td>16
1.2</td></tr>
<tr><td>Non-resistive</td><td>24 to 415 AC
250V AC</td><td>16
1.0 #</td></tr>
</table>
L/R = 15ms with two contacts in series
</td>
</tr>
<tr>
<td>Operation Counter
  </td>
<td>• Operates mechanically
• Display total number of breaker operation cycles</td>
<td></td>
</tr>
</table>

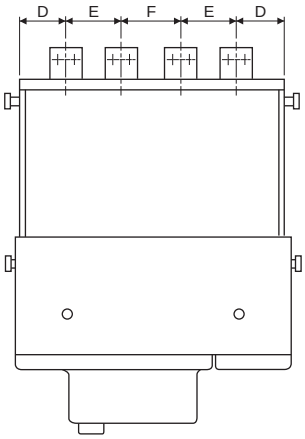
Overall Dimensions

Fixed Breakers

For 630A to 2500A 3P/4P C/H

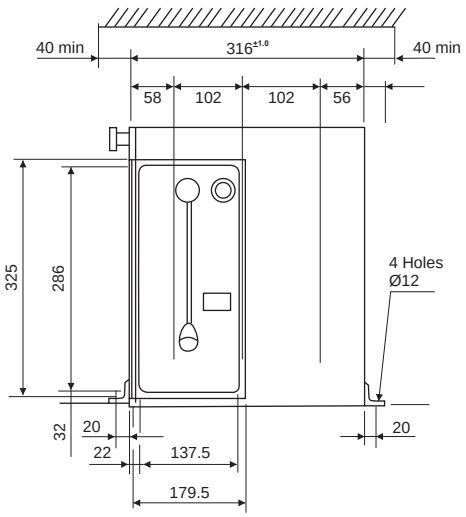


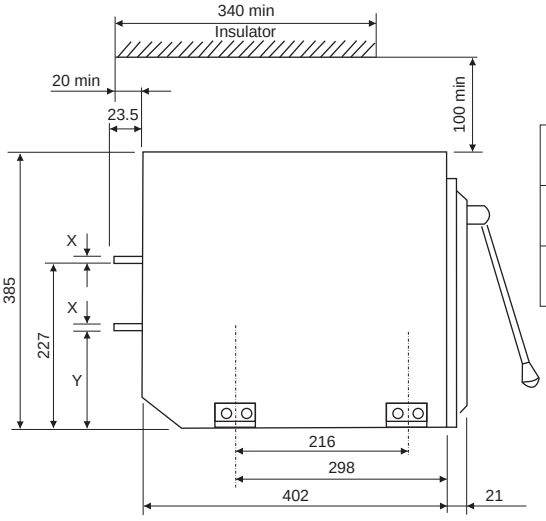




Ratings CN - CS			Dimensions (mm)				Weight (kg.)	
			A	D	E	F	Manual	Electrical
630/800/1000A	C/H	3P	326	57	102	-	50	57
1250/1600A	C/H	3P					51	58
630/800/1000A	C/H	4P	414	56	98	98	54	61
1250/1600A	C/H	4P					55	62
2000/2500A	C/H	3P	482	83	154	-	69	76
2000/2500A	C/H	4P	628	82	150	156	77	84

For CN-CS...E 400A-2000A 3P





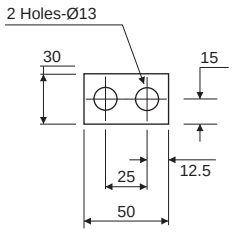
Rating Type	X	Y
400E - 1250E	5	150
1600/ 2000E	15	140

Note : All Dimensions are in mm.

