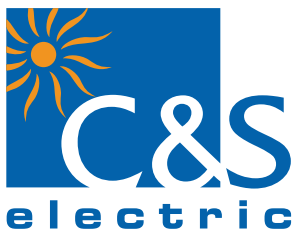


# WiNmaster 2

Breaker with intelligence



**RoHS**  
Compliant



## Air Circuit Breaker

# Breaker with intelligence

WiNmaster2 Power Circuit Breakers are a new generation of Air Circuit Breakers having modular construction to offer a truly global product platform meeting IEC, ANSI and UL standards.

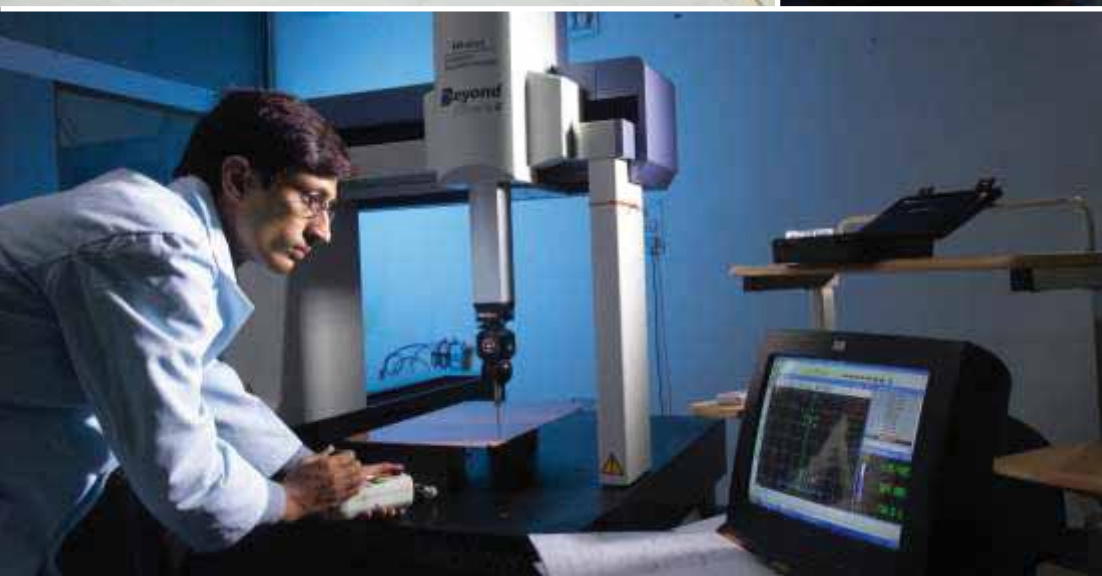
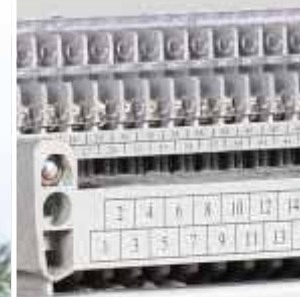
A line of Three and Four pole devices ranging from 630 to 2500 Amp in two basic frames with fault interruption ratings of up to 50kA. A design offering a unique combination of High Fault current withstands ratings, short fault interruption time and zone selectivity.

The device includes the new state-of-the-art MicroPro2 intelligent trip unit that enables the circuit breaker with the latest technology for system safety, reliability, measurement, relaying and communications using the Modbus, Profibus or devicenet protocol.

# WiNmaster 2

LV Air circuit breaker, 630A to 2500A







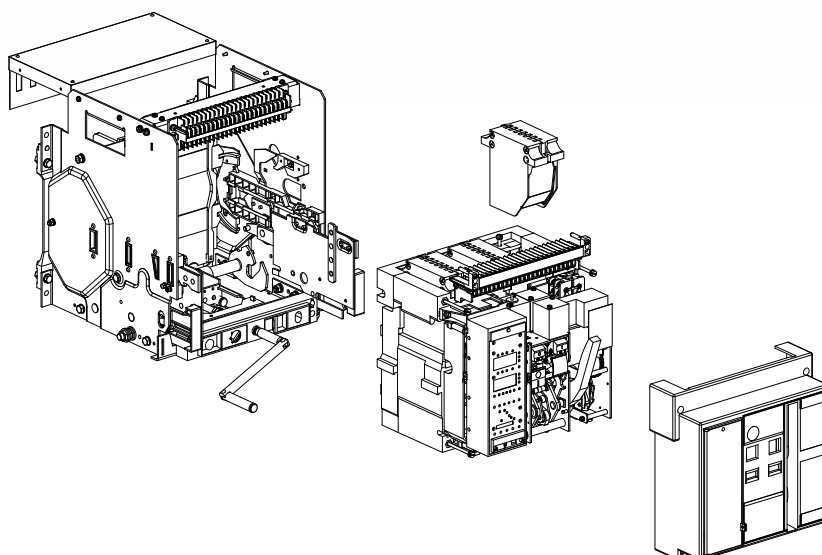
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## Complete Modular construction



### WiNmaster 2 - WX Series ACB

- Range: 630A~2500A
- Two frame sizes for complete range
  
- Intelligent release
  - Micropro 2-3.1
  - Micropro 2-4.1
  - Micropro 2-7.1
  
- Communication
  - RS-485/232
  - Modbus
  - Profibus
  - Devicenet



The new WiNmaster2 ACBs are the result of constant commitment to look for new solutions and the know how C&S has developed over the years.

In this series C&S introduces New WiNmaster2 Air Circuit Breaker which is an incredibly innovative high quality circuit-breaker supported by state-of-the-art manufacturing technologies which ensures utmost performance, reliability, complete safety and uninterruptible service throughout the product life that ultimately reduces the stress on components.

WiNmaster2 Air Circuit Breaker is available from 630A to 3200 A rating in 3 and 4 pole execution, with breaking capacity of 50kA / 65kA. It provides total solutions with an advanced trip relay for measurement, diagnosis, analysis, and communication as well as protective functions for absolute protective coordination and electric power monitoring system.

