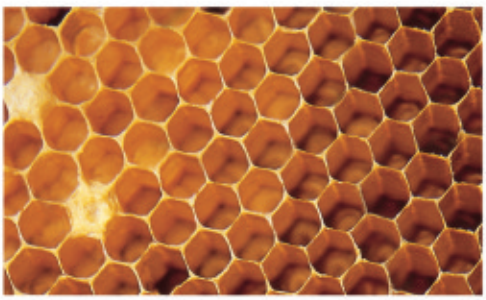
L&T SWITCHGEAR
SAFE & SURE

U-POWER system of Air Circuit Breakers

LARSEN & TOUBRO
It's all about Imagineering



"The geometry of the beehive supports the least wax for containing the same quantity of honey, and which has at the same time a very remarkable regularity and beauty, connected of necessity with it's frugality."

-Colin Mac Laurin (1698-1746)
Philosopher & Professor of Mathematics

U-POWER system

...inspired by Nature's Math

U-POWER - the next generation Air Circuit Breaker from L&T - draws inspiration from the perfection so commonly found in nature.

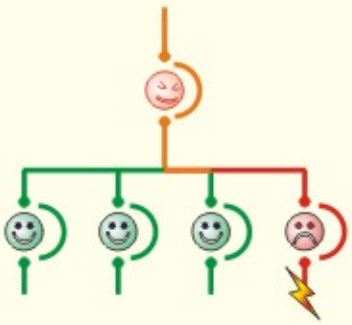
U-POWER employs state-of-the-art technology to offer a comprehensive system solution... from Intelligent Protection to Complete Control... from Installation to Operating Convenience... from User Safety to System Security. All this in the most Modular design of Optimized dimensions... Just like a beehive.

Nature mastered the art of creating efficient designs over millions of years, Mathematicians discovered it over centuries and L&T implemented it in **U-POWER** ! The result... A product surpassing global benchmarks... Cutting across many frontiers.

Salient Concepts

Compactness without compromises:

Modern trends worldover are towards making ACBs increasingly compact. While compactness is a welcome change, fundamental characteristics of ACB cannot be compromised.



High Withstand Capacity:

ACB must support current and time based discrimination, to allow downstream devices to trip and isolate only faulty feeders. Breakers with short time withstand capacity (Icw) lower than Icu & Ics, fail to support discrimination for faults beyond Icw. U-POWER provides Icu=Ics=Icw for the complete range.

Maintainability:

Electrical life of an ACB can be extended till mechanical life by contact replacement. For any industry, quick and easy maintenance translates into less down time and more productivity. U-POWER supports quick and easy on-site contact replacement for the entire range.

Optimized frame sizes:

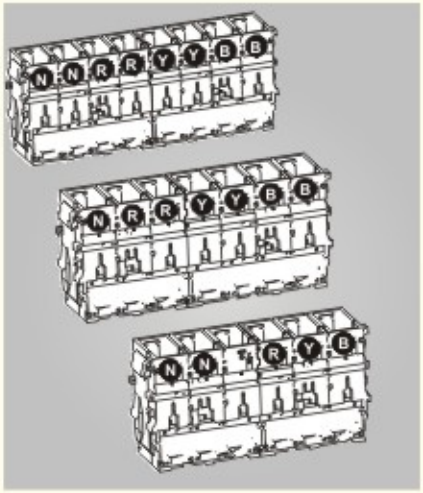
Manufacturing economies encourage ACB designers to reduce the number of frame sizes in the range and exploit the benefits of component & process commonization. However, frame commonization typically results in an increased breaker width, thereby forcing the panel size to increase. U-POWER range has 4 optimized frame sizes to offer a space saving solution to the users.

Aligned Design:

An aligned design is the one in which the operating mechanism remains at a fixed distance from any one side of the breaker, throughout the range and width increases in one direction. While aligned design is difficult to achieve, it offers better utilization of space, especially in a multi-tier panel. U-POWER range follows right aligned design.

True 50% & 200% Neutral rating:

In U-POWER, modularity extends beyond accessories, even to breaker construction. Space saving solutions for 50% & 200% neutral ratings, quick & easy maintenance across the range are just a few examples.



Arc Chute Interlock:

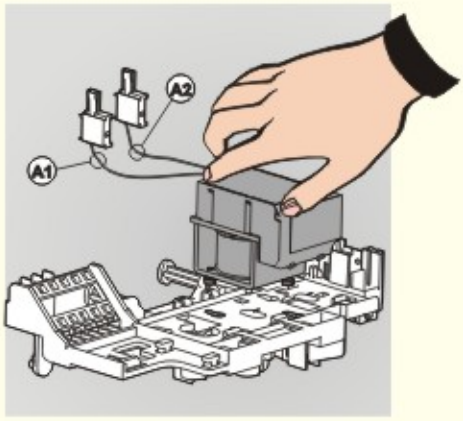
Arc chutes need to be opened periodically for contact inspection. To ensure such a critical component is properly secured, U-POWER offers a unique interlock, which prevents the breaker from closing if an arc chute is missing.

True Ready-To-Close (RTC):

RTC signals fulfillment of all conditions pre-requisite for breaker closing. Imagine a breaker signaling 'Ready-To-Close', even when an arc chute is missing!!! Only U-POWER detects the presence of arc chutes before signaling 'Ready-To-Close'.

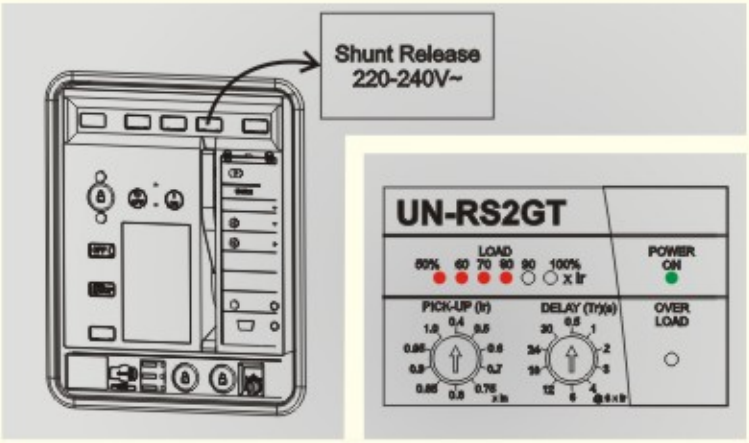
5 Minutes Modularity:

Traditionally, definitions of modularity have revolved around operational ease and flexibility. U-POWER also defines modularity on time axis. Any routine maintenance operation on U-POWER, like accessory fixing, can be completed within 5 minutes.



Energy Saving Releases:

Conserving every unit of energy is an economic and social need. Towards this cause, U-POWER offers lower watt-loss poles and more. Thanks to in-built electronics, U-POWER's voltmetric releases consume minimal energy, once energized.



Supervisory Information:

U-POWER's unique facia architecture provides complete information on electrical accessories mounted on the unit. This information is available to users, without opening the panel door.

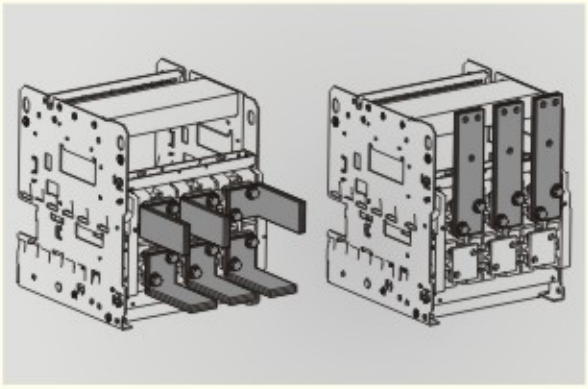
U-POWER's Protection & Control Unit offer quick information on % current loading. The range also offers an option of LCD display with metering function

Termination Flexibility:

U-POWER dimensions are optimized without compromising terminal width and interphase clearances.

U-POWER offers flat terminal as standard, which provide flexibility for accommodating various link configurations.

Terminal adaptors are available for specific requirements of vertical/horizontal terminal configuration.

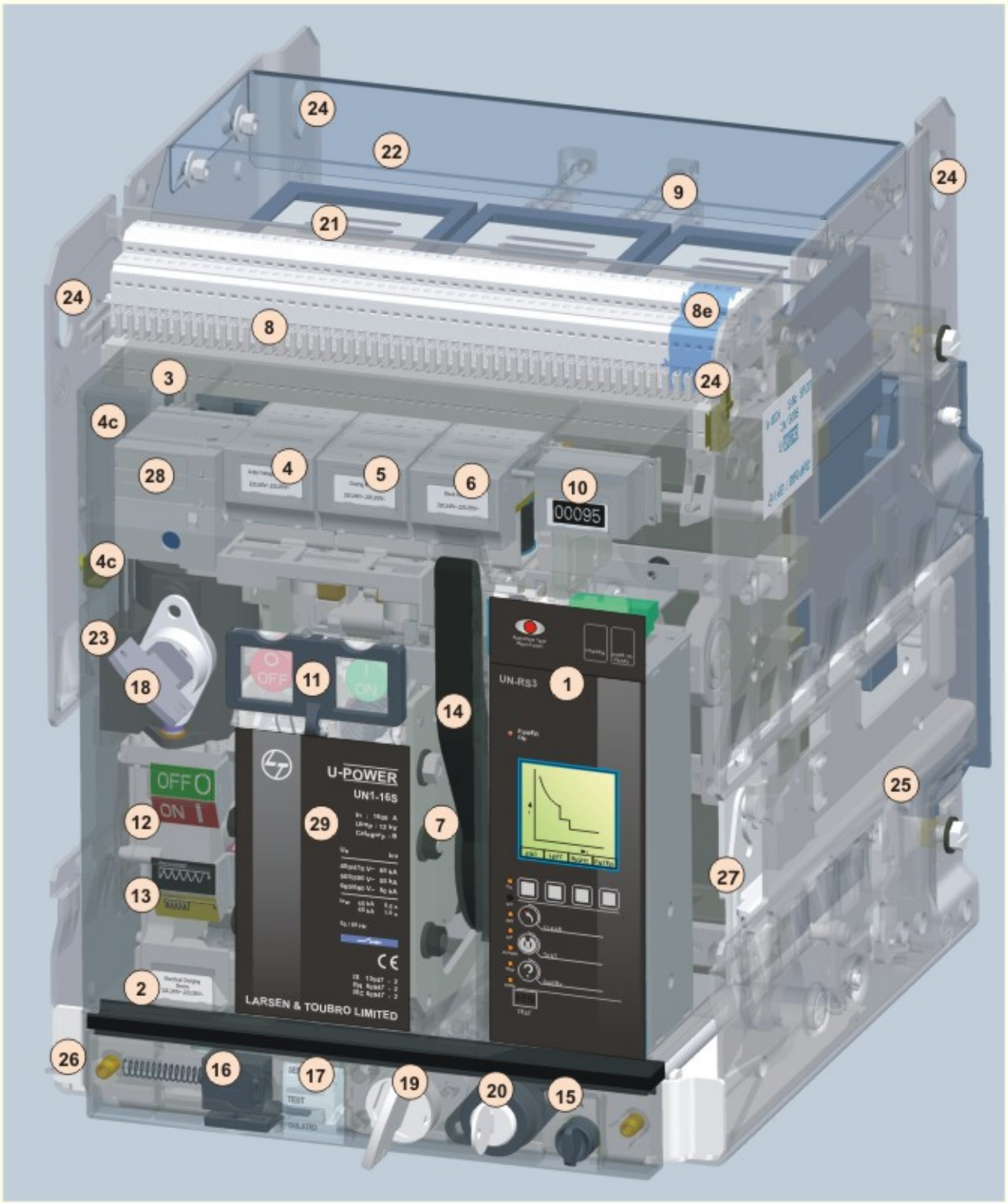


Product Innovations:

U-POWER boasts of 18 design patents in various areas of product-user interaction. This high degree of innovation has resulted in a wide spectrum of safety & convenience features which are unique to U-POWER.

Overview

1. Protection & Control Unit
2. Electrical Charging Device
3. Auxiliary Contacts
4. Undervoltage Release
4c. Undervoltage Release Controller
5. Closing Release
6. Shunt Release
7. Ready to Close(RTC)
8. Secondary Isolating Contacts(SICs)
8e. Electrical Position Indication
9. Additional Electrical Position Indication
10. Operation Counter
11. Shroud for ON-OFF Buttons
12. ON-OFF Indication
13. Spring Charged-Discharged Indication
14. Charging Handle
15. Racking Handle
16. Racking Shutter
17. Position Indicator
18. OFF Button Locking
19. Position Lock - 1
20. Position Lock - 2
21. Arc Chute
22. Arc Shield
23. Rating Error Prevention
24. Lifting Locations - 4 nos
25. Withdrawal Rail
26. Door Racking Interlock
27. Breaker Pull-Out Handle
28. Users' Identification Location
29. Name Plate


24
22
9
24
21
24
8
8e
3
24
4c
28
4
5
6
10
00095
4c
23
18
11
OFF
ON
14
UN-RS3
1
U-POWER
UN1-16S
OFF
ON
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LARSEN & TOUBRO LIMITED
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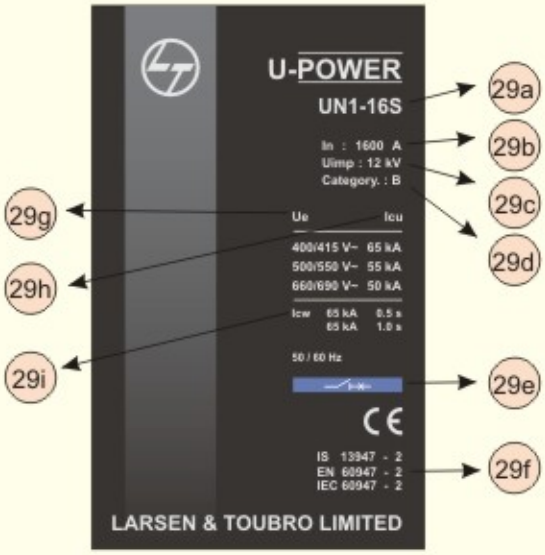
Overview



29b - Rated Uninterrupted Current
29c - Rated impulse withstand voltage
29d - Utilization Category
29e - Suitability for isolation
29f - Conformance to Standards
29g - Rated operational voltage
29h - Rated Ultimate Short Circuit breaking capacity
29i - Rated short-time withstand Current

29a - **UN1-16S**

	Frame
1	Frame 1
2	Frame 2
3	Frame 3
4	Frame 4

Rated Uninterrupted Current (In)

04	400A
06	630A
08	800A
10	1000A
12	1250A
16	1600A
20	2000A
25	2500A
32	3200A
40	4000A
50	5000A
63	6300A

Version for Breaking Capacity

N	50 KA
S	65 KA
H	80 KA
V	100 KA

2.5 Technical Data

Common Parameters	Unit	Symbol	
Rated Operational voltage at 50/60 Hz	V	Ue	Upto 690
Rated Insulation voltage at 50/60 Hz	V	Ui	1000
Rated Impulse withstand voltage - Main circuit	kV	Uimp	12
Rated Impulse withstand voltage - Auxiliary circuit	kV	Uimp	4
No.of poles			3 & 4
Suitability for isolation			Yes
Intrinsic degree of protection of breaker front			IP53
Pollution degree suitability			3
Utilization category			B

Tested at:

KEMA
TILVA
CPRI
ERDA

Conforms to:

IEC 60947-2
EN60947-2
IS 13947 (Part 2)
GB 14048.2

A038767

Overview

Rating Specification Parameters			Symbol									
Frame				I		II			III		IV	
Version				N	S	S	H	V	H	V	H	V
Rated Uninterrupted Current at 40deg. C			In (A)	400 to 1600	630 to 1600	2000 to 3200	630 - 3200	630 - 3200	3200, 4000	3200, 4000	5000, 6300	5000, 6300
Rated ultimate S.C. Breaking Capacity	400/415V~ 50/60 Hz		Icu (kA)	50	65	65	80	100	80	100	80	100
	500/550V~ 50/60Hz			42	55	55	70	85	70	85	70	85
	660/690V~ 50/60Hz			42	50	50	55	75	55	75	55	75
Rated Servive S.C. Breaking Capcity	400/415V~ 50/60 Hz		Ics (kA)	100% Icu								
	500/550V~ 50/60Hz											
	660/690V~ 50/60Hz											
Rated Short Time Withstand Capcity	0.5 sec		Icw (kA)	50	65	65	80	100	80	100	80	100
	1.0 sec			42	65	65	75	85	80	100	80	100
	3.0sec			25	36	36	50	57	50	57	50	57
Rated S.C. Making Capcity	400/415V~ 50/60 Hz		Icm	105	143	143	176	220	176	220	176	220
	500/550V~ 50/60Hz			88	121	121	154	187	154	187	154	187
	660/690V~ 50/60Hz			88	105	105	121	165	121	165	121	165
Opening Time			msec.	40								
Closing Time				60								
Dimensions	Fixed ACB	Width 3P	W (mm)	347	347	447	447	447	647	647	847	847
		Width 4P	100% W (mm)	447	447	581	581	581	847	847	1114	1114
		Depth	D (mm)	355								
		Height	H (mm)	430								
	Drawout ACB	Width 3P	W (mm)	347	347	447	447	447	647	647	847	847
		Width 4P	100% W (mm)	447	447	581	581	581	847	847	1114	1114
		Depth	D (mm)	418	421							
		Height	H (mm)	433								
Mechanical Life			x 1000 cycles	20	20	15	15	15	10	10	5	5
Frequency of Operation -Mechanical			cycles / hour	60							30	
Electrical Life	with Maintenance		x 1000 cycles	20	20	15	15	15	10	10	5	5
	without Maintenance		x 1000 cycles	10*	10*	5	5	5	5	5	2.5	2.5
Frequency of Operation -Electrical			cycles / hour	40	40	30	30	30	20	20	10	10
Pitch I/C - O/G				105								
Pitch	Ph-Ph		mm	100	100	133.3	133.3	133.3	200	200	266.7	266.7
	Ph-N	100% N	mm	100	100	133.3	133.3	133.3	200	200	266.7	266.7
Termination Width	Phase		mm	80	80	100	100	100	165	165	230	230
	Ph-N	100% N	mm	80	80	100	100	165	165	165	230	230
Weight	Fixed ACB	3P	kg	39	39	59	59	86	86	86	106	106
		4P 100% N	kg	48	48	71	71	108	108	108	133	133
	Drawout ACB	3P	kg	70	70	88	88	124	124	124	227	227
		4P 100% N	kg	84	84	106	106	166	166	166	268	268

*= 8000cycles for 1600A

Intelligent Protection

U-POWER offers a brand new series of microcontroller based, true RMS sensing Protection & Control units.
Three platform versions and several feature variants offer complete flexibility for users, to select the features needed for the application.