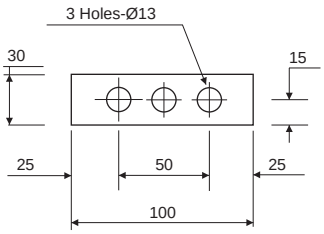
Overall Dimensions

Fixed Breakers

Terminal

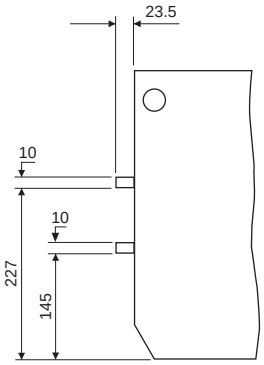


400 to 2000E & 800/1000/1250/1600C/H

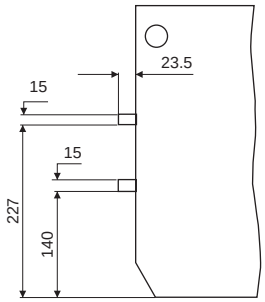


2000/2500C/H

Terminal Connections

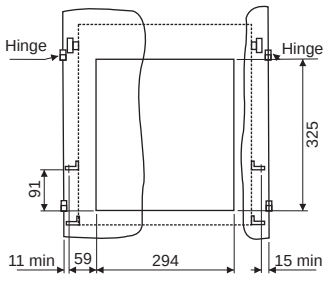


Terminal for 800/1000C/H

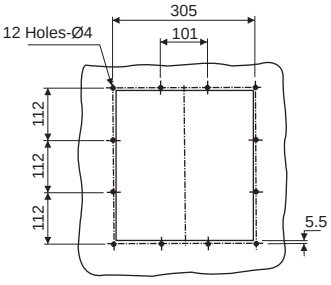


Terminal for 1250/1600/2000/2500C/H

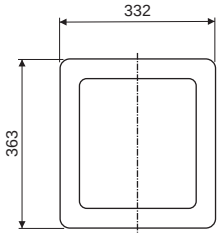
Bezel Fixing Plan for all Fixed Breakers



Door Cutout



Door Drilling for Bezel Fixing Plan



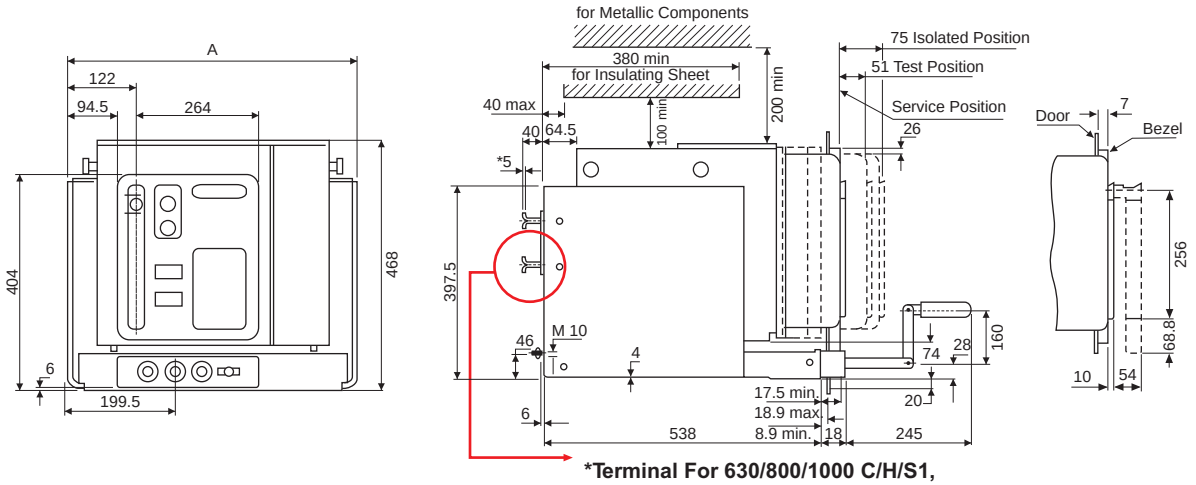
Bezel

Note: All dimensions are in mm.