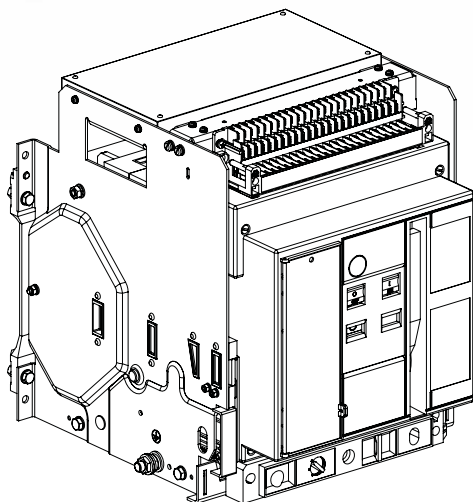
WiNmaster 2 has a modular construction which has been designed according to customer's demand and present day complex requirement of electrical systems.

These ACBs are most compact in size with wide range & high breaking capacity. Compact yet offering Horizontal Type Busbar Termination for ease of installation enhanced life and intuitive operation makes them a very user friendly range of circuit breaker for any application. The height and depth are same through out the range. The accessories are common, front accessible and easy to fit up to 3200 A

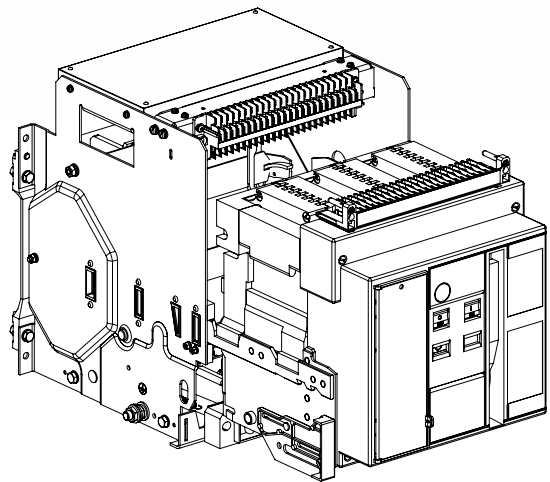
WiNmaster2 ACB stands for...Reliability as it confirms to the latest IEC 60947-2/IS 13947-2 standard for Isolation.



Available in both Fixed & Drawout version



Fixed Type



Drawout Type



## Constructions Characteristics

### Structure of the Circuit Breaker

The sheet steel structure of WiNmaster 2 is extremely compact, considerably reducing overall dimensions.

WiNmaster 2 circuit breakers comes in two frame sizes.

WX-A: 630A to 2500A

WX-B: 2000A to 3200A

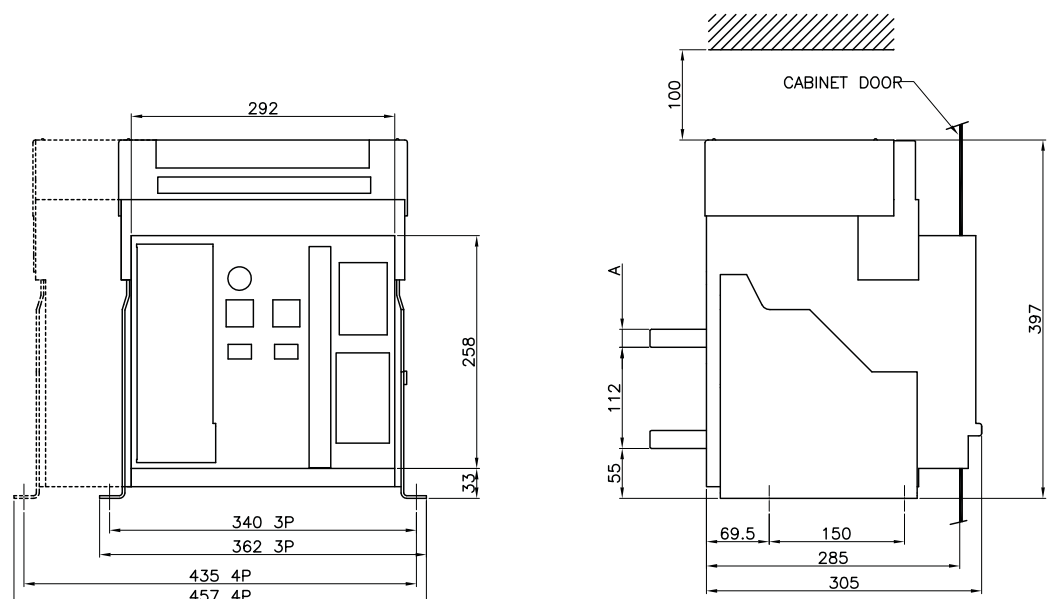
Performance levels: 50kA (N)

WX-A	Model	Performance
	WX06A	■
	WX08A	■
	WX10A	■
	WX12A	■
	WX16A	■
	WX20A	■
	WX25A	■

### Uniform Construction

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

The height and width are showing below for frame WX-A up to 2500A. The panel cutout size is same for all types of WiNmaster2, which makes it easy to arrange them in switchboards. Panel cutout for front remains same.