UN-RS1/1.5 Series

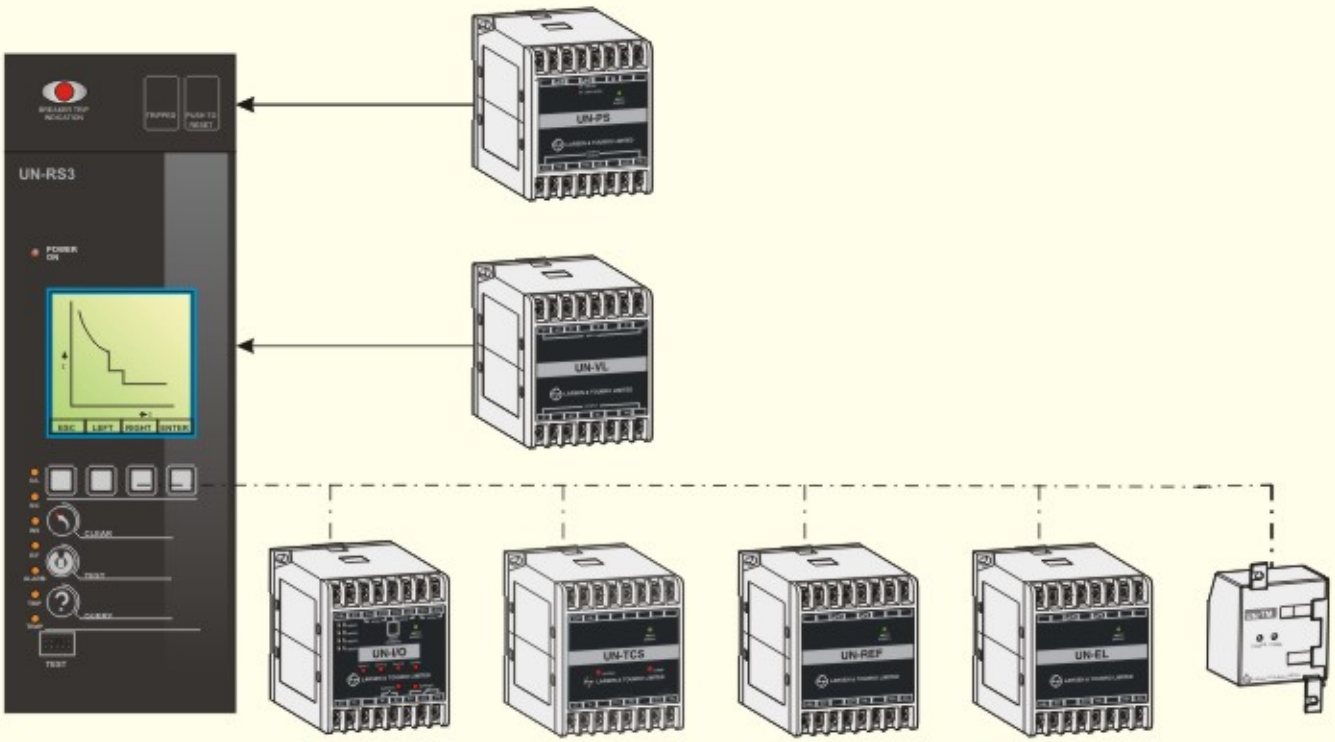
- Overload protection with variable current & fixed time delay settings
- Short circuit protection with variable current & time delay settings
- Instantaneous protection
- Selectable I^2t based curves for short-time zone
- Self-powered protections
- Thermal reflectivity
- Local fault annunciation
- LCD display with current metering

UN-RS2/2.5 Series

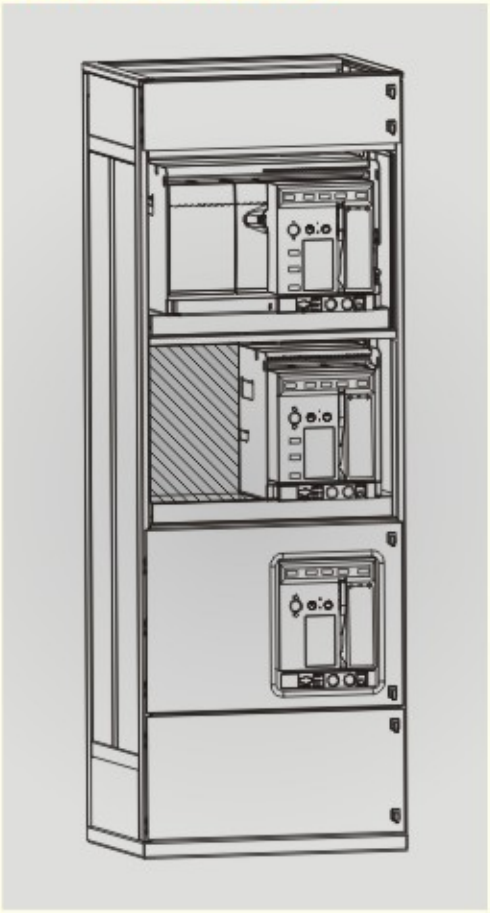
- Overload protection with variable current & time delay settings
- Short circuit protection with variable current & time delay settings
- Instantaneous protection
- Earth fault protection with variable current & time delay setting
- Selectable I^2t based curves for short time and earth fault zones
- Switchable neutral overload protection
- *i* Discrimination to ensure trip timings in accordance with fault zones, thus minimising system stresses
- Communication on modbus RTU protocol
- Self-powered protections
- Switchable thermal reflectivity
- Local fault annunciation
- Separate electrical fault indication
- % Loading / LCD display with current metering

UN-RS3

- Real-time on-line display of OSIE curves
- On-screen display of measurements:
  - Current: phase/neutral/earth, average, max, % loading, seq components
  - Voltage: Phase, Line, Average
  - Power & energy: active, reactive, total
  - Frequency & Powerfactor
  - Maximum Demand
  - Termination temperature
- Extended protections
  - Overload, short circuit & earth fault protections with variable current & time delay settings
  - Neutral overload (upto 200%N)
  - Instantaneous protection
  - Selectable I^2t based curves for short time and earth fault zones
  - Restricted earth fault & earth leakage
  - Undercurrent
  - Under/Over Voltage
  - Reverse Power
  - Under/Over Frequency
  - Current Unbalance
  - Temperature rise at breaker terminals
- Intelligent discrimination
- Thermal reflectivity enables faster tripping on recurrent overloads
- Breaker failure feedback
- Trip circuit supervision to detect failures in emergency trip circuit
- Event records & fault history for system analysis and fault diagnosis
- I^2t based contact status indicator
- Stores two sets of protection characteristics for closer protection in case of periodic changes in source / load
- Integrated Modbus RTU communication with breaker control, metering and setting change
- Input & output contacts for interlocking & signaling e.g. load management
- Password protected settings & commands
- Selectable I^2t based curves for short-time and earth fault zones
- Self-powered protections

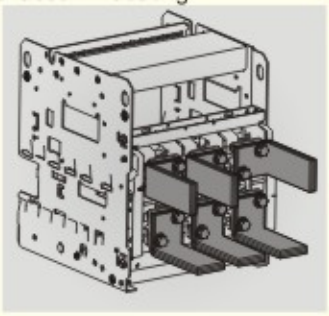


Switchboard Friendly

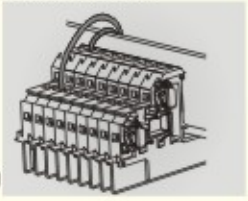


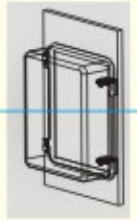
- 4 frame sizes offer optimized widths for various ratings and save panel space
- Right aligned design helps optimize space utilization in switchboard
- Space saving solutions for 50% and 200% neutral requirements
- Common height & depth across the range facilitates switchboard design
- Supports multi-tier arrangement with minimal clearance, using arc shield
- Interleaved busbars help reduce link temperature and electrodynamic stresses U-POWER offers special versions to support interleaved busbar design
- Wider termination area for direct termination of aluminium links, thereby avoiding additional copper spreaders and associated watt-losses.
- Standard flat terminals offer flexibility for accommodating various link configurations.

- Optional add-on terminals for horizontal, vertical & front connections. Common add-on terminals for horizontal & vertical configurations



- Liberal inter-phase clearances lead to flexibility in selection of link sizes
- Nut retainer on cradle eliminates need for nut-plate
- Integral provision for mounting phase-phase and incoming-outgoing barriers simplify mechanical design in switchboards
- Quick & easy control termination, without using hardware or lugs
- Unipolar, snap-fit control terminals enable independent termination of 2 wires of up to 2.5 mm^2 each





- Door ingress seal fits, without using any tools, hardware or adhesives
- Optional facia shroud for switchboards requiring Ip55 of breaker front

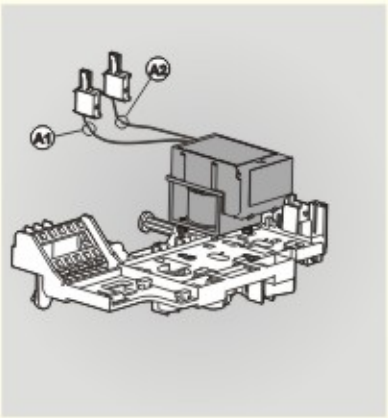
Complete range:

- 400-6300 A in four optimized frame sizes
- 3 pole & 4 pole versions
- Fixed & Drawout versions
- S, H & V versions of increasing breaking capacities
- Icu=Ics=Icw for the entire range
- Standard 100% neutral
  Space saving solution for 50% neutral (3200A -6300A)
  True 200% neutral (upto 2500A)
- Wide range of accessories, common across the range

User Friendly:

•Unique facia architecture displays electrical accessories (with control voltage) equipped on the breaker.

- U-POWER redefines modularity on a time scale of 5 minutes. Snap-fit electrical accessories are pre-wired with control connections
- Manually operated breaker can be easily converted to electrically operated version, by adding a modular spring charging device
- Arc chutes are opened periodically by users, for contact inspection. Unique latching arrangement in U-POWER enables arc chutes to be opened and re-installed without the need for any tools and bolting
- U-POWER supports electrical interchangeability and easy, on-site conversion of Fixed version to drawout version
- U-POWER offers electrical indication of 'Ready-to-close', when the following conditions are fulfilled,
  - All arc chutes are installed and properly secured
  - Main spring is charged
  - Trip indication lever is reset
  - Shunt release is de-energized
  - Undervoltage release is energized
  - Racking shutter is closed (i.e. Racking operation to Service/Test/Isolated position is complete)
  - Breaker is in OFF condition
- U-POWER offers special version of shunt releases with operating band of 10%-130% of control voltage. This enables the shunt release to operate inspite of voltage drop under fault conditions
- Typical total opening time of U-POWER is 40 ms, which also includes initiation time of the tripping device. Faster opening reduces system stress under fault condition
- Typical spring charging time (with electrical charging device) of < 7 s helps U-POWER to be quickly ready for next closing operation
- Unique pole design helps reduce mV drop across the breaker
- Very low temperature rise at U-POWER cradle terminals (compared to the maximum rise permitted by IEC; part of combined sequence testing as per IEC) facilitates breaker selection based on actual site conditions



Environment Friendly:

• Unique low-watt-loss pole design and voltmetric releases for energy conservation

•Single material used in moulded components for easy disposal

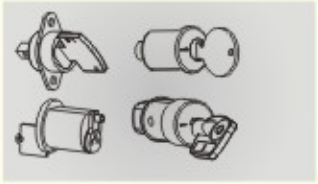
•Avoiding use of harmful material in electrical contact systems

•Use of easily disposable packing material and avoiding use of thermocole

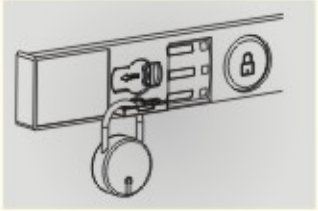
•Special pigments used to avoid lead content

Unmatched Security:

- ON & OFF buttons can be independently padlocked to prevent unauthorized access.
- Facility to lock breaker in OFF condition, for key lock based interlocking.
- 2 position locks for locking breaker in Isolated position or all positions.
- Accepts Castell, Kirk, Ronis, Profalux & Fortress makes among other international locks.



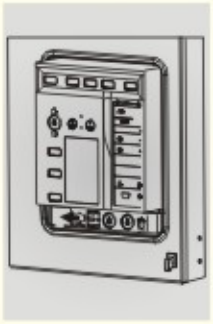
- Racking shutter can be padlocked to prevent inadvertent racking operation. Useful for implementation of 'Lock-out, Tag-out' systems in Industry.



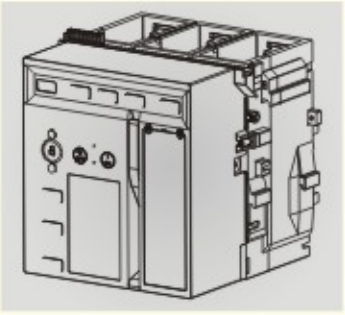
- upto 3 breakers can be mechanically interlocked using bowden cable. The Interlock is suitable for fixed, draw-out or a combination.
- Facility to seal the access to P&C unit settings.

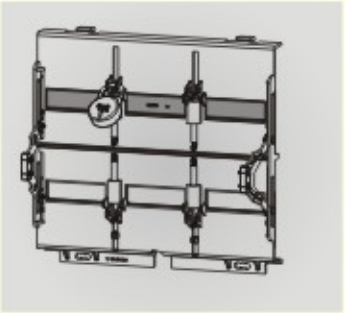
Superior Safety:

- Arc chute, a critical component in arc quenching, is periodically opened for contact inspection. It is important that ACB is switched on, only when all are chutes properly installed. U-POWER is equipped with a unique 'Arc Chute Interlock' which prevents ACB from switching ON if any arc chute is missing or not installed properly. U-POWER also senses presence of arc chute, before signaling 'Ready -to-Close'

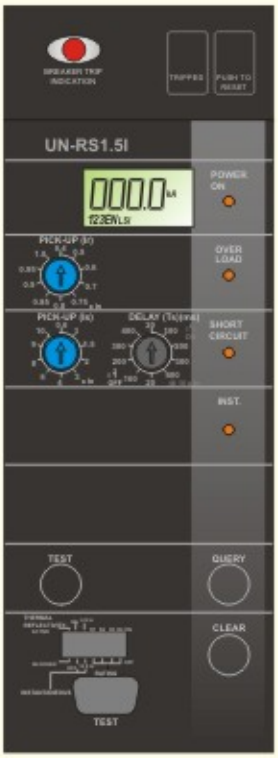


- Smart racking shutter ensures total safety throughout racking operation
- Breaker can be closed only in distinct Service/Test/Isolated positions
- Racking interlock prevents racking operation when panel door is open
- Use of extra safe engineering plastics, which meet Glow Wire tests as per IEC60695-2-1
- Built-in Mechanical & Electrical anti-pumping
- Fully enclosed poles prevent accidental contact with live parts of breaker
- Safety shutters prevent undesired access to live terminals. Safety shutters can be padlocked one/both sides
- Rating error preventor ensures matching of breaker and cradle, before racking in





Protection & Control units
UN-RS1/1.5 series



Parameter			UN-RS1	UN-RS1.5I
Overload	Current Setting(A), Ir = In x …		0.4-0.5-0.6-0.7-0.75-0.8-0.85-0.9-0.95-1.0	
	Time, Tr (s) at 6 x Ir		2.5	
Short-Circuit	Current Setting(A), Is = In x …		0.6-1.0-1.5-2-3-4-6-8-9-10	
	Delay,Ts (ms) at 10 x In	I^2t OFF	25	20-100-200-300-400
		I^2t ON	-	20-100-200-300-400
Instantaneous	Current Setting(A), Ip = In x …		-	OFF - 6 - 12
Thermal Reflectivity			Active	Active / Blocked
Metering	Current		-	Phase currents
	Fault current		-	Type, Magnitude & Phase
Display			-	Backlit LCD
LED Indications	Power On		✓	✓
	Overload		✓	✓
	Short-Circuit		✓	✓
	Instantaneous		-	✓
Testing	Self- Diagnostic Test		✓	✓

Protection & Control units UN-RS2/2.5 series

Parameter		UN-RS2G / UN-RS2.5G	UN-RS2GT / UN-RS2.5GT	UN-RS2GC / UNRS2.5GC
Overload (Phase)	Current Setting(A), Ir = In x … Time Delay, tr (s) at 6 x Ir	0.4-0.5-0.6-0.7-0.75-0.8-0.85-0.9-0.95-1.0 0.5-1-2-4-6-8-12-18-24-30		
Overload (Neutral)	Current Setting(A), I_N = Ir x … Time Delay (s)	OFF - 50% - 100% Same as 'Overload (Phase)'		
Short-Circuit	Current Setting(A), Is = In x … Time Delay,Ts (ms) I^2t OFF at 10 x In I^2t ON	0.6-1.0-1.5-2-3-4-6-8-9-10 20-100-200-300-400 20-100-200-300-400		
Instantaneous	Current Setting(A), Ip = In x …	1.5-2-3-4-5-6-8-10-12- OFF		
Earth Fault	Current Setting(A), Ig = In x … Time Delay (s), tg I^2t OFF I^2t ON	0.2-0.3-0.4-0.5-0.6 0.1-0.2-0.3-0.4-1.0-OFF 0.1-0.2-0.3-0.4		
i Discrimination		-	-	✓
Thermal Reflectivity	Active/Blocked	✓	✓	✓
Metering (UN-RS 2.5 Version)	Current	Phases, Neutral and Earth		
	Fault current	Type, Magnitude and Phase		
Display (UN-RS 2.5 Version)		Backlit LCD		
Fault History (Last 5 records) with Type, Magnitude & Phase of Fault		-	-	✓
LED Indications	Power On	✓	✓	✓
	Overload	✓	✓	✓
	Short-Circuit	✓	✓	✓
	Instantaneous	✓	✓	✓
	Earth Fault	✓	✓	✓
	% Loading (UN-RS2 versions)	✓	✓	✓
Electrical Trip Indications	Overload	-	✓	✓
	Short-Circuit / Instantaneous	-	✓	✓
	Earth Fault	-	✓	✓
Auxiliary Supply	24V dc	-	✓	✓
Communication	MODBUS RTU Protocol	-	-	✓
	RS 485 Serial Link	-	-	✓
Testing	Self-Diagaustic Test	✓	✓	✓

Protection & Control units UN-RS3

Protections			Details
Overload (Phase)	Current Setting(A), Ir = In x …		0.4 to 1.0 in steps of 0.05xIn
	Time Delay,Tr (s) at 6 x Ir		0.5-1-2-4-6-8-12-18-24-30
	Trip/Alarm		Both
	Pre-trip Alarm setting		0.5 to 0.95xIr in steps of 0.05xIr
	Thermal Reflectivity		ACTIVE/ BLOCKED
Overload (Neutral)	Current Setting(A), I_N = Ir x …		OFF - 50% - 100% - 200%
	Time Delay (s)		Same as 'Overload (Phase)'
	Trip/Alarm		Both
Short-Circuit	Current Setting(A), Is = In x …		0.5 to 10 in steps of 0.05xIn6xIn
	Time Delay,Ts (ms) at 10 x In	I^2t OFF	0; 100-200-300-400
		I^2t ON	0; 100-200-300-400
	Trip/Alarm		Both
	Pre-trip Alarm setting		0.5 to 0.95xIs in steps of 0.05xIs
	Cold-Load Pickup		Enable/Disable
Instantaneous	Function		Enable/Disable
	Current Setting(A), Ip = In x …		1.5 to Icu in steps of 0.1xIn till 10xIn,
			beyond which steps are of 5kA
	Trip/Alarm		Both
	Cold-Load Pickup		Enable/Disable
Earth Fault	Function		Enable/Disable
	Current Setting(A), Ig = In x …		0.1-0.2-0.3-0.4-0.5-0.6
			0.1-0.2-0.3-0.4-0.5-0.6 with auxiliary supply
	Time Delay (s), Tg		I^2t OFF: 0.1 to 5.0s in steps of 0.1s
			I^2t ON: 0.1, 0.2, 0.3, 0.4s
	Trip/Alarm		Both
	Pre-trip Alarm setting		0.5 to 0.95xIg in steps of 0.05xIg
	Cold-Load Pickup		Enable/Disable