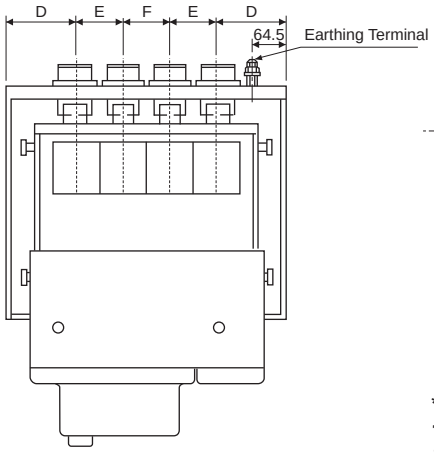
Overall Dimensions

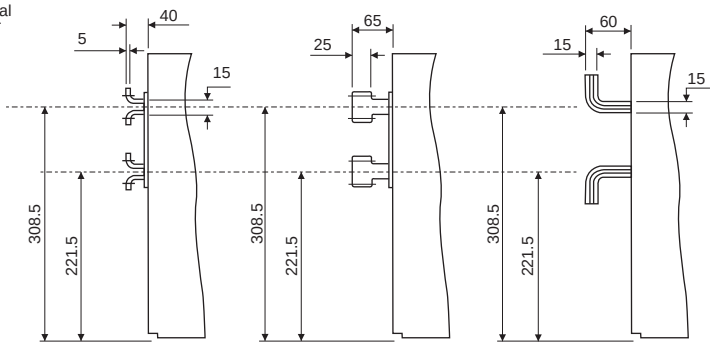
Drawout Breakers

For 630A to 3200A C/H/S1 3P/4P, 3200H1/4000H 3P



*Terminal For 630/800/1000 C/H/S1, 1250/2500S1 & 2000C/H





*Terminal for 1250/1600/2500C/H & 800/1000H

*Terminal for for 3200S1

*Terminal for 3200H0/H1 & 4000H0/H

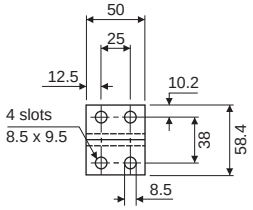
Ratings CN - CS			Dimensions (mm)			
			A	D	E	F
630/800/1000A	C/H/S1	3P	399	97.5	102	-
2000A	S1	3P				
1250/1600A	C/H/S1	3P				
630/800/1000A	C/H/S1	4P	487	96.5	98	98
2000A	S1	4P				
1250/1600A	C/H/S1	4P				
2000/2500A	C/H	3P	555	123.5	154	-
2500/3200A	S1	3P				
2000/2500A	C/H	4P	701	122.5	150	156
2500/3200A	S1	4P				
3200A	H0/H1	3P	701	148.5	202	-
4000A	H0/H	3P				
3200A	H0/H1	4P	909	151.5	202	202
4000A	H0/H	4P				

Note : All Dimensions are in mm.

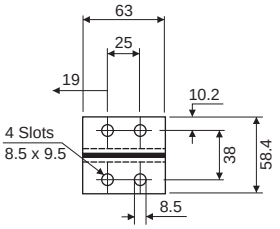
Overall Dimensions

Drawout Breakers

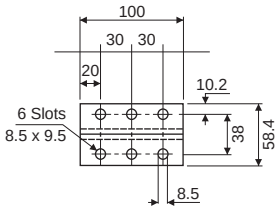
Flat Terminal Connections



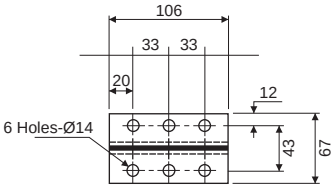
630 - 1000C & 630 - 1250S1



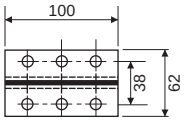
800 - 1000H, 1250/1600C/H & 1600 - 2000S1