## Constructions Characteristics

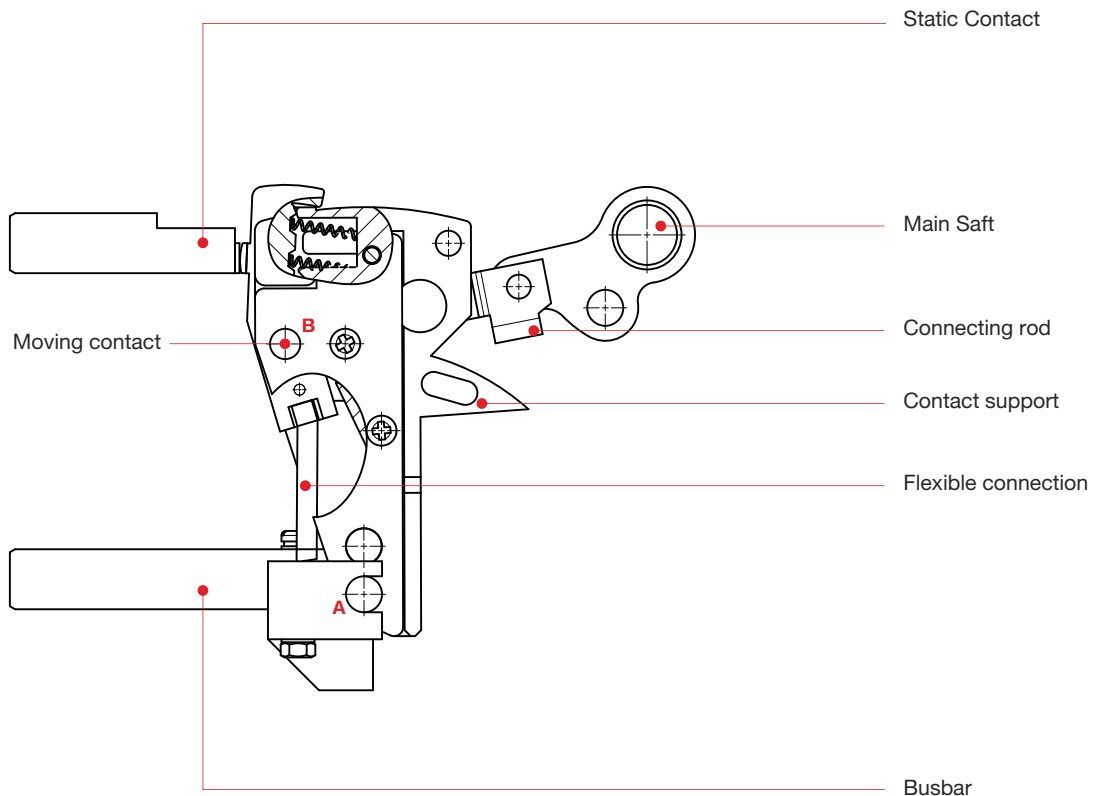
### Contact System

Contact system of each phase is installed in a small chamber that is made up of insulating materials, with arc-extinguish chamber above it. Contact system is connected with the main shaft outside the insulating base through connecting rod, so as to finish the closing and opening operations.

In order to reduce the electric repulsion and improve the reliability, contact system of each phase adopts parallel connection of 10~14 moving contacts that are installed on a contact support.

One end of contacting piece of the contact is connected with the busbar through flexible connection.

When the circuit breaker closes, the main shaft drives the connecting rod to make the contact support revolve around the point "A" counterclockwise, after the moving contact touches the static contact, the contact support will continue to rotate around the point "A" counterclockwise, while the moving contact will rotate around the point "B" clockwise to compress the spring, so as to produce a certain contact force that guarantees reliable closing of circuit breaker.



### Operating Mechanism

The operation of circuit breaker has two modes: manual operation and electric operation. Operating mechanism of circuit breaker makes use of cam to compress a group of energy-storage spring to reach the aim of energy storing, makes use of the energy of energy-storage spring during releasing to close the circuit breaker, the closing speed has no relation to electric or manual operating speed. Circuit breaker will carry out energy pre-storage under closing state for the next closing. The operating mechanism has function of free tripping. The circuit breaker has three types of working position, whose operating process as follows:

#### Energy storage

External force of electric operation or manual operation drives the cam to rotate, the energy-storage lever on the cam rotates along with it. During the rotation of cam, energy-storage spring is compressed continuously until the cam rotates to a certain angle (finish position of energy storage); the reaction force of energy-storage lever will push the cam to go on rotating (turn to energy releasing position), in the meantime, the fixed shaft on the cam is just pressed against the lever 1, and the other end of lever 1 is locked by the energy-releasing tripping half-shaft, so the “go on rotating” of cam also is locked (in energy-storage position). On the other hand, when the external force of electric operation or manual operation helps the energy storing of energy-storage spring, cam drives the connecting rod 1 to rotate, the lever 2 on connecting rod 1 rotates towards the re-trip position, when reaching the re-trip position, the tripping half-shaft is rotated to the re-trip position under the action of spring force on the re-trip half-shaft, so as to finish the re-trip process. Now the energy storage is finished, it is ready for closing of circuit breaker.

#### Closing

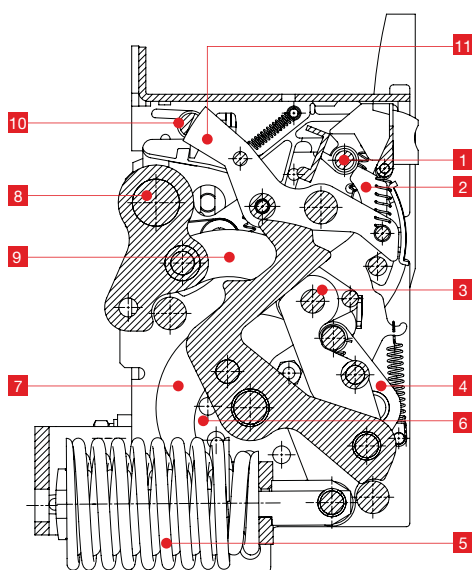
Press the closing button or closing electromagnet, let the half-shaft of energy-releasing release rotate counterclockwise, then the lever 1 pressing against the energy-releasing tripping half-shaft trips, cam rotates clockwise under the action of energy-storage spring force until reaching the cam gap, energy-storage lever rotates counterclockwise under the action of energy-storage spring force, axle pin on the energy-storage lever just hits the connecting rod 2 fiercely, which enables the connecting rod 2 to rotate, and drives the connecting rod 1 and connecting rod 3 to run, as the running direction (by means of force transmission of lever 2) of connecting rod 1 is locked by the tripping half-shaft, then the connecting rod 3 pushes the main shaft 8 to rotate clockwise, to close the circuit breaker.

#### Breaking

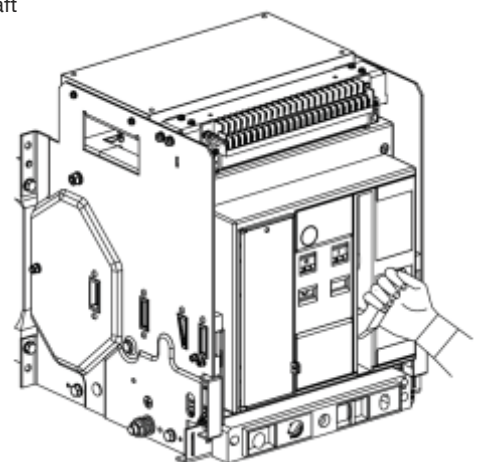
Let the shunt tripping half-shaft (10) rotate clockwise by pressing the opening button or through the tripping operation from under-voltage release, shunt release and intelligent release, lever 2 trips, force pressing against the connecting rod 1 is disappeared, and now the connecting rod 1 is in free state, the four-rod link mechanism composed of connecting rod 1, 2 and 3 now becomes five-rod linkage mechanism, under the action of contact reaction force and backspring force, the circuit breaker opens quickly.

