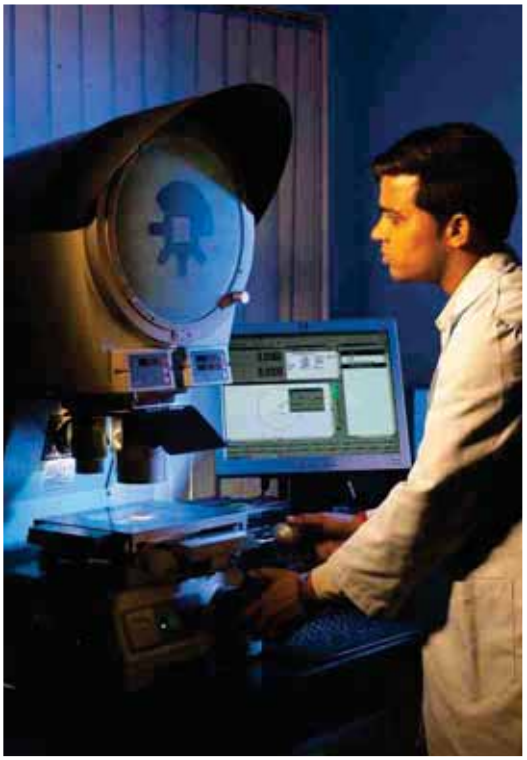
WiNmaster

LV Air circuit breaker, 630A to 4000A, 3 & 4 Pole

C&S electric


C&S

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Contents

R&D center, Noida

Mechanical Expertise

Electronic Expertise

Testing Facilities

Introduction

In the 1980s, C&S Electric (then Controls & Switchgear Company Ltd); began the production of Air Circuit Breakers, ranging from 630A to 6300A in India under technical collaboration with Terasaki Electric Company of Japan. Through the nineties C&S Electric invested in R&D and enhanced the performance of the products substantially and added several complementary products and accessories to the range indigenously.

From 2003 onwards C&S gave further thrust to its R&D efforts and opened a new R&D center with comprehensive competencies in mechanical, electrical & electronics technology, combined to create products that win in the market place. Investment was made in state of the art equipment, tools, Design software and also in human resources. European consultants were also involved in building up the capabilities to a world class level.

Several new products have been launched by C&S Electric since then, which have been born in its own R&D stables and these products have achieved excellent success in the marketplace.

C&S now introduces the new **WiNmaster Air Circuit Breakers** meeting complex requirements of electrical systems of today and tomorrow ensuring reliability which can offer un-interrupted service throughout the product life undergoing all the stresses that system encounters.

Apart from meeting all the traditional requirement of power circuit breakers (high breaking capacity, 3pole & 4pole, cool running at higher temperature, selectivity, absolutely no maintenance, draw out option), WiNmaster now offers total solution for modern day requirement for measurement, analysis and communications, all in optimized size.

WiNmaster circuit breakers use the latest technology to enhance performance and safety. Compact yet offering various connections for ease of installation, snap on site fit accessories, enhanced life and intuitive operation makes them a very user friendly range of circuit breaker for any application.

Complete range of WiNmaster ACB confirms to the latest IEC 60947-2/IS 13947-2 standard.

Frame A

Frame B

Draw-out

Compact

Complete range in only 2 frame sizes

Complete range up to 4000A in just 2 frames having 2 performance levels … N-S for meeting standard application and also industrial application with high short circuit levels.

WiNmaster circuit breakers two frame size:

WM-A: 400A to 2000A

WM-B: 2000A to 4000A

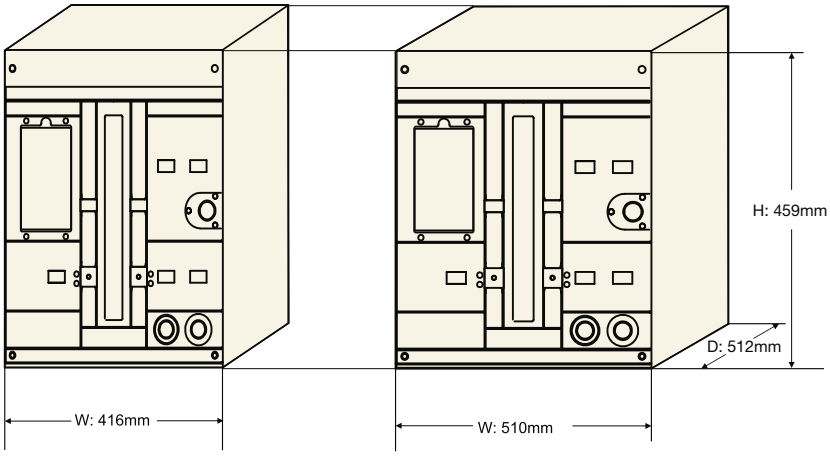
Performance levels:		50KA (N)	65KA(S)
WM-A	WM06A	■	■
	WM08A	■	■
	WM10A	■	■
	WM12A	■	■
	WM16A	■	■
	WM20A	■	■
WM-B	WM20B	■	■
	WM25B	■	■
	WM32B	■	■
	WM40B	■	■

■ available ■ Not available

Uniform Construction

……. Offering ease for installation and possibility for optimized panel size.

The height and depth are identical for both frames up to 4000A. The panel cutout size is same for all types of WiNmaster, which makes it easy to arrange them in switchboards. Panel cutout for front remains same for both frames.



Horizontal type

Vertical type

Mixed type

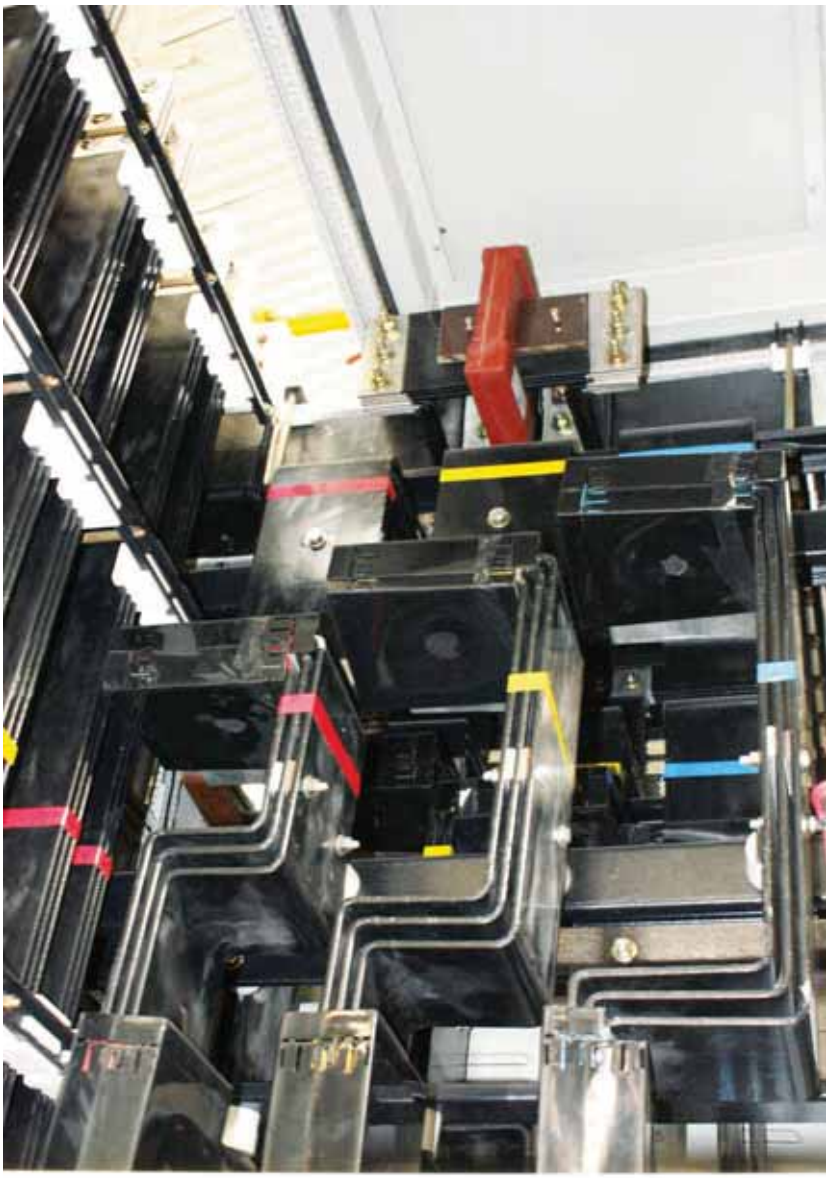
Connection installation

Multiple connections for ease of different installation

WiNmaster ACB simplifies the design of switchboard and standardizes the installation of the products.

This offers flexibility for construction of busbar as product is available with different terminal requirement (Horizontal, vertical or mixed connection) meeting varied customer requirement for termination. Such facility allows user to optimize the size of switchboards and busbar connection.

Single pole pitch of 100 / 130 mm Thus offering enough clearances for termination of aluminum / Copper busbars or cable.



Mounting of Shunt trip

Mounting of UVT

Motor / Remote connection

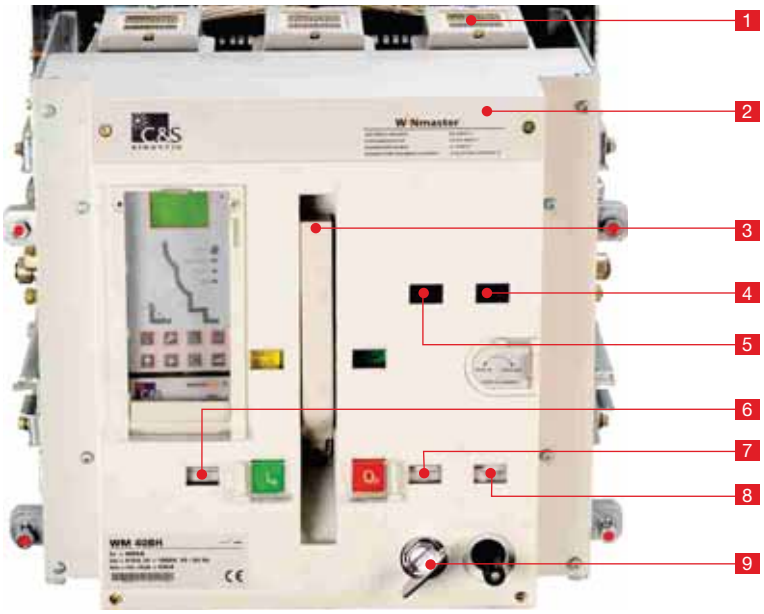
Accessories

Ease of Installation, Operation and Maintenance

All accessories are common for entire range and now can be easily fitted from the front.

Therefore, it is now possible to convert Manual breaker to electrical breaker at site or even in installation. All accessories (Shunt coil, UVT, closing coil, locks etc.) can now be installed very easily from front after removing the top cover of ACB and all accessories are clip-on require no screws for mounting and even motor drive require just one screw for mounting on the ACB for easy access.

1. Arc chute
2. Remove front cover to install all accessories
3. Charging handle
4. Position indication switch
5. Operation counter
6. Closing coil
7. Shunt coil
8. UVT coil
9. Castle / Key lock



Micropro 4.1

Micropro 5.1

Micropro 6.1/7.1

Intelligent trip units

More options for different application and customer need

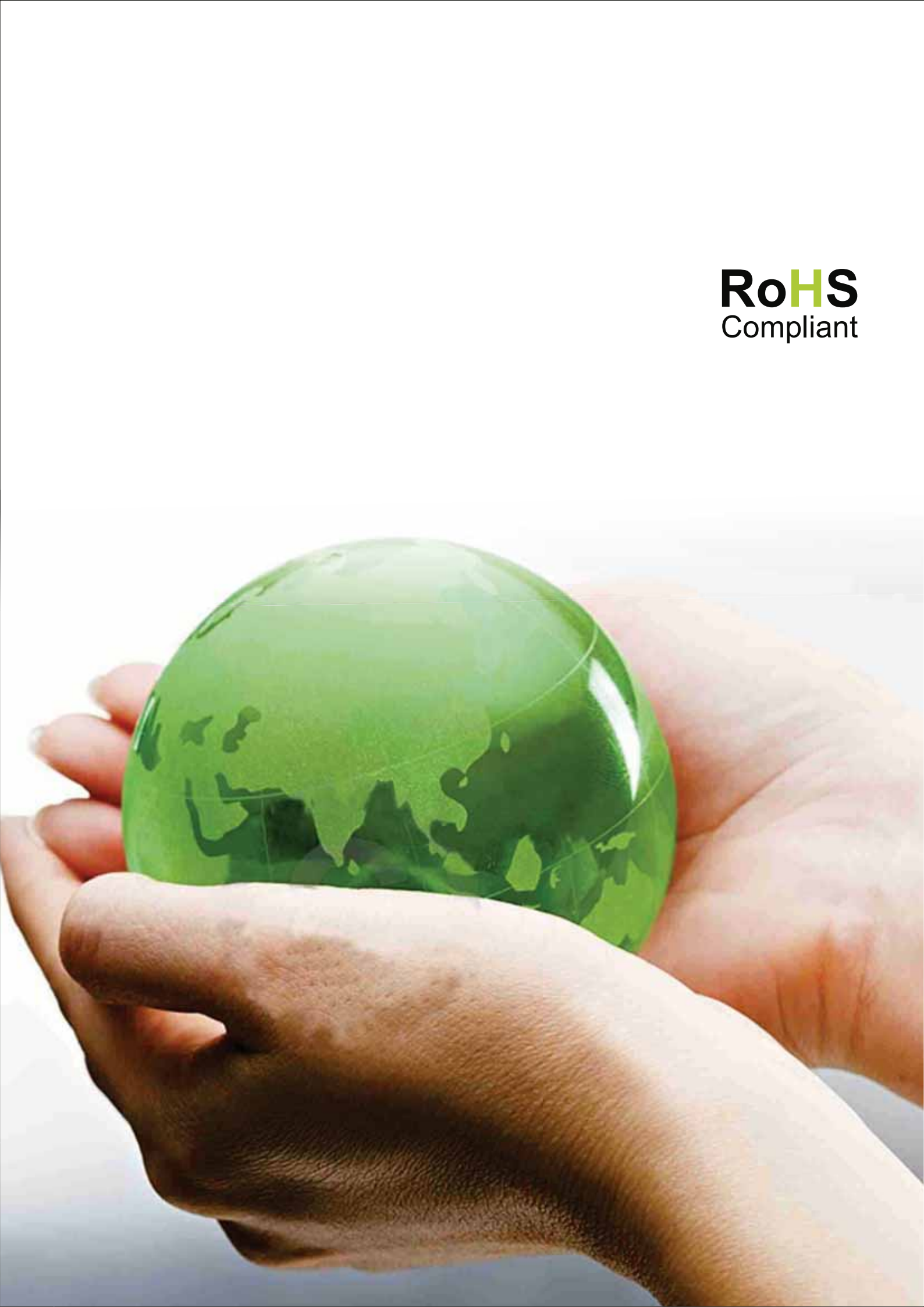
Today, Microprocessor based trip units has increased the scope of ACB function in any electrical system. With energy being the key both in terms of its availability and also conservation, it is required that energy is saved to its maximum optimizing its use to maximum when needed. Such complex present day requirement is easily achieved with use of sophisticated over current trip device fitted in ACB offering increasingly powerful functions. It offers measurement of system parameters, store data, log various events, calculate required data, signal alarms with communication through various modes and even take action to optimize the available energy in system etc. WiNmaster ACB equipped with Micrpro trip units offers both, reliable protection and accurate measurement.

Micropro release is equipped with LCD display which is part of same navigator panel. Control unit is designed to offer great use for user to access and operate the same easily and without any training.

Micropro 3.0 is offered for installation where economy is the key. This option is also available with same setting as offered in Micropro 3.1 with earth fault function as optional.

Micropro is completely microprocessor based device with LCD display offering various options including ammeter, power measurement, zone selectivity, Neutral protection, diagnosis facilities and harmonics filter. These control units also offers communication through RS485 / Modbus protocol.

RoHS
Compliant



Ready to the future

Compliance with environmental requirements

C&S Electric fully takes into account environmental requirements, starting right from the design phase of every product through to the end of its service life:

- the materials used for WiNmaster are not potentially dangerous to the environment
- the production facilities are non-polluting in compliance with the ISO 14001 standard
- the energy dissipated per pole is low, making energy losses insignificant
- the materials are marked to facilitate sorting for recycling at the end of product service life.

Installation upgrade now easy

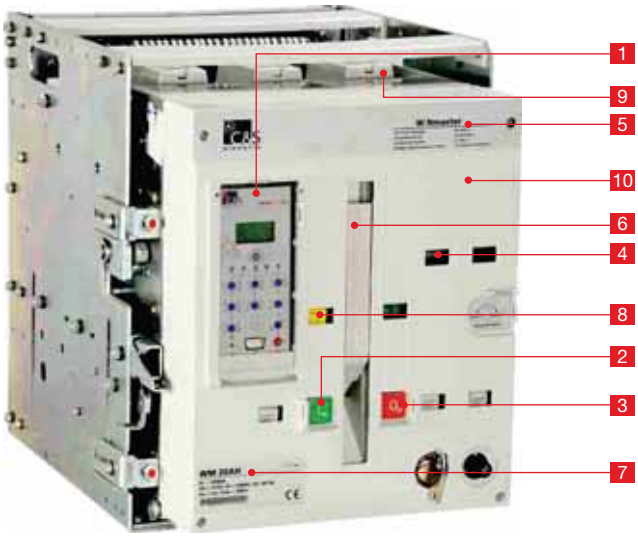
Upgradation of installation is essential due to changing requirement thus necessary changes in panels are required from time to time. WiNmaster ACB is designed to meet such eventualities very easily

- Trip units can be interchanged with another one.
- Communication option can be changed and new options as per requirement can be added any time
- All accessories like UVT, Shunt, motor, closing coil can be changed/ upgraded at site / installation with new ones very easily
- Product change is carried out from time to time but continuity of design is ensured , offering easy system upgrades in future as and when required

External configuration

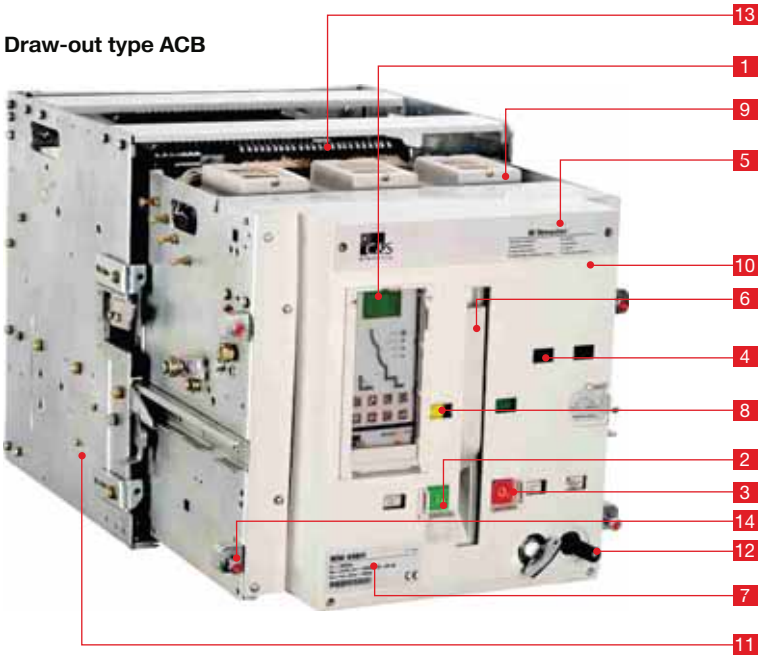
1 Trip relay
2 ON button
3 OFF button
4 Counter
5 Series name
6 Charge handle
7 Rated name plate
8 Charge/Discharge indicator
9 Arc chute
10 Front cover