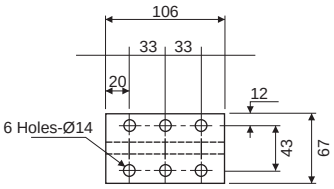
2000C



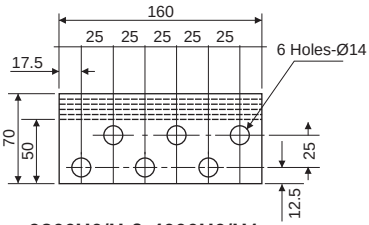
2500C/H & 2000H



2500S1

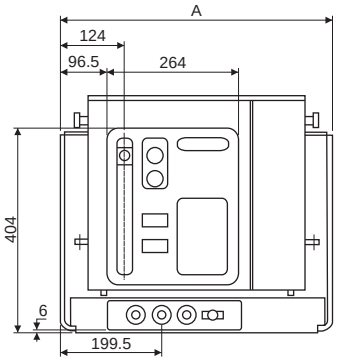


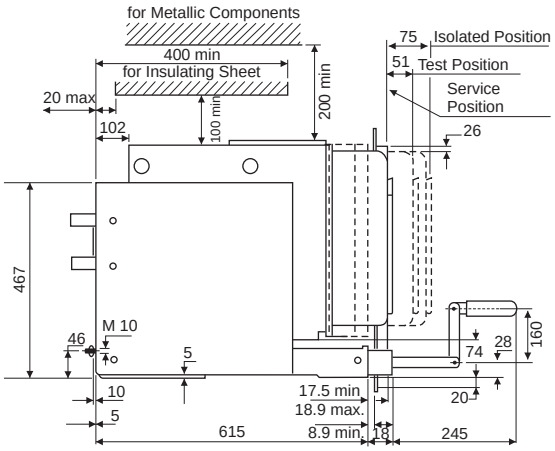
3200S1

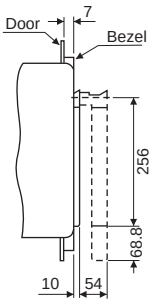


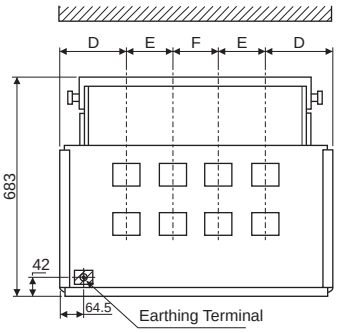
3200H0/H & 4000H0/H1

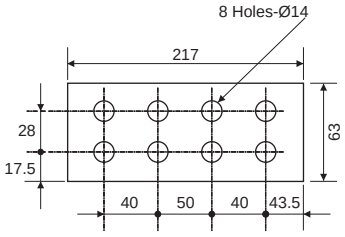
For 5000C/6300C 3P











Terminal Connections
5000C/6300C

Ratings		Dimensions (mm)			
		A	D	E	F
5000A	C 3P	913	187.5	269	-
6300A	C 3P	913	187.5	269	-
5000A	C 4P	1182	187.5	269	269
6300A	C 4P	1182	187.5	269	269

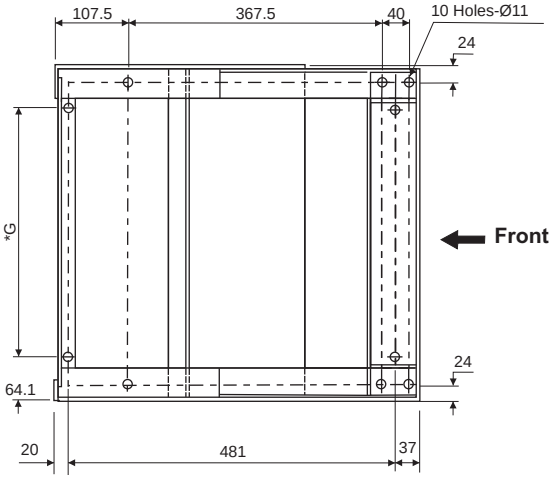
Note: All Dimensions are in mm.

Overall Dimensions

Mounting Details

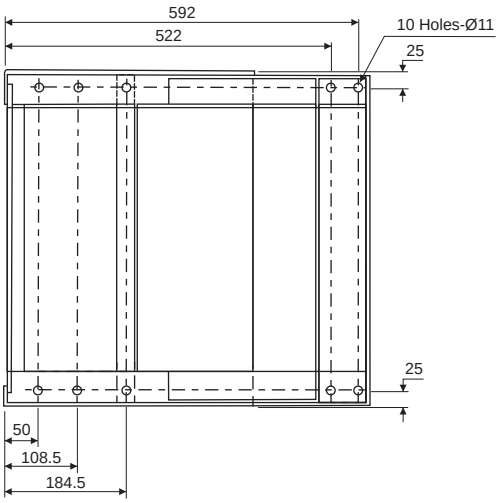
For Horizontal Mounting of all Draw-out Breakers