#### Electric energy-storage mechanism

The electric energy-storage mechanism is composed of motor, position limited inching switch and a group of gear reduction system that has planetary gear, used for energy storing and energy pre-storing of operating mechanism.



- 1 Energy releasing tripping half-shaft
- 2 Lever
- 3 Connecting rod 2
- 4 Energy storage lever
- 5 Energy storage spring
- 6 Cam
- 7 Connecting rod 1
- 8 Main shaft
- 9 Connecting rod 3
- 10 Breaking tripping -shaft
- 11 Lever 2

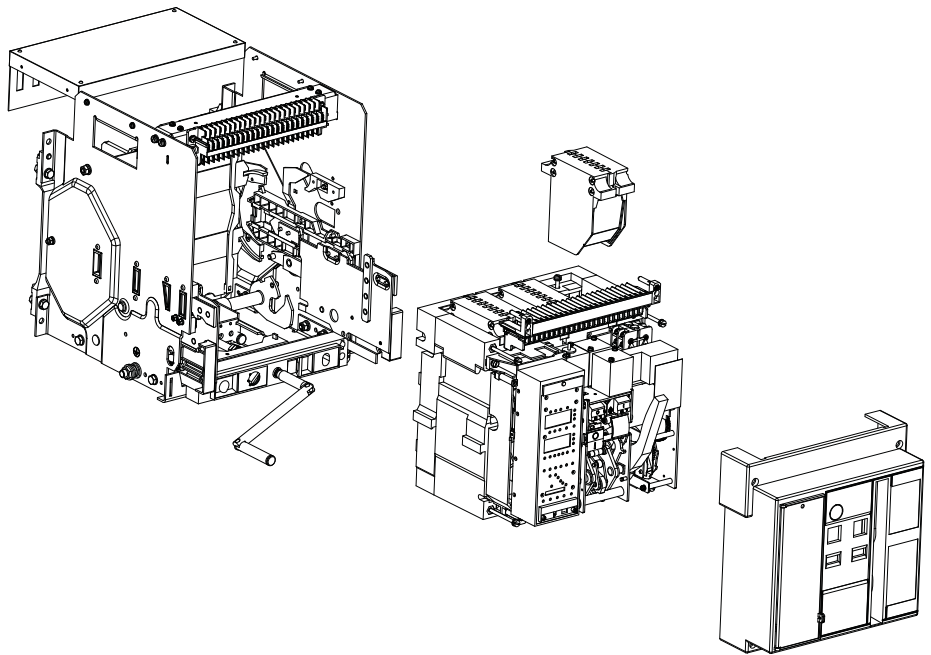


## Constructions Characteristics

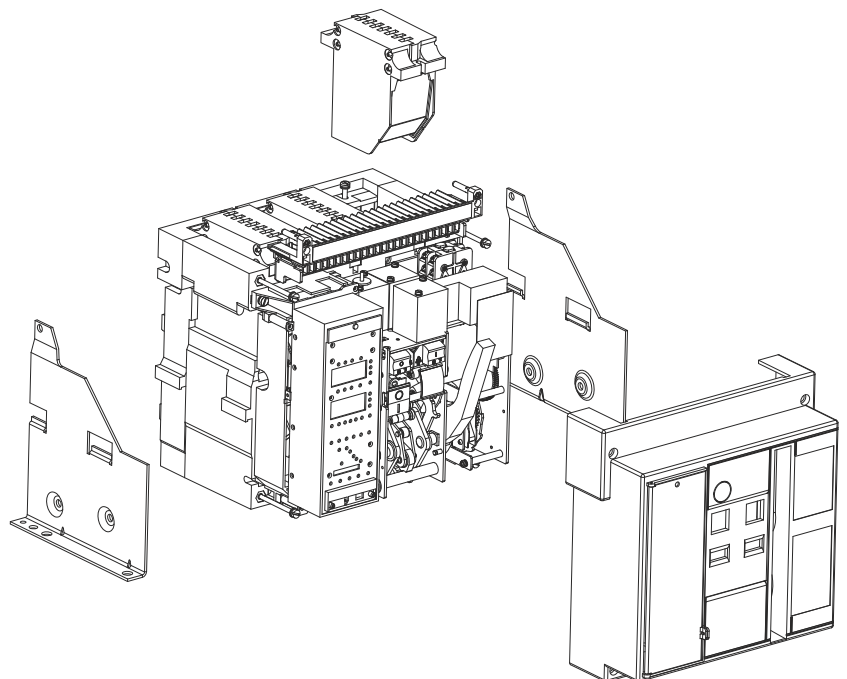
### Basic Structure

WiNmaster2 WX series circuit breakers are available in Drawout & fixed versions. The drawout version is mounted on a chassis & the fixed version is installed using fixing brackets.