Fixed type ACB



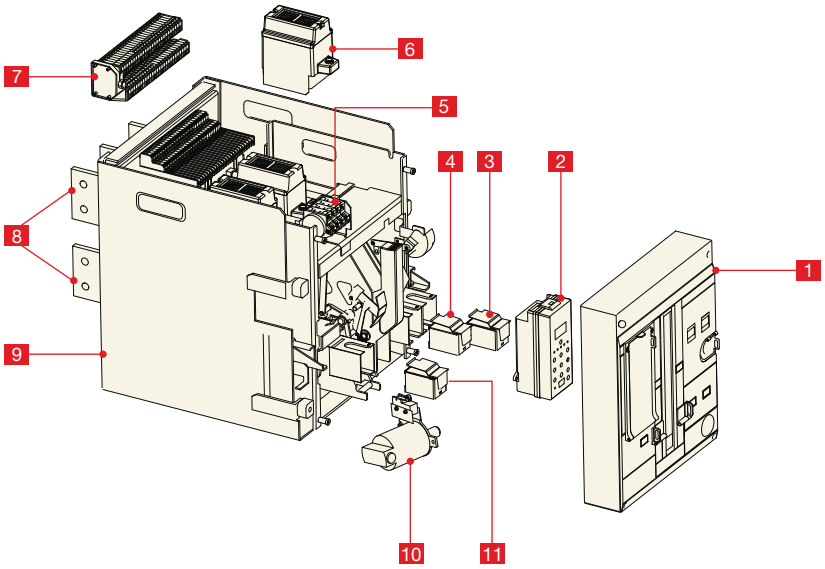
1 Trip relay
2 ON button
3 OFF button
4 Counter
5 Series name
6 Charge handle
7 Rated name plate
8 Charge/Discharge indicator
9 Arc chute
10 Front cover
11 Cradle
12 Draw-out handle
13 Secondary isolating contacts
14 Fixing bolt

Draw-out type ACB

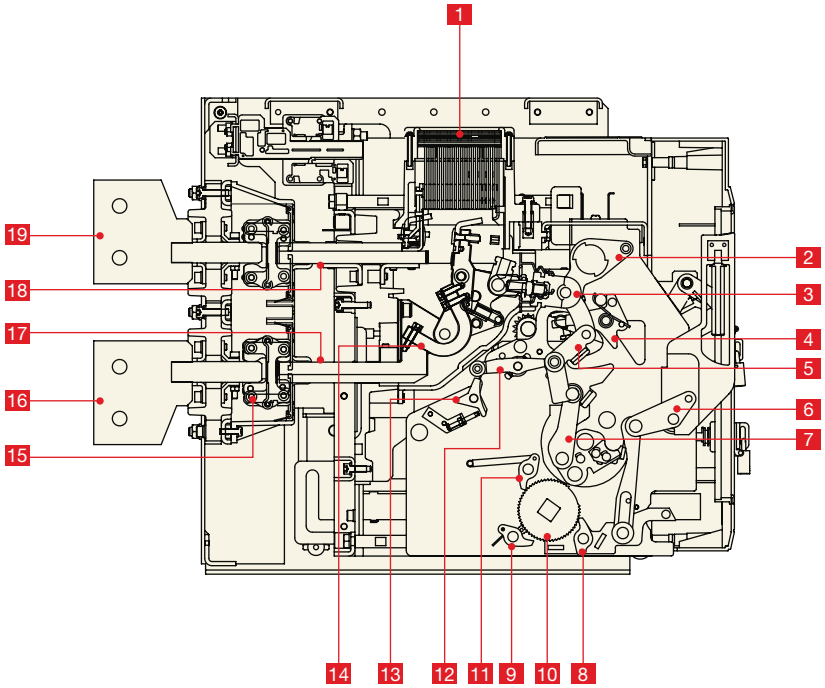


Internal configuration

1. Front facia
2. Micro-pro controller
3. UVT
4. Shunt coil
5. Aux. contacts
6. Arc chute
7. Secondary isolating contacts
8. Terminal
9. Cradle
10. Charging Motor
11. Closing coil



1. Arc chute
2. Cross bar
3. Contact holder
4. Closing latch
5. Toggle link
6. Handle lever
7. Manual charging link
8. Charging pawl
9. Lower holding pawl
10. Ratchet
11. Upper holding pawl
12. Trip latch
13. Trigger
14. Flexible
15. Jaw contact
16. Lower terminal (draw-out)
17. Lower terminal (fixed)
18. Upper terminal (fixed)
19. Upper terminal (draw-out)



General overview

Circuit breakers

- ratings:
  - ❖ WiNmaster WM-A 630 to 2000 A
  - ❖ WiNmaster WM-B 2000 to 4000 A
- Circuit breakers type N for WM-A and S type for WM-B
- 3 or 4 poles
- Compact size
- Modular construction. Common H x D for both frames
- Short Circuit breaking capacities of 50 KA and 65 KA

Intelligent release

MicroPro 3.0

- Overload protection
- Short Circuit current protection

MicroPro 3.1

- Overload protection
- Short Circuit current protection
- Earth Fault protection

MicroPro 4.1

- Overload & Short Circuit protection
- Instantaneous current protection
- Neutral & Ground Fault Protection
- Zone Selectivity, Ampere Meter
- LCD display and fault LED retention in case of power failure

MicroPro 5.1

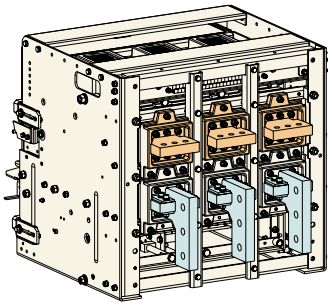
- Overload & Short Circuit protection
- Instantaneous current protection
- Neutral & Ground Fault Protection
- Zone Selectivity, Ampere Meter
- LCD display and fault LED retention in case of power failure

MicroPro 6.1

- Overload & Short Circuit protection
- Instantaneous current protection
- Neutral & Ground Fault / Leakage Protection
- Various Protection related to voltage, frequency, load and motor
- Zone Selectivity, Measurement of V, I, P, F, KWH, KVArh etc.

MicroPro 7.1

- Overload & Short Circuit protection
- Instantaneous current protection
- Neutral & Ground Fault / Leakage Protection
- Various Protection related to voltage, frequency, load and motor
- Zone Selectivity, Measurement of V, I, P, F, KWH, KVArh, Harmonics etc.



Communication

- COM option in WiNmaster with micropro 4.1, 5.1, 6.1 & 7.1
- Port: RS 485, Protocol: Modbus, Profibus* & Device net*

* available with micropro 6.1 & 7.1 only

Connections

- Rear connection (horizontal or vertical)
- Optional accessories
- Vertical-connection adapters
- Safety shutters

General overview

Locking

- OFF-position locking by padlock or key / castle lock
- Locking in connected, disconnected and test positions
- Door interlock (inhibits door opening with breaker in 'ON' position)
- Racking interlock
- Interlock between connect to test position
- Breaker removal possible only in 'TRIP' condition ensuring safety
- Mismatch interlock

Indication contacts

- Standard or low-level contacts:
  - ❖ ON/OFF indication
  - ❖ "Fault trip" indication (ALA)
  - ❖ Position indication switch

Remote operation

- Remote ON/OFF:
  - ❖ Motor
  - ❖ Closing or shunt release
- Remote tripping function:
  - ❖ Shunt release

- Adjustable or non-adjustable delay
  - ❖ Under voltage release.

Accessories

- Key lock
- Castle key interlock
- Operation counter

Technical characteristics

Characteristics as per IEC 60947-2 / Frame size			
Type			
Rated current (A)		In	at 40 °C/50 °C
CT Rating (A)			
Rating of 4th pole (A)			
Number of poles			
Rated insulation voltage (V)		Ui	
Impulse withstand voltage (kV)		Uimp	
Rated operational voltage (V AC 50/60 Hz)		Ue	
Suitability for isolation			
Degree of pollution			
Ultimate breaking capacity (kA rms)		Icu	380/400/415 V AC
V AC 50/60 Hz			500 V
			550 V
			690 V
Rated service breaking capacity (kA rms)		Ics	% Icu
Utilisation category			
Rated short-time withstand current (kA rms)		Icw	
V AC 50/60 Hz			1 s
Rated making capacity (kA peak)		Icm	380/400/415 V AC
V AC 50/60 Hz			500 V
			550 V
			690 V
Opening time (ms)			
Closing time (ms)			
Service life	Mechanical	with maintenance	
	Electrical	with maintenance	
Motor power			380/415 V (kW)
Weight (kgs)		Fixed	3Pole
			4Pole
		Drawout	3Pole
			4Pole
Dimension (mm)		Fixed	3Pole
(H x W x D)			4Pole
		Drawout	3Pole
			4Pole

Technical characteristics

WM-A						WM-B			
WM06	WM08	WM10	WM12	WM16	WM20	WM20	WM25	WM32	WM40
630	800	1000	1250	1600	2000	2000	2500	3200	4000
400, 630	400, 630, 800	400, 630, 800, 1000	400, 630, 800, 1000 1250	400, 630 800, 1000 1250, 1600	400, 630, 800, 1000 1250, 1600 2000	2000	2000, 2500	2000, 2500, 3200	2000, 2500 3200, 4000
100%						100%			
3/4						3/4			
1000						1000			
12						12			
690						690			
IEC 60947-2						IEC 60947-2			
3						3			
50kA						65kA			
40kA						55kA			
35kA						50kA			
30kA						40kA			
100%						100%			
B						B			
50kA						65kA			
105kA						143kA			
84kA						121kA			
74kA						105kA			
63kA						84kA			
30ms						30ms			
40ms						40ms			
20000						15000			
10000					8000	7000			5000
60	60	60	60	30	30	20	20	20	10
52.40				54.40	56.40	67.90			
62.40				64.40	66.40	77.90			
92.30				94.30	96.30	131.20			
102.30				104.30	106.30	141.20			
398 x 332 x386						398 x 488 x 386			
398 x 432 x 386						398 x 618 x 386			
459 x 416 x 512						459 x 510 x 512			
459 x 516 x 512						459 x 640 x 512			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WM 20AH

Overview - Intelligent Release

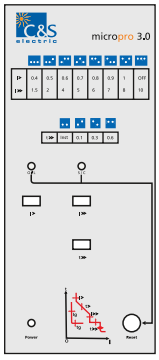
Micro-pro 3.0 / 3.1

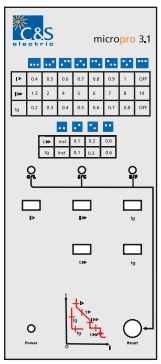
MicroPro 3.0

- Overload protection
- Short Circuit current protection

MicroPro 3.1

- Overload protection
- Short Circuit current protection
- Earth Fault protection





Micro-pro 4.1 / 5.1

MicroPro 4.1

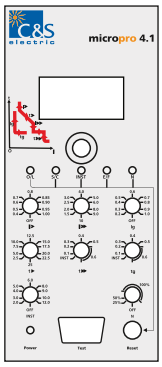
- Overload & Short Circuit protection
- Instantaneous current protection
- Neutral & Ground Fault Protection
- Zone Selectivity, Ampere Meter
- LCD display and fault LED retention in case of power failure

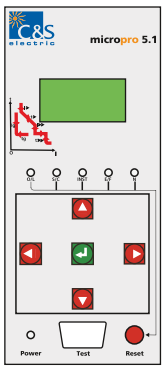
MicroPro 5.1

- Overload & Short Circuit protection
- Instantaneous current protection
- Neutral & Ground Fault Protection
- Zone Selectivity, Ampere Meter
- LCD display and fault LED retention in case of power failure

Communication

- Port: RS485
- Protocol: Modbus





Micro-pro 6.1 / 7.1

MicroPro 6.1

- Overload & Short Circuit protection
- Instantaneous current protection
- Neutral & Ground Fault / Leakage Protection
- Various Protection related to voltage, frequency, load and motor
- Zone Selectivity, Measurement of V, I, P, F, KWH, KVArh etc.

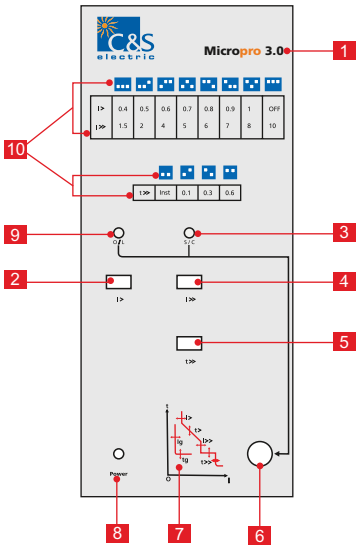
MicroPro 7.1

- Overload & Short Circuit protection
- Instantaneous current protection
- Neutral & Ground Fault / Leakage Protection
- Various Protection related to voltage, frequency, load and motor
- Zone Selectivity, Measurement of V, I, P, F, KWH, KVArh, Harmonics etc.

Communication

- Port: RS485
- Protocol: Modbus/Profitbus/Devicenet

Intelligent Release



Micro-pro 3.0

It is most basic version of Micropro relay series. It is self powered release with overload and short circuit protection. It has LED's to acknowledge fault type and these LED's can be retained after supply cut-off with help of auxiliary supply.

Protection settings

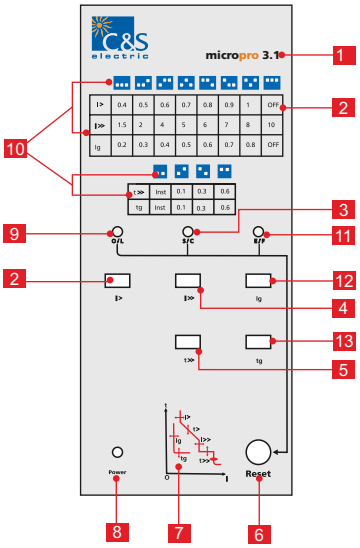
Protection thresholds and delays are set using adjustable DIP switches

Overload protection

True RMS long time protection with adjustable threshold setting

Short-circuit protection

Short time (RMS) protection with adjustable threshold and delay setting



Micro-pro 3.1

This relay is a step forward then its predecessor i.e. Micro-pro 3.0. It provides Earth Fault protection in addition to protections provided by Micro-pro 3.0

Protection settings

Protection thresholds and delays are set using adjustable DIP switches

Overload protection

True RMS long time protection with adjustable threshold setting

Short-circuit protection

Short time (RMS) protection with adjustable threshold and delay setting

Earth fault protection

True RMS Earth fault protection with adjustable threshold and delay settings

1. Series name
2. Long time current setting
3. Short-circuit indication
4. Short-circuit current setting
5. Short-circuit delay setting
6. Reset button
7. Tripping characteristics curve
8. Power ON LED
9. Overload indication
10. Setting instruction
11. Earth fault indication
12. Earth fault current setting
13. Earth fault time setting

Intelligent Release

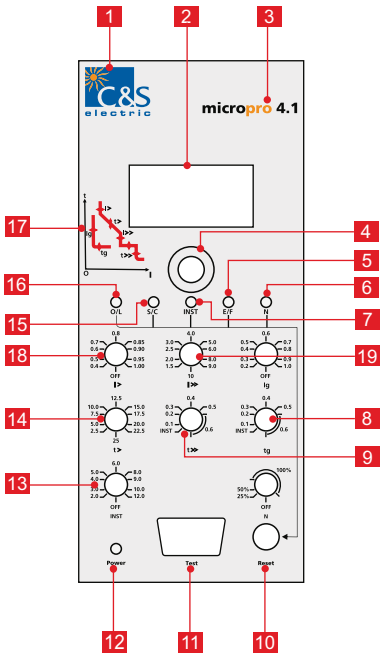
Micro-pro 3.0 - Technical Characteristics

Over Load Protection	
Pick up	0.4 to 1.0 In with OFF in 8 steps: 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1, OFF
Delay	6 sec at 6 Ir
Short Circuit	
Pick up	1.5 - 10 Ir in 8 steps: 1.5, 2, 4, 5, 6, 7, 8, 10
Delay	Inst - 600 msec in 4 steps: Inst., 0.1, 0.3, 0.6
Indications	
Power ON LED	Available
Over Load Flashing LED	Available
Over Load Trip LED	Available
Short Circuit Trip LED	Available

Micro-pro 3.1 - Technical Characteristics

Over Load Protection	
Pick up	0.4 to 1.0 In with OFF in 8 steps: 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1, OFF
Delay	6 sec at 6 Ir
Short Circuit	
Pick up	1.5 to 10 Ir in 8 steps: 1.5, 2, 4, 5, 6, 7, 8, 10
Delay	Inst - 600 msec in 4 steps: Inst. 0.1, 0.3, 0.6
Earth Fault	
Pick up	0.2 to 0.8 In 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8
Delay	Inst-600 msec in 4 steps: Inst. 0.1, 0.3, 0.6
Indications	
Power ON LED	Available
Over Load Flashing LED	Available
Over Load Trip LED	Available
Short Circuit Trip LED	Available
Earth Fault Trip LED	Available

Intelligent Release



1. Corporation Logo
2. LCD display
3. Series name
4. Test switch
5. LED indiction Earth fault
6. LED indiction neutral fault tripping
7. LED indiction instantaneous tripping
8. Earth fault time pickup
9. Short time tripping delay
10. Reset Button
11. Test Port
12. Power On LED
13. Instantaneous current pickup
14. Long time tripping delay
15. LED indiction short time tripping
16. LED indiction long time tripping
17. Tripping characteristics curve
18. Long time current setting
19. Short time current setting

Micro-pro 4.1

Protection settings

Protection thresholds and delays are set using the adjustment dials

The running load is displayed in amperes

Overload protection

True RMS long-time protection

Thermal memory: thermal image before & after tripping

The long-time dial setting “OFF” enables to cancel the overload protection

Short-circuit protection

Short-time (RMS) and instantaneous protection

Earth fault protection

Earth fault protection is definite type curve setting, which ensure the more reliablity

Neutral protection

On three-pole circuit breakers, neutral protection is not possible

On four-pole circuit breakers, neutral protection may be set using a neutral dial switch

Zone selective interlocking (ZSI)

A ZSI terminal block may be used to interconnect a number of control units to provide total discrimination for short-time and earth-fault protection, without a delay before tripping

"Ammeter" measurements

Micropro 4.1 control units measure the true rms values of currents

It provide continuous current measurements from 10 % to 100% and accurate to within 5% (including the sensors)

A digital LCD screen continuously displays the all phases currents (Ir, Iy, Ib & In) in sequence with auto scrolling feature

Last fault tripping history

On LCD screen, last fault history can be viewed.

Communication option

In conjuction with Communication module, the Micropro 4.1 transmits the following setting values:

1. All ammeter measurements
2. Tripping causes
3. OFF setting is provided in ground fault & Instantaneous to cancel the both protection, if required.

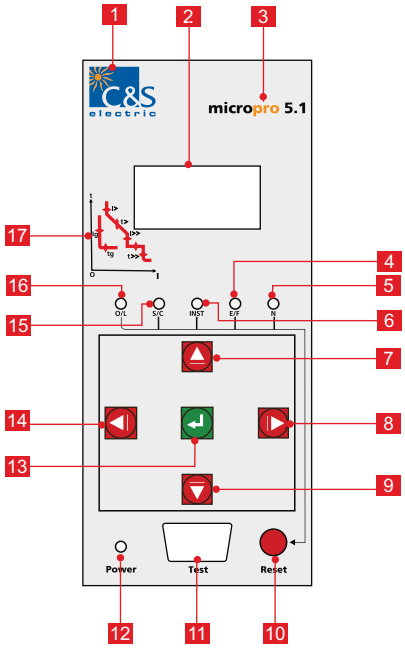
Intelligent Release

Micro-pro 4.1 - Technical Characteristics

Over Load Protection	
Pick up	0.4-1.0 In with OFF in 10 steps: 0.4, 0.5, 0.6, 0.7, 0.8, 0.85, 0.9, 0.95, 1,OFF
Delay	2.5 to 25 sec at 6 Ir in 10 steps: 2.5, 5, 7.5, 10, 12.5, 15, 17.5, 20, 22.5, 25 sec
Short Circuit	
Pick up	1.5-10 Ir in 10 steps: 1.5, 2, 2.5, 3, 4, 5, 6, 8, 9, 10
Delay	Inst - 600 msec in 7 steps: Inst. 0.1, 0.2, 0.3, 0.4, 0.5, 0.6
Instantaneous	
	2.0-12 In with OFF in 10 steps: 2, 3, 4, 5, 6, 8, 9, 10, 12, OFF
Earth Fault	
Pick up	0.2-1.0 In with OFF in10 steps: 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, OFF
Delay	Inst-600 msec in 7 steps: Inst. 0.1, 0.2, 0.3, 0.4, 0.5, 0.6
N Protection	
Pick up	OFF, 25%, 50%, 100% In
Cooling time constant	30 min
Indication, Monitoring & Control	
Power ON LED	Available
Over Load Flashing LED	Available
Over Load Trip LED	Available
Short Circuit Trip LED	Available
Earth Fault Trip LED	Available
LCD Display	Available
Remote Alarm/Trip Indication	Through 7 programmable relays (optional)
Trip History	Fault type, current and time for last 16 trip events
Zone selectivity	Available
Settings Adjustment by	Knob
Measurements	
Load current	Phase, N & E
Fault current	OL, SC, Inst, EF & N
Communication	
To remote	All parameters through communication module
Connectivity & protocol	To SCADA system through MODBUS & other popular protocols

In case of fault tripping by control unit, last fault history can be viewed on the display.