For 630A to 3200A C/H/S1 3P/4P 3200 H0/H1, 4000 H0/H 3P/4P

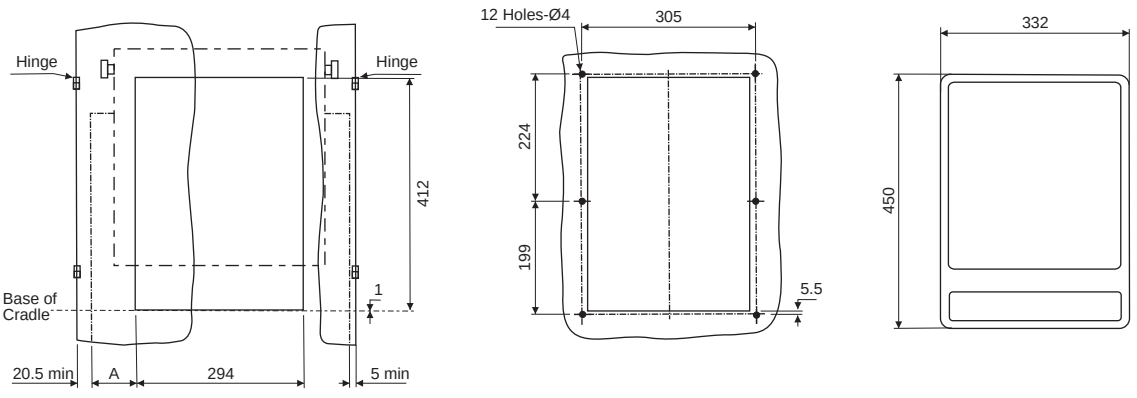


Ratings		Type	G (mm)
800A - 1600A	3P	C/H	280.3
630A - 2000A	3P	S1	280.3
800A - 1600A	4P	C/H	368.3
630A - 2000A	4P	S1	368.3
2000/2500A	3P	C/H	436.3
2000/2500A	4P	C/H	582.3
2500/3200A	3P	S1	436.3
2500/3200A	4P	S1	582.3
3200A	3P	H0/H1	582.3
3200A	4P	H0/H1	790.3
4000A	3P	H0/H	582.3
4000A	4P	H0/H	790.3
5000/6300A	3P	C	863
5000/6300A	4P	C	1132