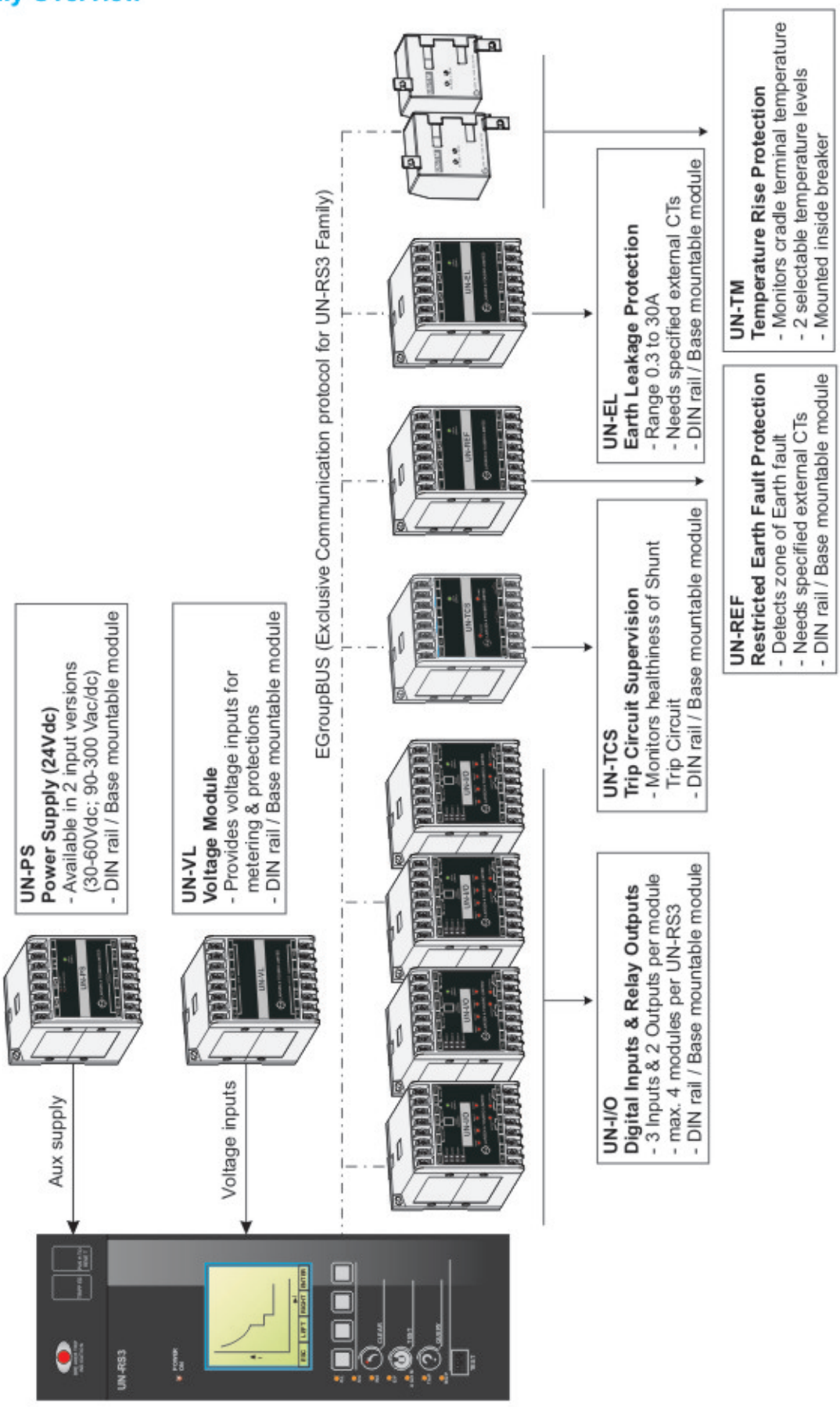
Protection & Control units UN-RS3

Additional Protections		Details
Undercurrent	Function	Enable/Disable
	Current setting (A) xIn	15% to 80% in steps of 5%
	Time delay (s)	1 to 255 in steps of 1 s
	Trip/Alarm	Either/Both
Current Unbalance	Function	Enable/Disable
	Current setting (A) xIn	10% to 100% in steps of 5%
	Time delay (s)	1 to 10 in steps of 0.5 s
	Trip/Alarm	Both
Overvoltage (requires UN-VL module)	Function	Enable/Disable
	Voltage setting (V) Vs = Vnx..	105% to 150% in steps of 5%
	Time delay (s)	0.1 to 100 in steps of 0.1 s
		85% to 98% in steps of 1%
	Trip/Alarm	Either/Both
Undervoltage (requires UN-VL module)	Function	Enable/Disable
	Voltage setting (V), Vnx..	70% to 95% in steps of 5%
	Time delay (s)	0.1 to 5 in steps of 0.1 s
		102% to 115% in steps of 1%
	Trip/Alarm	Either/Both
Under-Frequency (requires UN-VL module)	Function	Enable/Disable
	Settings	45 to 55 Hz for 50 Hz in steps of 0.01 Hz
		55 to 65 Hz for 60 Hz in steps of 0.01 Hz
	Time delay (s)	0.1 to 100 in steps of 0.01 s
		0.02Hz to 0.100 Hz in steps of 0.1 Hz
	Trip/Alarm	Either/Both
Over-Frequency (requires UN-VL module)	Function	Enable/Disable
	Settings	45 to 55 Hz for 50 Hz in steps of 0.01 Hz
		55 to 65 Hz for 60 Hz in steps of 0.01 Hz
	Time delay (s)	0.1 to 100 in steps of 0.01 s
		0.02Hz to 0.100 Hz in steps of 0.1 Hz
	Trip/Alarm	Either/Both
Reverse Power (requires UN-VL module)	Function	Enable/Disable
	Setting	0.02 to 0.4xPn in steps of 0.01
	Time delay (s)	0.1 to 100 in steps of 0.01 s
	Trip/Alarm	Either/Both
Temperature rise (requires UN-TM module/s)	Function	Enable/Disable
	Time delay	0 to 15 mins in steps of 1 min
	Trip/Alarm	Either/Both
Restricted Earth Fault (requires UN-REF module with special CTs)	Function	Enable/Disable
	Setting	0.1 to 0.6xIn in steps of 0.01
	Time delay (s)	I^2t OFF: 0.1 to 5.0s in steps of 0.1s
		I^2t ON: 0.1, 0.2, 0.3, 0.4s
	Trip/Alarm	Both
	Pre-trip Alarm setting	0.5 to 0.95 in steps of 0.1
	Cold-Load Pickup	Enable/Disable
Earth Leakage (requires UN-EL module with special CTs)	Function	Enable/Disable
	Setting	0.3, 0.5 to 30A in steps of 0.5
	Time delay (s)	Instantenous, 100ms - 5s in steps of 100ms
	Trip/Alarm	Both
Trip Circuit Supervision (requires UN-TCS module)	Function	Enable/Disable
	Trip/Alarm	Either/Both
Breaker Failure	Function	Enable/Disable
	Time delay	0.05 to 2 s in steps of 0.01 s
	Trip/Alarm	Either/Both
i Discrimination		✓

Metering	Details
Current	Phase, NeutralandEarth
	Sequence Current Components
	Maximum Running Current per phase
	Percent loading
Voltage (requires UN-VL module)	Phase-Neutral
	Phase-Phase
Frequency (requires UN-VL module)	✓
Power Factor (requires UN-VL module)	✓
Power (requires UN-VL module)	Active power per phase and total (kW) Reactive Power per phase and total (kVAR) Apparent Power per phase and total (kVA)
	Maximum demand (kW)
Energy (requires UN-VL module)	Total Active Energy (kWh)
	Total Reactive Energy (kVARh)
Display	High resolution backlit LCD

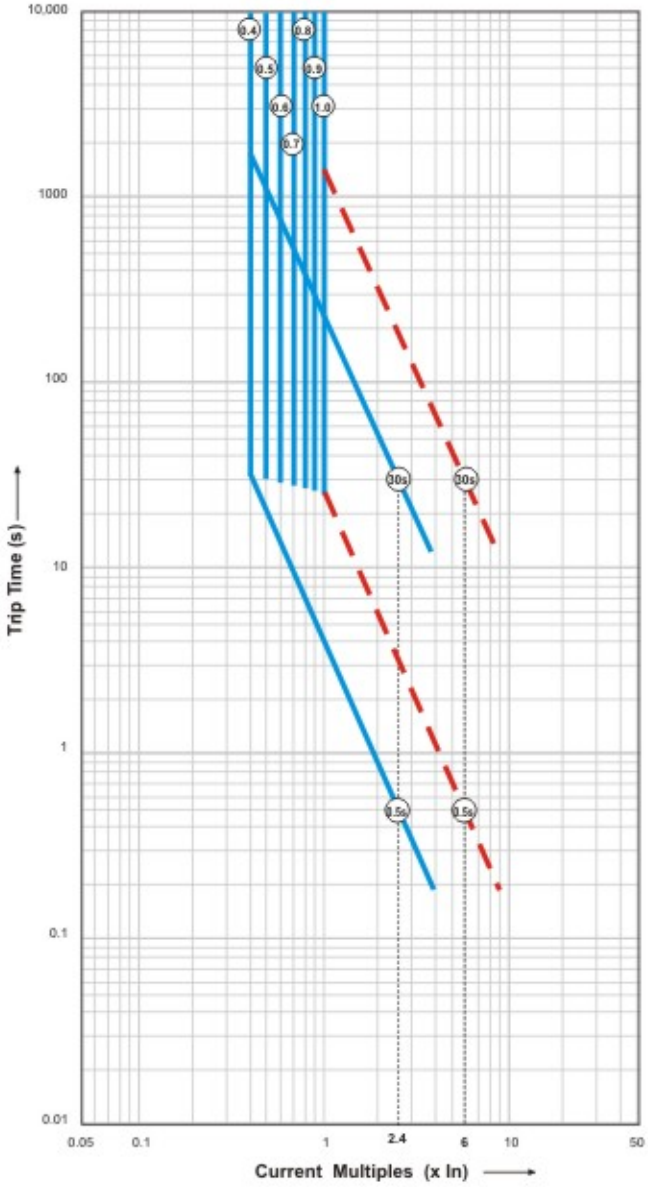
Additional features		Details
LED Indications	Power On	✓
	Overload	✓
	Short-Circuit	✓
	Instantanous	✓
	Earth Fault	✓
	Alarm	✓
	Trip	✓
	Temperature (requires UN-TM module/s)	✓
Auxiliary supply		24 Vdc
Digital Inputs		5 nos., Optically isolated, 24 Vdc
Output Relays		3 NO 240 Vac/5 A, 30 Vdc/5 A (resistive load)
Rating Plug	I_n Multiplier	0.5, 0.75 & 1.0
Communication	Protocol	MODBUS RTU
	Link used	RS485
Maintenance Indication		Time based
		I^2t based
Event Records		Pickup, Trip, Alarm, Control, Logical input, Date, Time and cause of Event
Fault & Alarm History		Last 5 records with date & time stamping, voltage & current readings in all phases, type of faults Or alarms, interrupted current, contact wear
Testing	Self-Diagnostic Test	✓
Supplementary Modules	Input / Output (UN-I/O)	[3 Digital inputs + 2 Relay outputs]x4
	Power Supply (UN-PS)	30-60V dc, 90-300V ac/dc
	Trip Circuit Supervision (UN-TCS)	✓
	Restricted Earth (UN-REF)	✓
	Earth Leakage (UN-EL)	✓
	Thermistor Module (UN-TM)	One for Frame I & II, Two for Frame III & IV
Programming Unit		✓
Storable Settings		2 sets