Intelligent Release



1. Corporation Logo
2. LCD display
3. Series name
4. LED indiction Earth fault
5. LED indiction neutral fault tripping
6. LED indiction instantaneous tripping
7. Up Button
8. Right Button
9. Down Button
10. Reset Button
11. Test port
12. Power On LED
13. Enter Button
14. Left Button
15. LED indiction shot time tripping
16. LED indiction long time tripping
17. Tripping characteristics curve

Micro-pro 5.1

Protection settings

Protection thresholds and delays are set using the key pad.

The selected values are momentarily displayed in amperes.

Overload protection

True RMS long-time protection.

Thermal memory: thermal image before & after tripping.

Short-circuit protection

Short-time (RMS) and instantaneous protection.

Earth fault protection

Earth fault protection is definite type curve setting, which ensure the more reliablity.

OFF setting is provided in ground fault & Instantaneous to cancel the both protection, if required.

Neutral protection

On three-pole circuit breakers, neutral protection is not possible.

On four-pole circuit breakers, neutral protection may be set using the key pad.

Zone selective interlocking (ZSI)

A ZSI terminal block may be used to interconnect a number of control units to provide total discrimination for short-time, without a delay before tripping.

"Ammeter" measurements

Micropro 5.1 control units measure the true rms values of currents.

They provide continuous current measurements from 10 % to 100% and accurate to within 5%(including the sensors).

A digital LCD screen continuously displays the all phases currents (Ir, Iy, Ib & In) in sequence with auto scrolling feature.

Last fault tripping history

On LCD screen, last fault history can be viewed.

Communication option

In conjuction with Communication module, the Micropro 4.1 transmits the following setting values:

1. All ammeter measurements

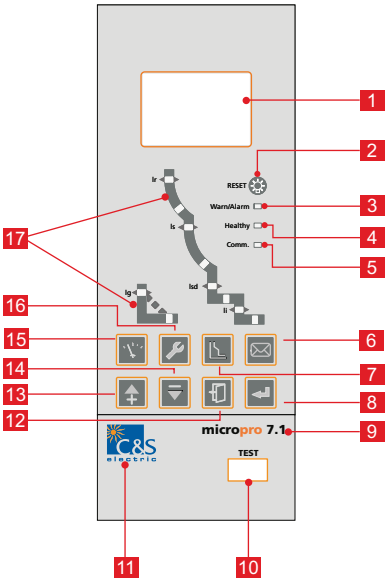
Intelligent Release

Micro-pro 5.1 - Technical Characteristics

Over Load Protection	
Pick up	0.4-1.0 In with OFF in steps of 0.01
Delay	2.5 to 25 sec at 6 Ir in steps of 0.5 Sec
Short Circuit	
Pick up	1.5-10 Ir in steps of 0.1 1.5, 2, 2.5, 3, 4, 5, 6, 8, 9, 10
Delay	Inst 100 to 600 msec in steps of 50 msec
Instantaneous	
	2.0-12 Ir In with OFF in steps of 0.5
Earth Fault	
Pick up	0.2-1.0 In with OFF in10 steps of 0.01
Delay	Inst 100 to 600 msec in steps of 50msec
N Protection	
Pick up	OFF, 25%, 50%,75%, 100% In
Cooling time contact	30, 45, 60 min
Indication, Monitoring & Control	
Power ON LED	Available
Over Load Flashing LED	Available
Over Load Trip LED	Available
Short Circuit Trip LED	Available
Earth Fault Trip LED	Available
LCD Display	Available
Remote Alarm/Trip Indication	Through 7 programmable relays (optional)
Trip History	Fault type, current and time for last 16 trip events
Zone selectivity	Available
Settings Adjustment by	Key pad
Measurements	
Load current	Phase, N & E
Fault current	OL, SC, Inst, EF & N
Communication	
To remote	All parameters through communication module
Connectivity & protocol	To SCADA system through MODBUS & other popular protocols

In case of fault tripping by control unit, last fault history can be viewed on the display.

Intelligent Release



1 LCD display
2 Reset key
3 Warn / alarm LED
4 Healthy LED
5 Communication Indication
6 Information Key
7 Protection setting Key
8 Enter Key
9 Series name
10 Test port
11 Corporation Logo
12 Exit Key
13 Upward Key
14 Downward Key
15 Measure Key
16 Basic setting Key
17 Tripping characteristics curve

Micro-pro 6.1 / 7.1

Protection settings

Protection thresholds and delays are set using the keypad buttons or the communication software.

The selected values are momentarily displayed on the display.

Overload protection

True RMS long-time protection.

Multiple ranges of Protection Curves for the co-ordination from inductive load to high voltage fuse: SI, VI, EI (G), EI (M), HV, and I2T.

Multiple selection of Thermal memory: thermal image before & after tripping.

The long-time setting “OFF” enables to cancel the overload protection.

Short-circuit protection

Short-time (RMS) and instantaneous protection.

Selection of Fixed Time Delay & Inverse Trip Current type, (ON or OFF) for delay.

Zone Selectivity Interlock.

Neutral protection

In Practice, cable & current characteristics of the neutral phase is very different from that of the other three phases. Micropro 6.1 / 7.1 take different protection measures according to different application needs. When the cable is relatively thin, half the set value can be used, and when the cable is normal, the set value can be used. When the mains harmonics are relatively big, double value.

Earth fault protection

Earth fault protection is definite type curve setting, which ensure the more reliability

Setting “OFF” enables, to cancel the earth fault protection

Earth fault Zone selective Interlocking

Earth Leakage Protection

This function is to prevent the leakage damage caused by insulation failure of the equipment. The unit of the tripping value is ampere and is irrelevant with the rated current of breaker. For Zero sequence signals adapting a rectangle mutual inductor is needed for better precision and sensitivity in the protection of small current.

Additional Protection & Alarm

The Micropro 6.1 / 7.1 can be set for the Air Circuit Breaker tripping provides the protection against the following parameters.

1) Over & under voltage
2) Voltage Unbalance
3) Over & Under frequency
4) Current unbalance
5) Reverse Power
6) Phase sequence

Intelligent Release

Micro-pro 6.1 / 7.1

Measurement

1) Micropro displays the electrical parameter like Current values, instant current value (RMS) including ground fault current, Creepage current with measuring precision of 5% (at above In) & 1.5% (at 2In).
2) Phase to phase & phase to neutral Voltage measurement with 0.5% precision
3) Phase sequence
4) Phase Unbalance
5) Active Power, Reactive Power & Apparent power
6) Power factor
7) Electrical Energy
8) Calculation of current and voltage total harmonic distortion (THD)*
9) Current and voltage and power fundamentals*
10) Current and voltage harmonics up to the 31st order*

Communication option

Micropro 6.1 / 7.1 can be connected with the protocol with the help of Rs 485/232 to converter.

Communication gives facility to perform following action:

1. To read & set all functions parameters remotely
2. To transmit all the measurements
3. To give signals for the tripping & alarms
4. To give maintenance history (Number of operation & contacts wear % etc)

An event log and a maintenance register, stored in Micropro 6.1 / 7.1 memory are also available locally.

5. The voltage & current waveform can be captured to analyze the power quality waveform

Histories

The last 8 trips, alarms & ACB status are recorded in to 3 separate files that may be displayed on screen.

1 Tripping history

a) Type of fault
b) Date & time
c) Values measured at the time of tripping

2 Alarm histories

a) Type of fault
b) Date & time
c) Values measured at the time of alarm

3. ACB status

It will give information about the ACB tripping locally or remotely etc.

Maintenance indicators

Micropro 6.1 / 7.1 gives information about the maintenance parameters of the Winmaster ACB.

1. Total no of mechanical operation counter.
2. Contact wear

MCR & HSISC Protection

MCR & HSISC is the instantaneous protection of the breaker itself. When limit exceeding fault current is detected, the breaker will send out a trip command within 10mS. MCR protects the making capacity of the breaker and prevents switch damage caused by making current exceeding the making capacity. The protection is enabled instantaneously (within 100ms) after closing and opening. HSISC is a breaker protection which prevents the breaker from carrying a persistent through fault current greater than it's through fault capability. It is effective after 100ms after breaker closing.

Micropro 6.1 / 7.1 can do the analysis of power quality including calculation of harmonics and the fundamentals.

Voltage & current Wave form can be analyzed for any event in power supply system.

It gives an enhanced alarm programming to analyze and track down the disturbance in the power network system.

*** Feature available in micropro 7.1 only.**

Intelligent Release

Micro-pro 6.1 / 7.1 - Technical Characteristics

Over Load Protection	
Pick up	Off 0.4 ~ 1.0In
Protection Curve	SI, VI, EI(G), EI(M), HV, I2T
Thermal Memory	Instananeous, 10 m, 20m, 30m, 45m, 1h, 2h, 3h
Delay	C 01 ~ C16 (rated at 1.5, 6 & 7 Ir)
Short Circuit	
Pick up	Inverse Trip Current Is = Off +1.5 ~ 15Ir
	Fixed Time Trip Current Is = Off +1.5 ~ 15Ir
Fixed Time Delay Time Tsd	0.1 ~ 0.4 S
Zone Selectivity Interlock	Available
Instantaneous	
	OFF+1.0~20In
N Protection	
Pick up	50%, 100%, 160%, 200%, Off
Earth Fault	
Earth Fault Protection	OFF+0.2～1.0xIn
Inverse Curve Multiple Cr	1.5～6, +OFF,
Delay Tg	0.1～1S,
Earth Fault Zone Selective Interlocking	Available
Earth Leakage	
Earth Leakage Protection IΔn	0.5～30.0A
Delay Time TΔn(S)	Instantaneous, 0.06, 0.08, 0.17, 0.25 0.33, 0.42, 0.5, 0.58, 0.67, 0.75, 0.83
Current Unbalance Protection	5%~60%
Delay Set Value	0. 1~40.0S
Return Value	5%~Start Value
Return Delay	10~200S
Performance	Alarm/Break/Close
Under Voltage Protection Parameters	
Protection Start Set Value	100V～Return Value
Protection Delay Set value	0.2～60S
Protection Return Value	Start Value ～1200V
Protection Delay Return Time	0.2～60S
Protection Alarm DO Output	Set one of the DO of the signal unit as “Under Voltage Alarm”. Protection Performance Alarm/Break/Switch Off
Over Voltage Protection Parameters	
Set value of the protected Starting	Return value~1200V
Delay time set of the protected operation	0.2～60S
Set value of the protected operation returns	Start Value ～1200V
Delay time of protection returns	0.2～60S
Protect alarming DO output	Set one DO of the signal units as“overvoltage error”. (not muST, if not set this item, the alarm information will only be read from the screen of the controller, without the connecting point output；)
Protection operating way	alarm/trip/close
Voltage Unbalance Protection	
set value of the Protected Start	2%~30%
Set value of the protected operation delay time	0.2~60.0S
Return set value of the protected operation	2%~ STarting value
Delay time of the protected return	0.2~60.0S
Protected alarm DO output	Set one DO of the signal units “U imbalance alarm”.（not muST, if not set this item, alarm infor can only be read from the screen of the controller, without the connecting port output）
Performing way	Alarm/trip/close

Intelligent Release

Micro-pro 6.1 / 7.1 - Technical Characteristics

Underfrequency Protection Parameters	
Set value of the Protected Start	45.0～ return value
Set value of the protected operation delay time	0.2～5.0S
Return set value of the protected operation	Start value～65Hz
Delay time of the protected return	0.2～36.0S
Protected alarm DO output	Set one DO of the signal units as“underfrequency error”.（not muST，if not set this item，the alarm infor can be only read from the screen of the controller, without connecting port output；）
Performing way	Alarm/trip/close
Over frequency Protection Parameters	
Set value of the Protected Start	Return value～65.0HZ
Set value of the protected operation delay time	0.2～5.0S
Return set value of the protected operation	45.0HZ ～STart value
Delay time of the protected return	0.2～36.0S
Protected alarm DO output	Set one DO of the signal units as“overfrequency error”.（not m muST，if not set this item，the alarm infor can be only read from the screen of the controller, without connecting port output；）
Performing way	Alarm/trip/close
Reverse Power Protection	
Set value of the Protected Start	5～500kW
Set value of the protected operation delay time	0.2～20S
Return set value of the protected operation	5 kW～STart value
Delay time of the protected return	1.0～360S
Protected alarm DO output	Set one DO of the signal units as“power error”. (not m muST，if not set this item，the alarm infor can be only read from the screen of the controller, without connecting port output；）
Performing way	Alarm/trip/close
Phase sequence protection	
Operating phase sequence	Δφ：A，B，C /Δφ：A，C，B
Protected alarm DO output	Set one DO of the signal units as“phase sequence error”. (not m muST，if not set this item，the alarm infor can be only read from the screen of the controller, without connecting port output；）
Performing way	Alarm/trip/close
Leakage Alarm	
Current Setting of Alarm Action	0.5～30.0A
Alarm Action Time Delay	0.0～1.0S
Alarm Return Current Setting	0.5～30.0A
Alarm Return Delay	0.0～1.0S
Alarm DO Output	Set one DO of the signal unit as “Leakage Alarm”.
Performance	Alarm + Switch Off
Current Unbalance Protection	
Delay Set Value	0. 1~40.0S
Return Value	5%~STart Value
Return Delay	10~200S
Alarm DO Output	Set one of the DO of the signal unit as “I unbalance alarm”.
Performance	Alarm/Break/Close
Indication	
Power ON LED	Available
Over Load Flashing LED	Available
OL/ SC/ EF Trip LED	Available
LCD Display	Available
Protocol	
Modbus	
Converter	RS485/232

Intelligent Release

Micro-pro 4.1 / 5.1 - Accessories

Communication Module

Communication module is an accessory of MicroPro Relay and is an optional module for the customer who needs additional features.The module gets connected to Micropro by two wires through general protocol & through 485 port, can be connected to Master PC. The communication module acts as a master for the MicroPro relay and as a slave to the supervisor PC.

The module can accept 9 different Digital inputs and has two relays inside whose contacts are brought out on the terminals which are D/O types.

There are 3 LEDs on the front indicating status of -

1. Communication between Micro Pro and Comm. Module
2. Communication between Comm. Module and Master PC.
3. Operation of the relay

The module has built in Power supply card. DC supply for the relay can be obtained from this module.

Operation

When connected to MicroPro and Master PC, Communication Module:

– Can read the settings of the MicroPro .

– Can change the settings of the MicroPro as dictated by Master PC.

– Can record following data related to last 16 faults

a) The type of fault

b) In which phase the fault has occurred

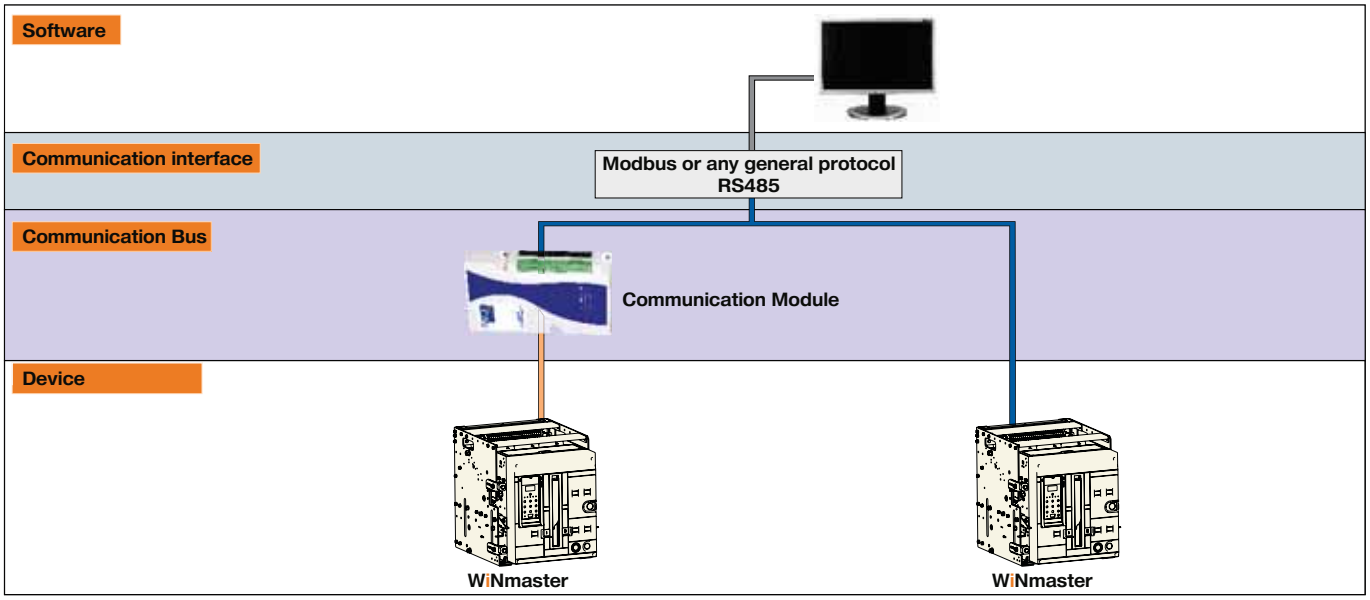
c) At, which instant the fault occurred

d) Fault current.

– Can record the normal currents IR, IY, IB, IE, and IN

– Operates one of the relays whose contacts are available on the terminals as soon as MicroPro exceeds the threshold of the trip.

Because of the above capabilities all the relevant information related to status of the relay can be furnished to the Master. The information can also be used for zone selectivity interlocking by using the contacts of the relevant relay.



Intelligent Release

Micro-pro 4.1 / 5.1 - Accessories

Power Supply and Relay Module

The module has relay outputs corresponding to the type of fault occurred in the MicroPro. There are total 7 Relays and contact of each relay is available for feeding to alarm annunciator or any other control .

The module has built in Power supply card DC supply for the micropro relay can be obtained from this module.If the relay card is not used then the module becomes power supply module.The power supply card is common with Communication module

Operation - PSRM

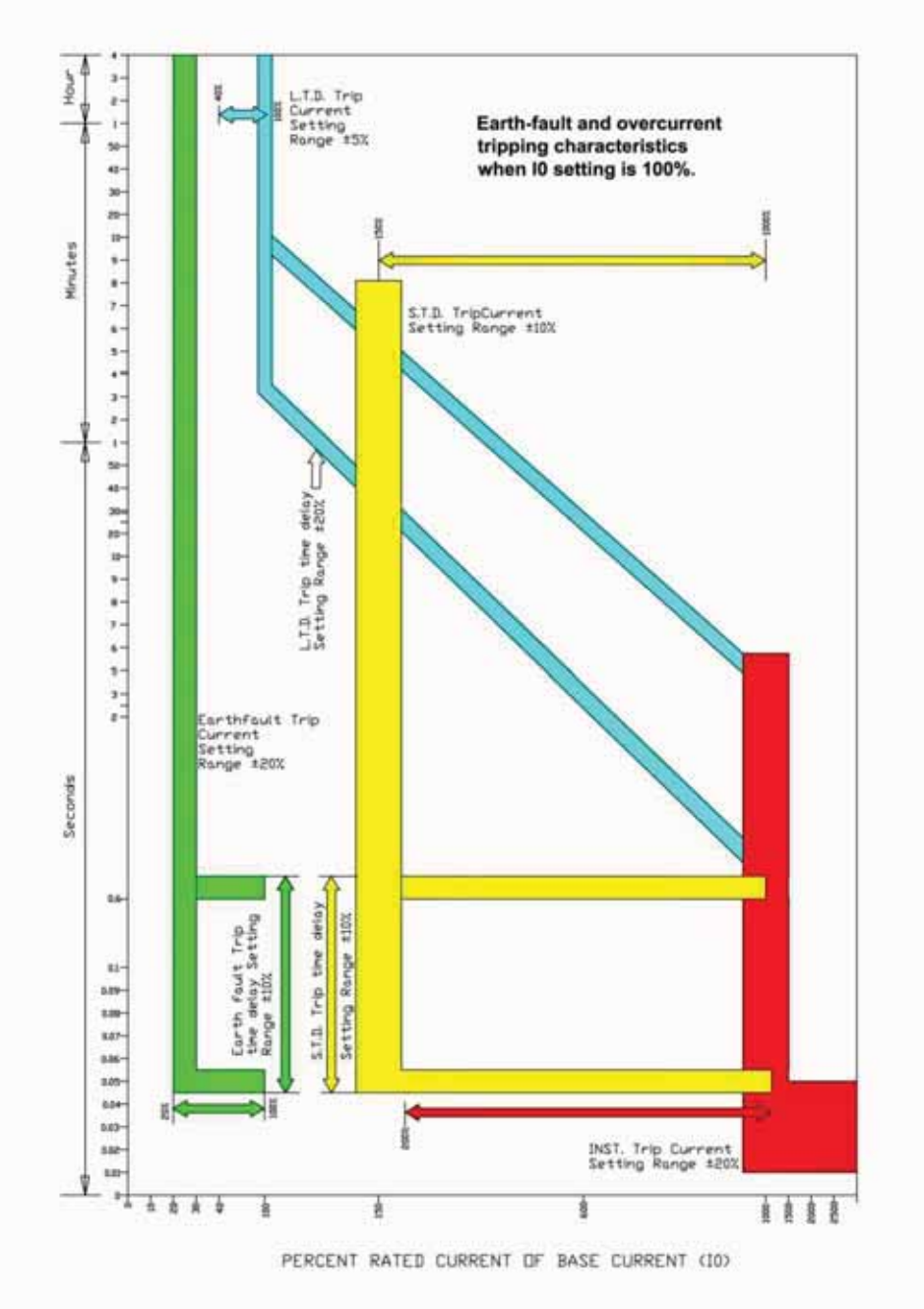
The PSRM module when connected to Micro pro will get the information of type of fault and in which phase the fault has occurred. Corresponding to this a particular relays will operate and the output contacts of the relay will change the status. Through 3 DIP switches, one can block the function. Blocking ensures that the particular output contact corresponding to the function have no effect even if the function in the relay device is activated. The contacts will remain open if DIP switches are used to block the function. There will be option of providing 4 or 7 relays.