For 5000C/6300C 3P/4P



Bezel Fixing Plan for all Draw-out Breakers



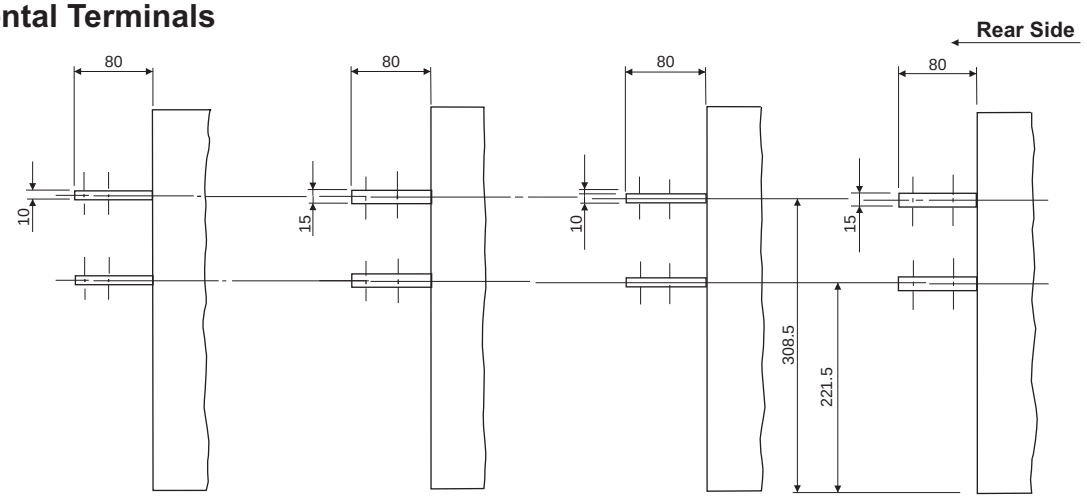
Door Cutout

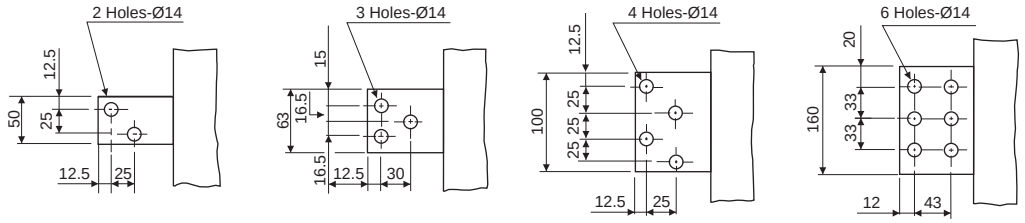
Note: For 5000C/6300C 3P ACB, A = 81.5
For other Drawout Breakers A = 79.5

Overall Dimensions

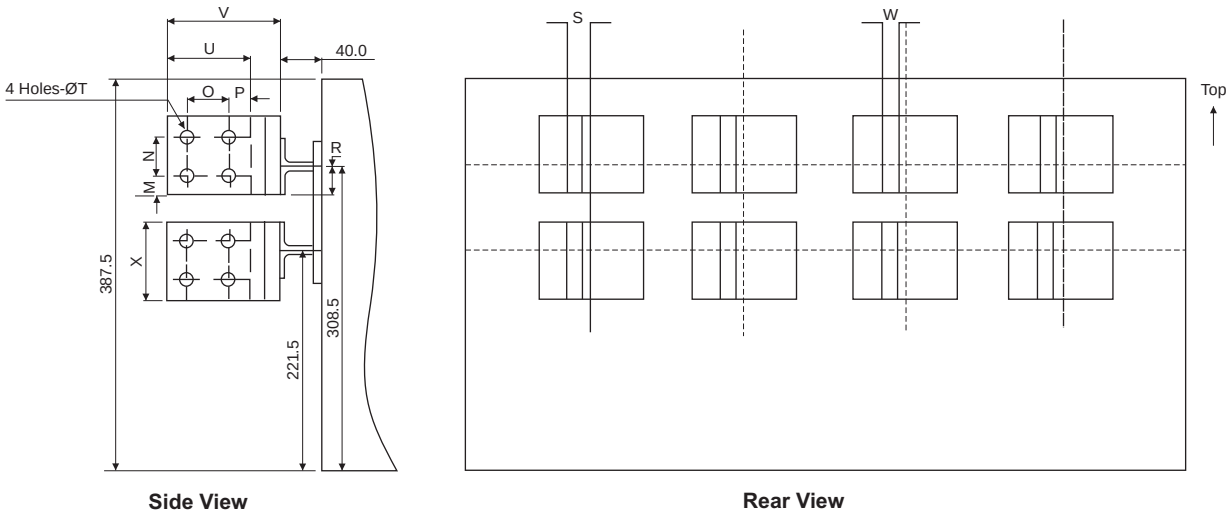
Terminals

Horizontal Terminals





Vertical Terminals



Ratings		M	N	P	Q	R	S	T	U	V	W	X
800/1000A	C	10.2	38	20	25	29.2	5	9	65	95	10	58.4
1250/1600A	C/H	20	40	20	25	29.2	5	9	65	95	10	80
800/1000A	H											
2000A	C	20	40	20	40	29.2	22.5	14	80	110	15	80
2500A	C/H	20	40	20	40	33.5	7.5	14	80	110	15	80
2000A	H											

Note : 1) All Dimensions are in mm. 2) Consult us for other Terminal Orientations.

Switchgear Training Centres

Pune

Lucknow

Coonoor

'Train & Gain' - This concept underlies L&T's commitment to its customers and the Indian switchgear industry. To this end, L&T has set up Switchgear Training Centers equipped with a wide range of education facilities at Pune, Lucknow & Coonoor. Specially designed 'Hands-On' training programs on the operation & maintenance of switchgear are conducted for engineers and technicians from different industry segments. The centers have state-of-the-art training facilities, well-equipped workshops and testing systems.