





Moulded Case Circuit Breakers



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

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

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

The dsine range, a new generation of MCCBs, stands out due to its state-of-the-art design, contemporary user-friendly features, wide choice of protective releases, ergonomics, aesthetics and compactness.

The sine range complies with the latest standards like IEC 60947-2, EN 60947-2 & IS 13947-2. The products conform to international standards, carry ← markings and are KEMA & CB certified. The range is specially designed for tropical conditions, ensuring reliable performance at high ambient and humid environments.

The claime range is designed to meet the changing needs of users after extensive analysis and user feedback. The range can satisfy the most demanding system requirements.

The dsine range, complimented by a wide range of accessories, offer total solution to customer applications ensuring operational safety, reliability and versatility.



Switchgear Factory, Mumbai

Contents



Range	1
Protection Releases	2
State-of-the-art technology	5
Accessories	7
Technical Data	11
Time - Current Characteristic Curves	13
Overall Dimensions	16









DN0 DN1 DN2

DN3

DN4

The Complete Range

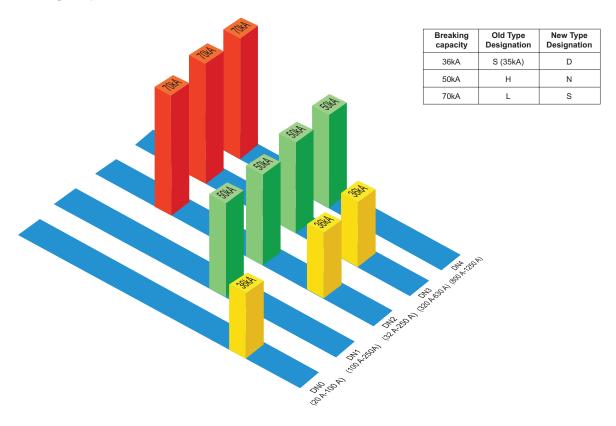


Features

- From 20 A to 1250 A
- 3 Pole & 4 Pole
- Choice of 36kA/50kA/70kA breaking capacities.
- With protection releases in Microprocessor, Thermal-Magnetic and only Magnetic
- MCCBs for motor backup protection
- MCCBs for distribution and SD versions
- Manual, rotary or motorised versions
- Wide range of internal and external accessories

	DN0						
Rated Current	20, 25, 32, 40, 50, 63, 80, 100 A						
Release	Thermal-Ma	agnetic					
	DN1						
Rated Current	100, 125, 160, 2	200, 250 A					
Release	Thermal-Ma	agnetic					
	DN2						
Rated Current	32, 40, 50, 63, 80, 100, 125, 160, 200, 250 A 40, 63, 100, 160, 250 A						
Release	Thermal-Magnetic Microprocessor						
	DN3						
Rated Current	320, 400, 500, 630 A	160, 250, 400, 630 A					
Release	Thermal-Magnetic Microprocessor						
	DN4						
Rated Current	800, 1000, 1	800, 1000, 1250 A					
Release	Microprocessor						

Breaking Capacities



Note: Since there is no change in the constructional aspect of the MCCBs, the product Certification with old designation remain valid with new type designation.



Thermal-Magnetic Release

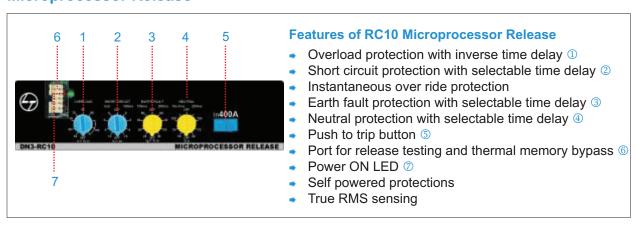


Protection	Settings					
	DN0 & DN1	DN2 & DN3				
Overload	80% - 100% <i>In</i>	80% - 100% <i>In</i>				
Short circuit	9 In (fixed)	6 - 10 <i>ln</i>				
Earth fault	External	External				

Features of Thermal-Magnetic Release

- Adjustable overload settings
- Adjustable short circuit settings
- True RMS sensing
- No contact with live parts

Microprocessor Release



RC10					
Rated Current In (A)	From 40 to 1250 A				
Overload (Phase)					
Current setting, Ir (Ir = XIn)	OFF, 0.4 to 1.0 in steps of 0.1				
Time delay, tr (Inverse)	10 sec at 6 <i>lr</i>				
Protection mode	ON / OFF				
Over	load (Neutral)				
Comment author In (In - VIa)	0.5,0.75 & 1.00 <i>Ir</i>				
Current setting, Ir (Ir = XIn)	Inverse 10 sec at 6 Ir / Fixed 200ms				
Protection mode	ON / OFF				
SI	nort Circuit				
Current setting, Is (Is =XIr)	1.5, 4 & 6 <i>lr</i> , 8 <i>lr</i>				
Time delay, ts	Inst. / 100 msec				
Protection mode	ON / OFF				
Instanta	neous Over ride				
Current setting, Ip	DN2-8In, DN3-400-12In, DN3-630-8In, DN4-8In				
E CONTRACTOR DE	arth Fault				
Current setting, Ig	0.2 to 0.5In steps of 0.1				
Time delay, tg	100 / 200 msec				
Protection mode	ON / OFF				