UN-RS3 Family Overview



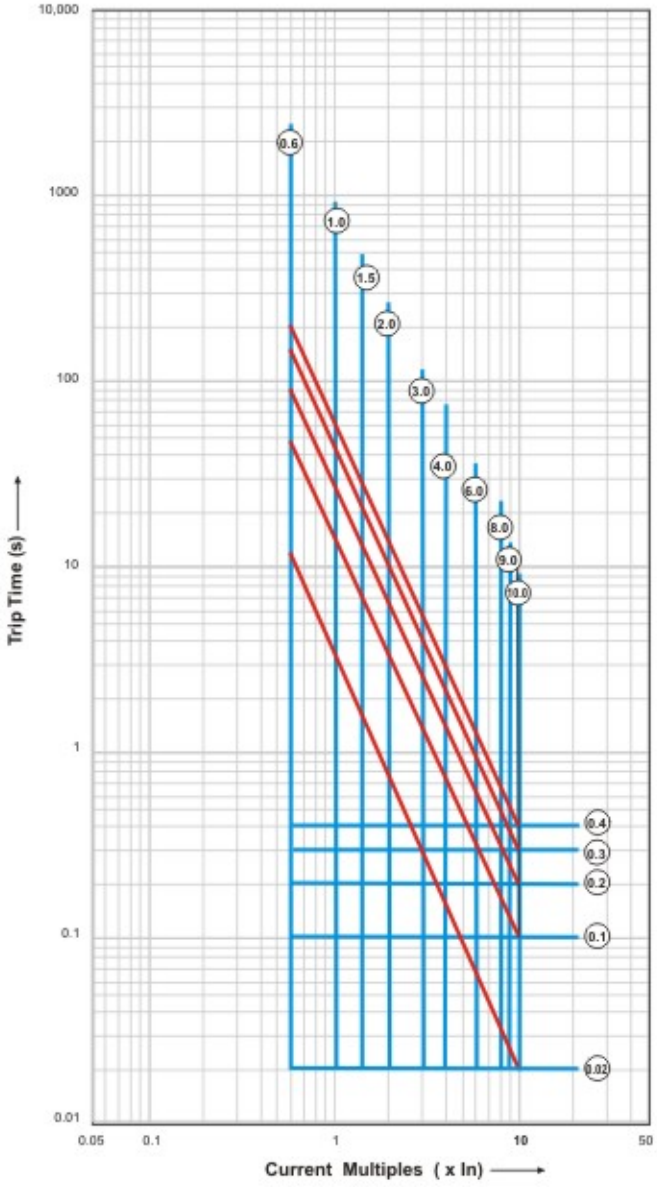
Protection Characteristics

Overload

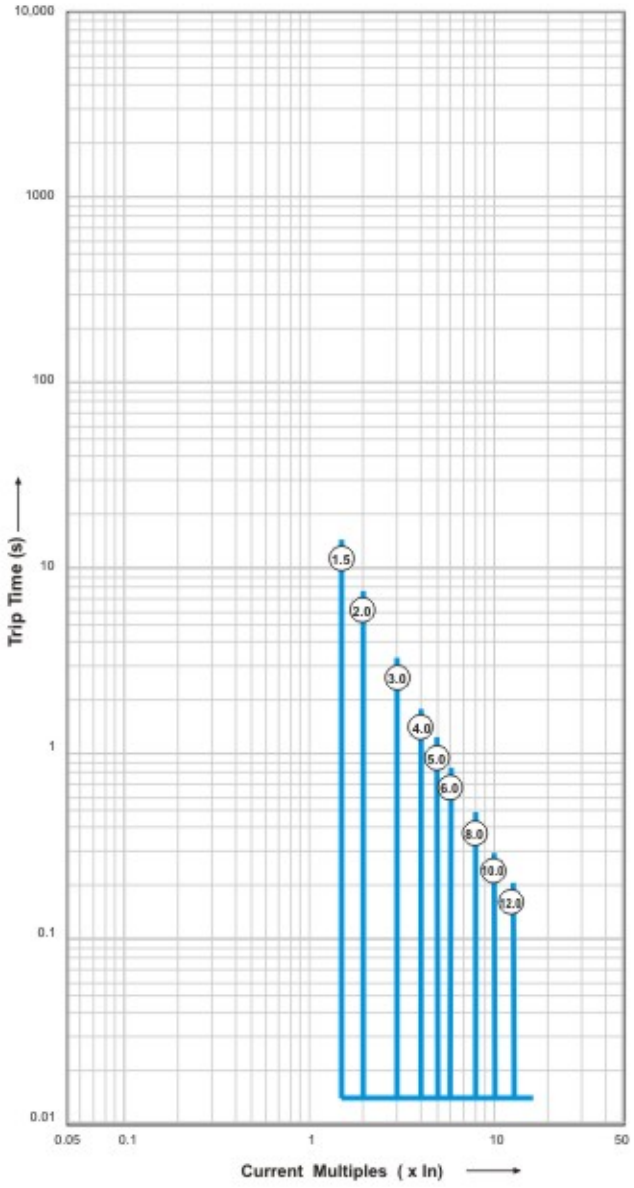


Short Circuit

I^2t ON I^2t OFF

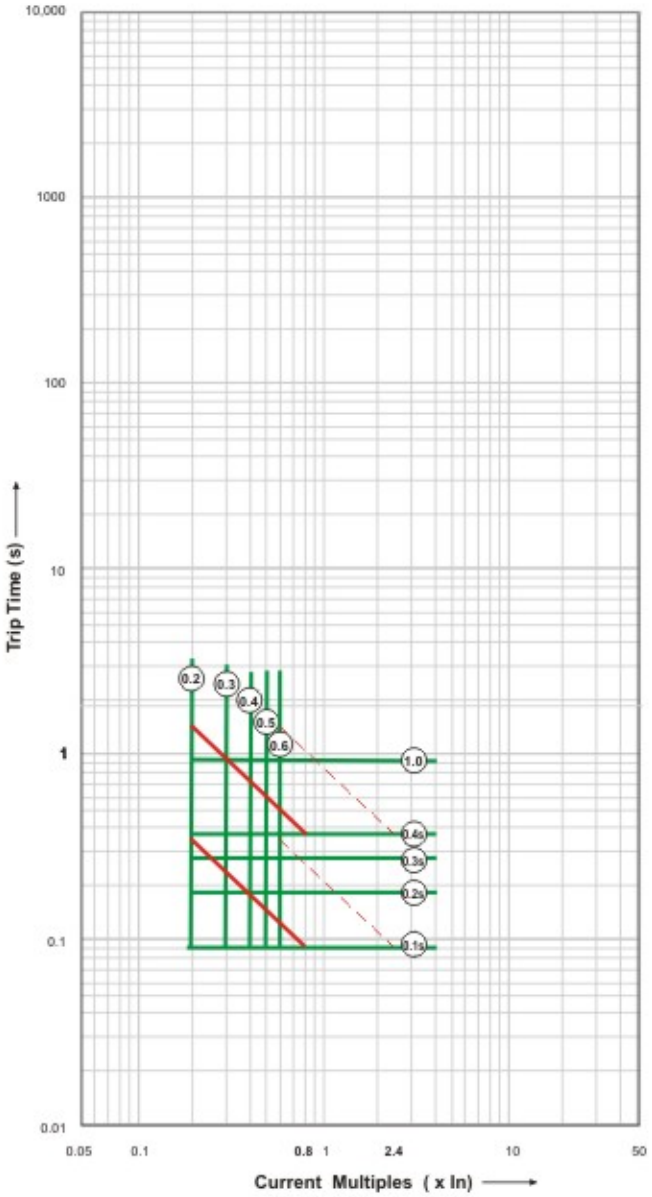


Instantaneous

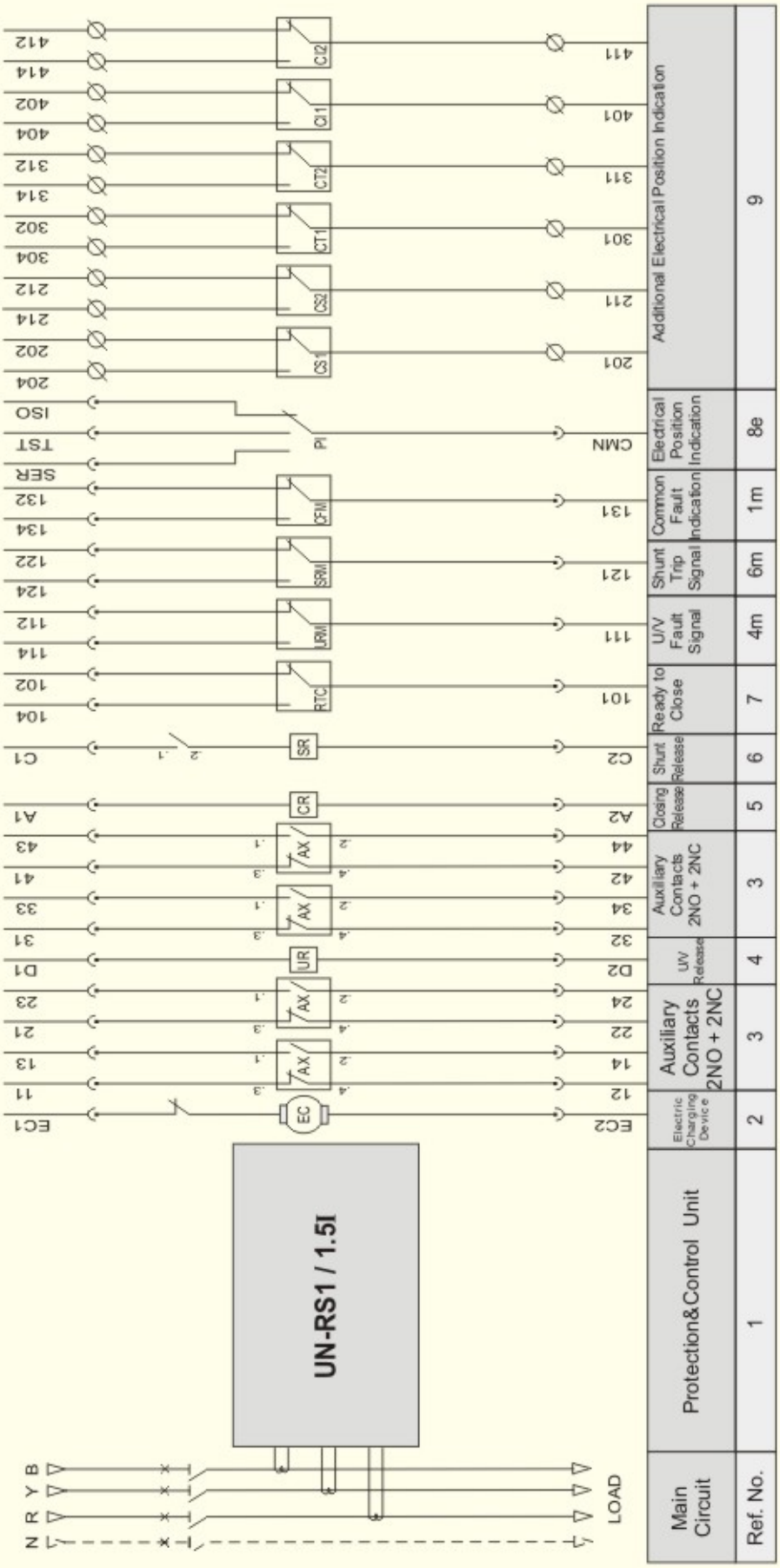


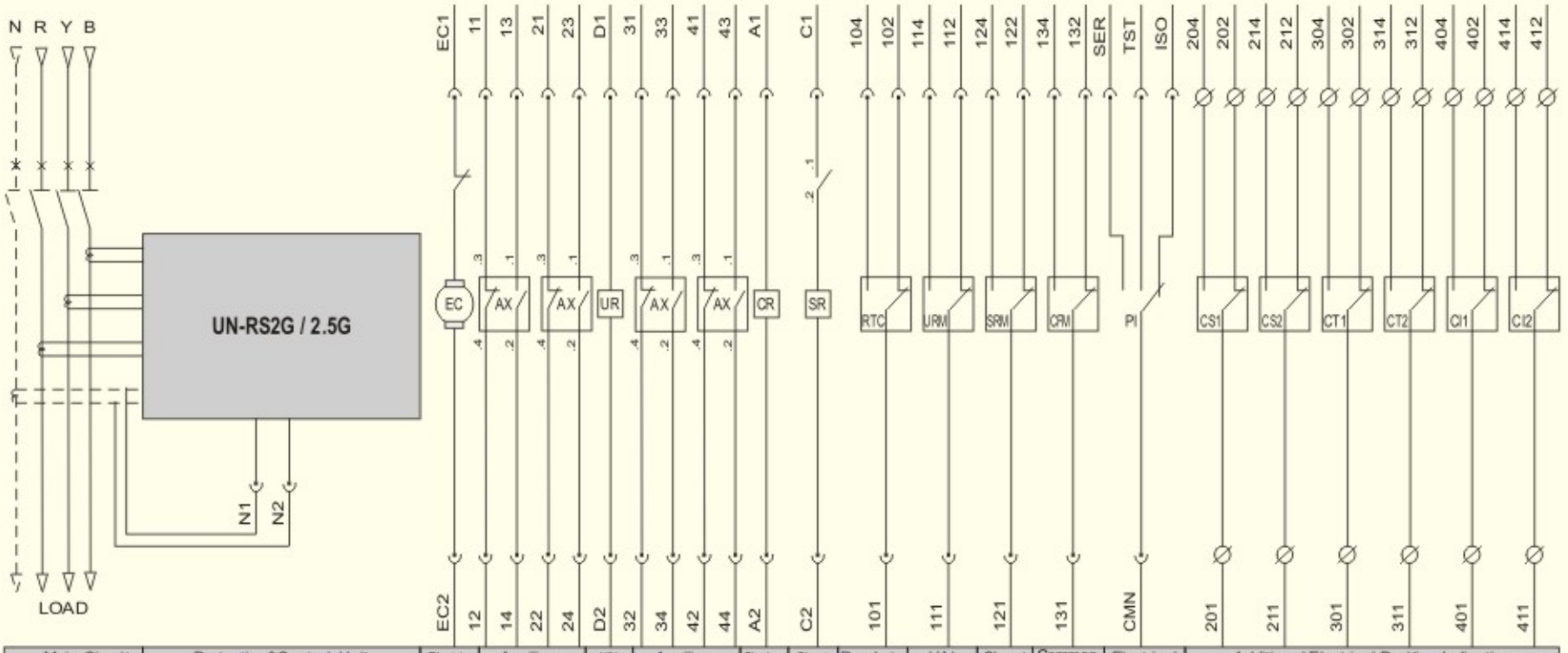
Ground Fault

I^2t ON I^2t OFF



Connection details
(UN-RS1/1.5I)

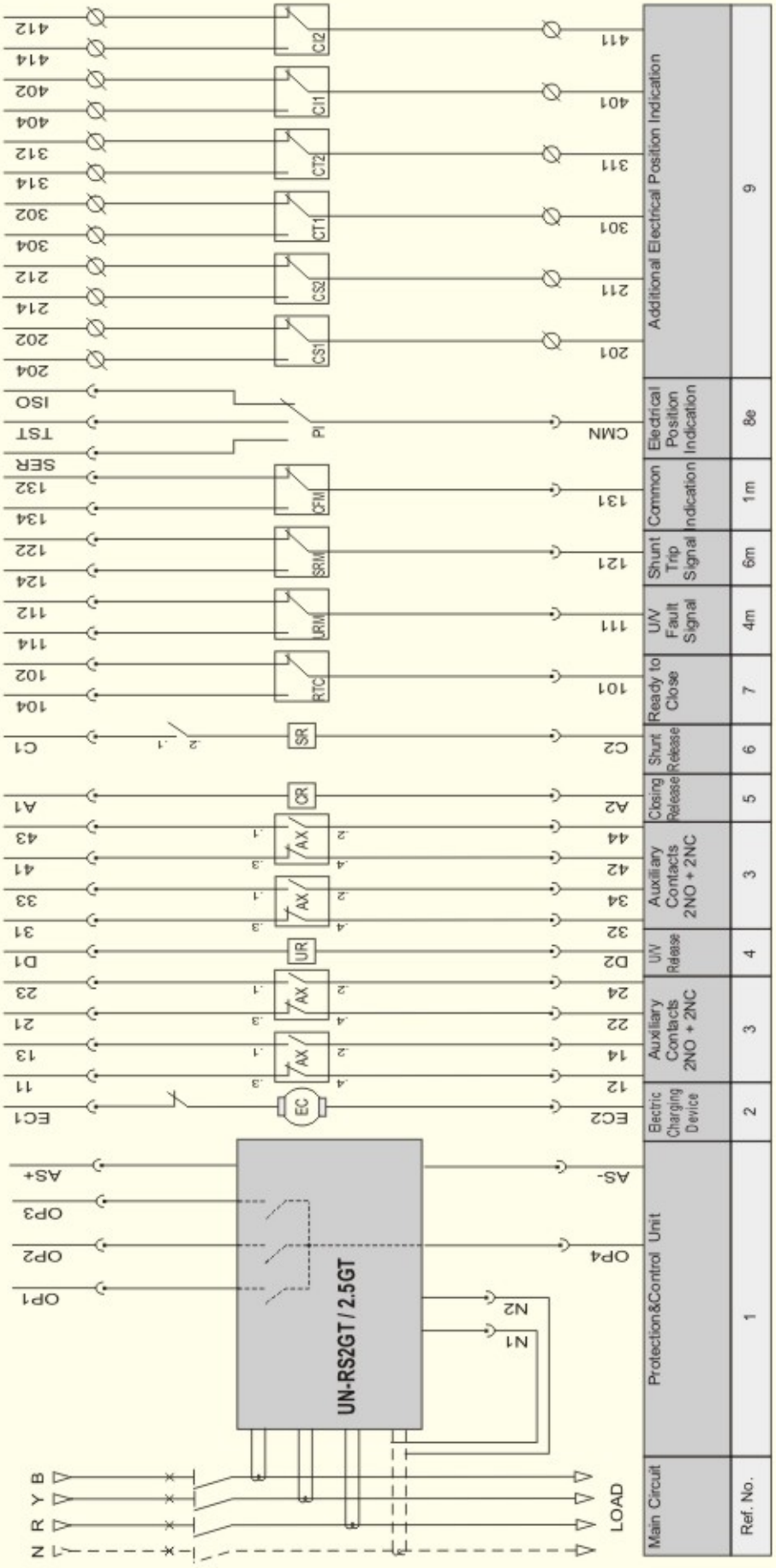




Main Circuit	Protection&Control Unit	Electric Charging Device	Auxiliary Contacts 2NO + 2NC	U/V Release	Auxiliary Contacts 2NO + 2NC	Closing Release	Shunt Release	Ready to Close	U/V Fault Signal	Shunt Trip Signal	Common Indication	Electrical Position Indication	Additional Electrical Position Indication
Ref. No.	1	2	3	4	3	5	6	7	4m	6m	1m	8e	9

N1, N2:External Neutral CT

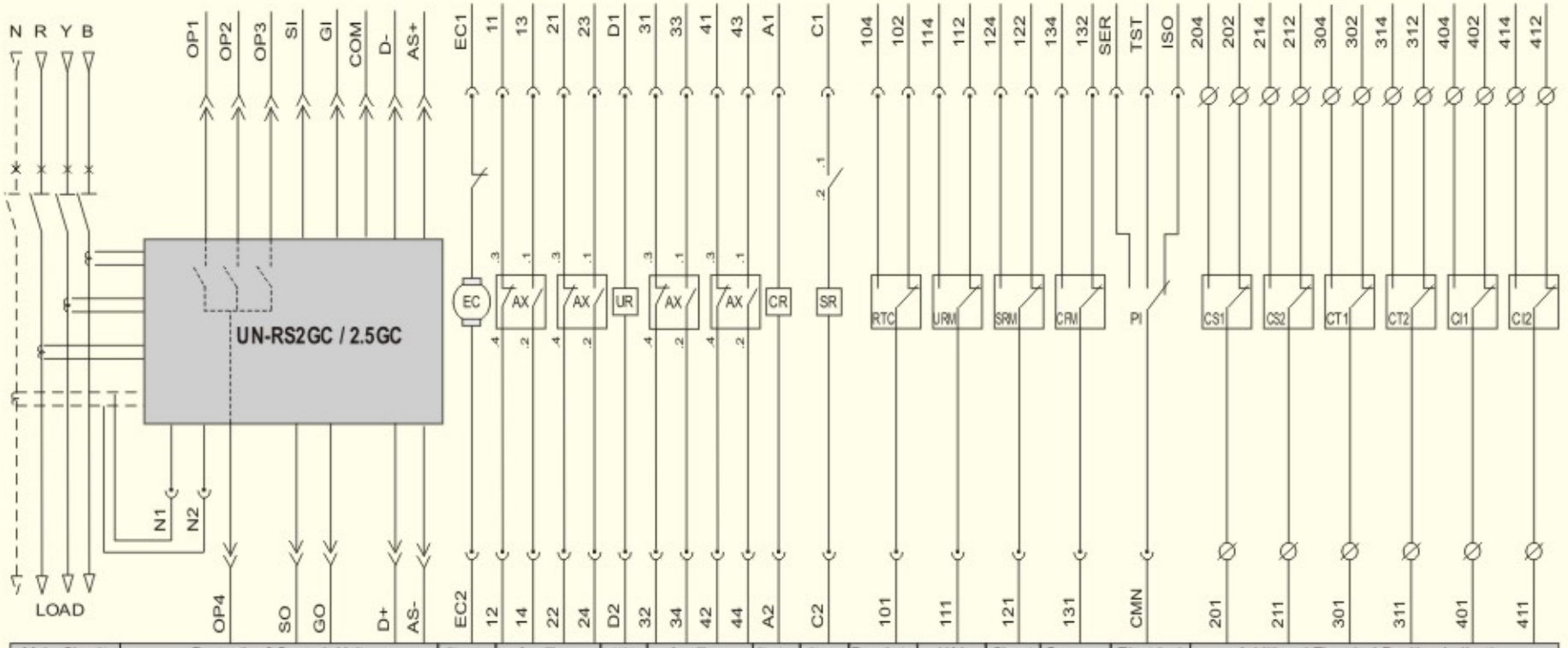
Connection details
UN-RS2GT / 2.5GT



OP1 : Overload Fault Indication
OP2 : Short-Circuit / Instantaneous Fault Indication
OP3 : Earth Fault Indication

Op4 : Common Terminal
AS+, AS- : Auxiliary Supply
N1, N2 : External Neutral CT

Connection details
UN-RS2GC / 2.5GC



Main Circuit	Protection&Control Unit	Electric Charging Device	Auxiliary Contacts 2NO + 2NC	U/V Release	Auxiliary Contacts 2NO + 2NC	Closing Release	Shunt Release	Ready to Close	U/V Fault Signal	Shunt Trip Signal	Common Indication	Electrical Position Indication	Additional Electrical Position Indication
Ref. No.	1	2	3	4	3	5	6	7	4m	6m	1m	8e	9

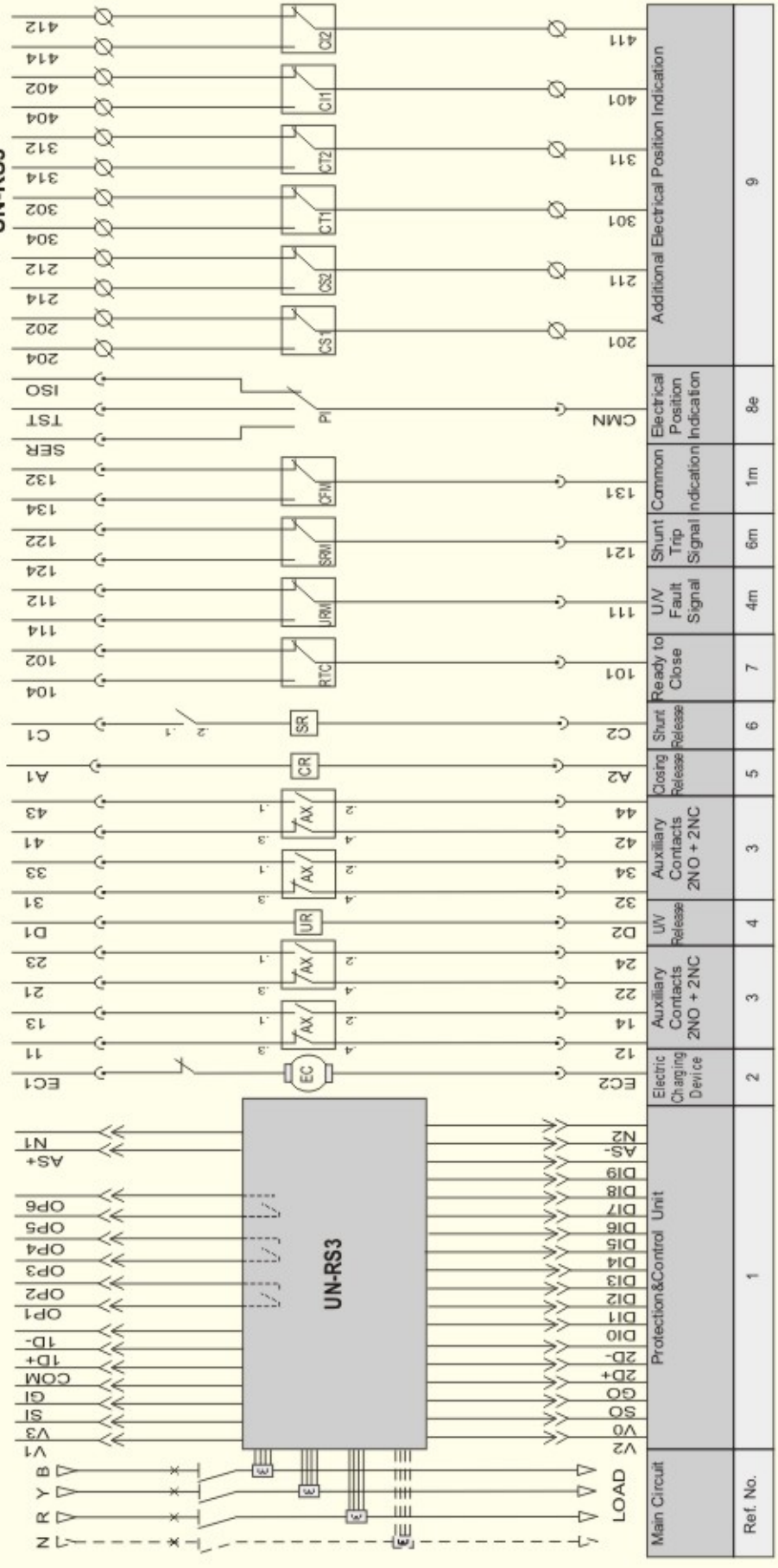
SI : *i* Discrimination - Short-Circuit Input
GI : *i* Discrimination - Earth Fault Input
SO : *i* Discrimination - Short-Circuit Output
GO : *i* Discrimination - Earth Fault Output
COM : *i* Discrimination - Common Terminal
D+, D- } Serial Communication with Control System (External Bus)

OP1 : Overload Fault Indication
OP2 : Short-Circuit / Instantaneous Fault Indication
OP3 : Earth Fault Indication
OP4 : Common Terminal
AS+, AS- : Auxiliary Supply
N1, N2 : External Neutral CT

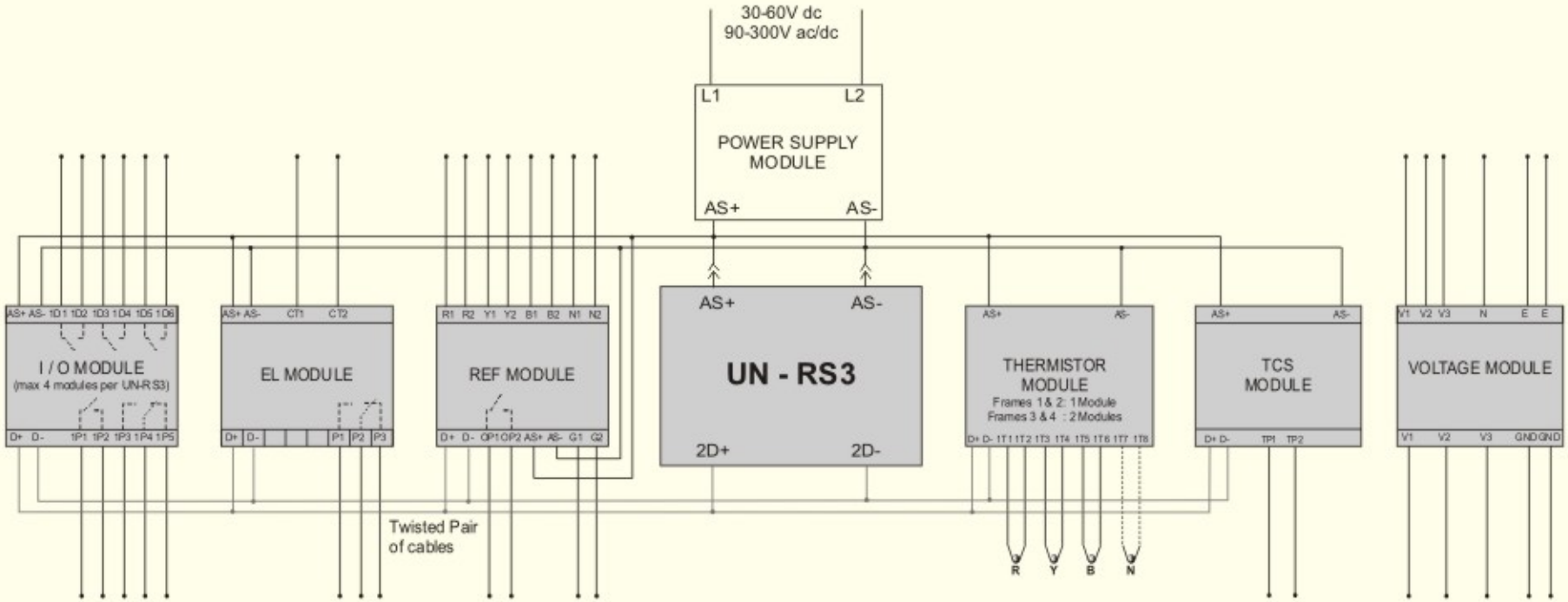
Note: For P&C Units type UN-RS2G*i*/UN-RS2GC & UN-RS3, special set of draw-out plug-in contacts are used.