Technical Specifications - PSRM

Auxiliary Supply	Input:	24V DC to 300V DC or 24V AC to 240 V AC
	Output:	24V DC ± 10%
Relays	Number of relays:	4 or 7 nos.
	Contact rating:	125V AC, 0.6A or 110V DC 0.6A
	Contacts:	1 terminal pair from each relay
Extension functions:	Extension provides operation of relays. Signal for such operation are sent by MicroPro on RS485 serial data communication interface. The relays operate on following faults: 1. Over current [I>] 2. Phase current High set [I>>} 3. Earth Fault [IE>] 4. Neutral Over current [IN>] 5. Circuit Breaker failure [CBF] 6. Pre-trip alarm [W] 7. Spare	
Function blocking:	DIP switches are provided for selectively blocking any of the above functions. 7 Position DIP switch works as follows: **Case 1: Number of relays =7:** Each position corresponds to one of the above functions and in the same sequence. When a switch is in OFF position, the corresponding function is blocked. This means that relay will not trip when its assigned fault occurs. **Case 2: Number of relays =4:** The enabled functions are assigned to consecutive relays. Not more than 4 functions can be enabled since there are only 4 relays. For example, if switches 2, 4 and 7 are OFF, then assignment is: I> Relay1 IE> Relay2 CBF Relay3 W Relay4	
Total Terminals: 21	Break-up of terminals is as follows: **Power Supply Side:** 3 terminals for supply input: L, N, E. 1 terminal blank 2 terminals for 24 V output: + & - . 2 terminals for communication to micro Pro: com+, com-. **Relay Module Side:** 14 terminals for Relay output. One terminal pair for each of N/O contact of all seven relays.	
Communication Device	RS485 Master	
Size:	W x H x D in mm: 119 x 63 x 50	

Tripping curves

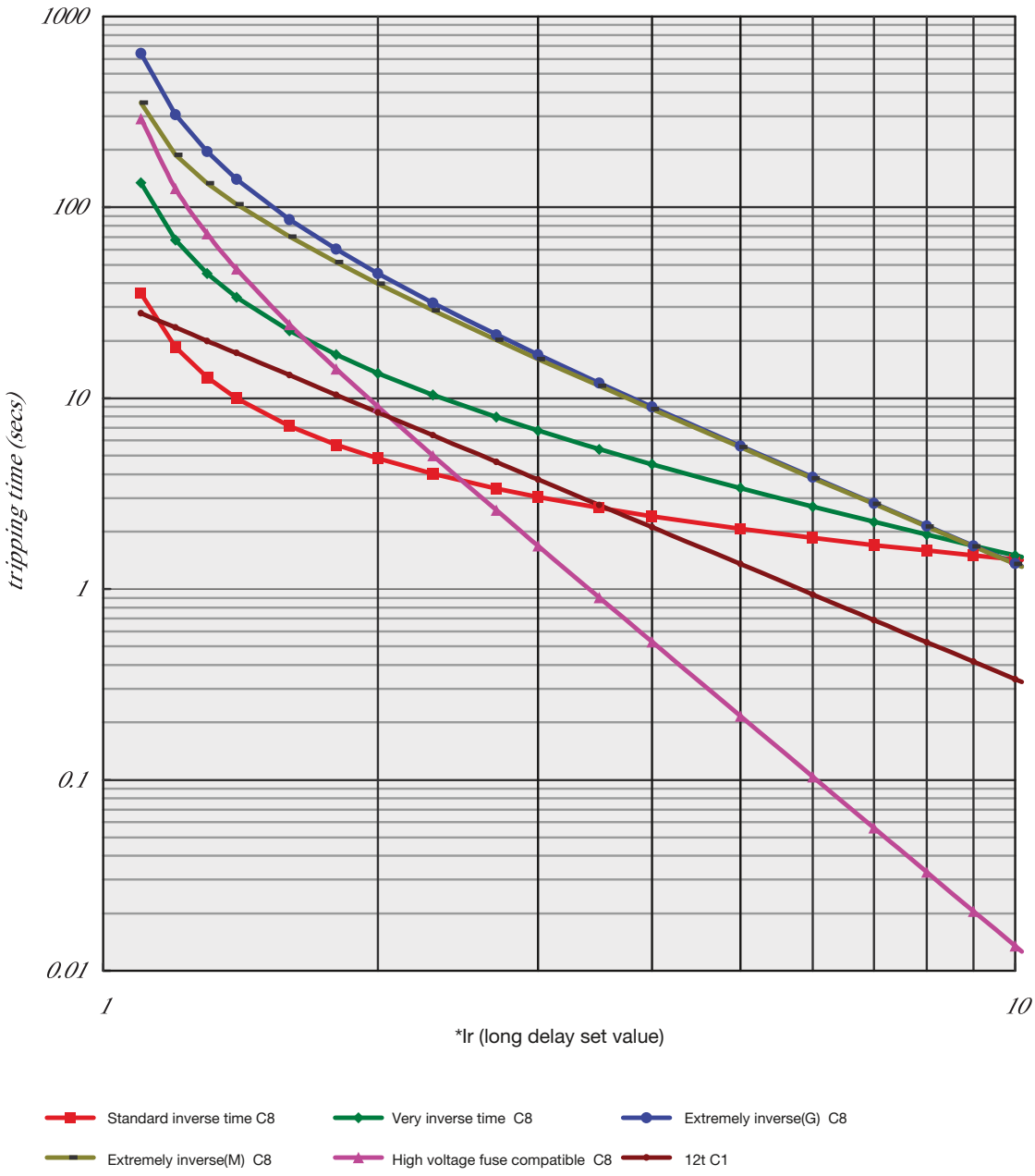
Micropro 3.0 / 3.1 / 4.1 / 5.1



Tripping curves

Micropro 6.1 / 7.1

Chart A1
comparison of different curve type (curve speed : C8)



Tripping curves

Micropro 6.1 / 7.1

Chart A2
Standard inverse time lag

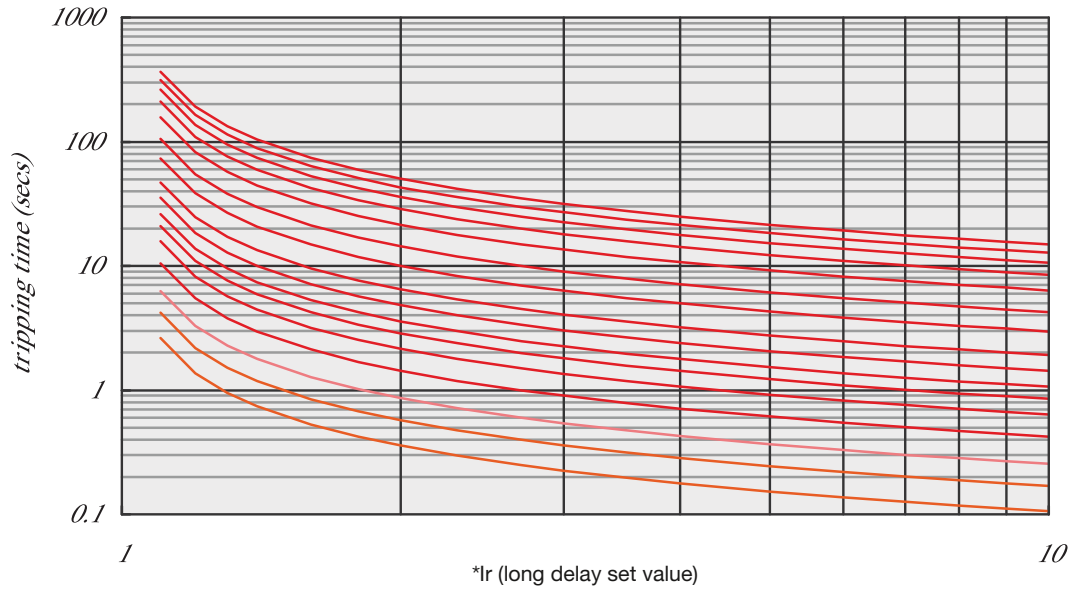
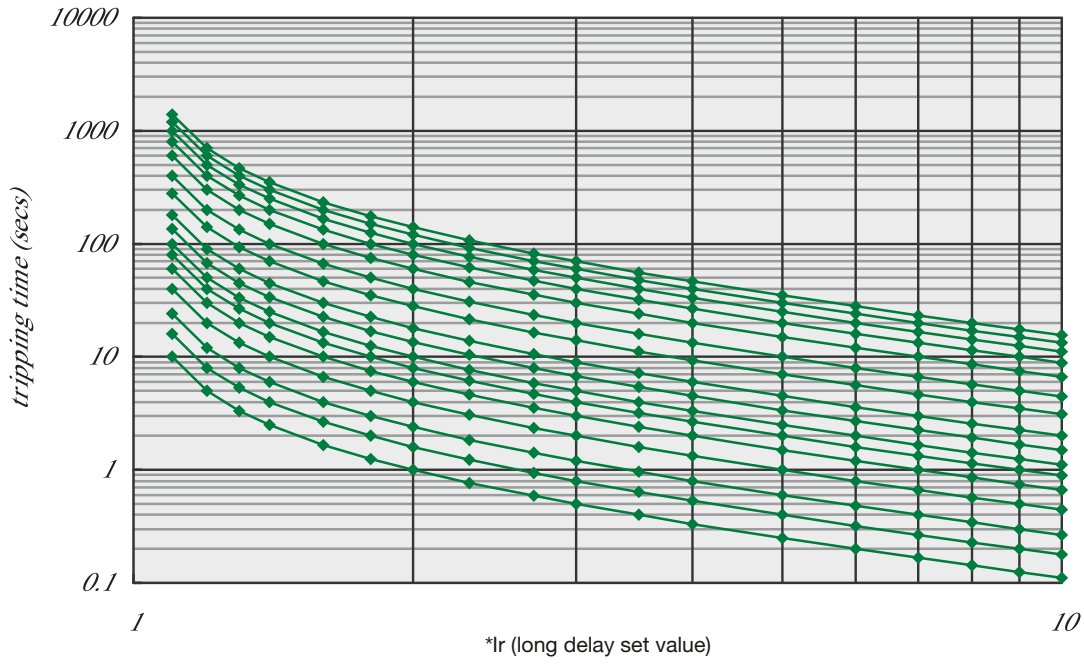


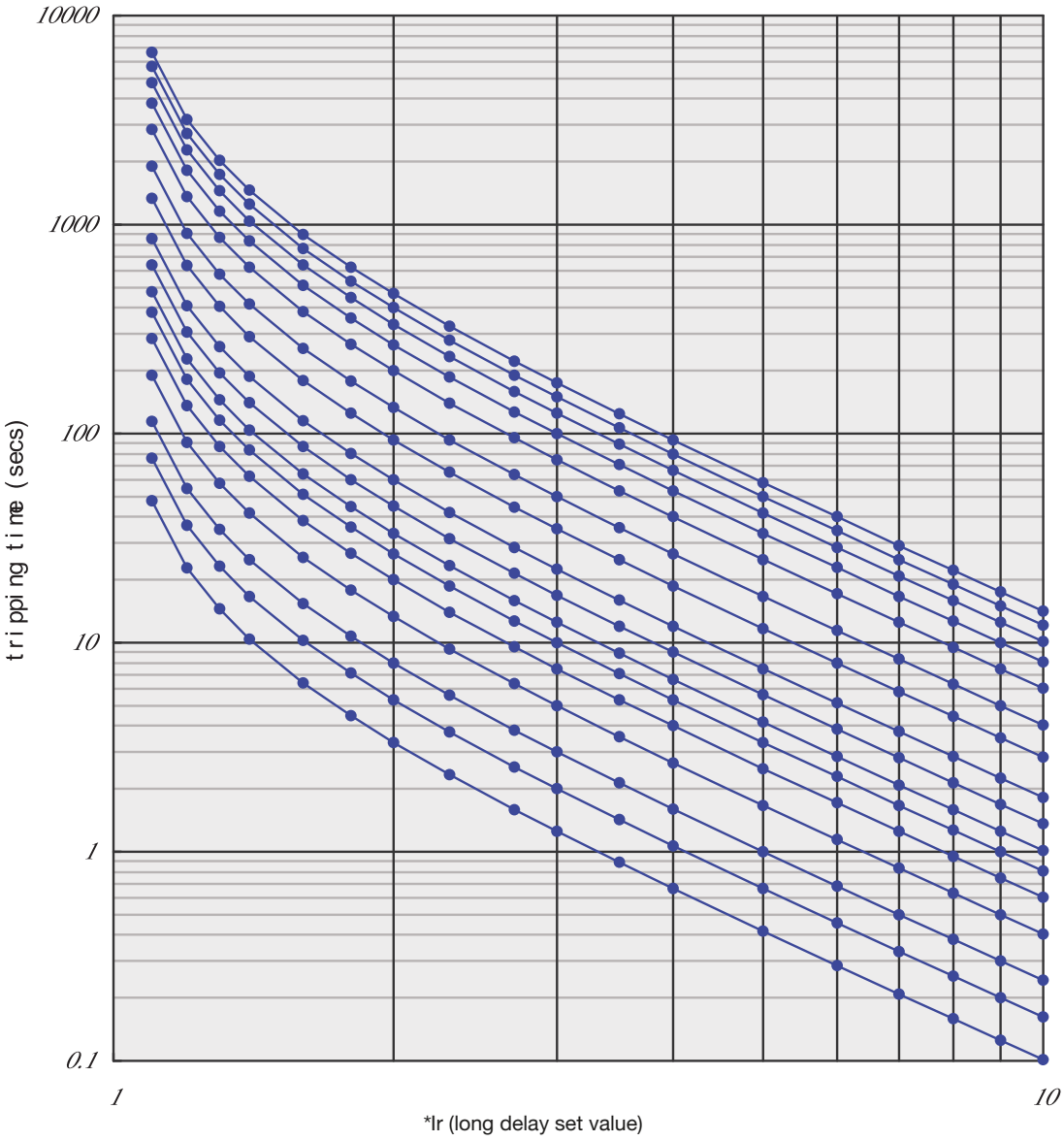
Chart A3
Very inverse time lag



Tripping curves

Micropro 6.1 / 7.1

Chart A4
Extremely inverse time lag (distributing protection)



Tripping curves

Micropro 6.1 / 7.1

Chart A5
Extremely inverse time lag (generator protection)

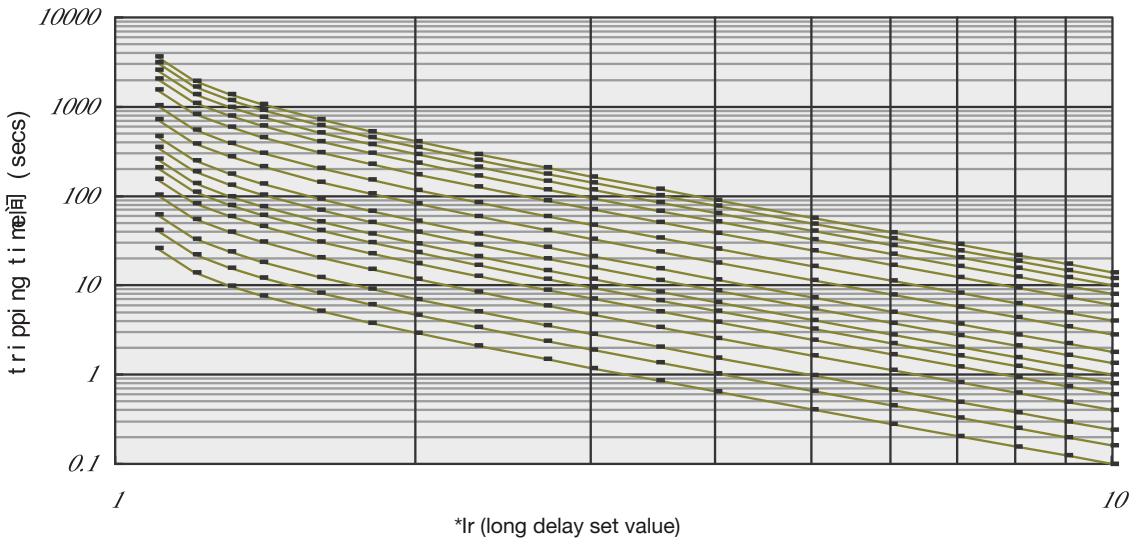
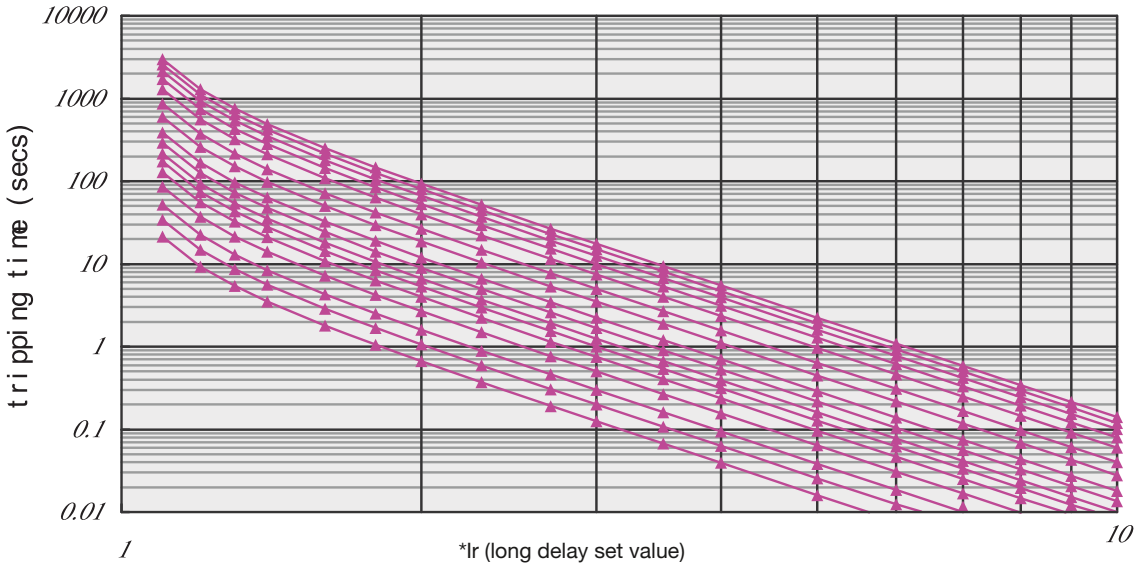