Microprocessor Release



Features of RC20 - Communication Capable

- Communication using RS 485
- Power on LED
- Backlit LCD display
- Scroll buttons
- Push to trip button
- → All features of RC10 release are incorporated
- Metering for current parameters
- Protection against unbalanced load / single phasing
- I²t protection
- Neutral protection
- Cold load protection
- User friendly navigation system
- Self powered
- MODBUS RTU protocol

	RC20
Rated Current In (A)	From 160 to 630 A
Ove	erload (Phase)
Current setting (A), $Ir(Ir = xIn)$	0.4 to 1.0 in steps of 0.1
Time delay, tr (s) (Inverse)	3, 6, 10, 15, 30 at 6 <i>lr</i>
Protection mode	ON / OFF
Preset trip alarm setting	0.8 to 1.0/r in steps of 0.05
Thermal memory	ON / OFF
Ove	erload (Neutral)
Current setting (A), Ir	50%, 100%, 150% <i>Ir</i>
Protection mode	ON / OFF
	Short Circuit
Current setting (A), Is	1.5, 4, 6, 8 <i>lr</i>
Time delections) to	For – I ² t OFF 20 to 200 in steps of 20
Time delay (ms), ts	For – I ² t ON 60 to 200 in steps of 20
Protection mode	ON / OFF
Preset trip alarm setting	0.8 to 1.0 times <i>Is</i> in steps of 0.05 <i>Is</i>
Cold load pickup	Enable / Disable
In	nstantaneous
Instantaneous	1.5 to 8 <i>In</i> in steps of 0.5 <i>In / Ir</i>
Protection mode	ON / OFF
Cold load pickup	Enable / Disable
Instan	taneous Over ride
Current setting (A), Ip	DN2-8In, DN3-400-12In, DN3-630-8In, DN4-8In
	Earth Fault
Current setting (A), Ig	0.2 to 0.5 <i>ln</i> steps of 0.1 <i>ln</i>
Time delay (ms), tg	0.1, 0.2, 0.5, 1, 3 sec.
Preset trip alarm setting	0.8 to 1.0 <i>lg</i> in steps of 0.05
Protection mode	ON / OFF
Cold load pickup	Enable / Disable



Additional Features of RC20

Current Unbalance					
Current setting (A) xIn	10% to 100% <i>In</i> in steps of 5%				
Time delay (s)	1 to 10 in steps of 0.5				
Protection mode	ON / OFF				
Cold load pickup	Enable / Disable				
	Temperature Rise				
Alarm / Trip	At 80°C / At 100°C				
	Metering				
Current	Phase, Neutral and Earth				
Display	Backlit LCD				
	Communication*				
Protocol	MODBUS RTU				
Link used	RS 485				
Event records	Pickup, Trip, Alarm upto 128 records-volatile memory				
Trip history	Last 5 trips records - non volatile memory				
Trip counter record	Counts for total number of trips				

Only Magnetic release (for Motor backup protection)

- Only magnetic with instantaneous protection upto 10In
- → Fault level protection for complete starter upto 50kA
- Type 2 charts available for DOL & Star/delta starters

Frame	250 A	630 A					
Туре	DN2-250M	DN3-400M	DN3-630M				
Current Range (A)	100-250	320-400	500-630				
Poles	3P only						
Icu(kA) @ 415V AC, 50Hz	50						

Switch Disconnector version (without protection release)

- Can be used as switching or Isolator devices
- → Higher withstand capacities
- Wide range of accessories for remote operation

Frame	250 A	400 A	630 A
Туре	DN2-250SD	DN3-400SD	DN3-630SD
Current Range (A)	100-250	320-400	500-630
Poles	3/4	3/4	3/4
Icw (kA) for 1sec.	3.6	6	6

^{*} To establish communication with computer every MCCB with RC20 will require a communication module.



→ Faster tripping

The unique speed contact system accelerates the opening of contacts during short circuit. This ensures faster tripping an ultimate current limiting feature. The result-very low let-through, cut-off current and fault clearing time

→ Mechanical Anti-reclosing

This unique feature ensures that under short circuit conditions, the contacts open and latch even before the release gives a trip command to the mechanism. This avoids contact re-closing and bounce



The entire current carrying path is optimally designed to achieve very low watt loss





→ Positive Isolation

The MCCB knob indicates the true position of the contacts

→ Double Insulation

The internal accessories are housed in insulated casings to ensure first level of insulation. When the front cover is opened for the fixing of internal accessories, the MCCB is totally insulated ensuring the double insulation

Marking

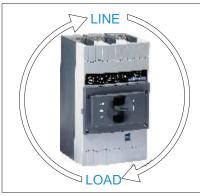
CE Marking ensures use of superior engineering plastic, meeting all requirements of flammability and glow wire testing path is optimally designed to achieve very low watt loss



→ Common Internal accessories

The internal accessories $\,$ remain same across DN0 / DN1 $\,$ DN2 / DN3 / DN4* and they are easy to install snap fit type





No load line bias

Either side of MCCB terminal can be used as load or line

→ Terminal finger proofing

Front terminal plates conceal the terminals to prevent human contact thus achieving complete finger proofing

→ Release shrouding

Release is shrouded from the front thus preventing tampering by unauthorized person

⇒ Safer release adjustments

No live parts are in contact during release adjustments







Common front adjustments for protection release

Overload & short circuit setting can be adjusted from front using a common knob for all the poles

→ Visibility

Push to trip button and release ratings are visible even when release plate is fitted

^{*} Except under voltage release.