Connection details

UN-RS3



Connection details
UN-RS3 with Supplementary Modules



2D+ } Serial Communication
2D- } with Supplementary Modules (EGroupBUS)
AS+, AS- : Auxiliary Supply
L1, L2 : Control Supply

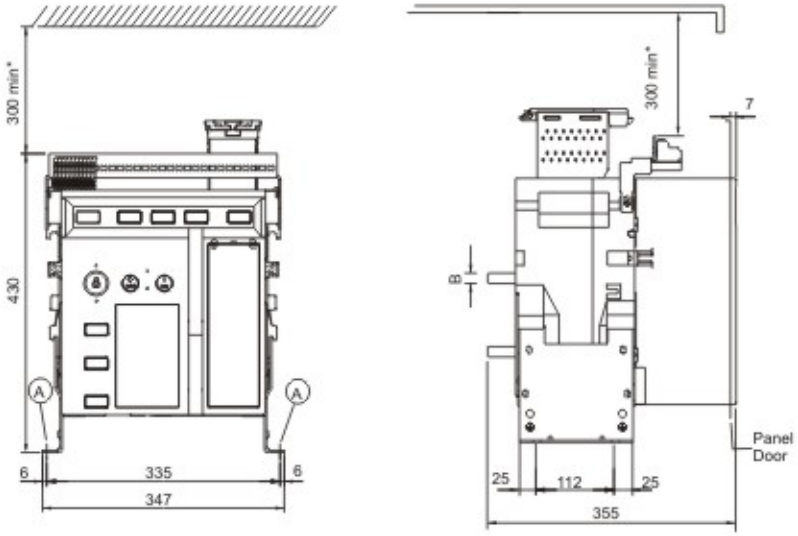
1P1 - 1P5 : Digital Outputs
1D1 - 1D6 : Digital Inputs
CT1 - CT2 : External CBCT inputs
P1 - P3 : Changeover Relay outputs
R1, R2, Y1, Y2, B1, B2, N1, N2 } External CT inputs
OP1 - OP2 : Relay output contacts

1T1 - 1T8 } Thermistor Inputs
2T1 - 2T8 }
TP1 - TP2 : TCS Module Outputs to be connected in series with Shunt release (C1 & C)
V1, V2, V3, N, E : Input Voltage connections
V1, V2, V3, GND : Output Voltage connections to SICs (Refer page 7-1)

Mounting
Frame I, 3P

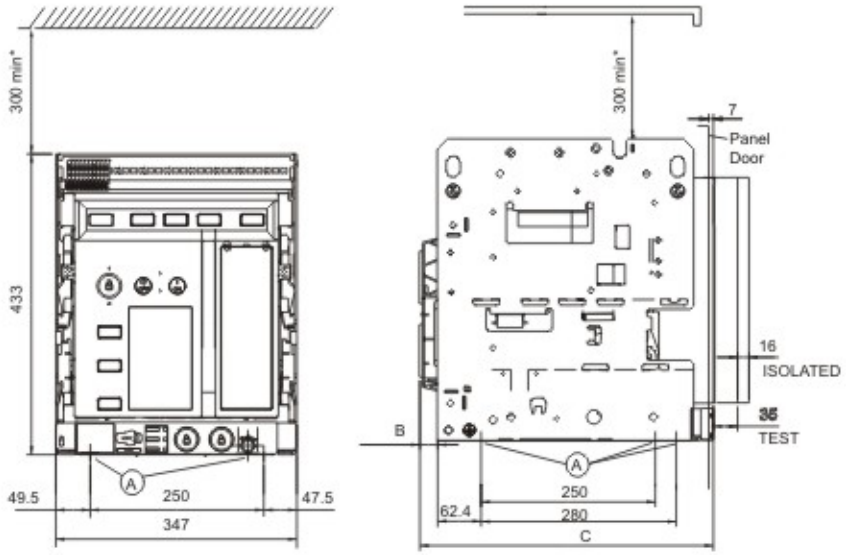
Fixed Circuit Breaker

Fri.1, 3P	B
400 - 1600 (N/S)	15
2000A (S)	30



Drawout Circuit Breaker

Fri.1, 3P	B	C
400 - 1250 N	22.5	418
1600 N	25.5	421
630 - 2000 S	25.5	421

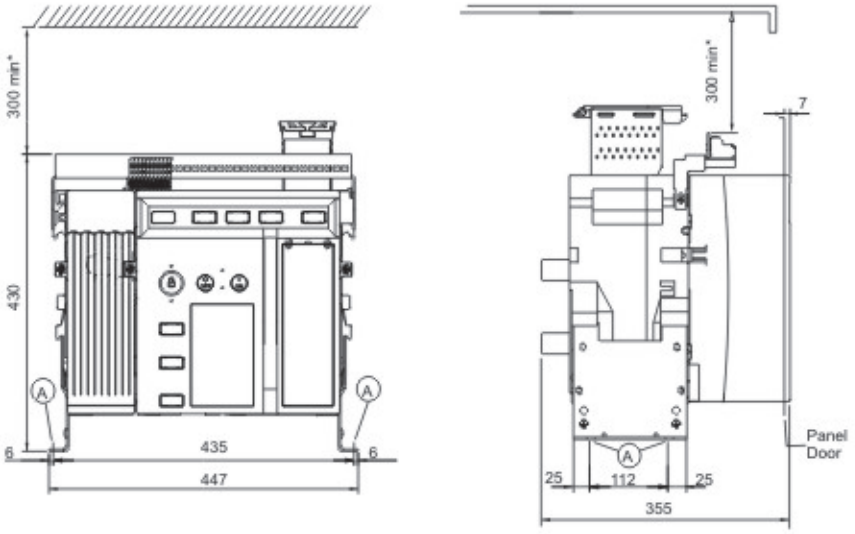


All Dimensions in mm
* Lower clearance of 45 mm can be achieved for 'N' version with Arc Shield (22)

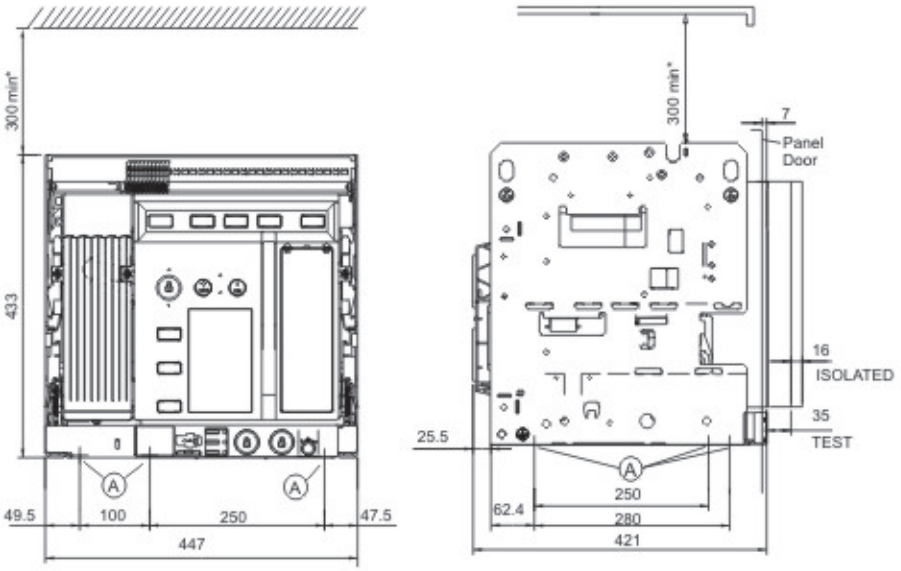
Ⓐ Mounting holes suitable for M10 / Equivalent BS bolt

Mounting
Frame II, 3P

Fixed Circuit Breaker



Drawout Circuit Breaker

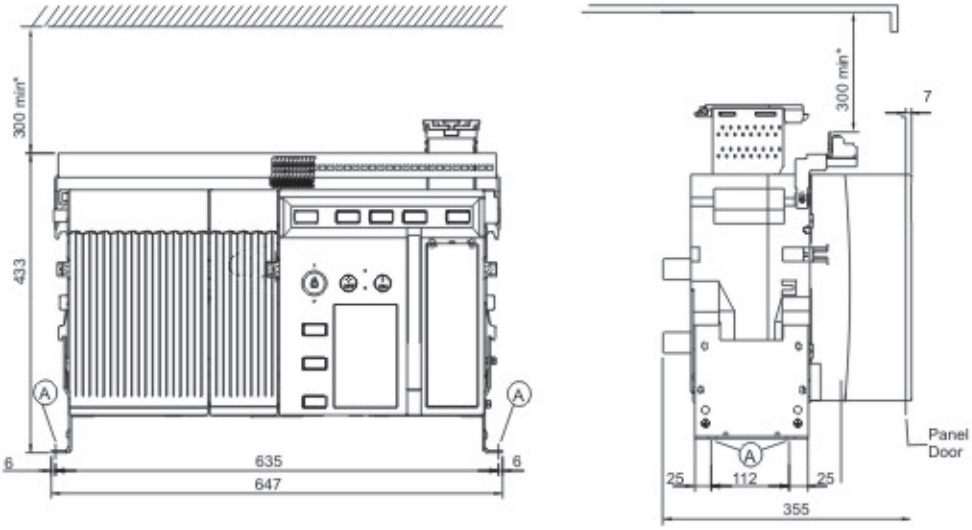


All Dimensions in mm
* Lower clearance of 45 mm can be achieved for 'S' version with Arc Shield (22)

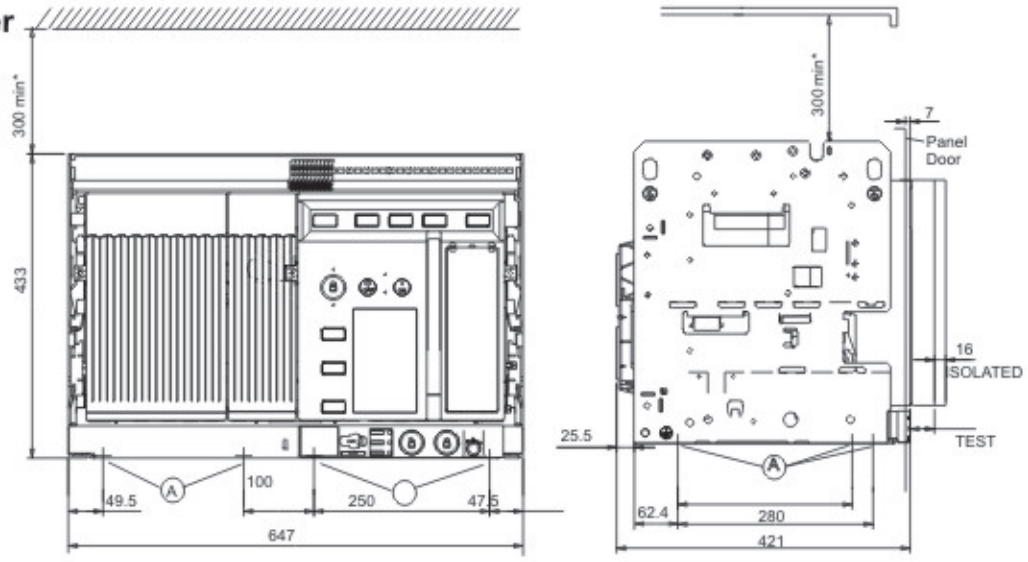
Ⓐ Mounting holes suitable for M10 / Equivalent BS bolt

Mounting
Frame III, 3P

Fixed Circuit Breaker



Drawout Circuit Breaker

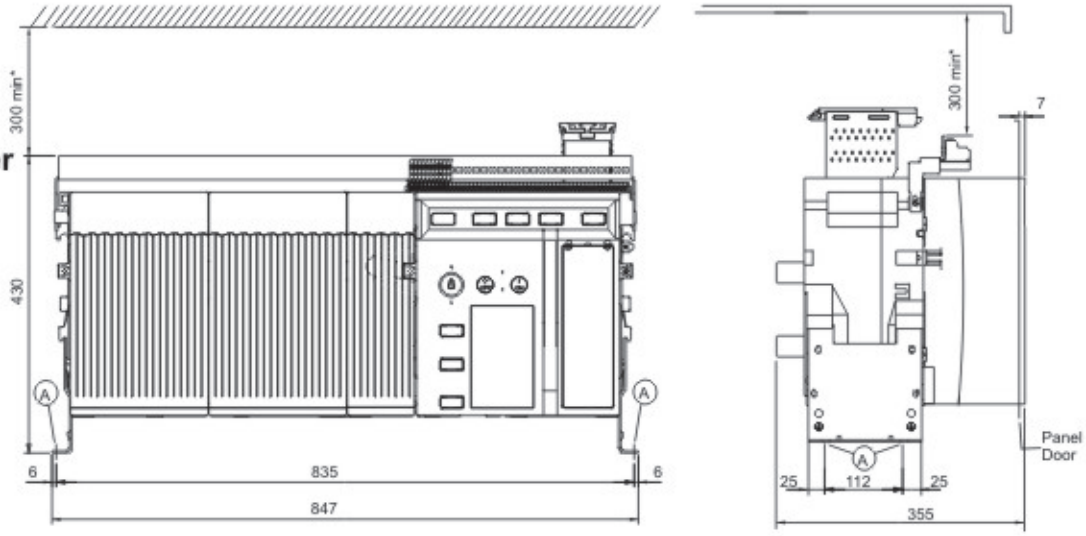


All Dimensions in mm
* Lower clearance of 45 mm can be achieved for 'H' version with Arc Shield (22)

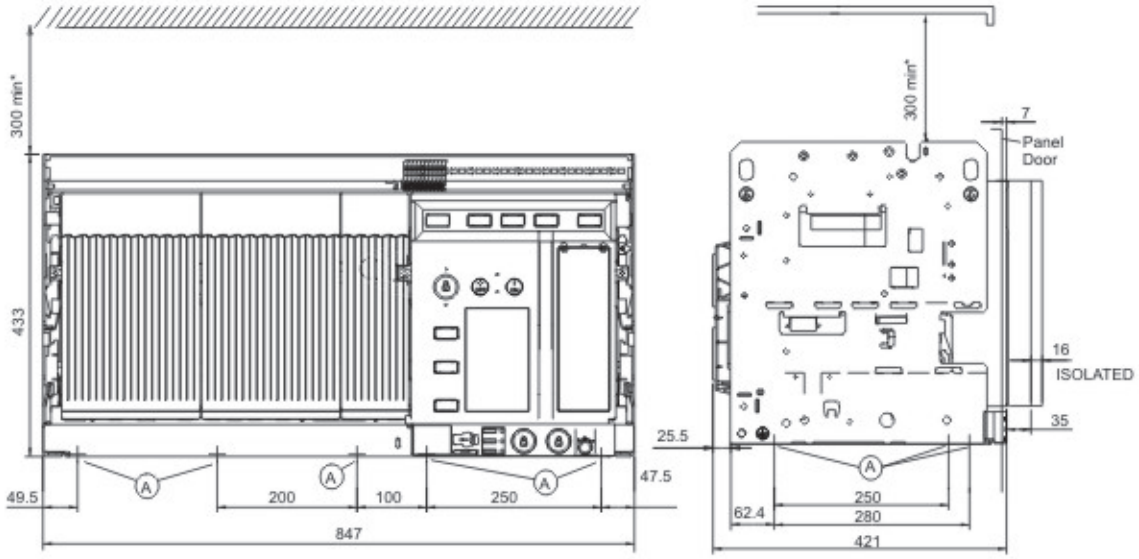
Ⓐ Mounting holes suitable for M10 / Equivalent BS bolt

Mounting
Frame IV, 3P

Fixed Circuit Breaker



Drawout Circuit Breaker

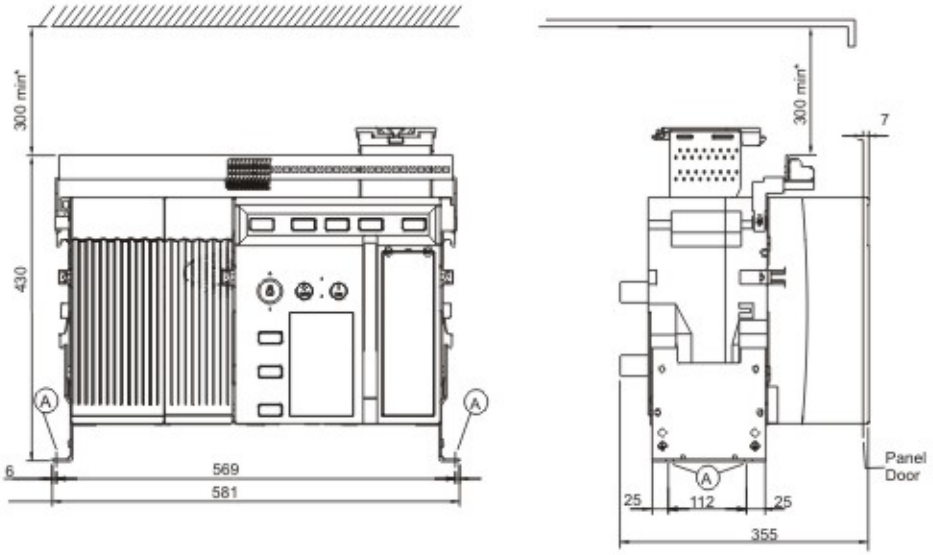


All Dimensions in mm
* Lower clearance of 45 mm can be achieved for 'H' version with Arc Shield (22)

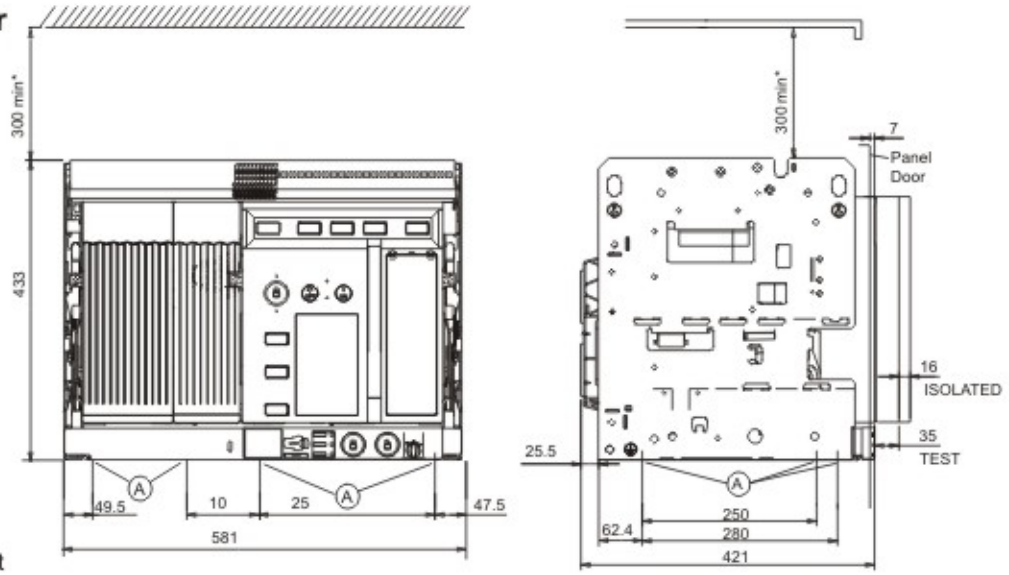
Ⓐ Mounting holes suitable for M10 / Equivalent BS bolt

Mounting
Frame II, 4P (100% N)

Fixed Circuit Breaker



Drawout Circuit Breaker

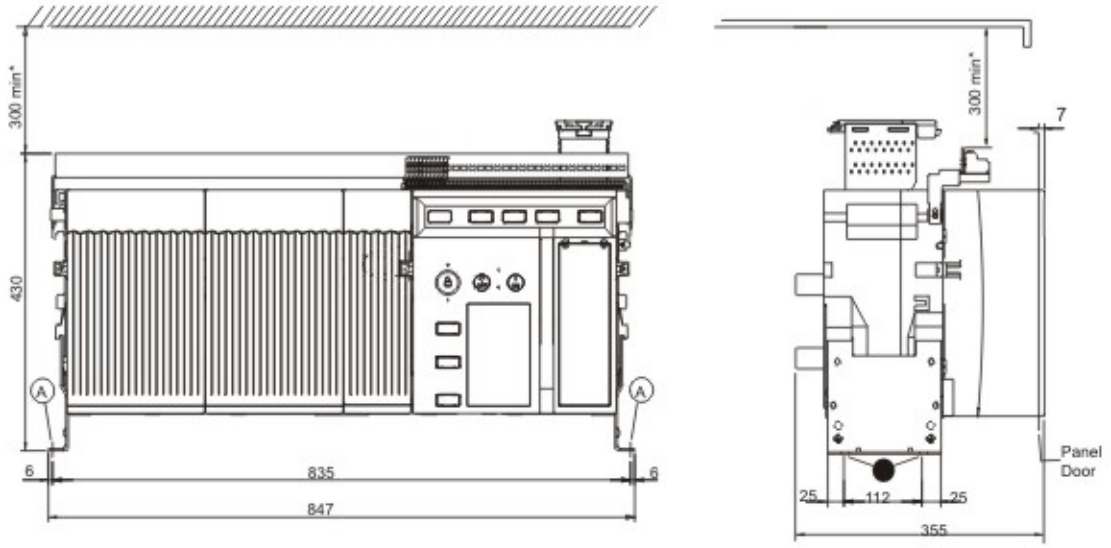


Details of 4P (200% N) on request
All Dimensions in mm
* Lower clearance of 45 mm can be achieved for 'S' version with Arc Shield (22)