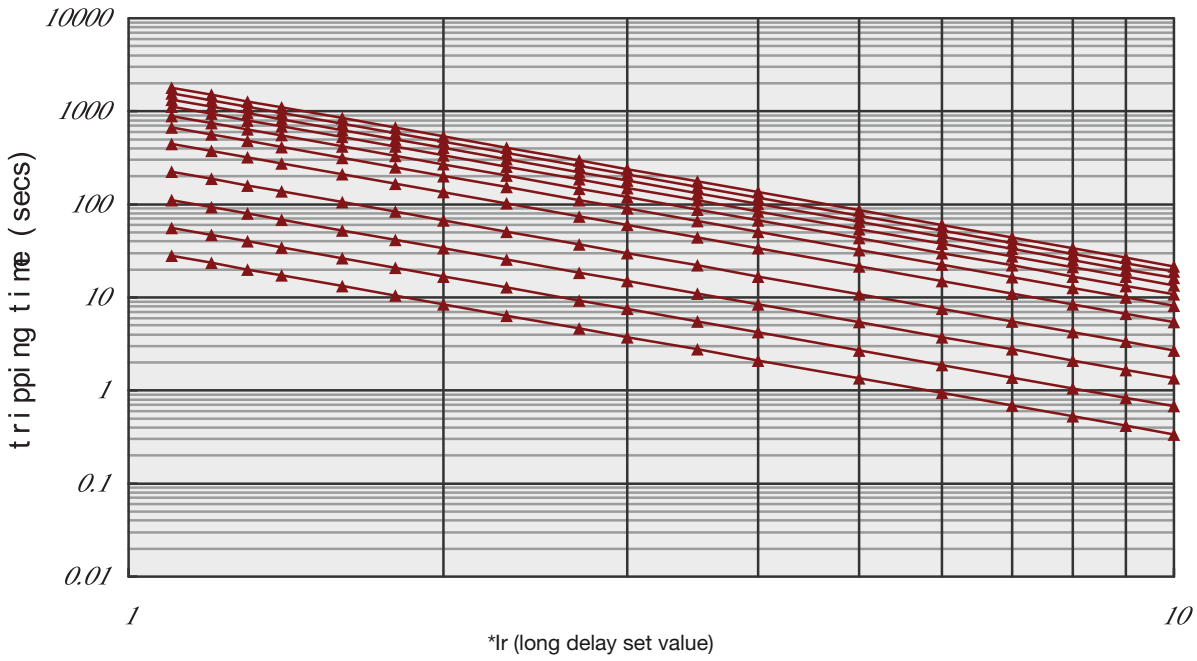
Chart A6
High voltage fuse compatible



Tripping curves

Micropro 6.1 / 7.1

Chart A7
Extreme inverse time curve



Tripping curves

Micropro 6.1 / 7.1

Chart S1
Short delay reverse time lag - standard reverse time lag

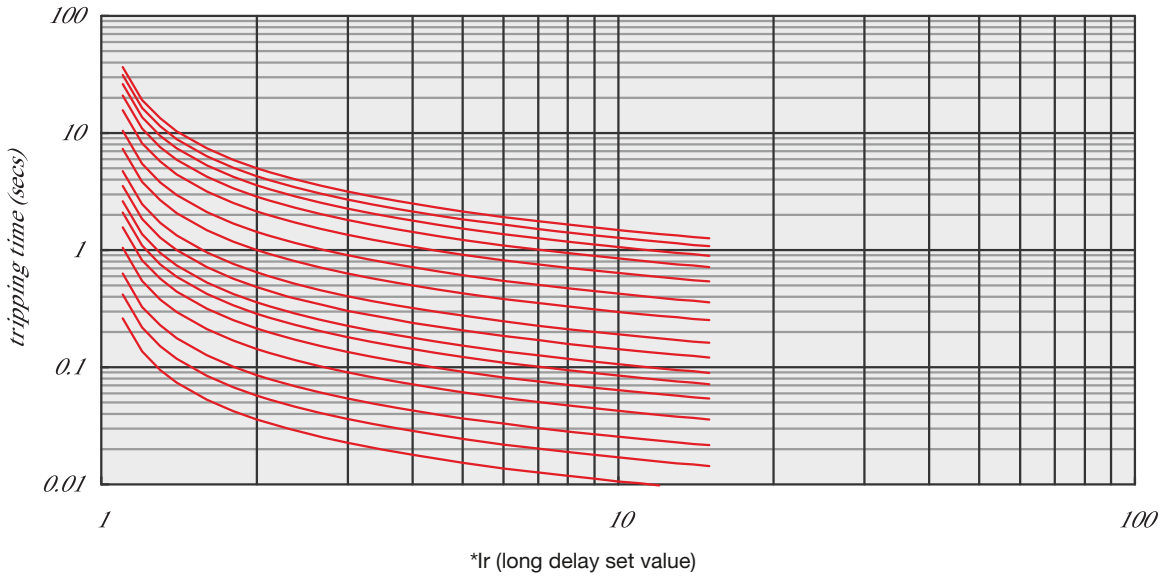
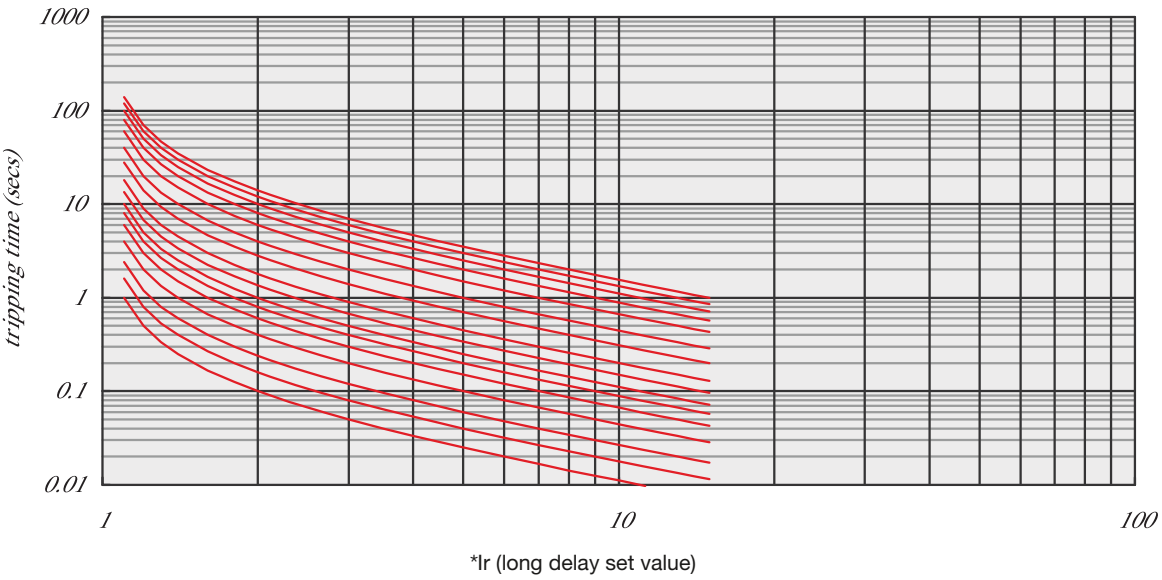


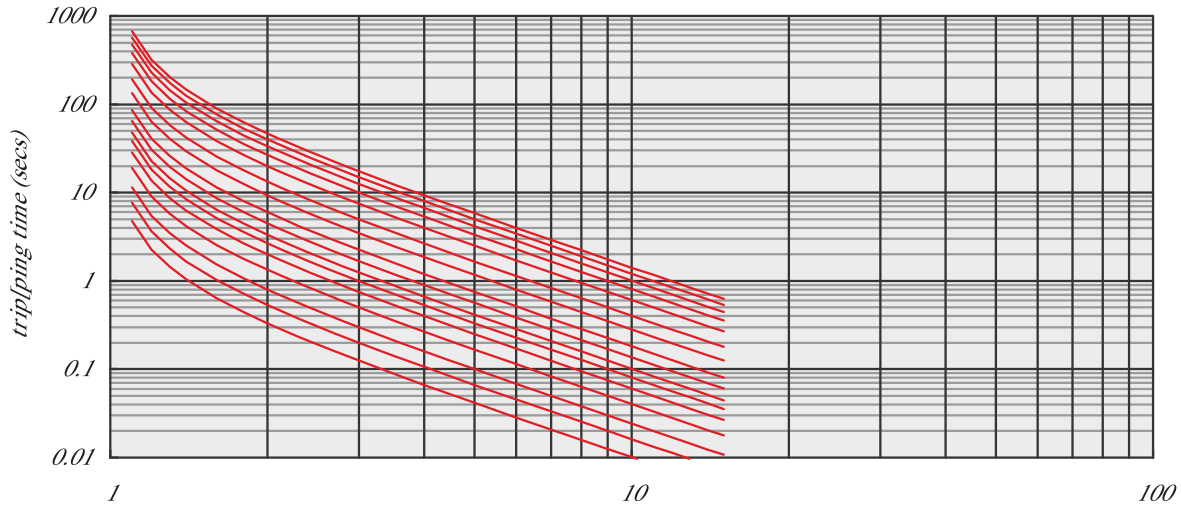
Chart S2
Sort time delay reverse time lag - fast reverse time lag



Tripping curves

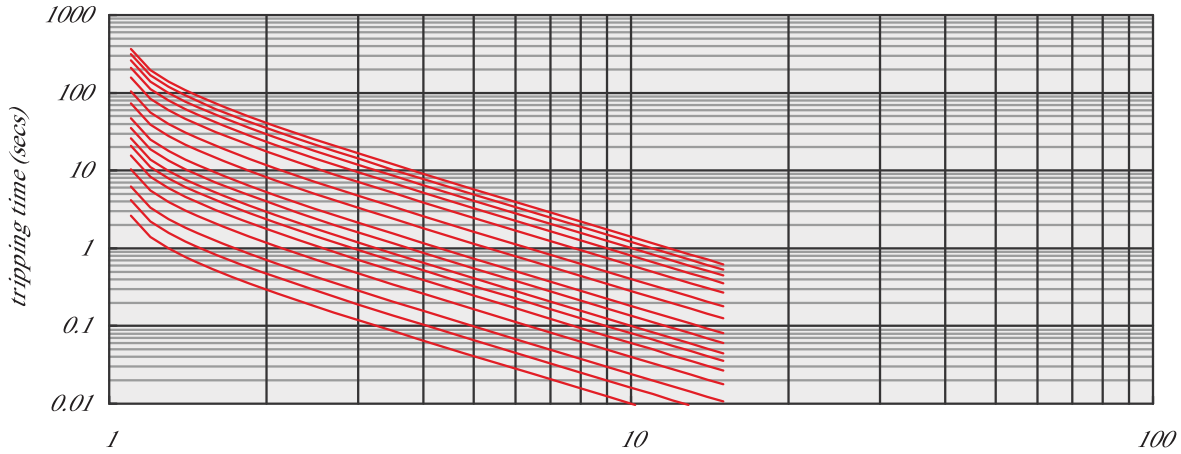
Micropro 6.1 / 7.1

Chart S3
Short delay reverse time lag - express reverse time lag
(distributing protection)



*Ir (long delay set value)

Chart S4
Sort delay reverse time lag - express reverse time lag
(generator protection)



*Ir (long delay set value)

Tripping curves

Micropro 6.1 / 7.1

Chart S5
Short delay reverse time lag - high voltage fuse compatible

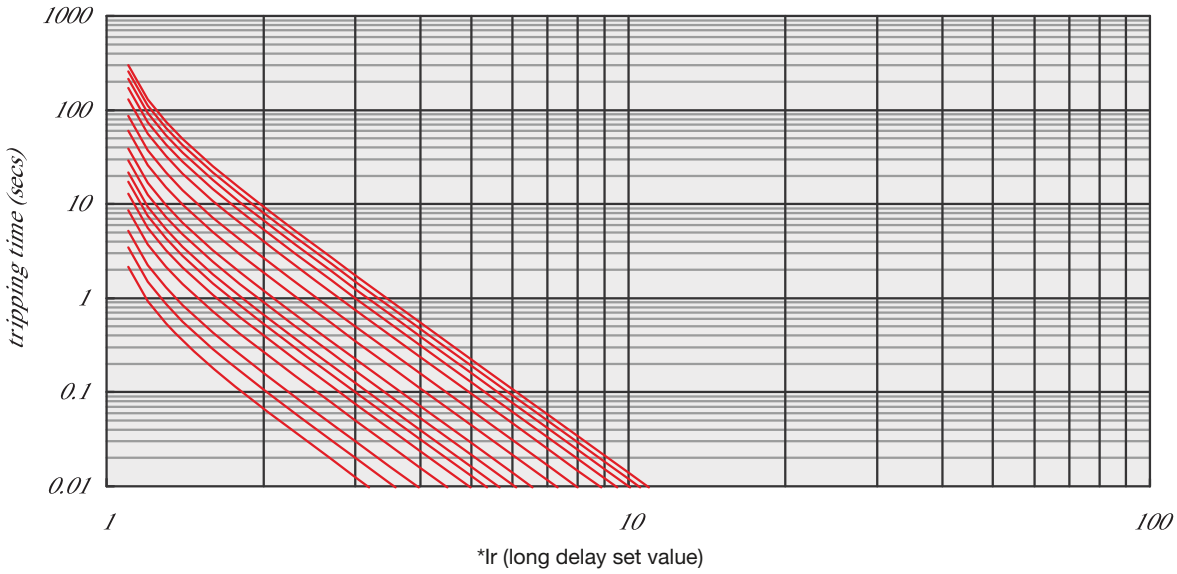
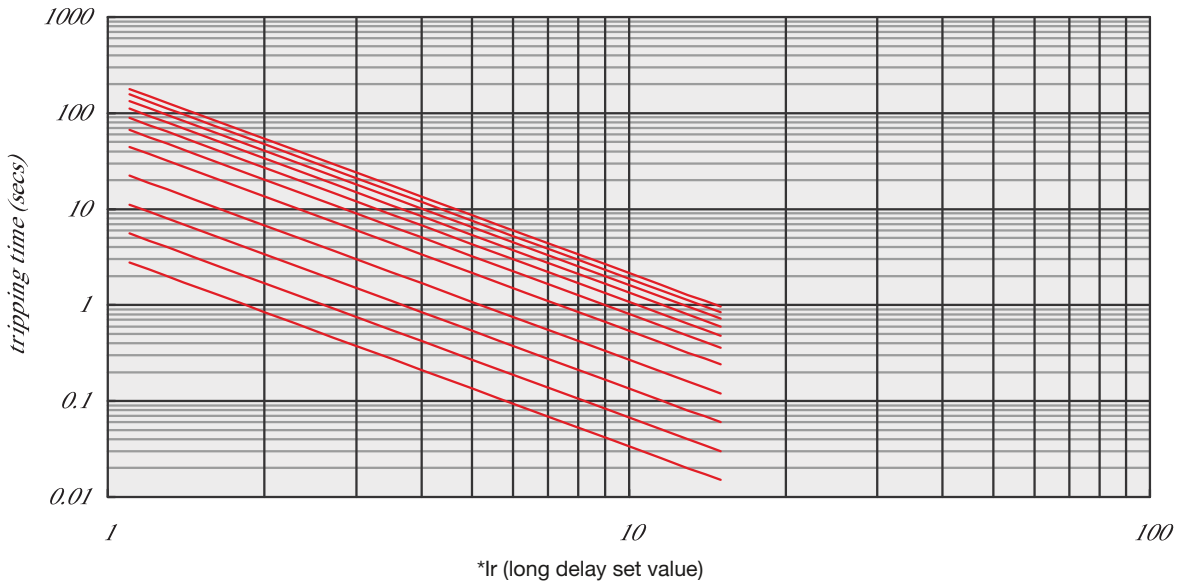


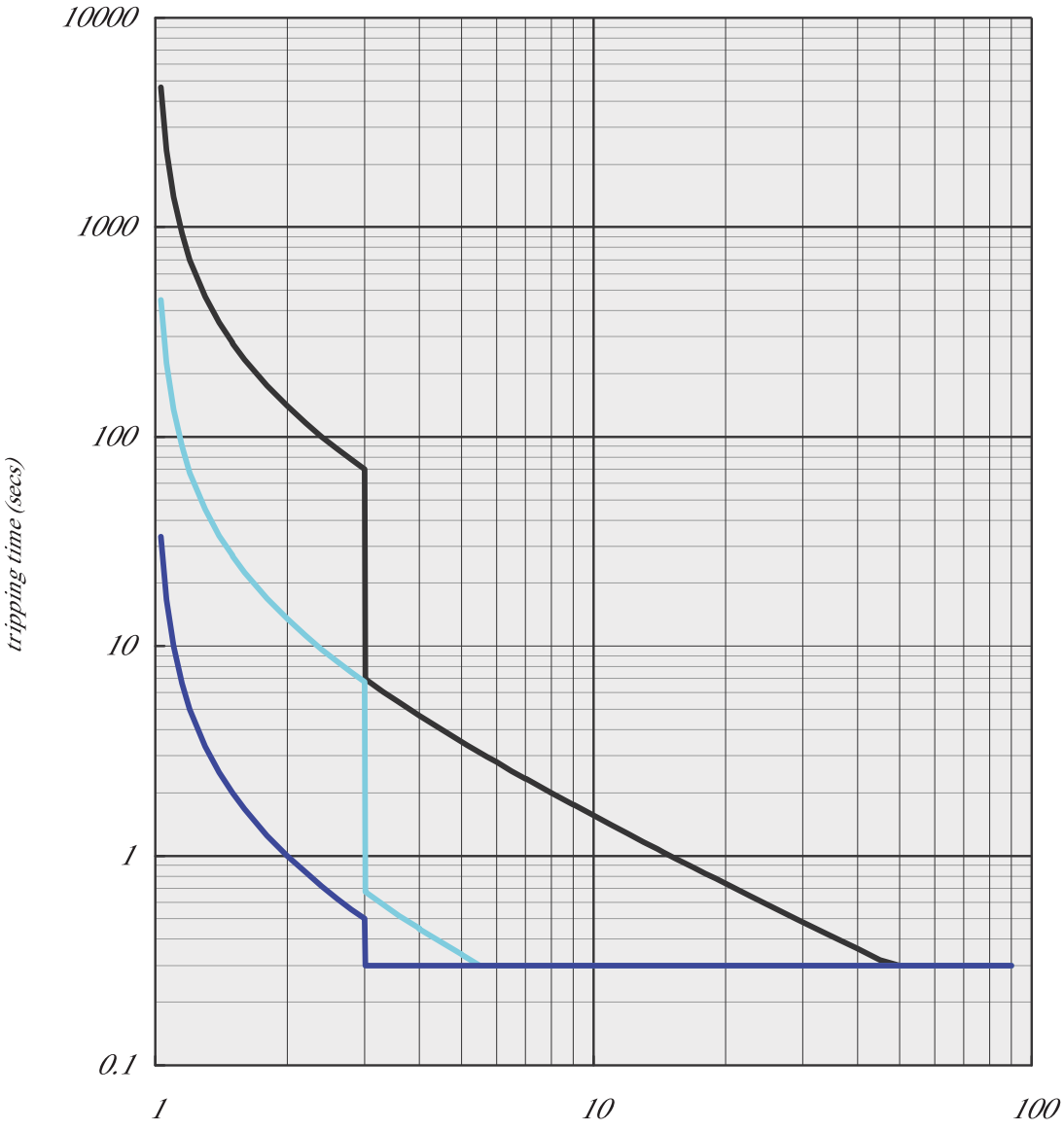
Chart S6
Short time reverse time lag - common use reverse time lag