Internal Accessories



Auxiliary Contact

List of Internal Accessories

- Auxiliary Contact 1 C/O
- Auxiliary Contact 2 C/O
- Trip Alarm Contact
- Auxiliary & Trip Alarm Contact
- Shunt Release
- Under Voltage Release

casine Range of MCCBs are offered with snap-fit type, easily installable internal accessories. There is no need to open main cover and no live parts are accessed during installation. TAC, Aux+TAC to be fitted in the right cavity & under voltage release to be fitted in left cavity.



MCCB with mid cover opened & Internal accessories fitted

External Accessories

Extended Rotary Handle (Panel Mounted)

- ROM mounts directly on MCCB without removal of mid cover
- Clear ON/OFF/TRIP indication
- Clear view of MCCB rating label with ROM mounted
- Direct access to push to trip button with ROM mounted
- IP 54 degree of protection with extended rotary handle
- → Unique coupling to allow ±3mm tolerance
- Door interlock in ON position, with defeat facility
- Door interlock in OFF condition with padlock feature
- Auto restoration of door interlock
- External keylock for mechanical interlocking



Extended Rotary Handle: Panel Mounted



Panel Door Mounted Key lock (To be used along with extended rotary handles)



Rotary Operating Mechanism

The rotary operating mechanism (ROM) for dsine MCCBs are available in Direct & Extended versions.

Direct rotary handle (MCCB mounted)

These versions are available for the entire family of dine MCCBs.



Mechanical Interlocking Schemes

1. Mechanical Interlocking Kit:

Two MCCBs can be interlocked using base plate mechanism, in side-by-side configuration.

Features

- → For 3 Pole & 4 Pole versions
- → For DN2 & DN3 frames
- → Site fittable



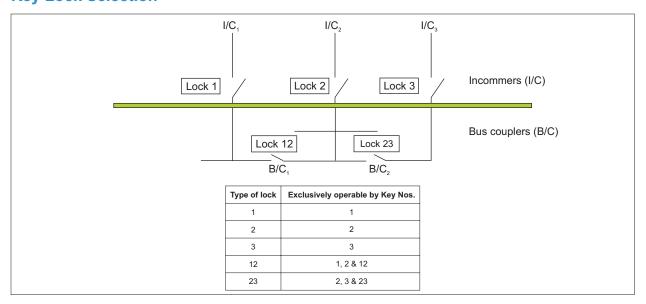
MIL with Base Plate

2. Mechanical Interlocking using Key locks:

For mechanical interlocking through Extended Rotary operating mechanism, a panel mounted key lock is available. The selection of the key lock as per the following details,

2 I/C	Any 1 type of lock for both MCCBs					
2 I/C and 1 B/C	Lock 1 and Lock 2 for I/C and Lock 12 for B/C					
3 I/C and 2 B/C	Locks 1, 2, 3 for I/Cs and Locks 12, 23 for B/Cs					

Key Lock Selection





External Neutral CTs

Features

- Add on accessory for 3P MCCB
- Reliable solution for Earth / Neutral fault protection for 3 Phase 4 wire system



Stored Energy Electrical Operating Mechanism

Features

- ON / OFF & Charged/Discharged indication
- Foolproof mounting
- Selector switch for Auto/Manual operation
- Padlock facility for locking in OFF position(3 nos locks)
- → Resetting time < 250msec & Closing time < 90 msec</p>
- → Higher mechanical & electrical endurance
- Back up fuse for extended motor protection
- Easy access to the protection setting on MCCB
- → True indication for ON/OFF & Trip

DN3 SE EOM data sheet	
Operating voltage (V AC)	240
Operating voltage (%)	85-110%
Closing time (ms)	90
Opening time (ms)	250
Power consumption (VA)	500
Life / No. of operations	5000
Door cut out (mmXmm)	96X96
IP protection, on the front	IP30
Operating frequency	1/min
Min. control impulse time (ms)	200





Automatic Source Transfer Switch Controller AuXC-1000



The AuXC-1000 controller brings simplicity and flexibility to an auto source transfer system. It has been developed to control and supervise the automatic or manual transfer of a utility load from a principal power supply source to a stand-by. It sets a new benchmark in Auto source transfer switch controller technology.

It includes all the necessary features to supervise and control power supply sources, composed by energy distribution systems or generating sets, and the relative transfer equipment, such as contactors, motorized moulded case circuit breakers and air circuit breakers.

The automatic transfer takes place through AuXC-1000 whenever conditions predefined by the user take place, for example:

- Power supply source not respecting programmed limits
- The need to have a very reliable power source
- The need to use the most economical power source

Some of the key features of this controller are:

- Front display for monitoring the system voltage and frequency and for onsite controller programming
- Six programmable inputs and five programmable outputs
- Front test feature to simulate the operation of the diesel generator set
- Status indication through 22 LEDs
- Flush mounting arrangement
- Communication capable

The AuXC-1000 controller is compatible with U-Power range of Air circuit breakers, asine range of MCCBs and MCX range of contactors.