#### Drawout version

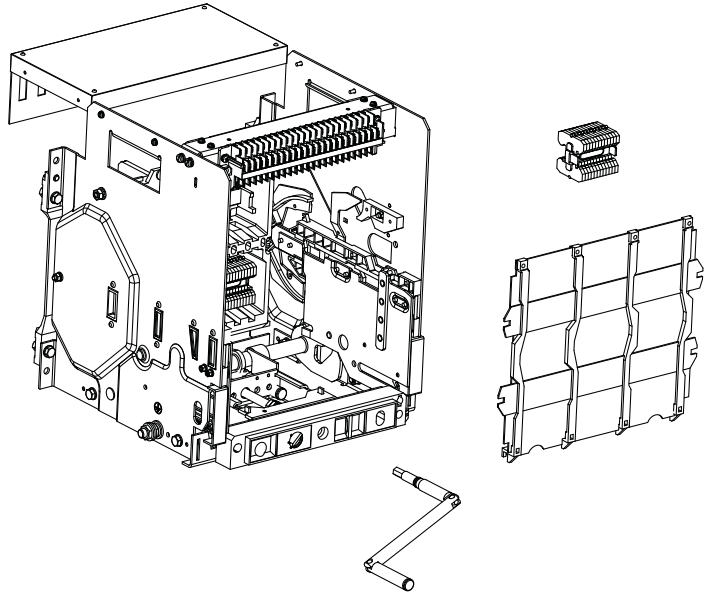


#### Fixed version

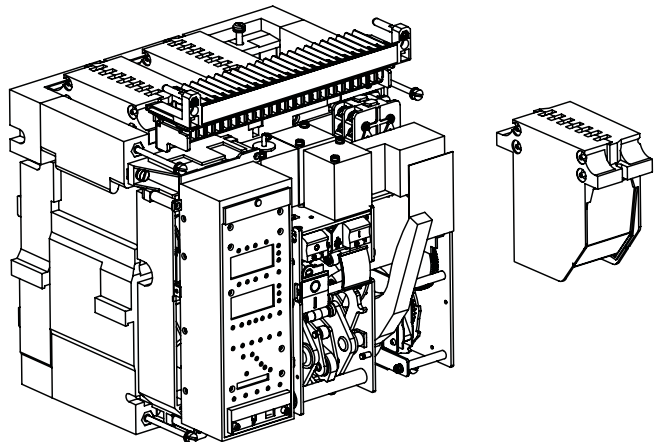


## Constructions Characteristics

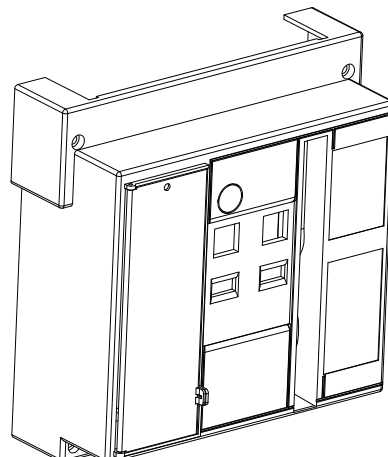
### Chassis



### Circuit breaker



### Front cover





# RoHS Compliant

WiNmaster2 ACB is a product conforming to RoHS (Restriction of Hazardous Substances) directive. That means, in conformity with EU Directive Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr+6), Polybrominated Biphenyls (PBB) and Polybrominated Biphenyl Ethers (PBDE) have not been used except for exempted applications.

### 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 2 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.

## Technical Characteristics

### Characteristics as per IEC 60947-2 / Frame size

Type		
Rated current (A)	$I_n$	at 40°C
Rating of 4th pole (A)		
Number of poles		
Rated insulation voltage (V)	$U_i$	
Impulse withstand voltage (kV)	$U_{imp}$	
Rated operational voltage (V AC 50 Hz)	$U_e$	
Suitability for isolation		
Degree of pollution		
Ultimate breaking capacity (kA rms) (V AC 50 Hz)	$I_{cu}$	415V - 50 Hz
Rated service breaking capacity (kA rms)	$I_{cs}$	415V - 50 Hz
Rated short-time withstand current (kA rms) (V AC 50 Hz)	$I_{cw}$	1s
Rated making capacity (kA peak) (V AC 50 Hz)	$I_{cm}$	415 V AC
Utilisation category		
Opening time (ms)		
Closing time (ms)		
Endurance		Mechanical
		Electrical
Motor power		VA
Weight (kgs)	Fixed	3Pole
		4Pole
	Drawout	3Pole
		4Pole
Dimension (mm) (H x W x D)	Fixed	3Pole
		4Pole
	Drawout	3Pole
		4Pole

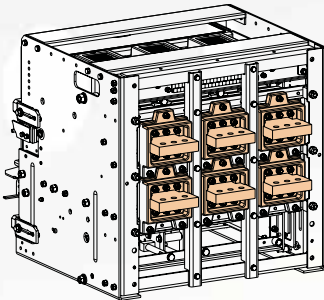




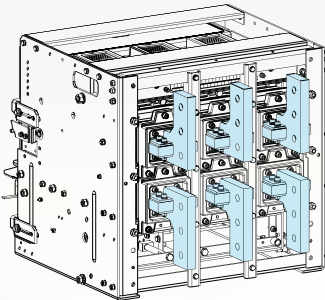
	N Type						
	WX06	WX08	WX10	WX12	WX16	WX20	WX25
	630A	800A	1000A	1250A	1600A	2000A	2500A
	60% In/ 100% In						
	3P, 4P						
	1000						
	12						
	415						
	YES						
	3						
	80 kA						
	50 kA						
	50kA						
	176 kA						
	B						
	25 ms						
	40 ms						
	20000						
	8000					3000	
	85						
	43	43	45	45	45	47	47
	52	52	54	54	54	56	56
	68	68	70	70	70	72	74
	77	77	80	80	80	81	83
	397x362x305						
	397x457x305						
	433x375x403						
	433x470x403						



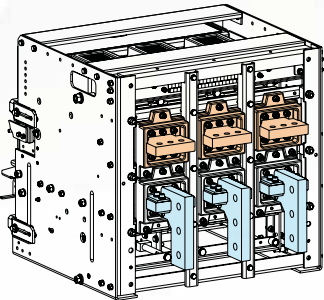
Cradle terminal as per panel manufacturer