Tripping curves

Micropro 6.1 / 7.1

Chart C1
Protection example of reverse time lag



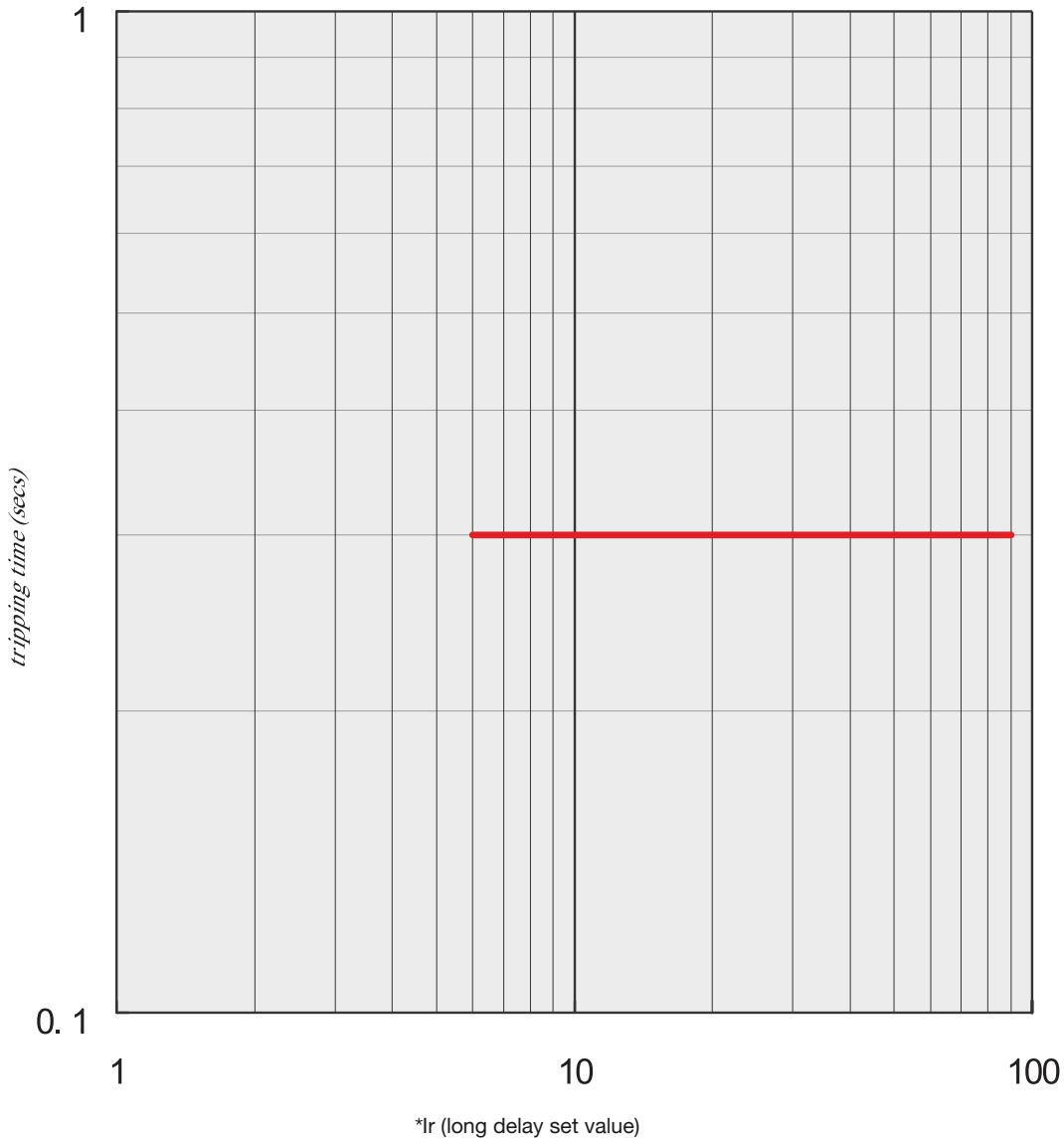
The curve above bases on the set value below:
- Curve type = fast reverse time lag
- Curve speed = C1, C8 and C16

Operation set value of short delay reverse time lag = 3 x I_{set}
Delay time of short delay fixed time lag set value = 0.3 S

Tripping curves

Micropro 6.1 / 7.1

Chart C2
Protection example of fixed time lag

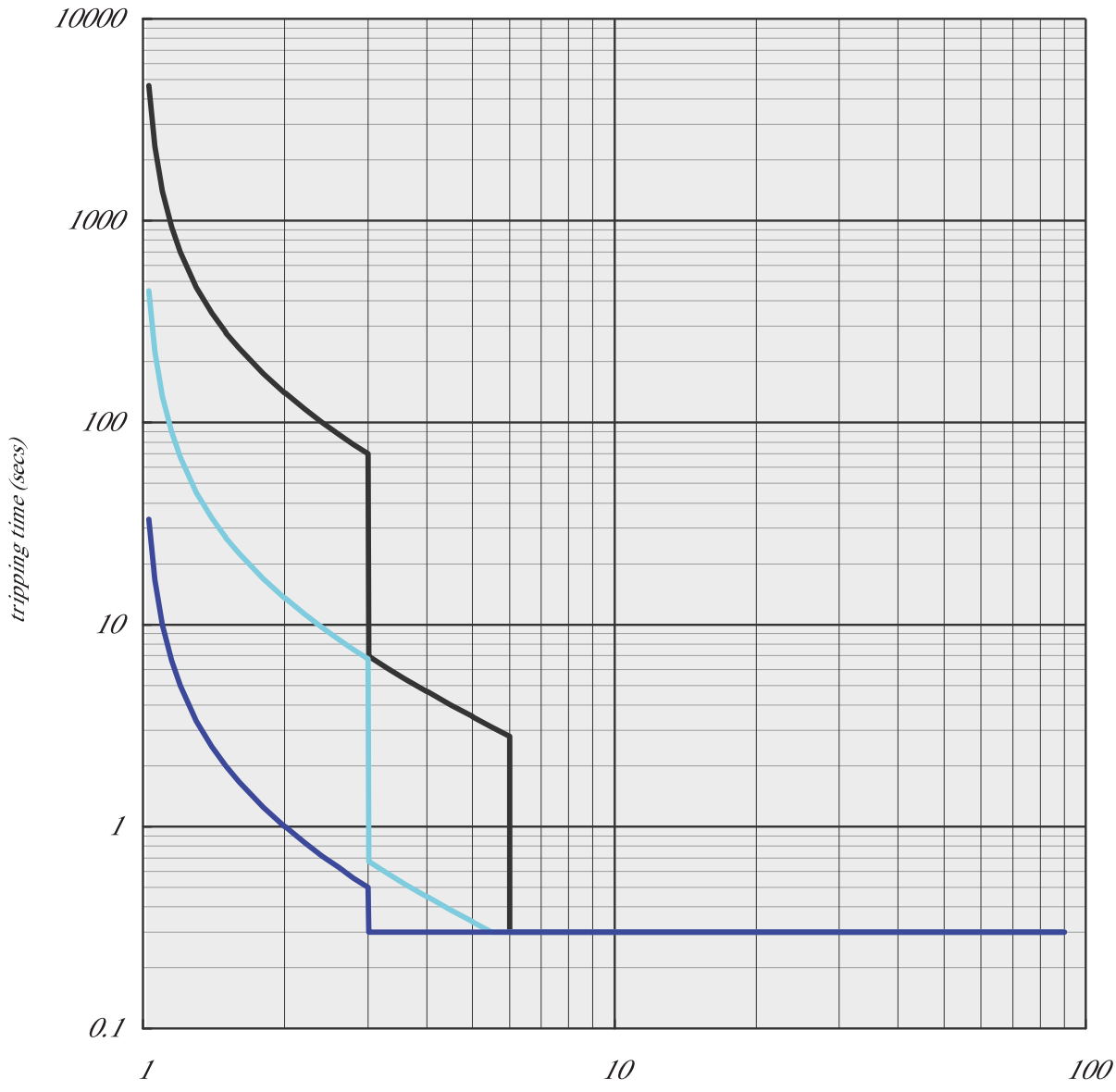


The curve above bases on the fixed value below:
- Delay time of short delay fixed time lag set value = 6 x Ir
- Delay time of short delay fixed time lag set value = 0.3 S

Tripping curves

Micropro 6.1 / 7.1

Chart C3
Example curve of reverse time lag, fixed time lag



The curve above bases on the set value below:
- Curve type = fast reverse time lag
- Curve speed = C1, C8 and C16 (C1 fastest)
- Operation set value of short delay reverse time lag = 3 x I_{set}
- Operating set value of short delay fixed time lag = 6 x I_r
- Delay time of short delay fixed time lag set value = 0.3 S

Tripping curves

Micropro 6.1 / 7.1

Chart G1
Ground protection

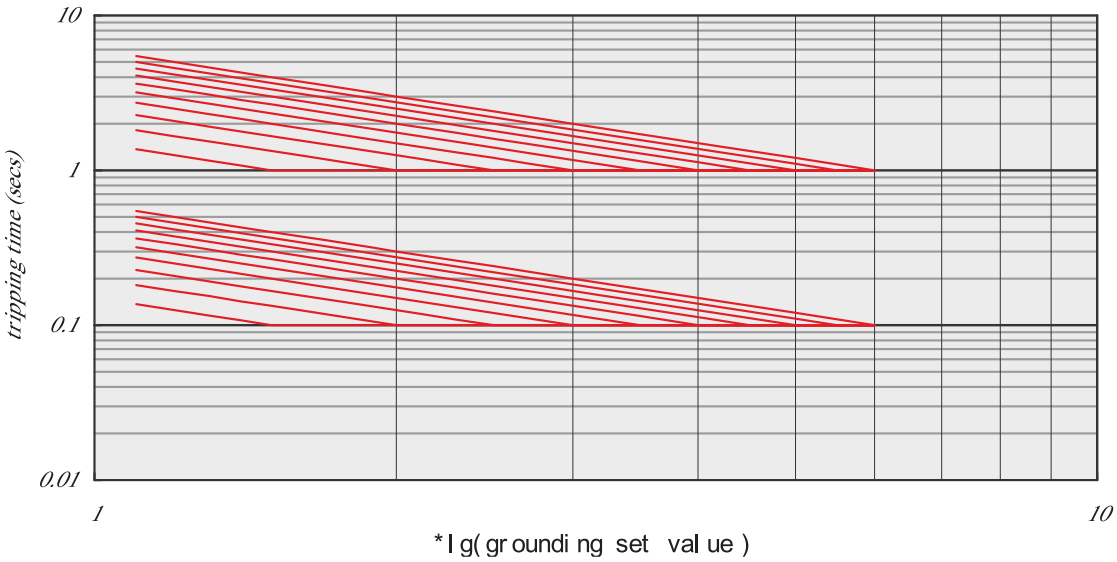
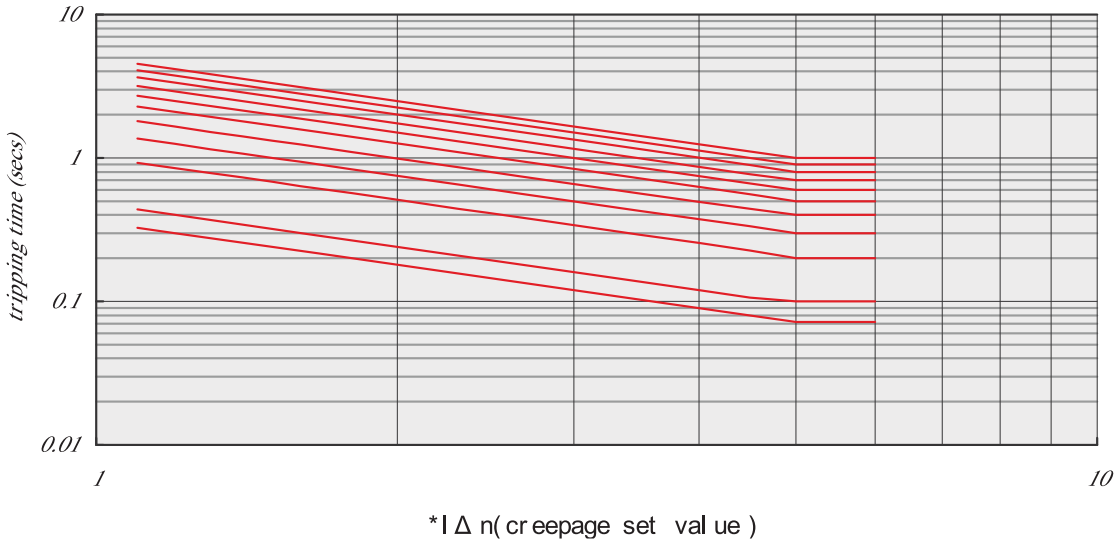
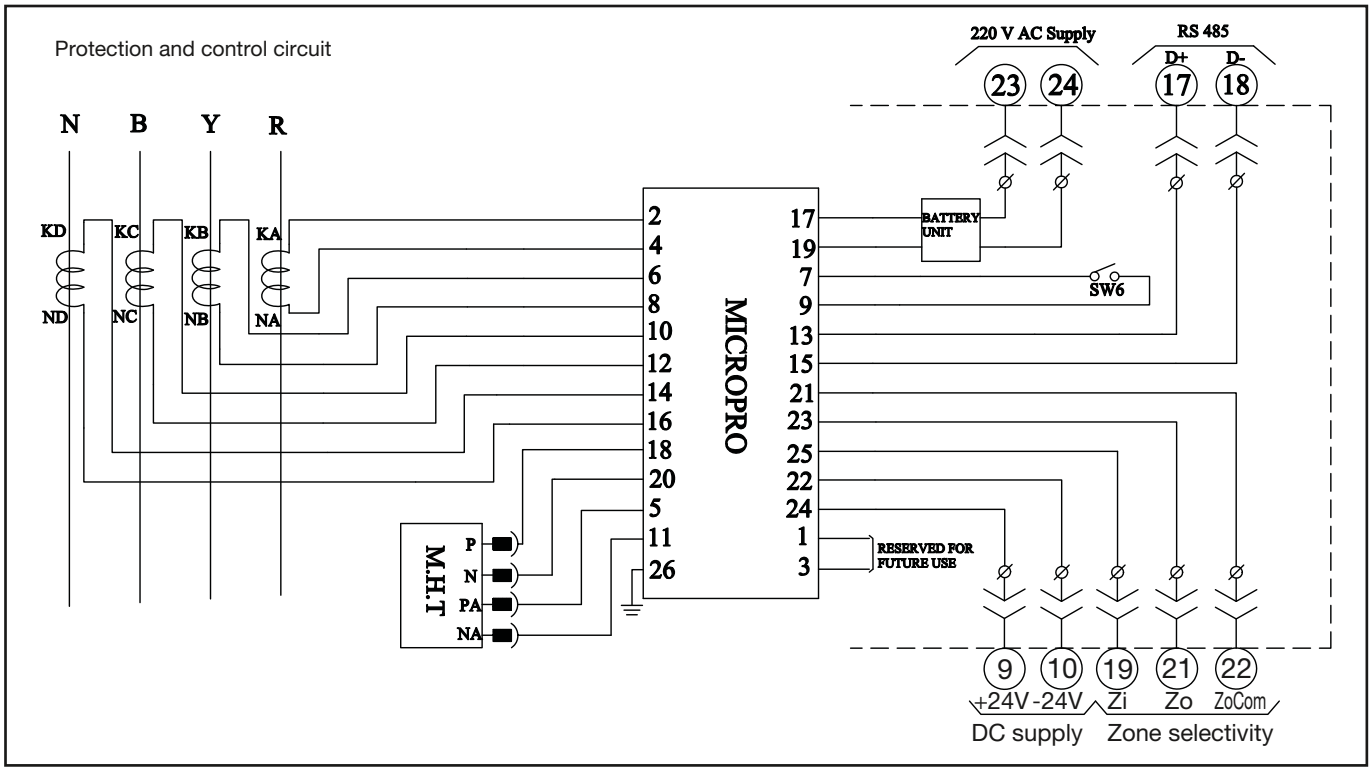


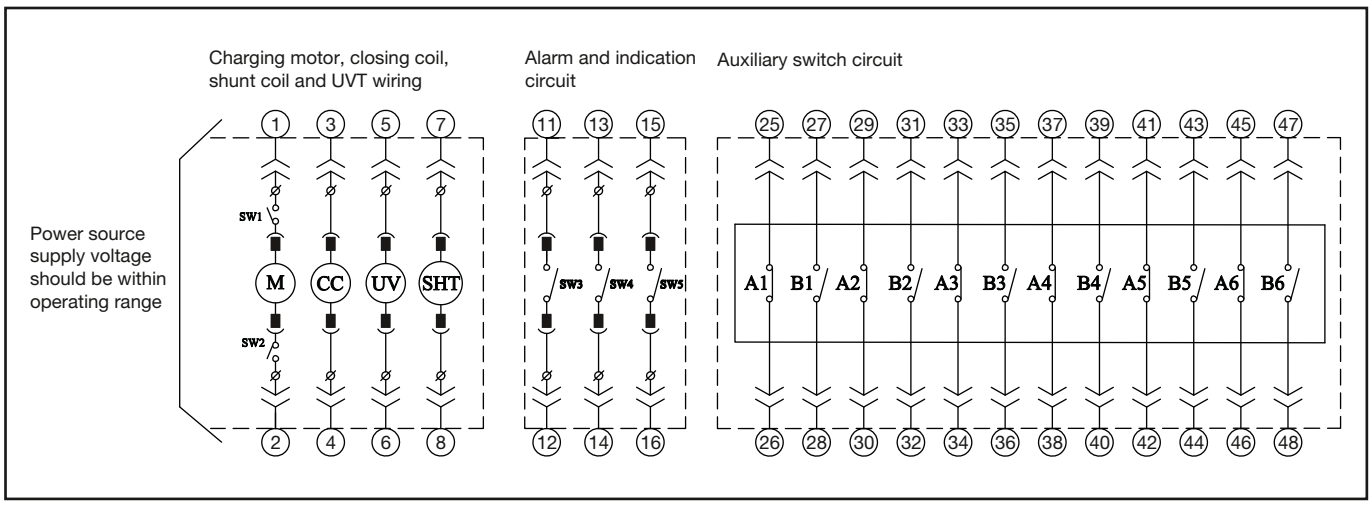
Chart G1
Creepage protection



Electrical diagram

Micropro 4.1 / 5.1





PLUG AND SOCKET CONNECTION

BREAKER WIRING

ISOLATING CONTACT

NOTE : SW2 WILL BE USED ONLY FOR DC MOTOR

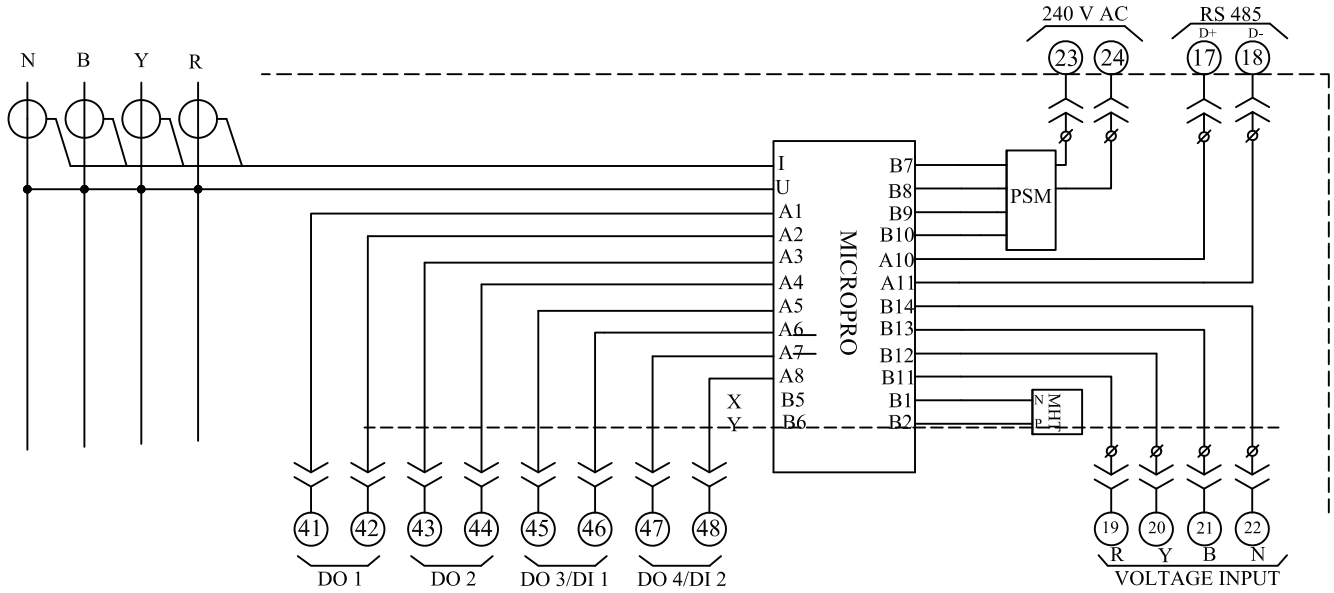
M --- Charging Motor
CC --- Closing Coil
UVT --- Under Voltage Trip Coil
SHT --- Shunt Trip Coil
MHT --- Magnetic Held Trigger Device