MIL with Base Plate & EOM

Technical Data















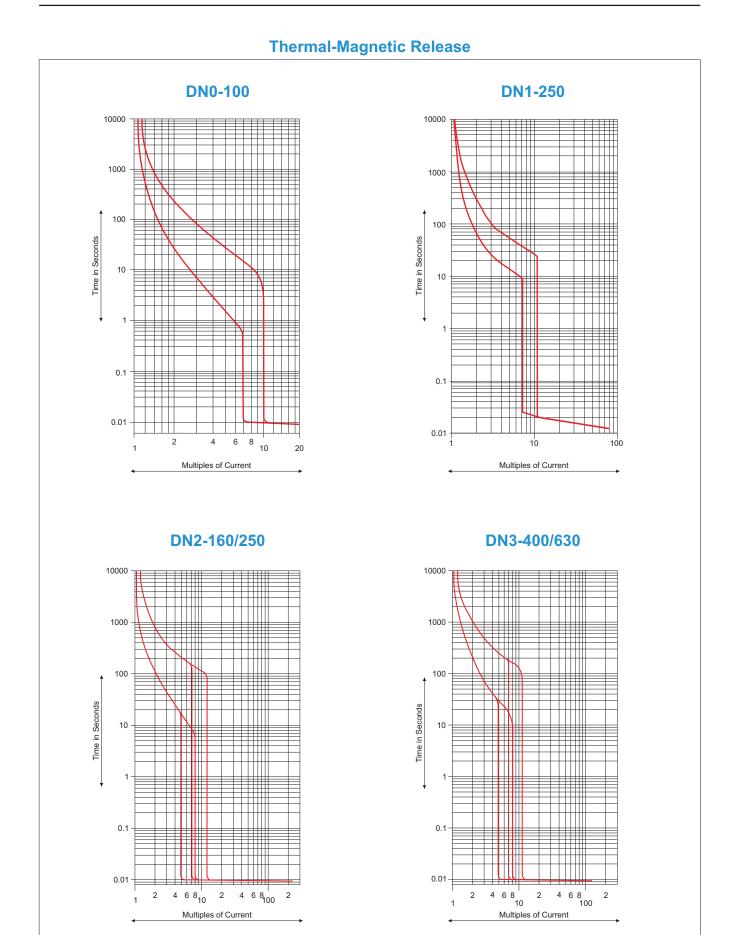
Frame			100 A	250 A	250 A		400 A		630 A			800 / 1000 / 1250 A					
Туре			DN0-100	DN1-250		DN2-250		DN3-400		DN3-400			DN3-630			DN4-1250	
Type			D	N	D	N	S	D N S		D N S			N	S			
Current	Range (A)		20, 25, 32, 40, 50, 63, 80 & 100 A	100, 125, 160, 200, 250 A	32, 40, 50, 6	3, 100, 125, 16	60, 200 & 250 A	63, 160, 250, 320, 400		400	63, 160, 250, 320, 400, 630 A			800, 1000, 1250			
Poles			3 / 4	3 / 4		3 / 4			3 / 4			3 / 4		3 / 4			
		Voltage (kV)	6	6		8		8			8			8			
	-	Voltage (V) (MAX)	600	600		690			690		690			690			
	nsulation Vo	<u> </u>	690	690	75				750		750			750			
	on Categor	у	A	A		А			A			Α			A		
Standar	rd		IEC / EN / IS	IEC / EN / IS		IEC / EN / IS		IEC / EN / IS		IEC / EN / IS		,	IEC / EN / IS				
		230 / 240 V	65	65	65	70	100	65	70	100	65	70	100	70	100		
		400 / 415 V	36	50	36	50	70	36	50	70	36	50	70	50	70		
7-2		500 V	10	10	25	36	42	25	36	42	25	36	42	25	36		
IEC-60947-2	lcu	550 V	8	8	18	25	36	15	20	25	15	20	25	20	25		
မှ	(kA		5	5	16	18	22	12	18	22	12	18	22	16	20		
<u>ŭ</u>		690 V	*	*	10	15	20	8	15	20	8	10	15	10	18		
		250 V DC (3P in series)	15	15	15	25	36	15	25	36	15	25	36	-	-		
		500 V DC (3P in series) L/ R<15msec		10	5	10	20	5	10	20	5	10	16	-	-		
		as % Icu	50%	50%	100%	100%	100%	100% 100% 100%		100% 100% 100%		100% 100%					
Life span Mechanical Electrical @1.0 In			30000	10000	25000				15000		15000			8000			
			4000	3000	10000 4000					2000 750			750				
Operating Frequency (Hz)		* ' '						50 / 60						1			
Total Opening Time <10 msec					<20 msec												
	proof Termin			Yes E ⁰ to EE ⁰ C													
	t Temperati							-5° to 55° C									
	Temperatu							-35° to 70° C									
	g Positions					Vertical and 90° in both directions 105 x 96 x 179 140 x 111 5 x 266 279 x 143 x											
Dimens mm ³	ions (W x D	O x H) 3-Pole	75 x 60 x 130	105 x 60 x 165		105 x 96 x 179		140 x 111.5 x 266							278 x 143 x 370		
		4-Pole	100 x 60 x 130	140 x 60 x 165	140 x 96 x 179			183.5 x 111.5 x 266			183.5 x 111.5 x 266			278 x 143 x 370			
Weight	(kg) (3/4 Pc		1 / 1.25	1.45 / 1.8		2.5 / 3.3		5.5 / 7.2		6 / 7.8			15 / 16				
.	-	Auxiliary Contact	1C/O or 2C/O	1C/O or 2 C/O		1C/O or 2C/O)	1C/O or 2C/O			1C/O or 2C/O			1C/O or 2C/O			
;	-	Trip Alarm Contact	1C/O or 2C/O	1C/O or 2 C/O		1C/O		1C/O		1C/O			1C/O				
Inte	ernal	Auxiliary & Trip Alarm Contact	1C/O + 1C/O	1C/O + 1 C/O		1C/O + 1C/O			1C/O + 1C/O		1C/O + 1C/O			1C/O + 1C/O			
	-	Shunt Release \$	240 / 415 V AC 50 / 60 Hz	240 / 415 V AC 50 / 60 Hz			110 / 415 V AC 50 / 60 Hz,110 / 220 V DC		110 / 415 V AC 50 / 60 Hz,110 / 220 V DC								
,	-	Under Voltage Release	240 V AC 50 Hz	240 V AC 50 Hz	220 - 240 V AC 50 Hz		220 - 240 V AC 50 Hz		220 - 240 V AC 50 Hz		220 - 240 V AC 50 Hz						
3	-	Rotary Operating Mechanism	√	✓	√		✓			✓				✓			
,		Electrical Operating Mechanism	X	X	✓		ailable with external GF module with TM release and			and Interdit	√ 44:			Х			
Ext	ernal	Earth Fault Release		F module with TM release				iliable with ext		with TN release	and inbuilt pro		oprocessor relea	ase			
		Mechanical Interlock	X	X		√		√							X		
■		Spreader Links	✓	✓		√		√				√			✓		
3		Key lock	X	X		√		✓			✓				✓		
		Pad lock through ROM	√#	√#		✓ ✓						✓					