Horizontal type



Vertical type



Mixed type

## Connection installation

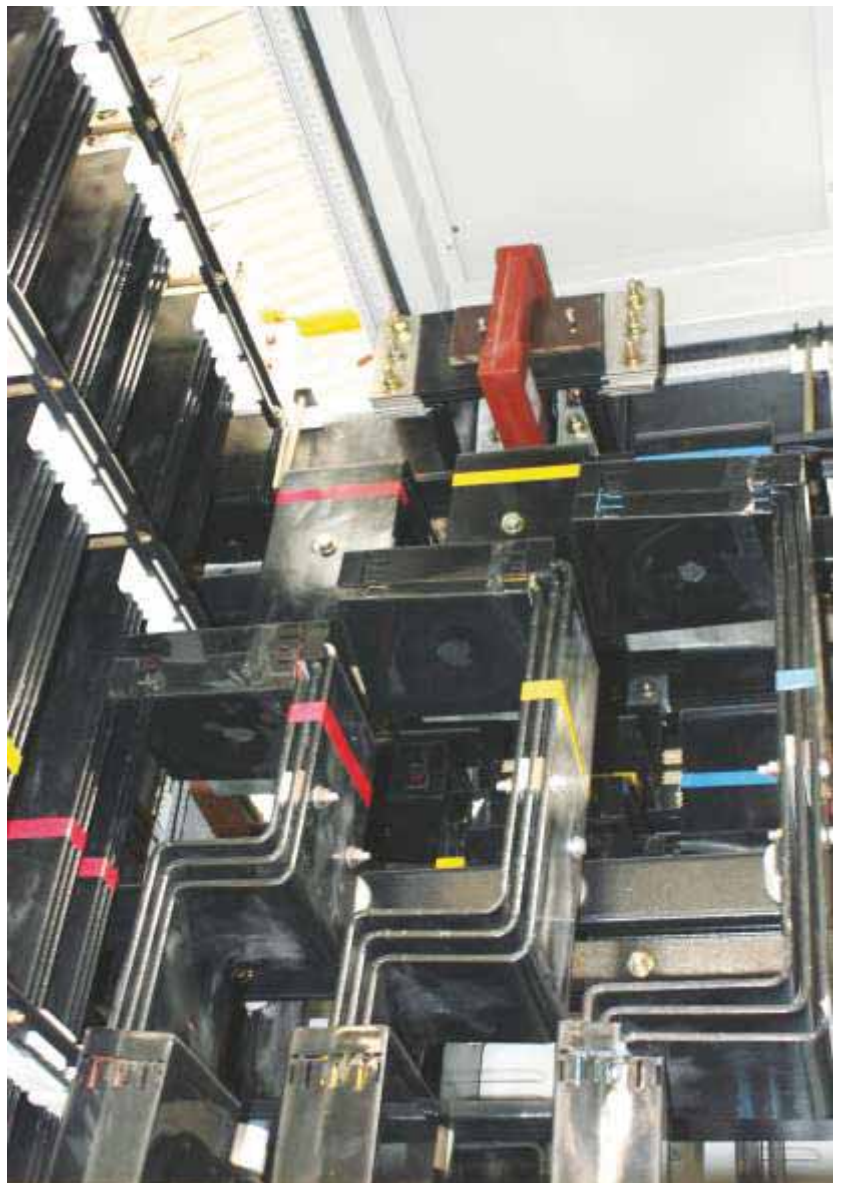
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### Connections for ease of different installation

C&S WiNmaster2 ACB meets your demands for high breaking capacity, fully line-up and optimized panel size. Various accessories and horizontal connection methods realize user friendly handling. This offers flexibility for construction of busbar as product is available with horizontal terminal requirement meeting varied customer requirement for termination. Such facility allows user to optimize the size of switchboards and busbar connection.

WiNmaster2 ACB provides you total solutions with an advanced trip relay for measurement, diagnosis, analysis and communication as well as protective functions for absolute protective co-ordination and electric power monitoring system.

### Breaker connection in Horizontal Type



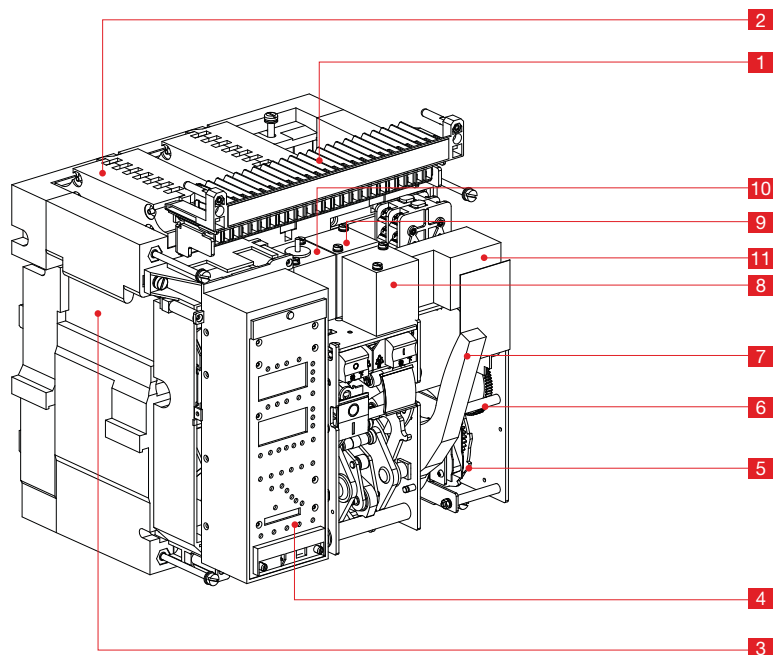
## External configuration

- 1 Trip relay
- 2 ON button
- 3 OFF button
- 4 Operational position indication
- 5 Charge handle
- 6 Rated name plate
- 7 Charge/Discharge indicator
- 8 Front facia
- 9 Auxiliary terminal shield



## Internal configuration

- 1 Auxiliary Contact group
- 2 Arc chute
- 3 Switch Body
- 4 Intelligent release
- 5 Spring charging motor
- 6 Electric motor
- 7 Charging handle
- 8 Closing coil
- 9 Shunt coil
- 10 UVT
- 11 UVT Delay block