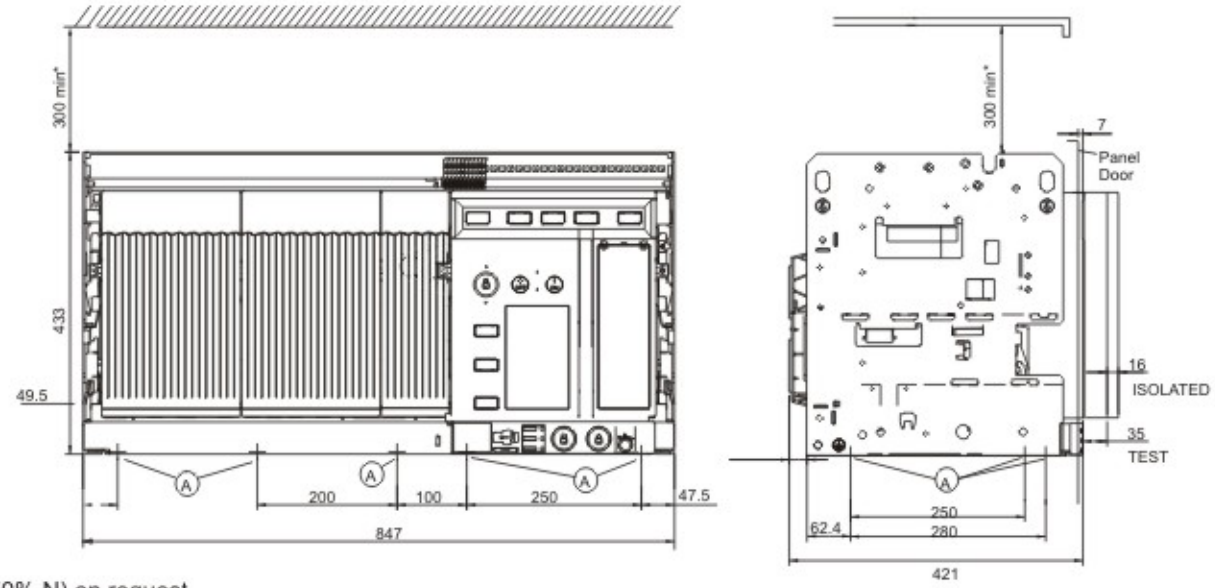
Ⓐ Mounting holes suitable for M10 / Equivalent BS bolt

Mounting
Frame III, 4P (100% N)

Fixed Circuit Breaker



Drawout
Circuit Breaker

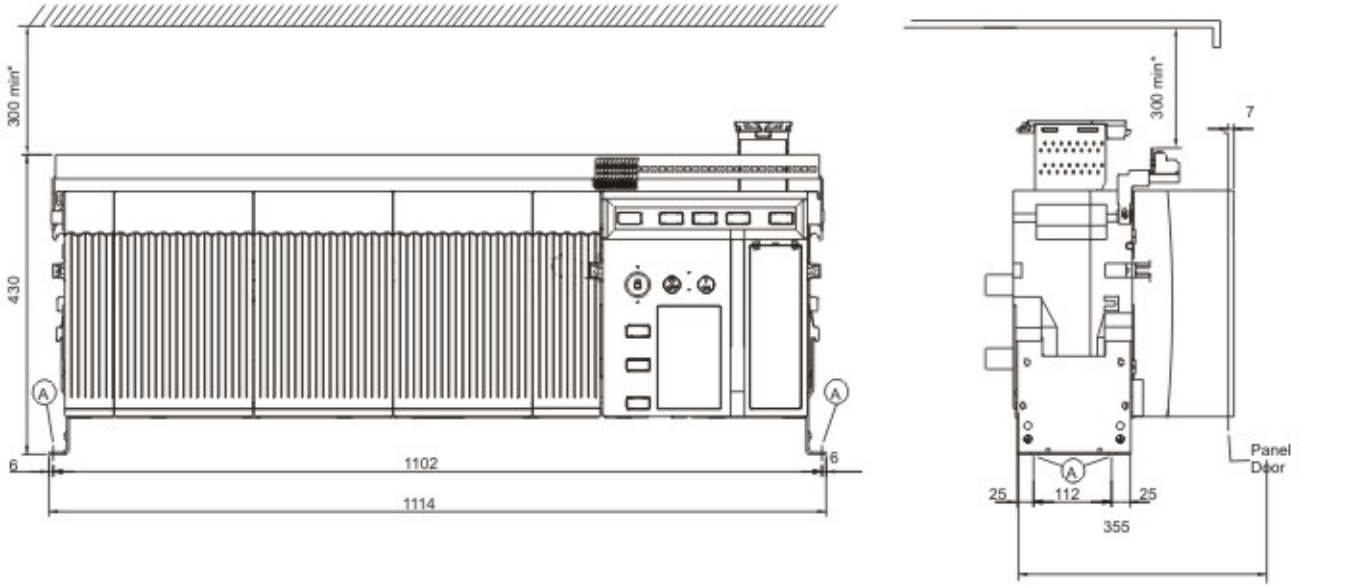


Details of 4P (50% N) on request
All Dimensions in mm
* Lower clearance of 45 mm can be achieved for 'H' version with Arc Shield (22)

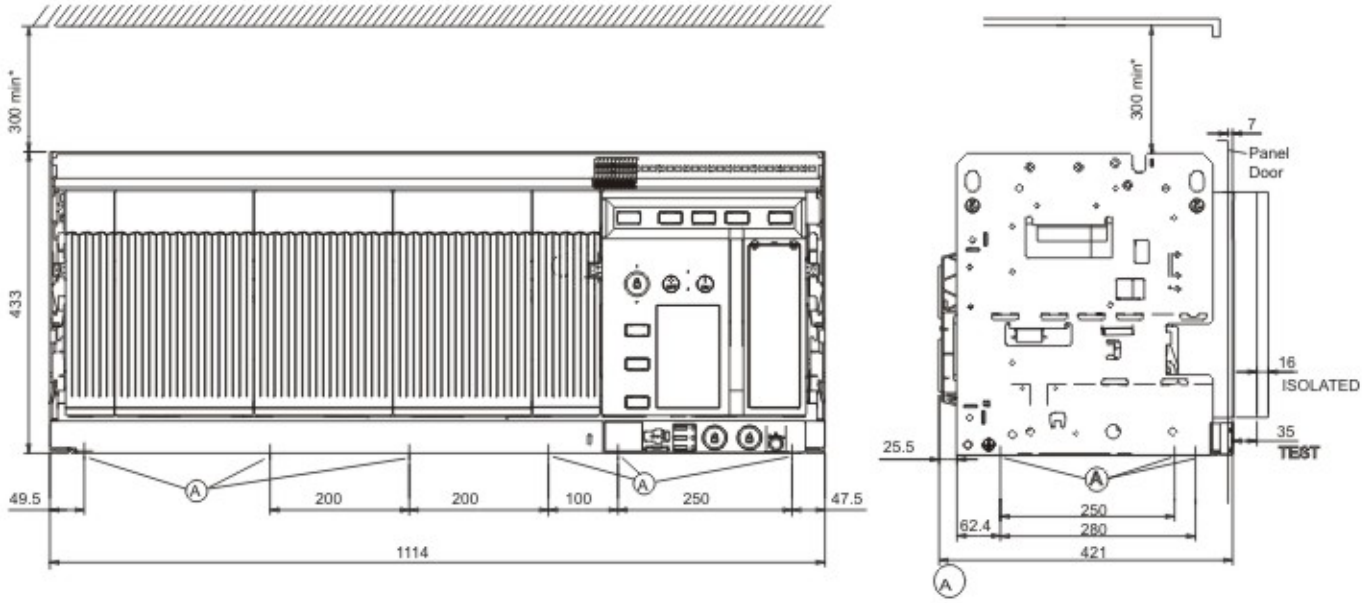
Ⓐ Mounting holes suitable for M10 / Equivalent BS bolt

Mounting
Frame IV, 4P (100% N)

Fixed Circuit Breaker



Drawout Circuit Breaker



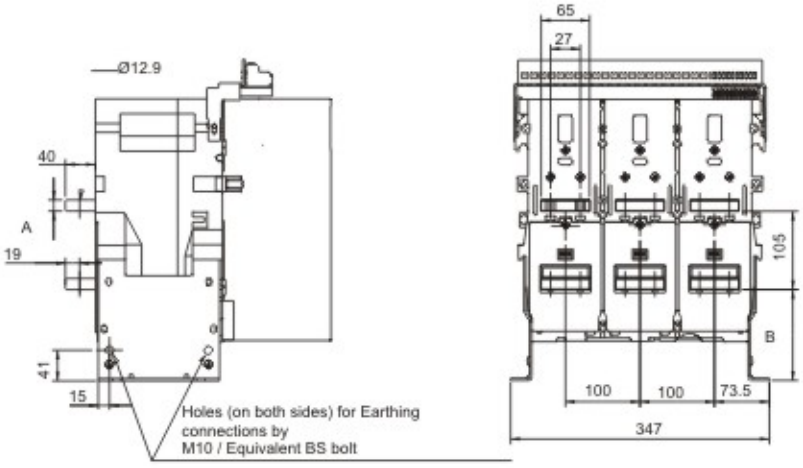
Details of 4P (50% N) on request
All Dimensions in mm
* Lower clearance of 45 mm can be achieved for 'H' version with Arc Shield (22)

Mounting holes suitable for
M10 / Equivalent BS bolt

Termination - Fixed Breakers

Frame I, 3P

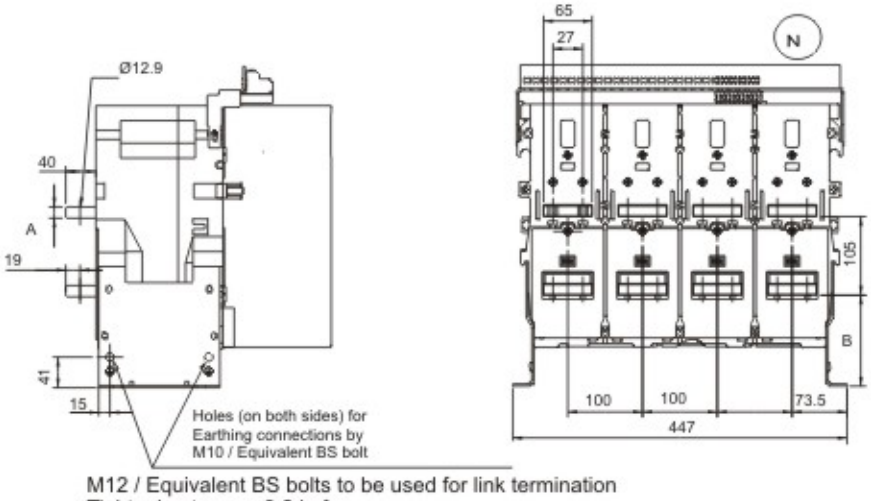
Fri.1, 3P	A	B
400 - 1250 N	8	125.5
1600 N	15	122
630 - 1600 S	15	122
2000S	30	122



M12 / Equivalent BS bolts to be used for link termination
Tightening torque: 3.2 kgfm

Frame I, 4P (100% N)

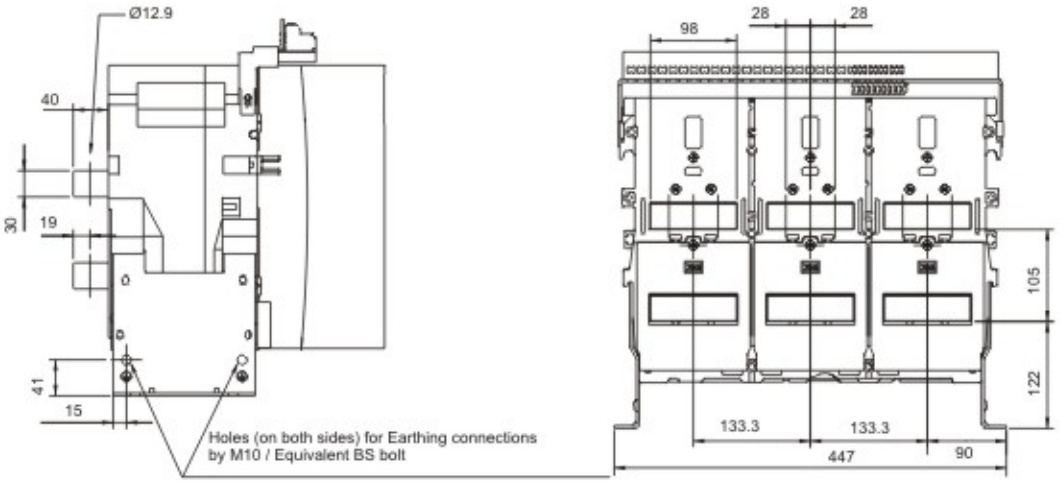
Fri.1, 4P	A	B
400 - 1250 N	8	125.5
1600 N	15	122
630 - 1600 S	15	122
2000S	30	122



Details of 4P(200% N) on request
All Dimensions in mm

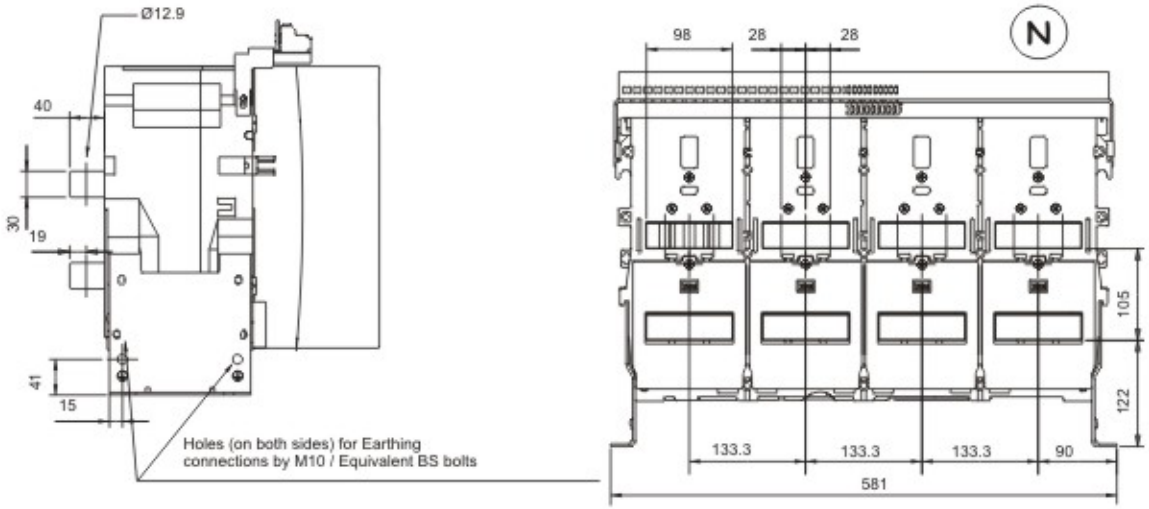
M12 / Equivalent BS bolts to be used for link termination
Tightening torque: 3.2 kgfm

Termination - Fixed Breakers
Frame II, 3P



M12 / Equivalent BS bolts to be used for links termination
Tightening torque: 3.2 kgfm

Frame II, 4P (100% N)

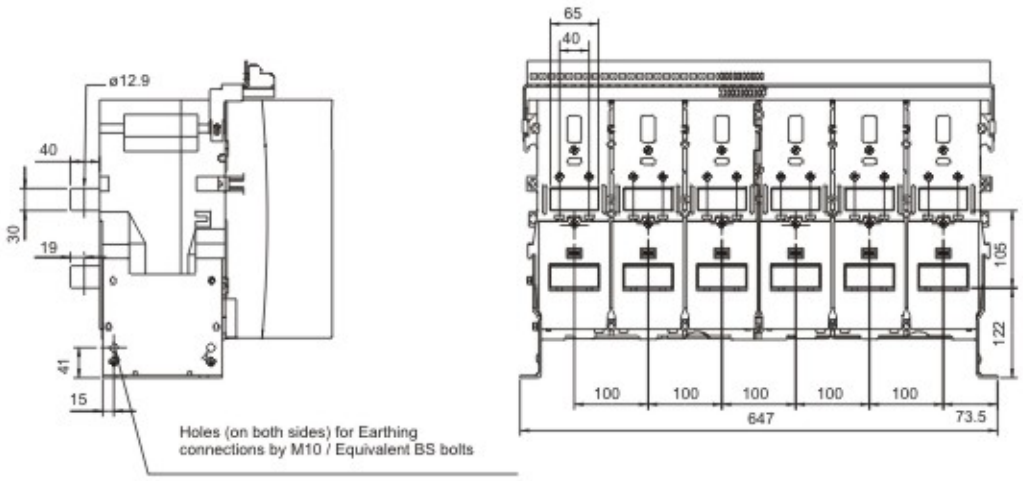


M12 / Equivalent BS bolts to be used for links termination
Tightening torque: 3.2 kgfm

Details of 4P(200% N) on request
All Dimensions in mm

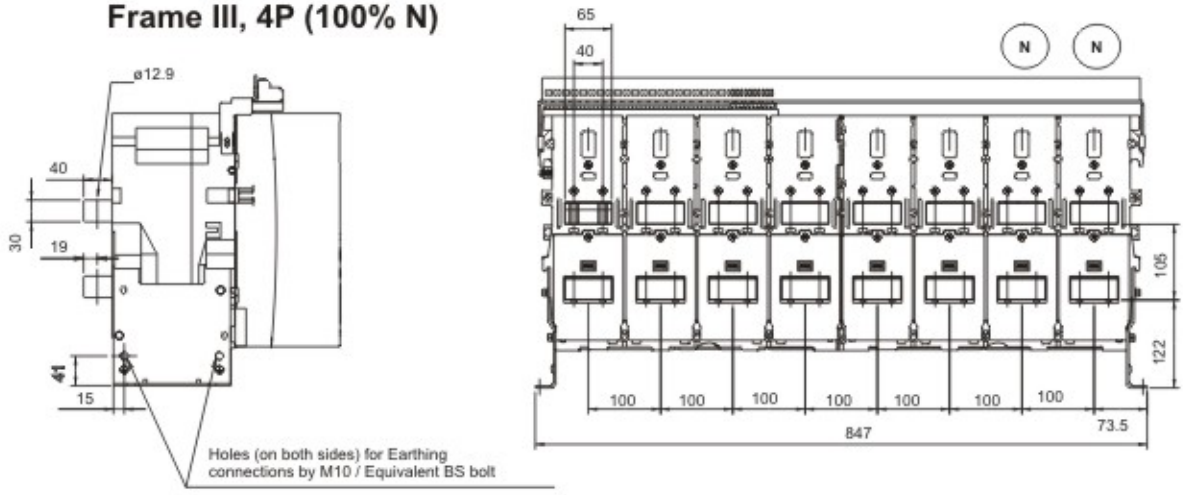
Termination - Fixed Breakers

Frame III, 3P



M12 / Equivalent BS bolts to be used for links termination
Tightening torque: 3.2 kgfm

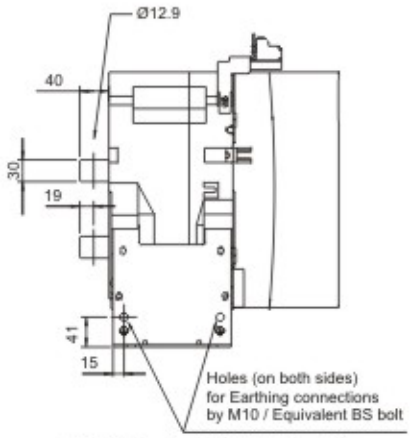
Frame III, 4P (100% N)