\$\frac{1}{2}\text{ 'O' of control contactor to be connected in series for 220V DC application.

Note: \text{ Any two internal accessories can be mounted at at time
} \text{ For special application like capacitor switching, DC please contact nearest branch office
} \text{ For motor application, use "M" series MCCBs (DN2M, DN3M)
} \text{ Available on request.
} \text{ Bircet Pad locking available}

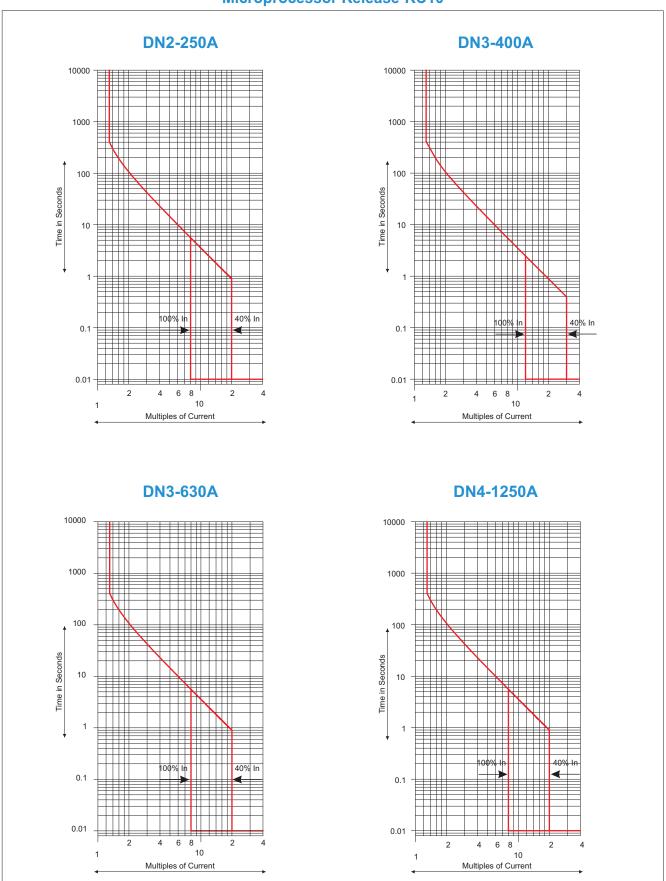
12 11





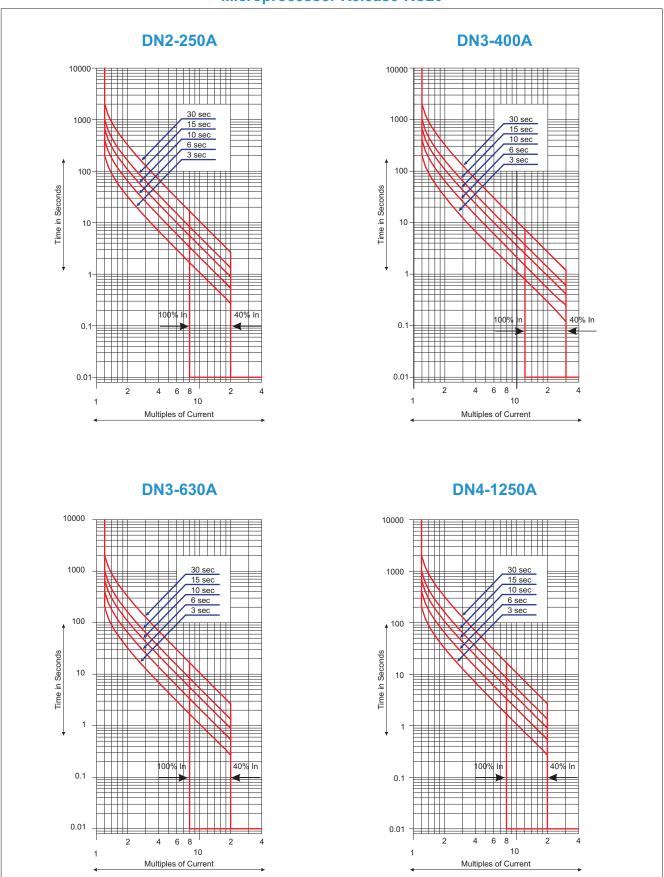


Microprocessor Release-RC10



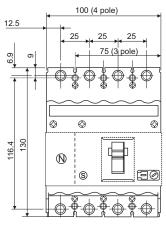


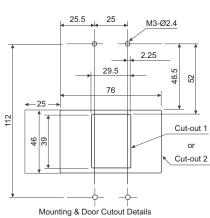