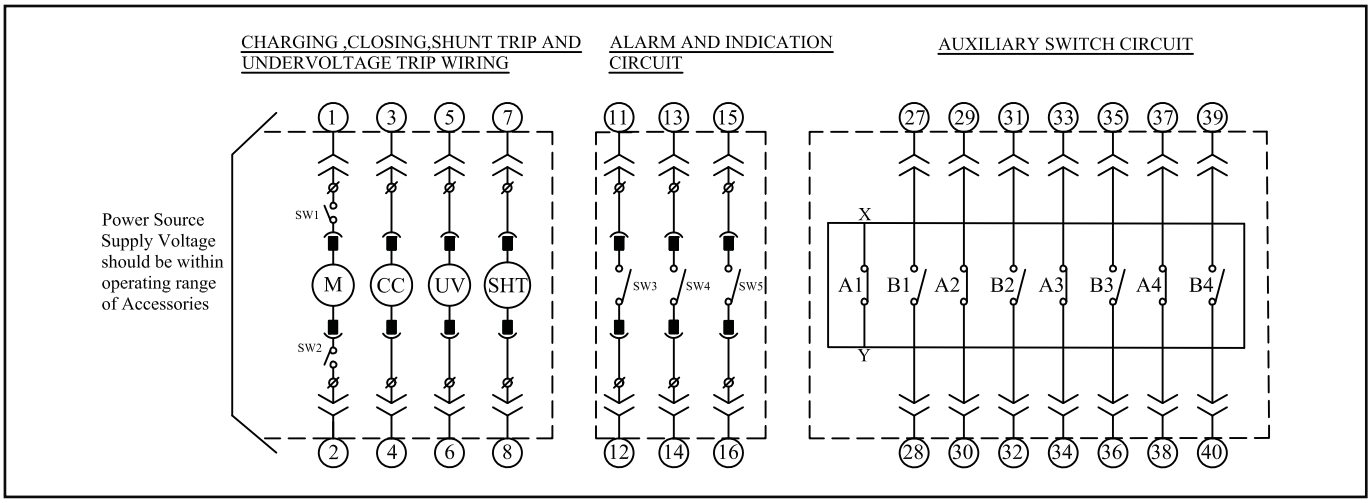
SW1 --- Motor CutOFF Switch
SW2 --- Motor CutOFF Switch(DC)
SW3 --- Trip Indication Switch
SW4 --- Charge Indication Switch
SW5 --- OCR Switch
SW6 --- MCR Switch

Electrical diagram

Micropro 6.1 / 7.1

Protection and control circuit





PLUG AND SOCKET CONNECTION

BREAKER WIRING

ISOLATING CONTACT

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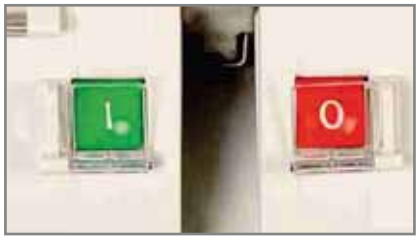
SW5 --- OCR Switch
SW6 --- MCR Switch

Locking options

1. Micropro locking
2. Draw-out handle locking
3. ON Pushbutton locking
4. OFF Pushbutton locking
5. Castle / Key locking



Push button protected by transparent cover

Padlock facility for ON-OFF push button

Micropro locking using a padlock

Castle / Key locking

Pushbutton locking

OPEN-CLOSE push button is blocked with transparent cover

Both OPEN-CLOSE push button can be padlock

Locking also possible for micropro trip unit in order avoid unauthorised access

Device locking in the OFF position

The key locks are available in any of the following configuration:

One lock, one key

Two locks, one keys

Three locks, two keys

More locking options available on request

Key may be removed only when locking is effective

Castle lock is available with following letter:

A, B, AB, -A, -B & BC etc.

Cable-type door interlock

This option prevent door opening and circuit breaker is closed and prevent circuit breaker closing when door is open

With the interlock install door cannot open when ACB is in ON condition

Remote operation

The closing springs are charged by an electric motor. A closing command from an external “Push button” energises the closing coil which releases the charge of the closing spring to quickly close the breaker. With the breaker closed, the motor automatically starts to charge the spring again for the next closing operation.

The remote ON / OFF function is used to remotely open and close the circuit breaker. Following parts are included for this operation:

Charging motor (WM-AMH-AB) equipped with spring charge indication (WM-SCIS-AB)

Closing coil (WM-ABH-C-AB-MA-MD)

Shunt coil (WM-ABH-S-AB-MA-MD)

Anti pumping feature (both electrical & mechanical for complete safety)

Following functions can also be added which are optional:

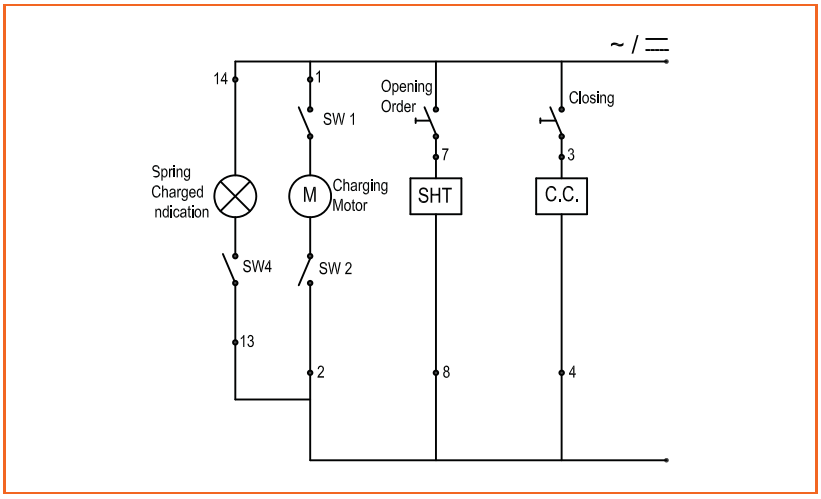
A) Fault alarm switch (WM-ALA-AB)

B) Spring charge indication switch (WM-SCIS-AB)

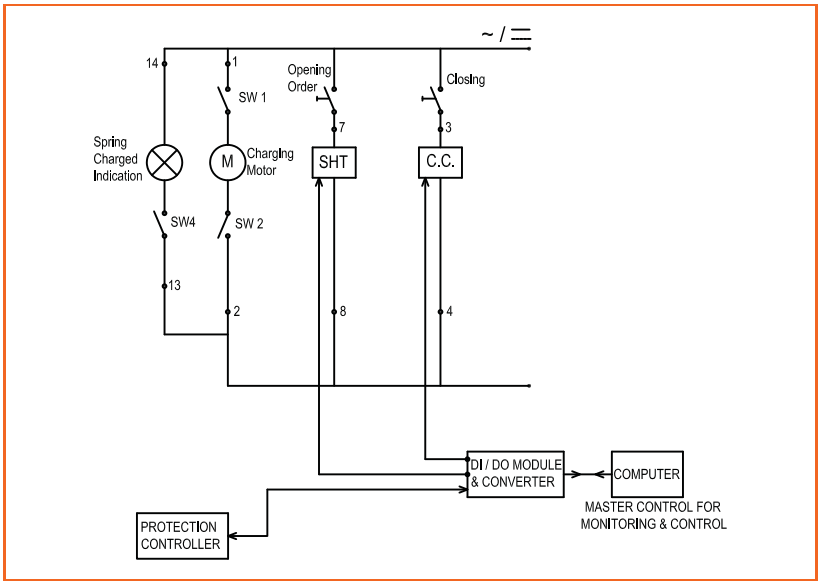
C) Power supply & relay module for remote indication (CSPSM-MICROPRO)

D) Communication module for ACB remote ON & OFF (CSPSCM-MICROPRO)

Wiring diagram of ON / OFF function



Wiring diagram of ON / OFF function with communication

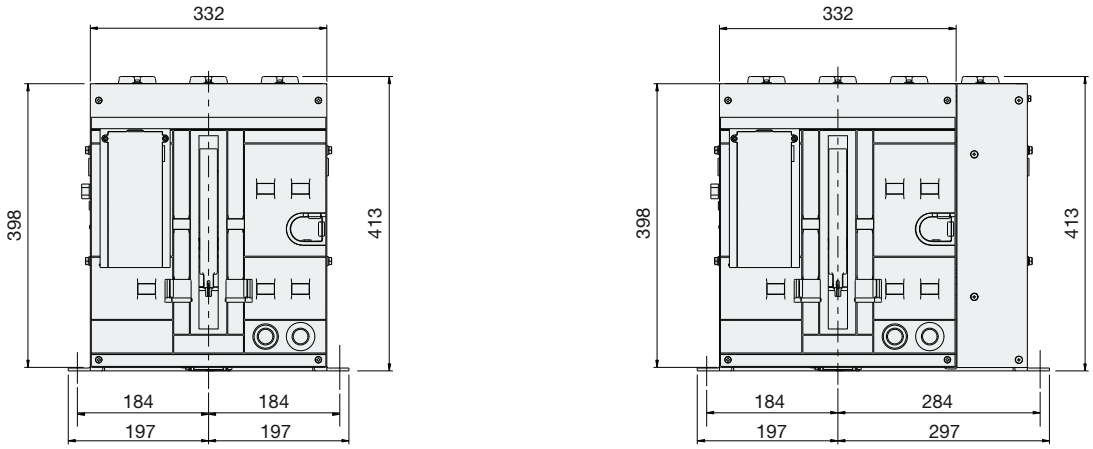


Dimension

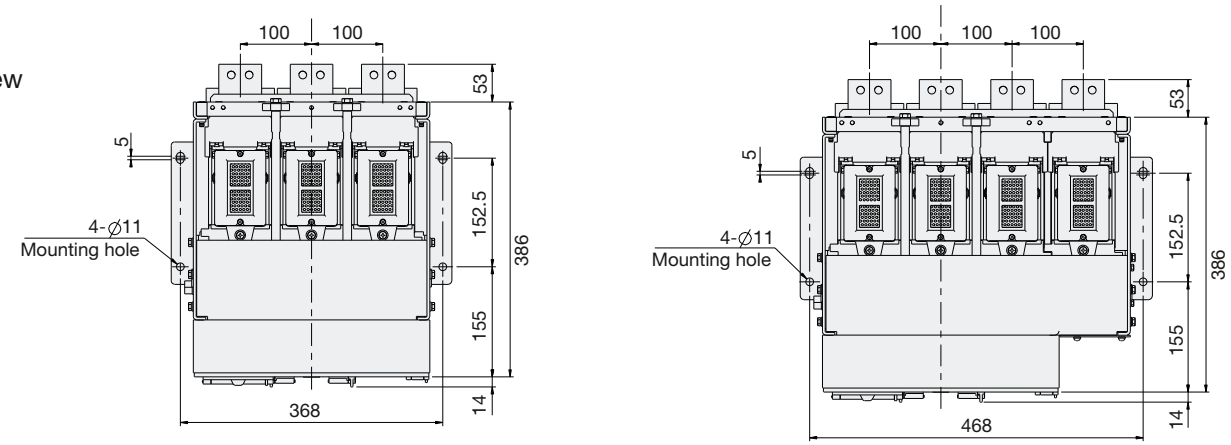
Frame 'A' fixed type
630A ~ 2000A (horizontal termination)