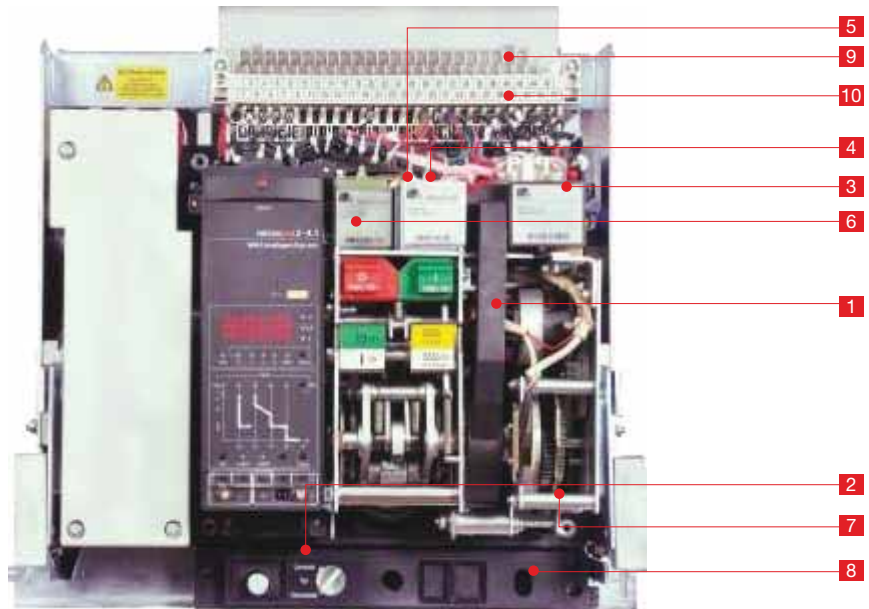
## External configuration

### 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 Charging handle
- 2 Operational position indication
- 3 UVT Delay Block
- 4 Closing coil
- 5 Shunt coil
- 6 UVT coil
- 7 Spring Charging Motor
- 8 Pad Lock position
- 9 Auxiliary terminal shield
- 10 Auxiliary terminal





## micropro2

quietly brilliant

The trip relay of WinMaster2 ACB provides the additional protection function for voltage, frequency unbalance and others in addition to main protection function for over current, short circuit, ground fault. It supports the advanced measurement functions for voltage, current, power, electric energy, harmonics, communication function and others

Analog trip function interlock with mechanism enhanced a durability of devices as well as the breaking capacity of ACB

Zone selective interlocking function make the protective coordination more simple and thermal memory can be applied to various loads

### 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 Micro trip units offers both, reliable protection and accurate measurement.

#### Intelligent release overview

##### Base

The base, as a function actuating part, is composed of the following parts.

- Interlocking mechanism: when the actuator magnetic flux converter of release acts, it drives tripping lever to break the circuit breaker, keeps this position and let the circuit breaker be unable to close before resetting of interlocking mechanism.
- Resetting mechanism: it is a mechanical structure (reset button and its mechanism), after the magnetic flux converter operates and let the main contact open, this resetting mechanism can reset the magnetic flux converter.
- Magnetic flux converter: it produces a magnetic field after receiving the current from release circuit, to change the direction of magnetic line of force, it induces the movable iron core that is under the action of reaction spring to run, which drives the tripping lever to open the circuit breaker through interlocking mechanism.

##### Auxiliary contact of release

It determine the opening and closing position of two pairs of NO contacts according to the main contact state of circuit breaker. The other pair is of changeover contacts, determine its working position according to the state of magnetic flux converter

##### Body case

In the body case, there is a basic circuit board of release, which receives various signals and sends out various commands according to the preset functions and requirements after judgment, to finish the functions required by circuit breaker.

##### Sensor

The sensor is installed on the main circuit bus of circuit breaker, the neutral-line transformer may be installed separately at requests. The sensor provides the energy and signal for the release. This sensor is different from the traditional transformer, it is made up of a rapidly saturable current transformer that is used to provide the normal work energy for release and an air-core transformer that is used to provide current for circuit. Magnitude of secondary current of air-core transformer is directly proportional to that of main circuit current. These two transformers are installed in a round plastic box together.

##### Power supply accessories

There are many kinds of power supply accessories: the one installed on the base is used for release display and working state memory when the main circuit of circuit breaker opens or current is very weak; power supply accessories installed on the drawer seat include AC power supply, DC power supply, uninterruptible (battery) power supply and so on (used for full-intelligent type release), to guarantee the power supply for release and relay accessories.

##### Relay

The relay, as a function extension of release, can be divided into two types: one is used to provide overload and short-circuit operation indication, load monitoring operation command and indication, earthing fault indication, local fault indication and so on totally sixteen types of relay contact output with different combinations for user according to the command of release. The other one is under control of computer, transmits various parameters remotely and relay output providing various indications and operations with different combinations for user.

## Intelligent trip units

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 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.

### Features

- Release Type MicroPro2-3.1, 4.1 & 7.1
- LSIGN with additional protection - under Current, Current unbalance under / over voltage, under/over Current, under/over Frequency & Earth Leakage
- Measurement of True RMS value of current
- Measurement of Current, Voltage, Frequency, Harmonics & Power parameters and also store max. value in maximeter
- Last fault Trip history
- Zone selective interlocking
- Digital display & fault LED retention
- Zone selective interlocking
- In-built thermal memory
- 1 or 2 way communication
- Communication Protocol through Modbus-RS 485/232