Microprocessor Release-RC20

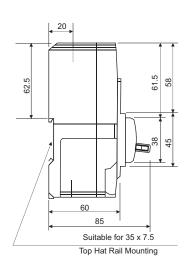




DN0-100 MCCB





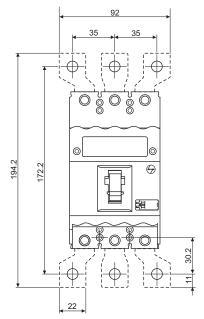


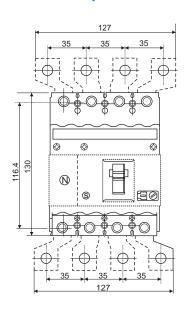
Recommended CAT number for DN0 spreaders

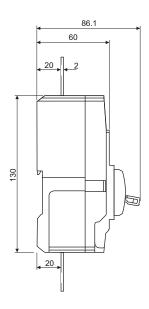
3P	4P
CM97785OOOO	CM979210000

Note: Spreaders are available as spare

DN0-100 with Spreader Links

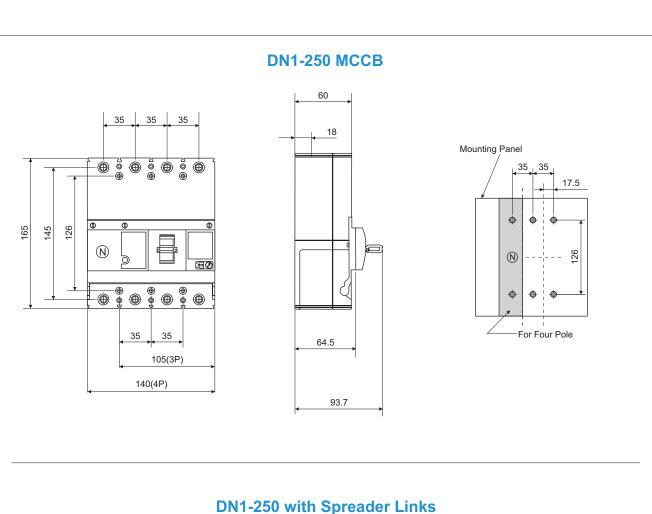


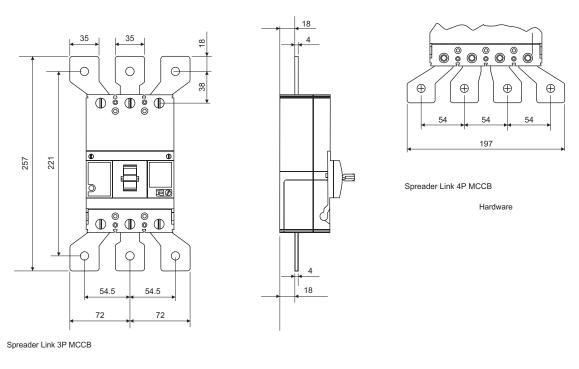




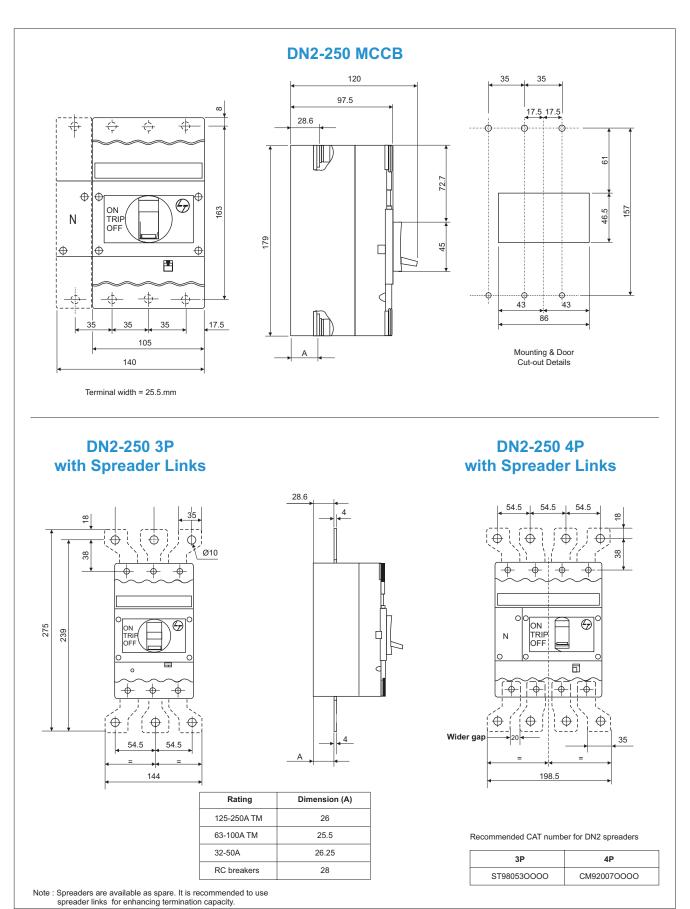
Note: Spreaders are available as spare. It is recommended to use spreader links for enhancing termination capacity