3 Pole | **4 Pole**

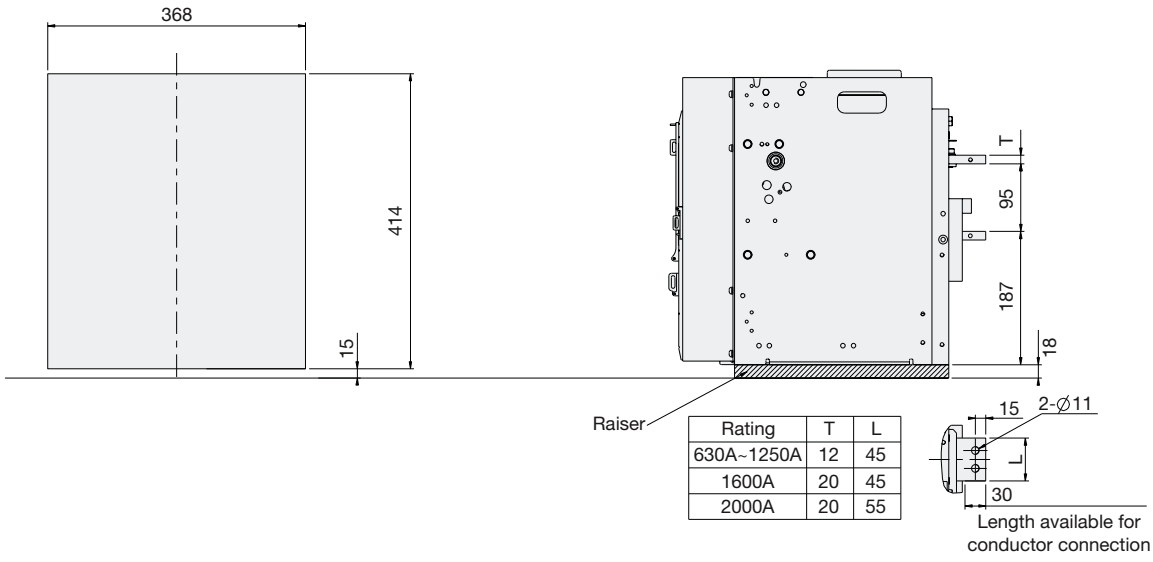
Front view



Top view



Panel cutout



Rating	T	L
630A~1250A	12	45
1600A	20	45
2000A	20	55

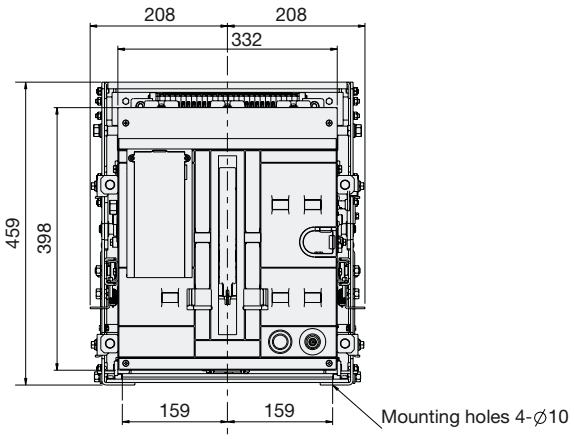
All dimensions are in mm

Dimension

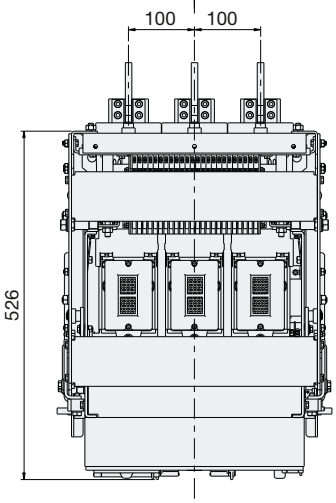
Frame 'A' draw-out type
630A ~ 2000A

3 Pole

Front view

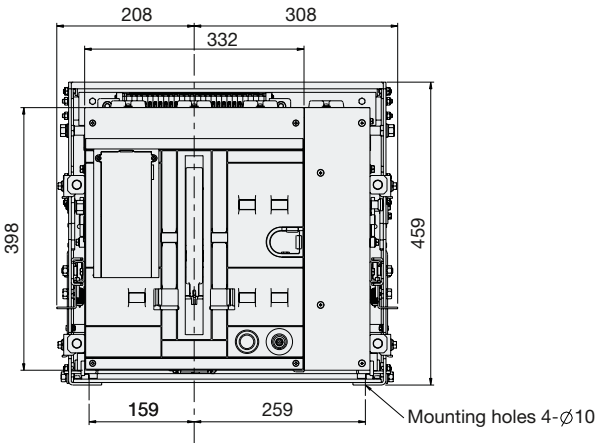


Top view

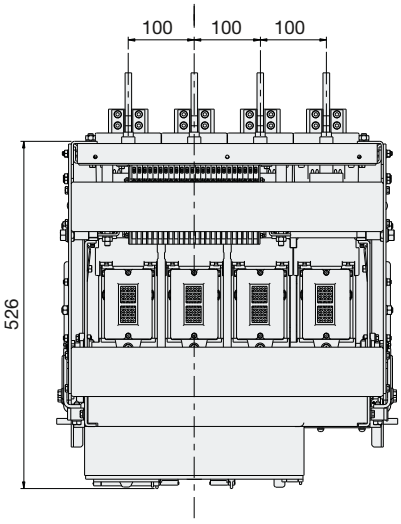


4 Pole

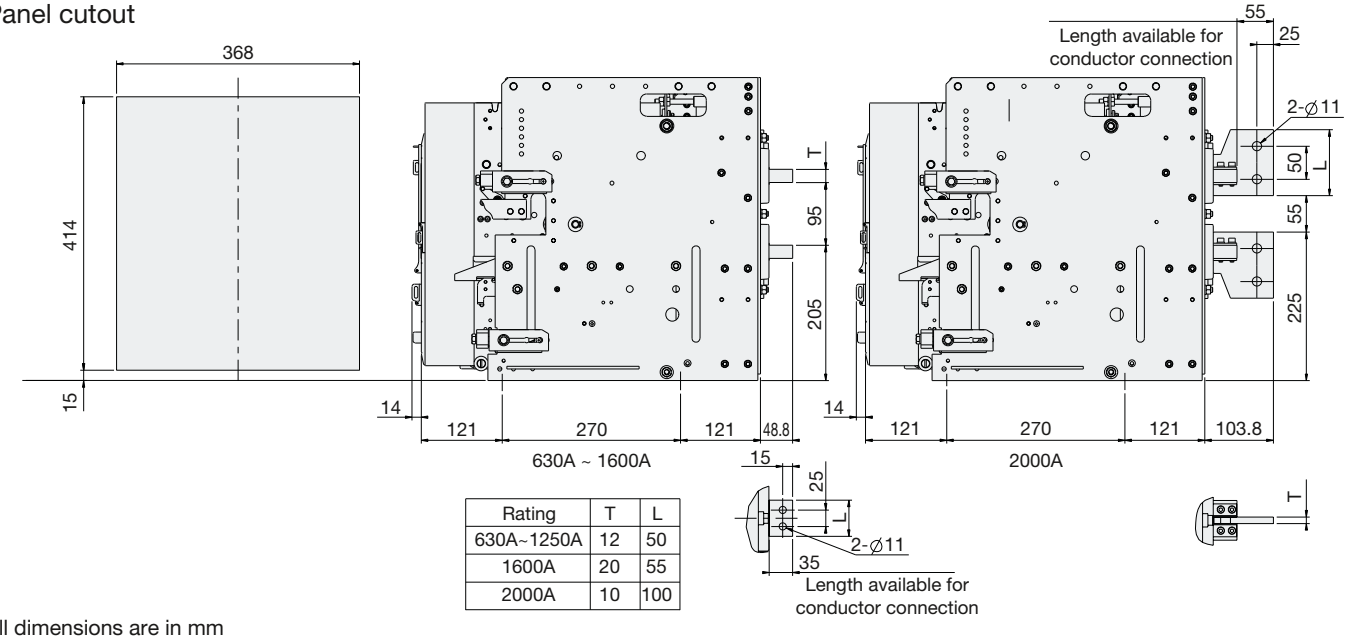
Front view



Top view



Panel cutout



Rating	T	L
630A~1250A	12	50
1600A	20	55
2000A	10	100

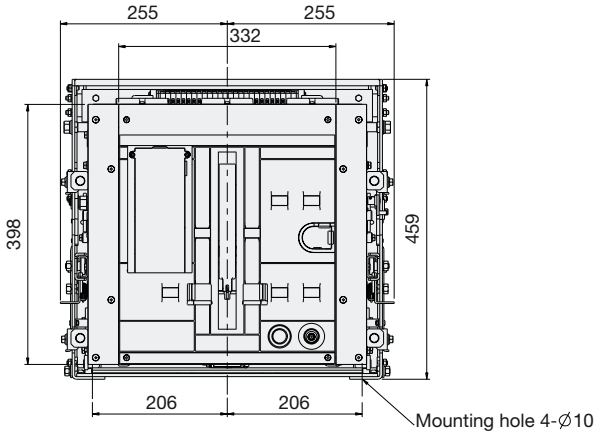
All dimensions are in mm

Dimension

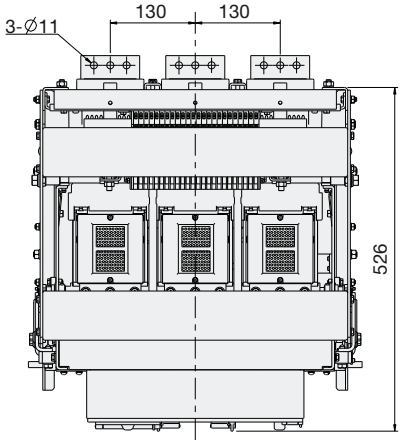
Frame 'B' draw-out type
2000A ~ 2500A

3 Pole

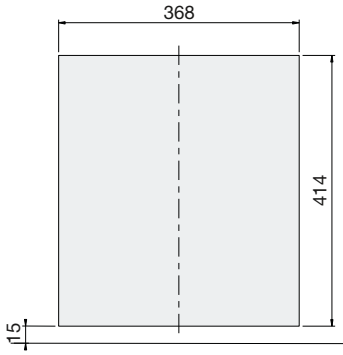
Front view



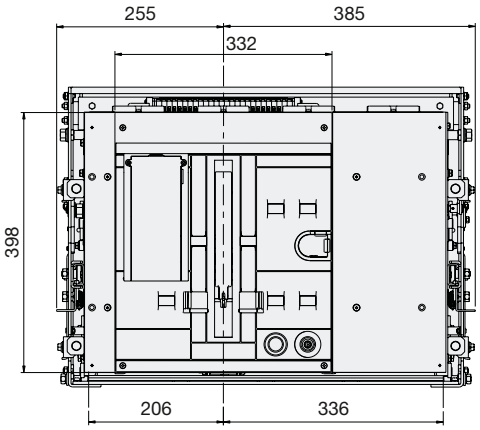
Top view

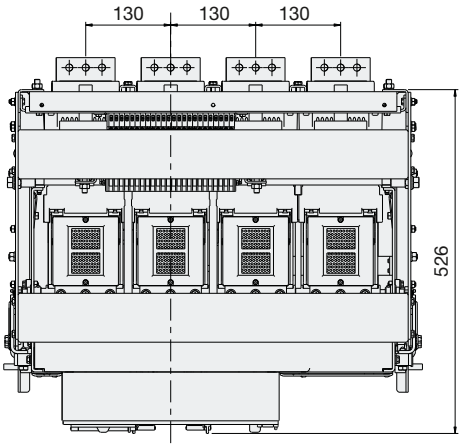


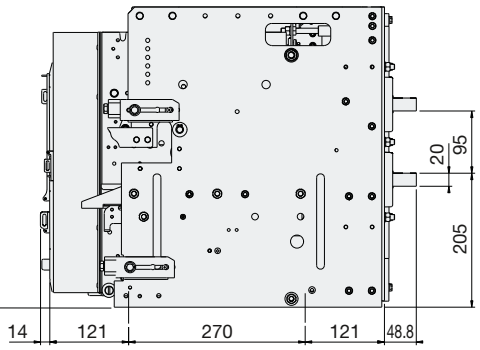
Panel cutout

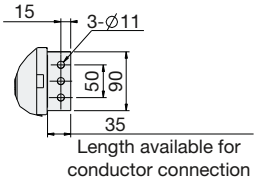


4 Pole









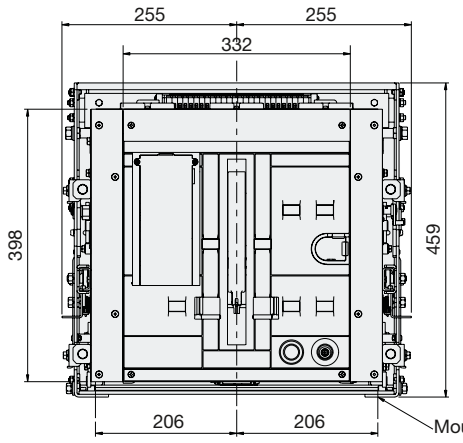
All dimensions are in mm

Dimension

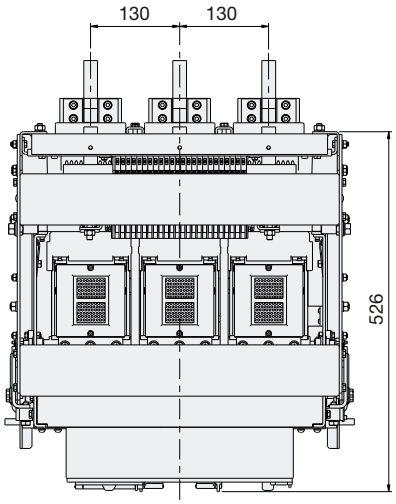
Frame 'B' draw-out type
3000A ~ 4000A

3 Pole

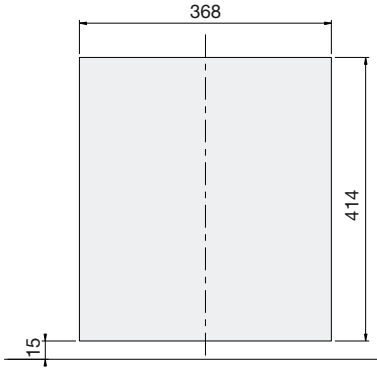
Front view



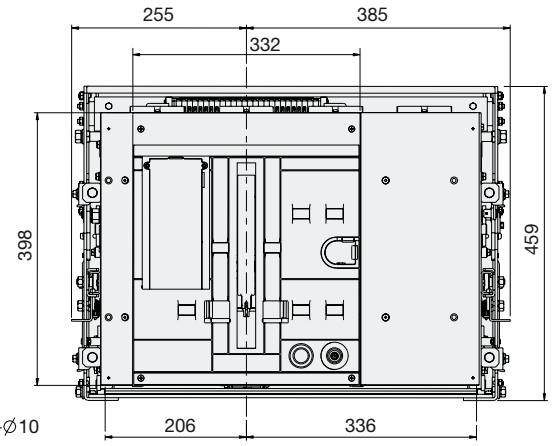
Top view

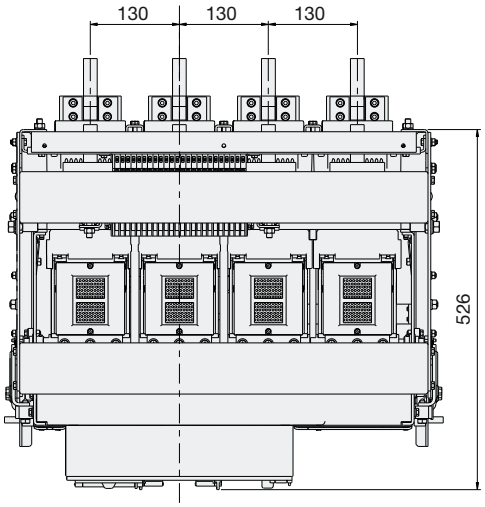


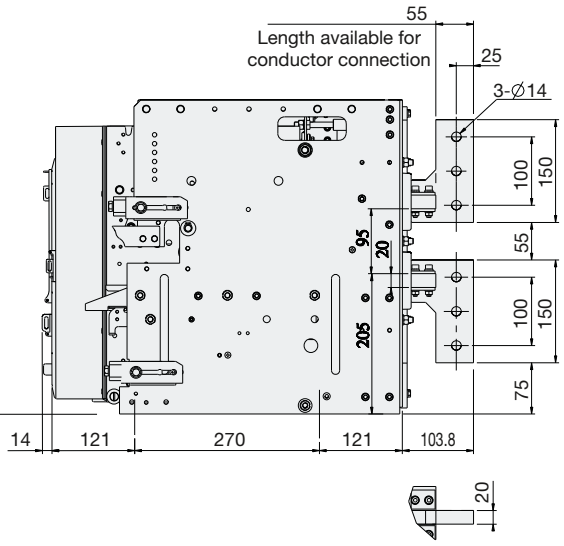
Panel cutout



4 Pole







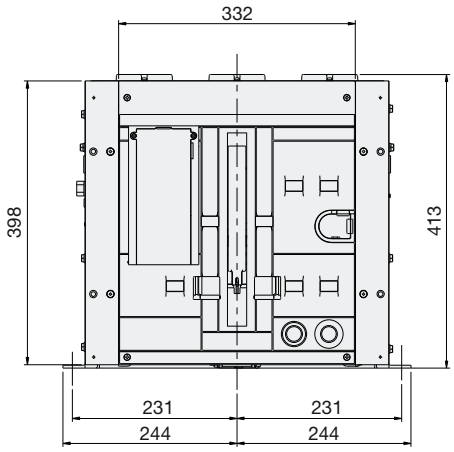
All dimensions are in mm

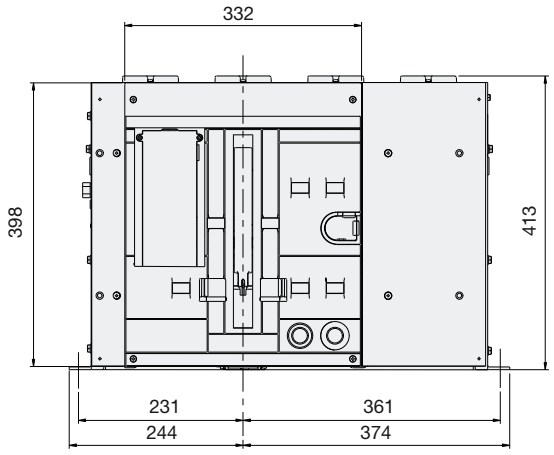
Dimension

Frame 'B' fixed type
2000A ~ 4000A (horizontal termination)

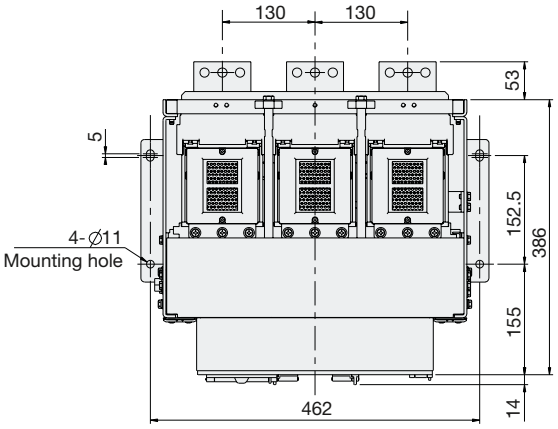
3 Pole | **4 Pole**

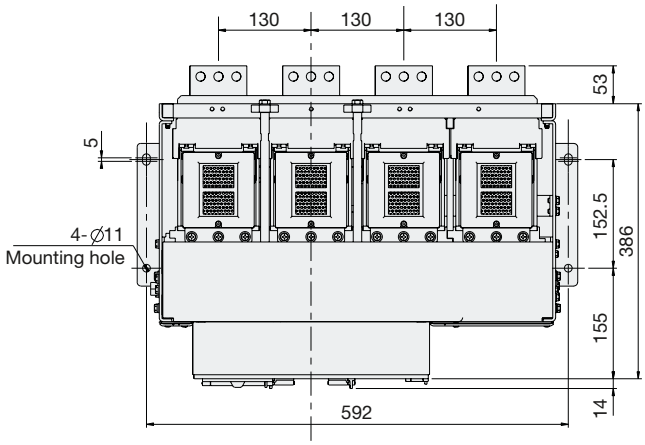
Front view



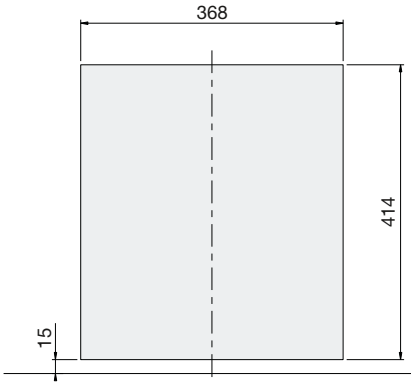


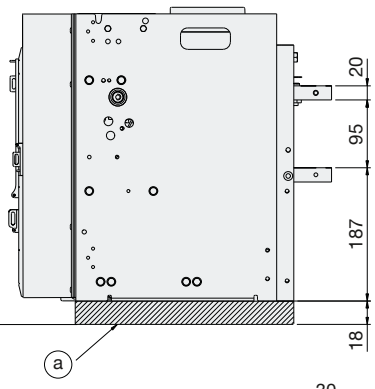
Top view



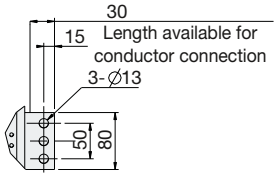


Panel cutout





(a) Mounting support to be provided by the customer.



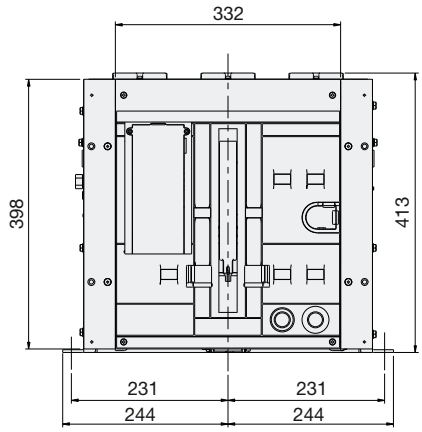
All dimensions are in mm

Dimension

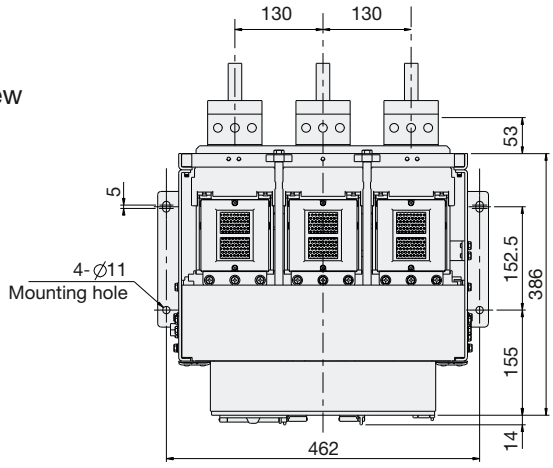
Frame 'B' fixed type
2000A ~ 4000A (vertical termination)

3 Pole

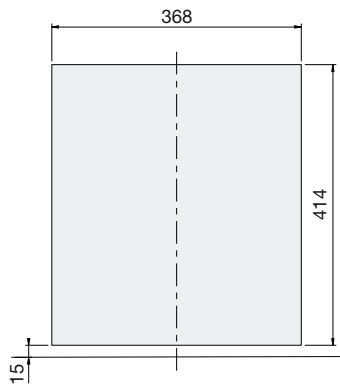
Front view



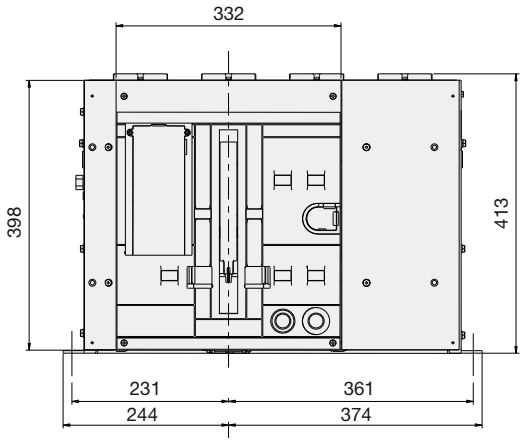
Top view

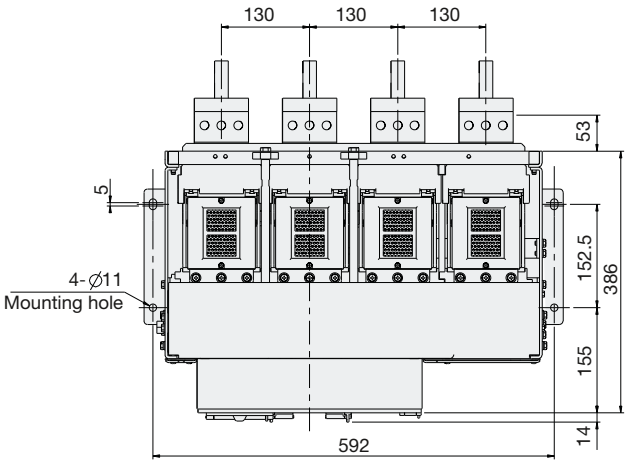


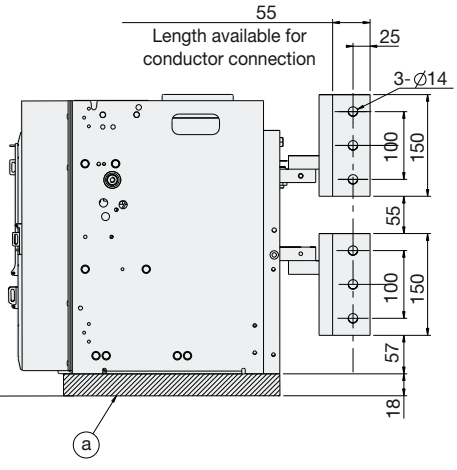
Panel cutout



4 Pole

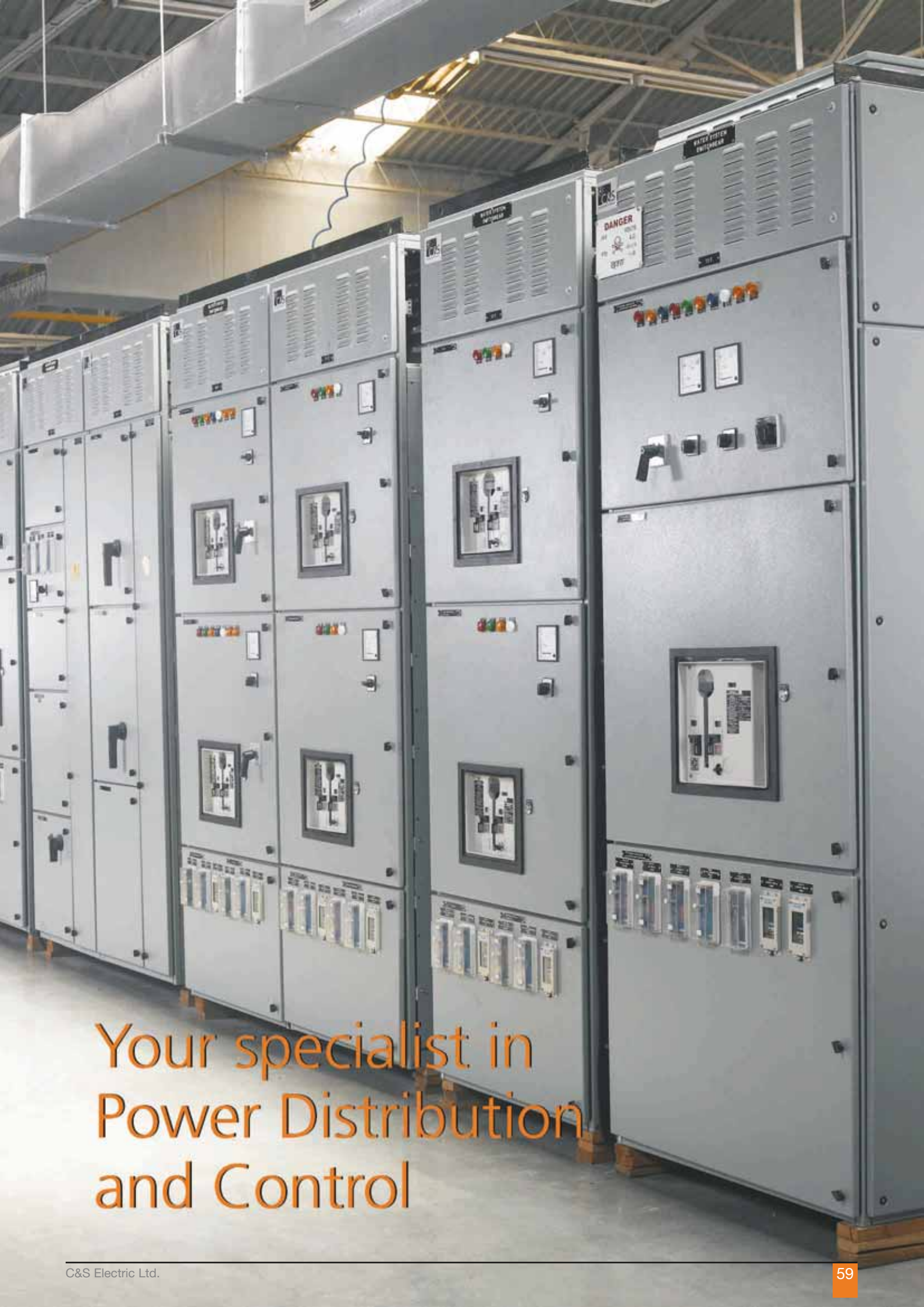






(a) Mounting support to be provided by the customer.

All dimensions are in mm



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WiNmaster

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