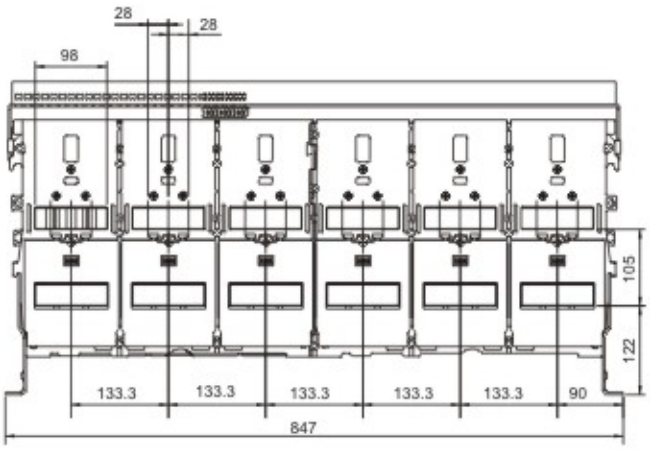


M12 / Equivalent BS bolts to be used for links termination
Tightening torque: 3.2 kgfm

Details of 4P(50% N) on request
All Dimensions in mm

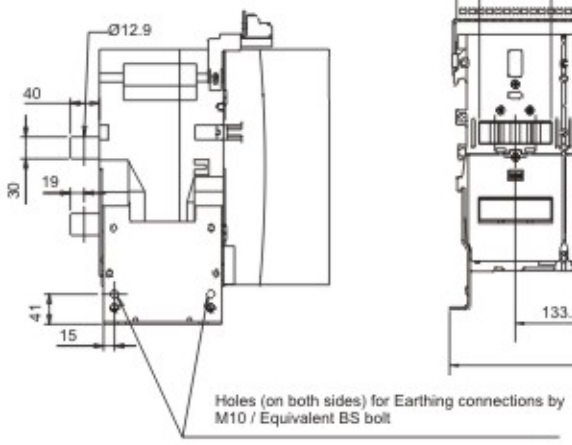
Termination - Fixed Breakers
Frame IV, 3P

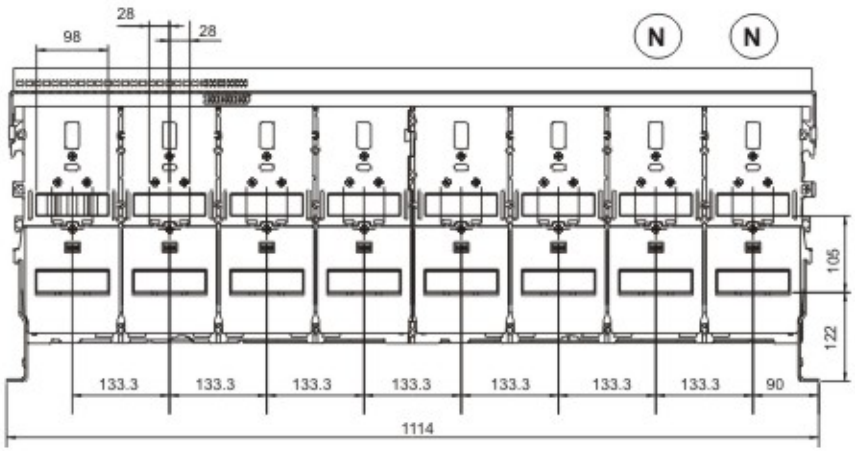




M12 / Equivalent BS bolts to be used for links termination
Tightening torque: 3.2 kgfm

Frame IV, 4P (100% N)





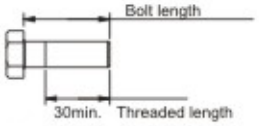
M12 / Equivalent BS bolts to be used for links termination
Tightening torque: 3.2 kgfm

Details of 4P(50% N) on request
All Dimensions in mm

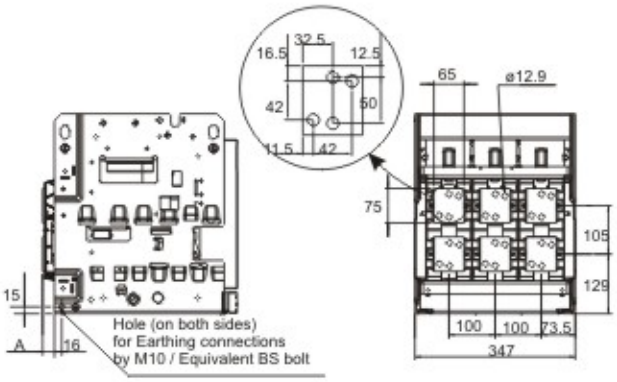
Termination - Draw-out Breakers
Frame I, 3P

Flat Terminals

Fri.1, 3P	A
400 - 1250 N	22.5
1600 N	25.5
630 - 1600 S	25.5
2000 S	25.5

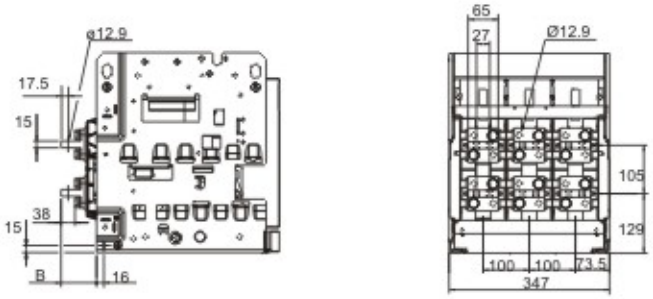


Bolt length for mounting link(s) on Flat Terminals to be cumulative link(s) thickness +25 min to 35 max



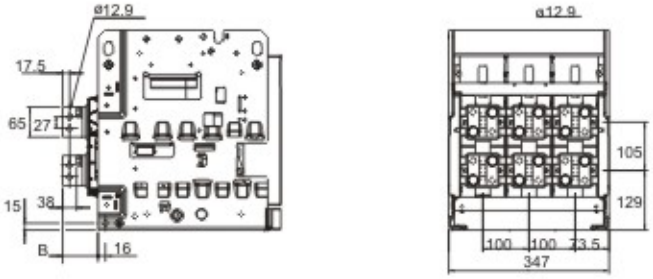
Horizontal Terminals

Fri.1, 3P	B
400 - 1250 N	80.5
1600 N	83.5
630 - 1600 S	83.5
2000 S	83.5



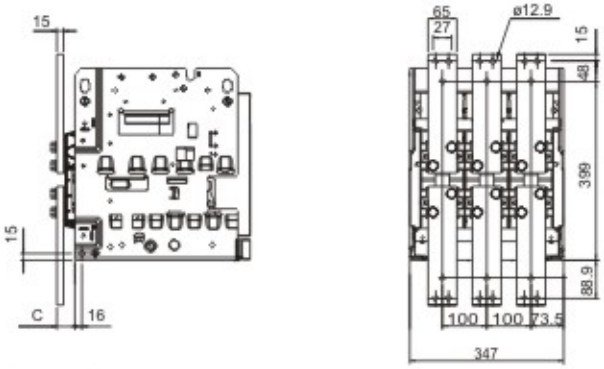
Vertical Terminals

Fri.1, 3P	B
400 - 1250 N	80.5
1600 N	83.5
630 - 1600 S	83.5
2000 S	83.5



Front Terminals

Fri.1, 3P	C
400 - 1250 N	37.5
1600 N	40.5
630 - 1600 S	40.5
2000 S	40.5



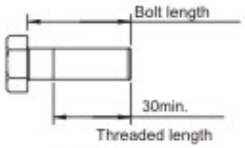
M12 / Equivalent BS bolts to be used for links termination
Tightening torque: 3.2 kgfm

Details of Version V on request
All Dimensions in mm

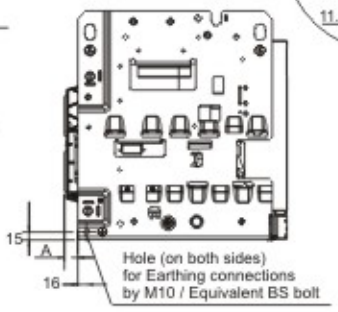
Termination - Draw-out Breakers
Frame I, 4P (100% N)

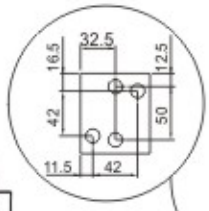
Flat Terminals

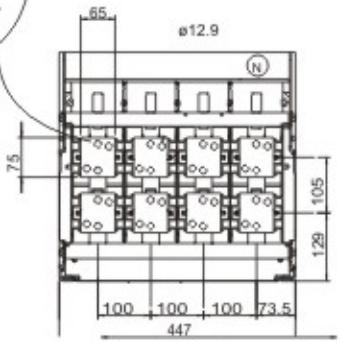
Fri.1, 4P	A
400 - 1250 N	22.5
1600 N	25.5
630 - 1600 S	25.5
2000 S	25.5



Bolt length for mounting link(s) on Flat Terminals to be cumulative link(s) thickness +25 min to 35 max

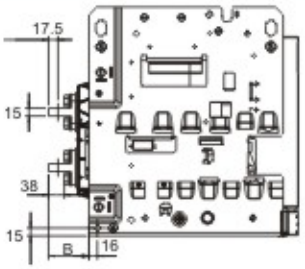


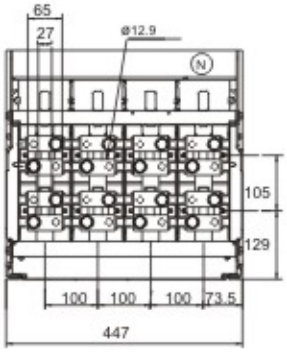




Horizontal Terminals

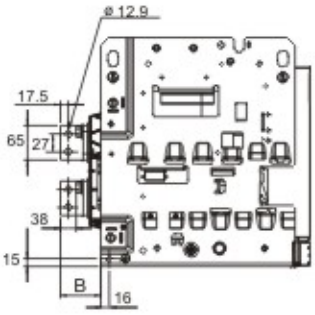
Fri.1, 4P	B
400 - 1250 N	80.5
1600 N	83.5
630 - 1600 S	83.5
2000 S	83.5

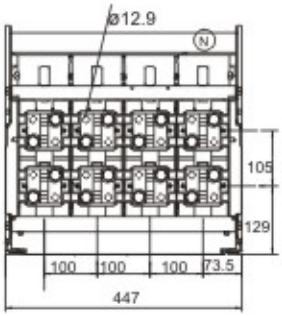




Vertical Terminals

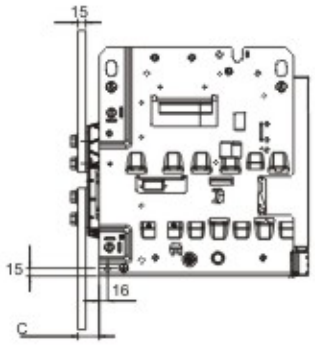
Fri.1, 4P	B
400 - 1250 N	80.5
1600 N	83.5
630 - 1600 S	83.5
2000 S	83.5

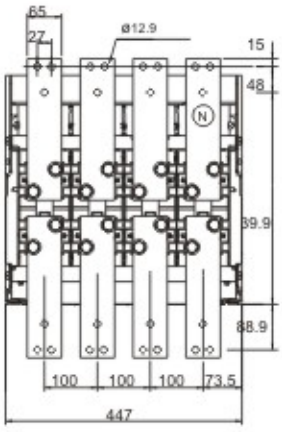




Front Terminals

Fri.1, 3P	C
400 - 1250 N	37.5
1600 N	40.5
630 - 1600 S	40.5
2000 S	40.5





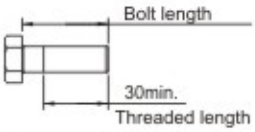
M12 / Equivalent BS bolts to be used for links termination.
Tightening torque: 3.2 kgfm

Details of 4P(200% N) on request
All Dimensions in mm

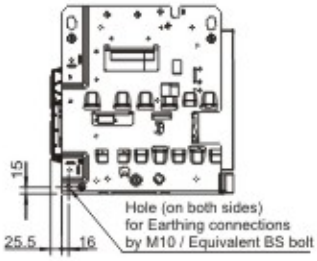
Termination - Draw-out Breakers
Frame II, 3P

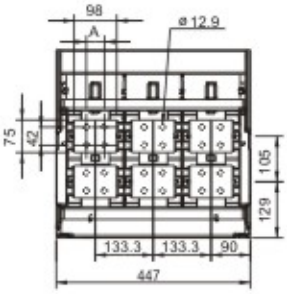
Flat Terminals

Rating	B
2000-2500 A	90.5
3200 A	95.5



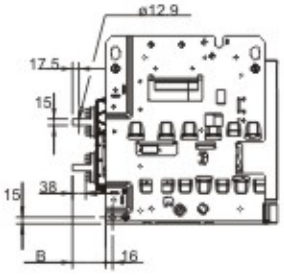
Bolt length for mounting link(s) on Flat Terminals to be cumulative link(s) thickness +25 min to 35 max

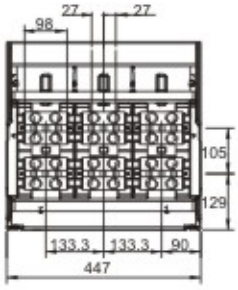




Horizontal Terminals

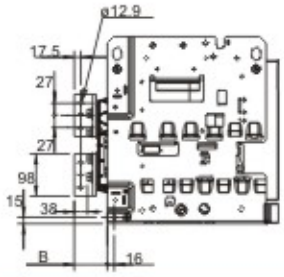
Rating	B
2000-2500 A	90.5
3200 A	95.5

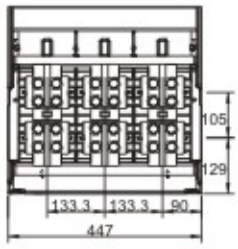




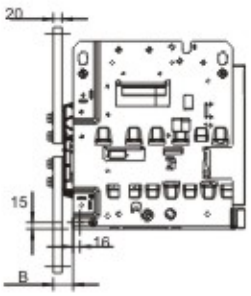
Vertical Terminals

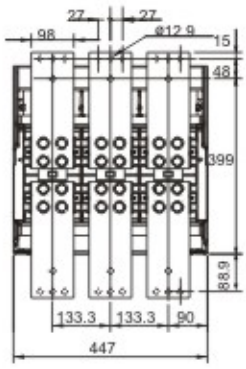
Rating	B
2000-2500 A	90.5
3200 A	95.5





Front Terminals





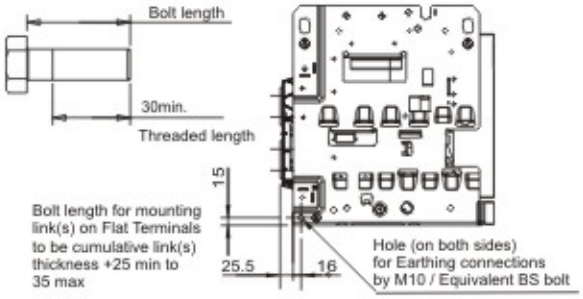
M12 / Equivalent BS bolts to be used for links termination.
Tightening torque: 3.2 kgfm

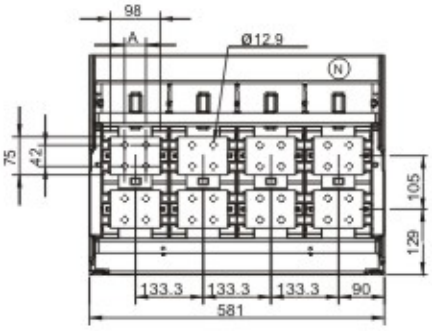
All Dimensions in mm

Termination - Draw-out Breakers
Frame II, 4P (100% N)

Flat Terminals

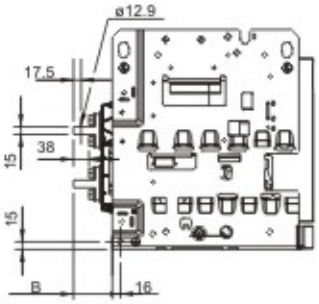
Rating	B
2000-2500A	42mm
3200A	75mm

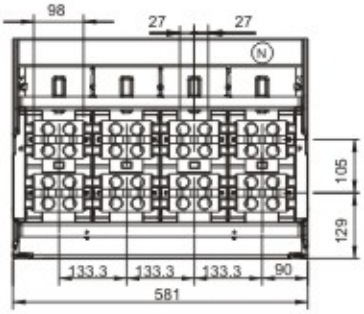




Horizontal Terminals

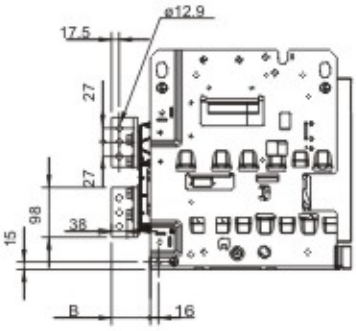
Rating	B
2000-2500A	90.5
3200A	95.5

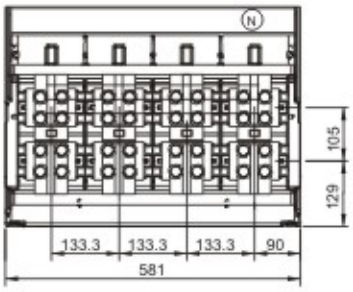




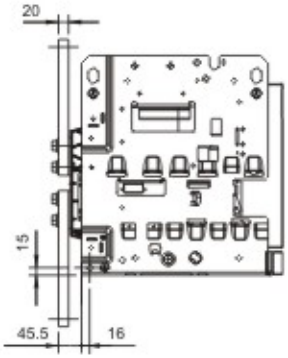
Vertical Terminals

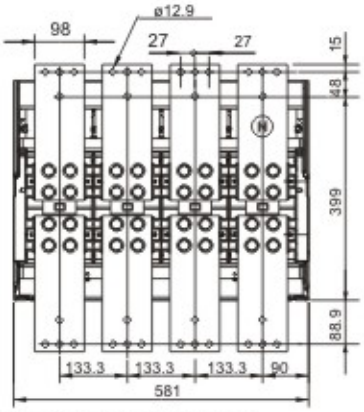
Rating	B
2000-2500A	90.5
3200A	95.5





Front Terminals



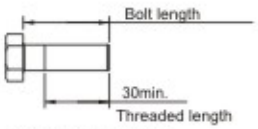


M12 / Equivalent BS bolts to be used for links termination.
Tightening torque: 3.2 kgfm

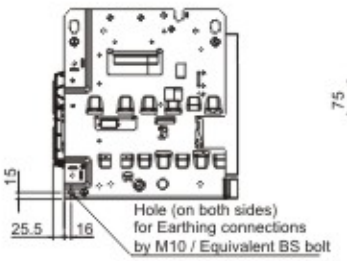
Details of Version V on request
Details of 4P(200% N) on request
All Dimensions in mm

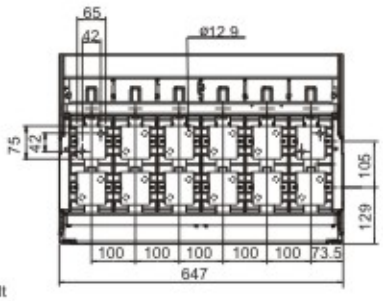
Termination - Draw-out Breakers
Frame III, 3P

Flat Terminals

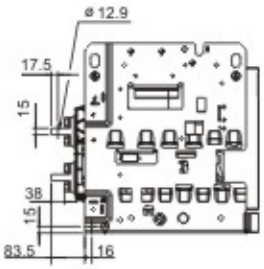


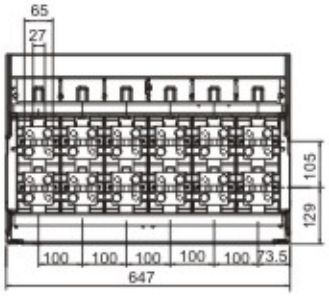
Bolt length for mounting link(s) on Flat Terminals to be cumulative link(s) thickness +25 min to 35 max