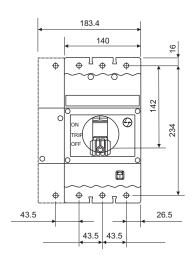




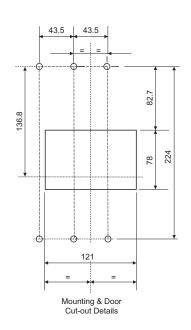




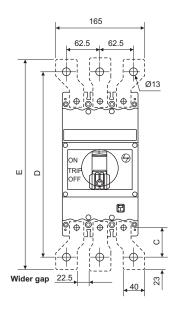
DN3-400/630 MCCB



Terminal width = 28mm

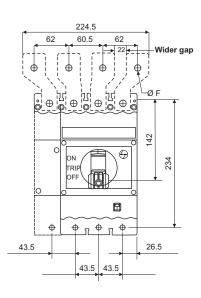


DN3-400/630 3P with Spreader Links

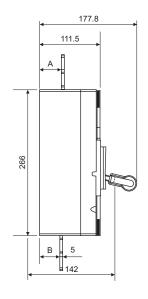


Note: Spreaders are available as spare. It is recommended to use spreader links for enhancing termination capacity.

DN3-400/630 4P with Spreader Links



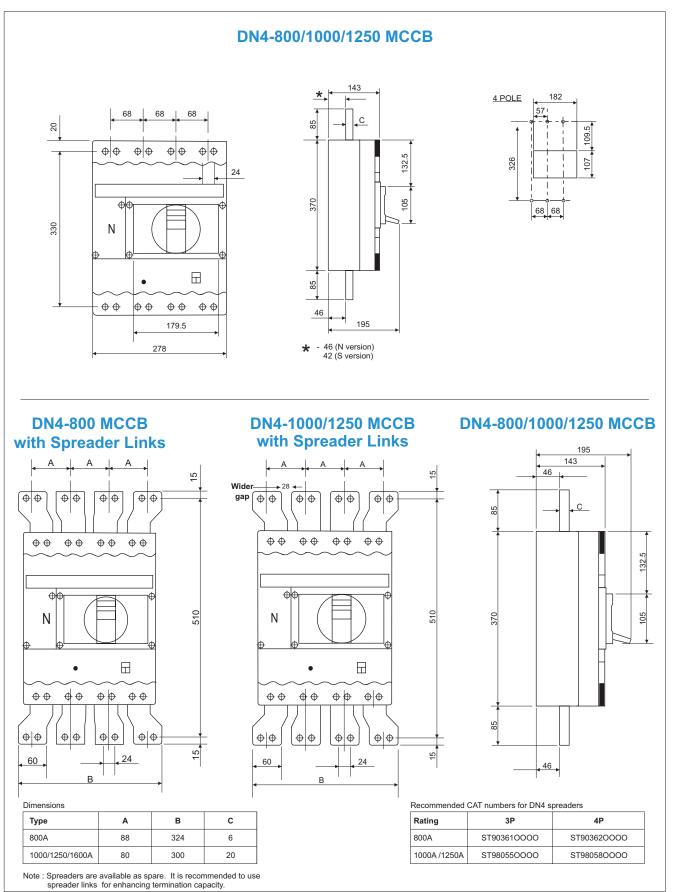
Туре	DN3-400	DN3-630
А	39	41
В	37	38
С	45	55
D	324	344
E	370	390
F	13	11



Recommended CAT numbers for DN3 spreaders

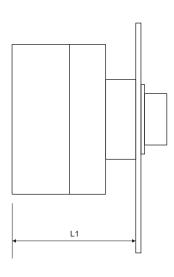
Rating	3P	4P	
400A	ST98065OOOO	ST98066OOOO	
630A	ST980540000	CM92004OOOO	



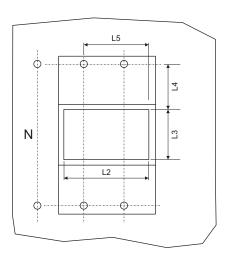




Direct ROM door cut-out detail

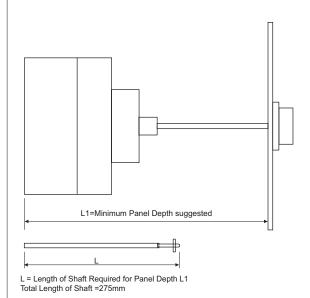


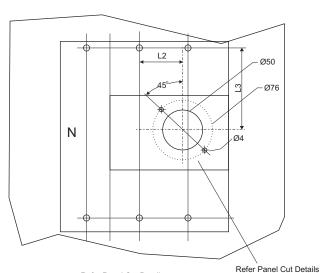
L1 = Mounting Depth L2/L3 = Panel Cut-out L4/L5 = Breaker Mounting Refer



Туре	L1	L2	L3	L4	L5
DN0	96.5	58	52	43.5	37
DN1	96.5	73	52	56.5	54
DN2	122	96	63	53	66
DN3	146	121	87	78	82

Extended ROM door cut-out detail





Refer Panel Cut Details

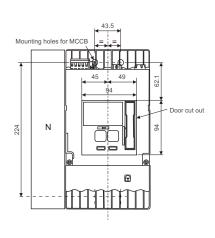
TYPE L1

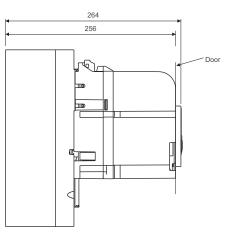
L3
69.5
04.7

DN0	169	L1 - 119	7.5	69.5
DN1	169	L1 - 119	24.5	81.7
DN2	202	L1 - 152	27	84
DN3	233	L1 - 183	39	122
DN4	302	L1 - 252	69	170



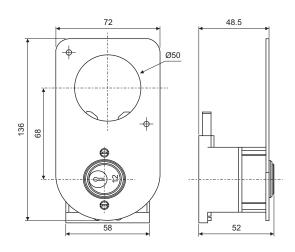
MCCB with EOM (Stored Energy) DN3

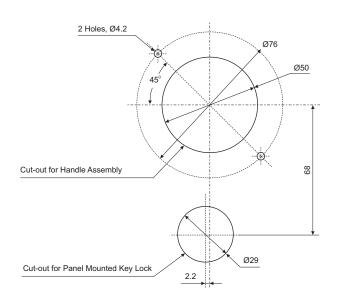




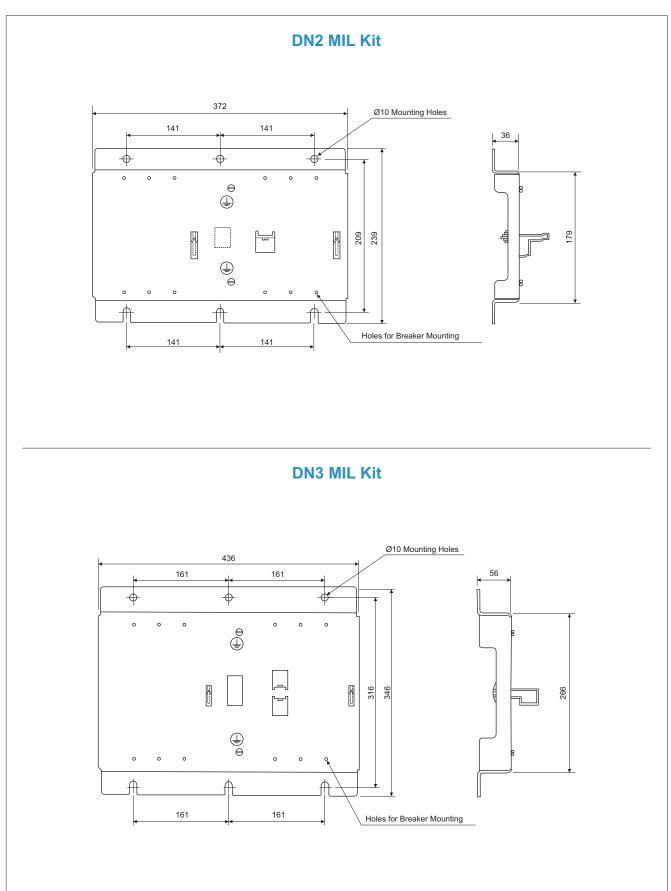
Cat. No.CM981300000

Panel Mounted Key Lock

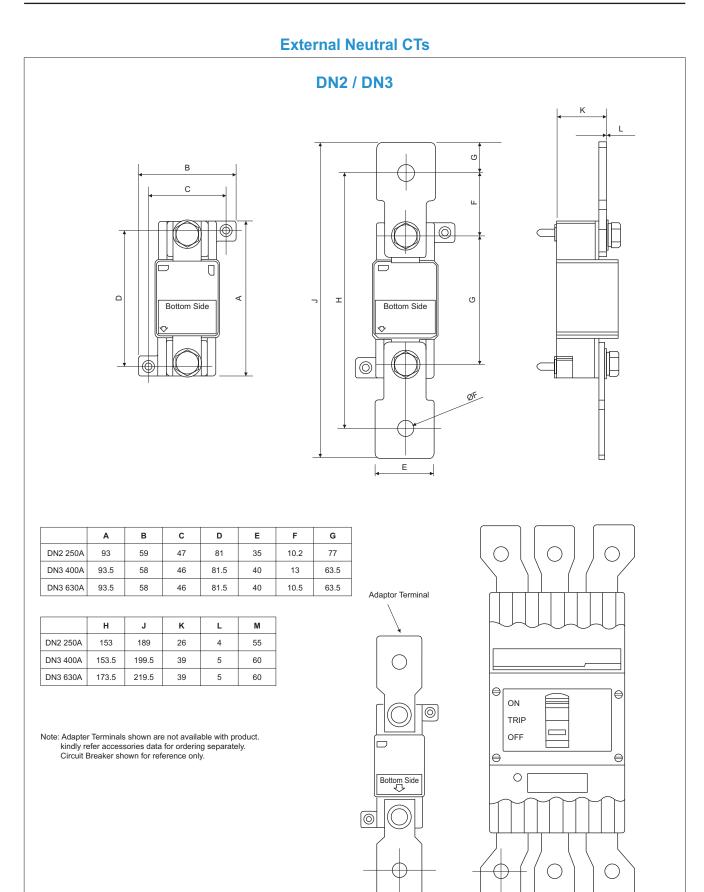












>M



External Neutral CTs