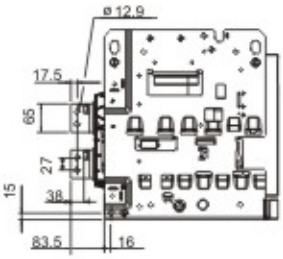


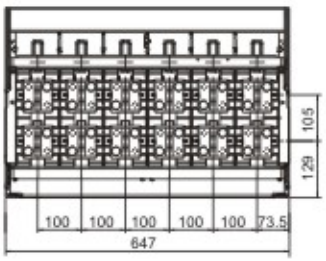
Horizontal Terminals



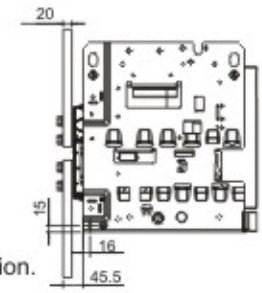


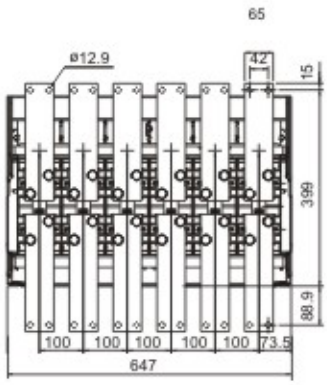
Vertical Terminals





Front Terminals



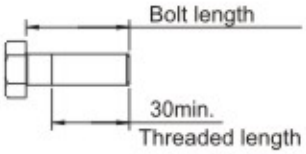


M12 / Equivalent BS bolts to be used for links termination.
Tightening torque: 3.2 kgfm

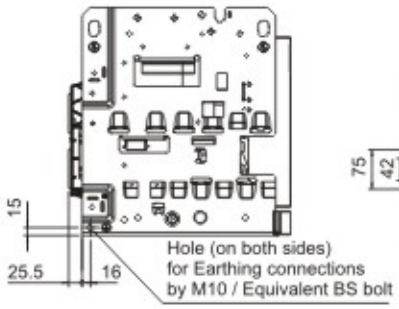
All Dimensions in mm

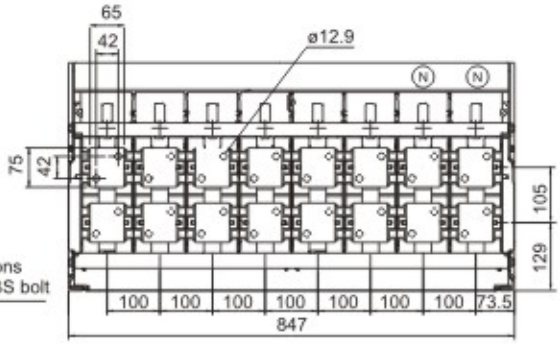
Termination - Draw-out Breakers
Frame III, 4P (100% N)

Flat Terminals

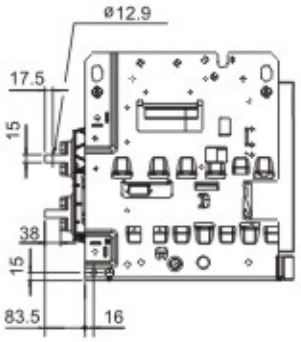


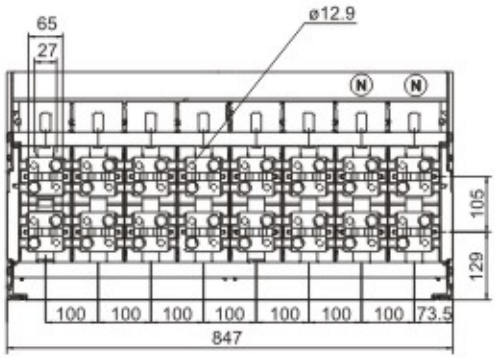
Bolt length for mounting link(s) on Flat Terminals to be cumulative link(s) thickness +25 min to 35 max



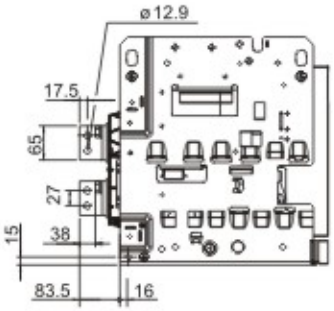


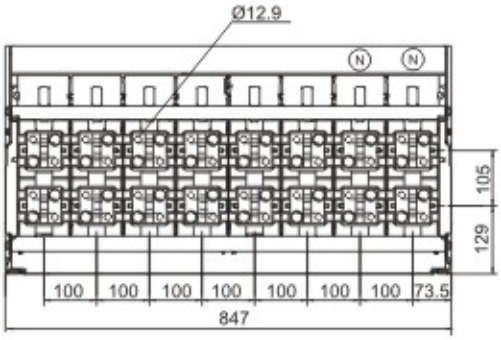
Horizontal Terminals



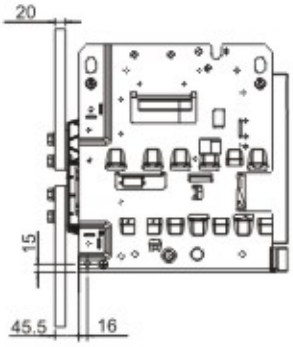


Vertical Terminals

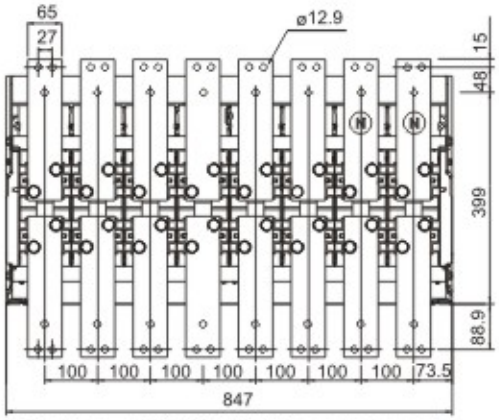




Front Terminals



M12 / Equivalent BS bolts to be used for links termination.
Tightening torque: 3.2 kgfm

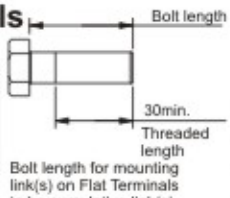


Details of 4P(50% N) on request
All Dimensions in mm

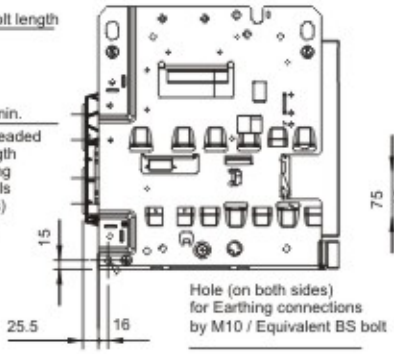
Termination - Draw-out Breakers
Frame IV, 3P

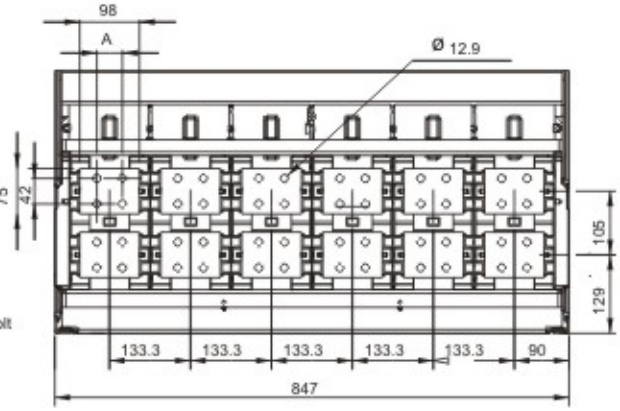
Flat Terminals

Rating	A
5000 A	42mm
6300 A	75mm



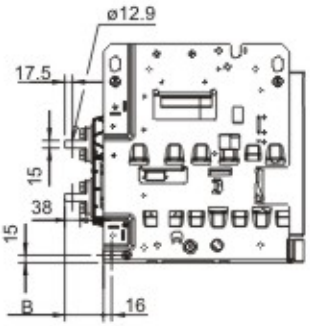
Bolt length for mounting link(s) on Flat Terminals to be cumulative link(s) thickness +25 min to 35 max

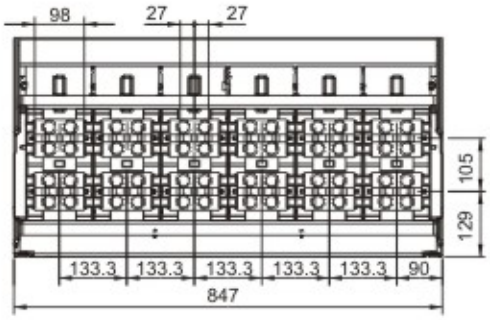




Horizontal Terminals

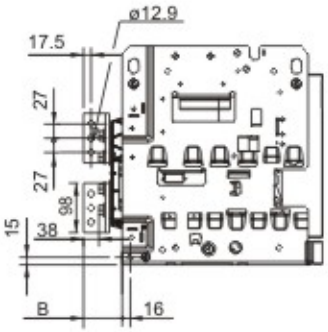
Rating	B
5000 A	90.5
6300 A	95.5

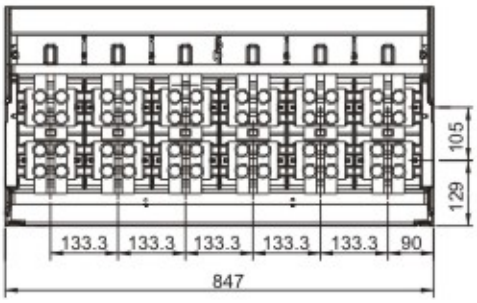




Vertical Terminals

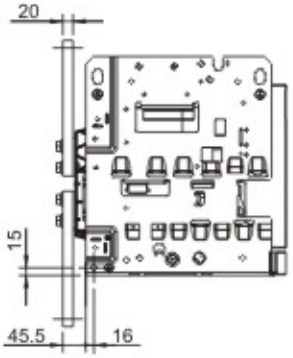
Rating	B
5000 A	90.5
6300 A	95.5

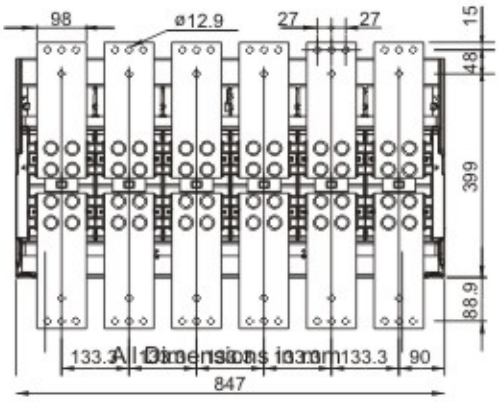




Front Terminals

M12 / Equivalent BS bolts to be used for links termination.
Tightening torque: 3.2 kgfm



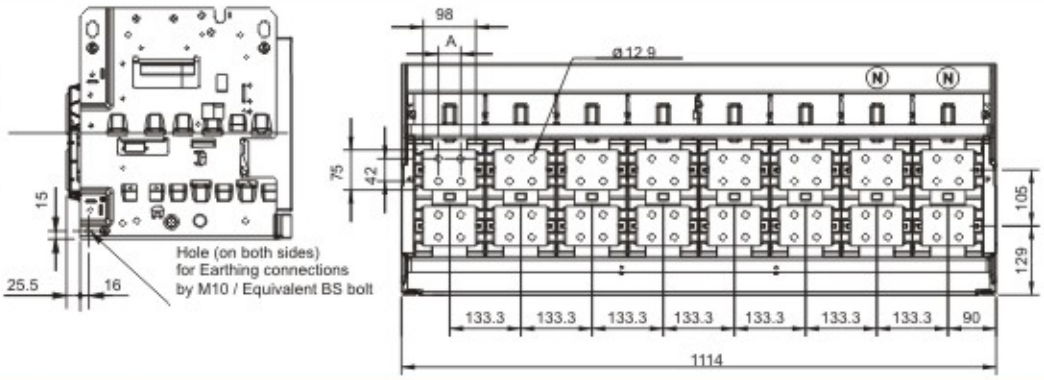


All Dimensions in mm

Termination - Draw-out Breakers
Frame IV, 4P (100% N)

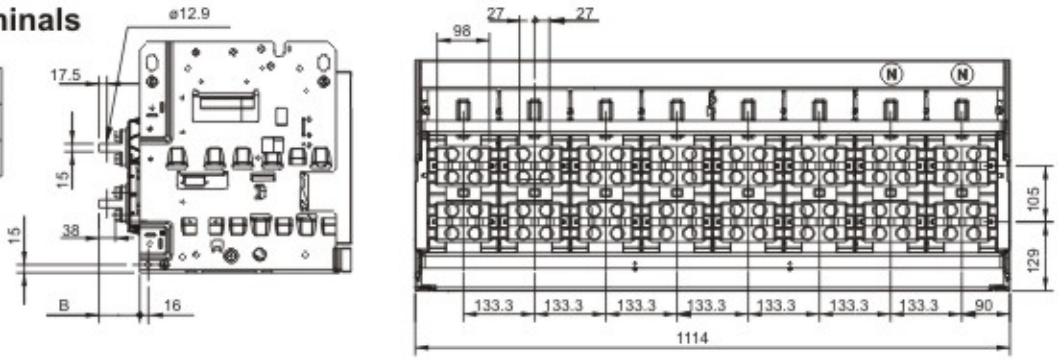
Flat Terminals

Rating	B
5000 A	42mm
6300 A	75mm



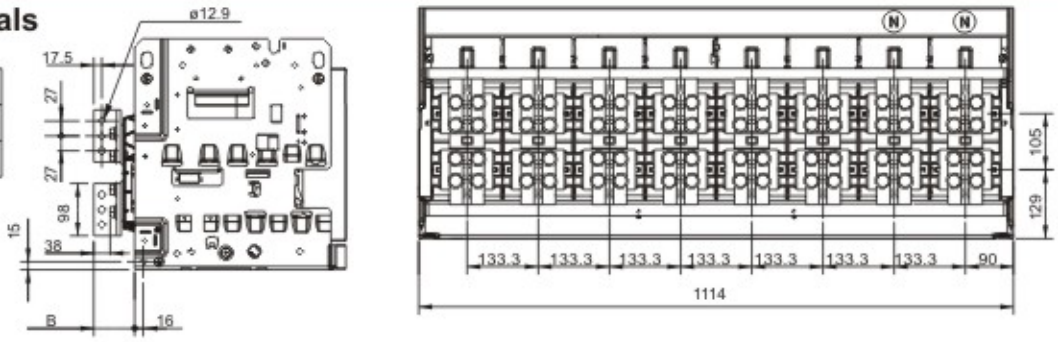
Horizontal Terminals

Rating	B
5000 A	90.5
6300 A	95.5

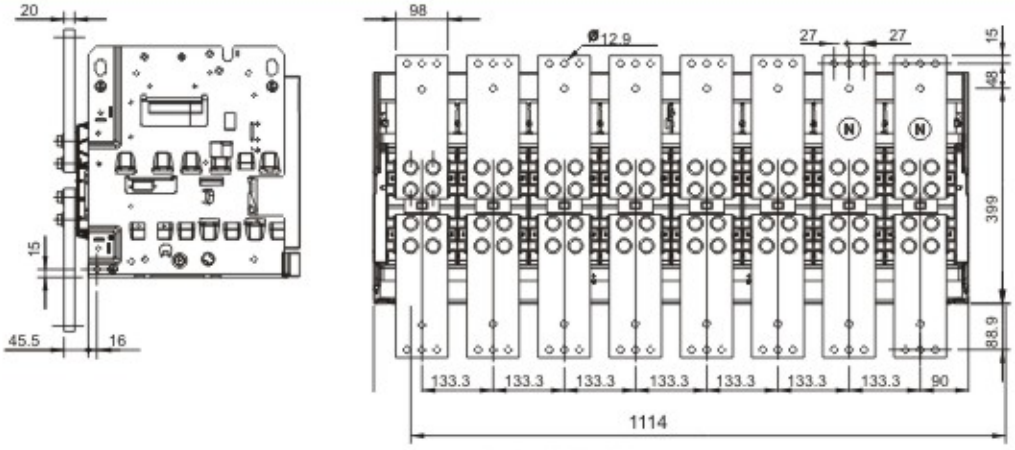


Vertical Terminals

Rating	B
5000 A	90.5
6300 A	95.5



Front Terminals



Details of 4P(50% N) on request
All Dimensions in mm

M12 / Equivalent BS bolts to be used for links termination.
Tightening torque: 3.2 kgfm

Order Form

Circuit Breaker Details

Rating	☐ 400A	☐ 630A	☐ 800A	☐ 1000A	☐ 1250A	☐ 1600A
	☐ 2000A	☐ 2500A	☐ 3200A	☐ 4000A	☐ 5000A	☐ 6300A
Version		☐ N	☐ S	☐ H	☐ V	
Number of Poles		☐ 3	☐ 4 (Please indicate neutral rating)			
Neutral Rating		☐ 50% (3200-6300A)	☐ 100% (400-6300A)	☐ 200% (400-2500A)		
Operational Voltage (Vac)		☐ 400/415	☐ 500/550	☐ 660/690		
Version		☐ Fixed	☐ Drawout	☐ Cradle only	☐ Drawout Breaker only	

Protection

Protection&Control Unit

☐ UN-RS1 ☐ UN-RS1I ☐ UN-RS1.5I

☐ UN-RS2G ☐ UN-RS2.5G ☐ UN-RS2GT ☐ UN-RS2.5GT ☐ UN-RS2Gi ☐ UN-RS2GC

☐ UN-RS2.5GC ☐ UN-RS3

☐ External I/O Modules

☐ 1 Unit ☐ 2 Units ☐ 3 Units ☐ 4 Units

☐ External Power Supply Module

☐ External TCS Module ☐ Thermistor Module

☐ Residual Earth Fault Module ☐ Earth Leakage Module

Neutral CT

☐ External CT for neutral conductor (for 3 Pole ACBs only)

Reset

☐ Auto ☐ Manual

Electrical Accessories

Electrical Charging Device (UN-EC)	Vac (50/60 Hz)	☐ 110	☐ 220	☐ 230/240	☐ 415	
	Vdc	☐ 24	☐ 30	☐ 48	☐ 60	☐ 110/125
		☐ 200	☐ 250			
Closing Release (UN-CR) (Also available for manual ACBs)	Vac,50Hz	☐ 110	☐ 230/240	☐ 415		
	Vac,60Hz	☐ 110	☐ 220	☐ 240	☐ 415	
	Vdc	☐ 24	☐ 30	☐ 48	☐ 60	☐ 110
		☐ 125/127	☐ 220	☐ 250		
Shunt Release (UN-SR)	Vac, 50 Hz	☐ 110	☐ 230/240	☐ 415		
	Vac, 60 Hz	☐ 110	☐ 220	☐ 240	☐ 415	
	Vdc	☐ 24	☐ 30	☐ 48	☐ 60	☐ 110
		☐ 125	☐ 127	☐ 220	☐ 250	
Shunt Release Wide Band (10-130%) (UN-SRW)	Vac, 50 Hz	☐ 240	☐ 415			

Undervoltage Release						
Without Delay (UN-UR0)	Vac	☐ 110	☐ 230/240	☐ 415		
	Vdc	☐ 24	☐ 30	☐ 48	☐ 110	220
With Delay 0.5-5s (UN-UR5)	Vac (50Hz)	☐ 110	☐ 230/240	☐ 415		
	Vac (60Hz)	☐ 110	☐ 220	☐ 230/240	☐ 415	
	Vdc	☐ 48	☐ 110	☐ 220		
Electrical Position Indication		☐ Service, Test, Isolated				
		☐ Additional Electrical Position Indication (Service/Test/Isolated)				
			☐ 1 Set	☐ 2 Sets		
Electrical Indication for		☐ Shunt release		☐ Common fault release		
		☐ Under Voltage release		☐ Ready to close		
Auxiliary Contact (UN-AX)		☐ 4NO + 4NC				

Mechanical Accessories

☐ Safety Shutter	☐ IP55 Cover		
☐ Racking Interlock	☐ Door Interlock		
☐ Operation Counter	☐ Panel Door Ingress Seal		
☐ Rating Error Preventor	☐ Shroud for ON/OFF Buttons		
Mechanical Interlock	☐ 2ACBs	☐ 3ACBs	
	☐ Fixed	☐ Drawout	☐ Mixed
Locking for OFF Button	☐ Arrangement only		☐ Arrangement + Lock
Lock Type	☐ Ronis	☐ Castell	☐ Kirk ☐ Profalux
Position Lock	☐ All positions		☐ Isolated only
	☐ Arrangement only		☐ Arrangement + Lock
Lock 1	☐ Ronis	☐ Castell	☐ Kirk ☐ Profalux
Lock 2	☐ Ronis	☐ Castell	☐ Kirk ☐ Profalux

Terminal Adaptors (for drawout ACBs)

Top	☐ Horizontal	☐ Vertical	☐ Front connection
Bottom	☐ Horizontal	☐ Vertical	☐ Front connection

Note:- In the absence of specific need, it is preferable to select ☐

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Product improvement is a continuous process. For the latest information and special applications, please contact any of our offices listed here.

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