MicroPro2-3.1



MicroPro2-4.1



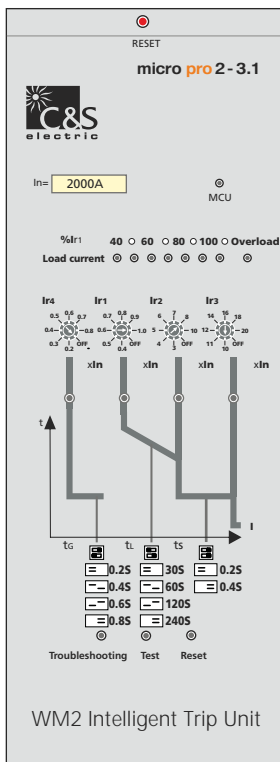
MicroPro2-7.1



## Intelligent trip units

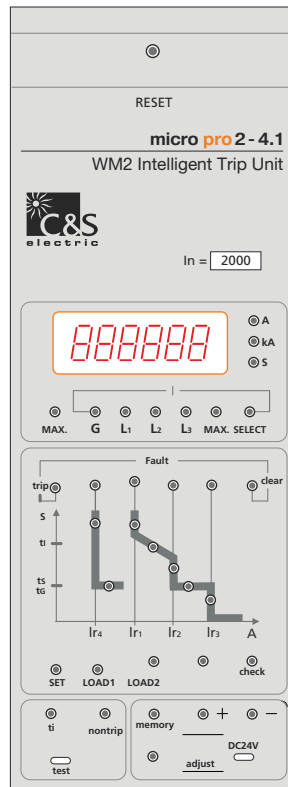
### MicroPro2 3.1

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



### MicroPro2 4.1

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

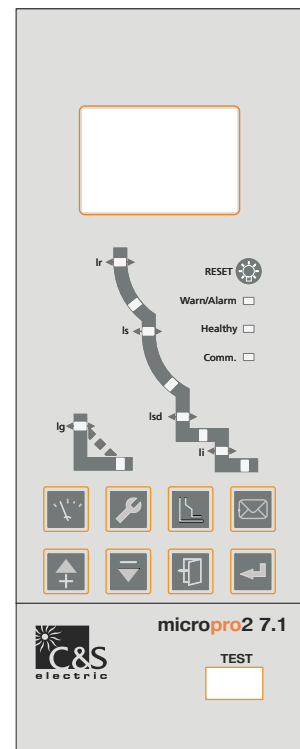


### MicroPro2 7.1

- 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. and also store the maximum value in maximeter

### Communication

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





micro pro2 - 4,1  
WM2 Intelligent Trip Unit

18.88

**W.Nmaster2**  
DC 200V-1  
DC 20-80VAC-1  
DC 120V-2  
OPERATION CATEGORY B



**WX40H**  
C 4000A

Type	4P 0 0 0 0	IP	0
	4P 0 0 0 0	4P 0	
UN	415 V 50/60 Hz		
U <sub>1</sub>	230 V		
U <sub>2</sub>	120 V		
U <sub>3</sub>	20 kV 4750		
U <sub>4</sub>	80 kV		
U <sub>5</sub>	80 kV 11 kV		

Ex 0 **CE**

**Release**

Control	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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**Electrical Accessories**

Accessories	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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**Mounting Data**

Mounting	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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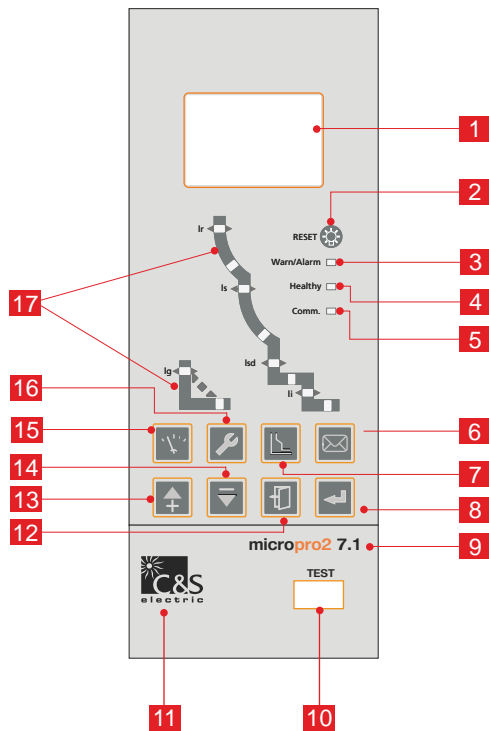
**Notes**

Notes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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**Dimensions**

Dimensions	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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### Micropro 2 - 7.1



- 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

#### 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 2 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 2 7.1 can be set for the Air Circuit Breaker tripping provides the protection against the following parameters.

- Over & under voltage
- Voltage Unbalance
- Over & Under frequency
- Current unbalance
- Reverse Power
- Phase sequence
- Maximum required value protection

### Micropro 2 - 7.1



#### Measurement

- 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  $I_n$ ) & 1.5% (at  $2I_n$ ) and also store the maximum value in maximeter.
- Phase to phase & phase to neutral Voltage measurement with 0.5% precision and also store the maximum value in maximeter.
- Phase sequence
- Phase Unbalance
- Active Power, Reactive Power & Apparent power and also store the maximum value in maximeter.
- Power factor
- Electrical Energy
- Calculation of current and voltage total harmonic distortion (THD)
- Current and voltage and power fundamentals
- Current and voltage harmonics up to the 31st order

#### Communication option

Micropro2 7.1 can be connected with the protocol with the help of Rs 485/232 to converter. Communication gives facility to perform following action:

- To read & set all functions parameters remotely
- To transmit all the measurements
- To give signals for the tripping & alarms
- To give maintenance history (Number of operation & contacts wear % etc)
- An event log and a maintenance register, stored in Micropro2 7.1 memory are also available locally.
- 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.

- **Tripping history**
  - Type of fault
  - Date & time
  - Values measured at the time of tripping
- **Alarm histories**
  - Type of fault
  - Date & time
  - Values measured at the time of alarm
- **ACB status**
  - It will give information about the ACB tripping locally or remotely etc.

#### Maintenance indicators

Micropro2 7.1 gives information about the maintenance parameters of ACB.

- Total no of mechanical operation counter.
- 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. Micropro2 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.

### Micropro 2 - 7.1



#### Over Load Protection

Pick up	Off 0.4 ~ 1.0In
Protection Curve	SI, VI, EI(G), EI(M), HV, I2T
Thermal Memory	Instantaneous, 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 $\Delta n$	0.5~ 30.0A
Delay Time T? n(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

### Micropro 2 - 7.1



#### 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

#### 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

### Micropro 2 - 7.1



#### 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	?f : A, B, C / ?f : 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

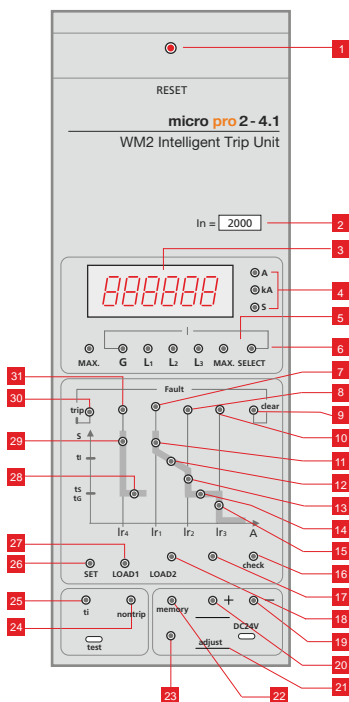
#### Indication

Power ON LED	Available
Over Load Flashing LED	Available
OL/ SC/ EF Trip LED	Available
LCD Display	Available

#### Protocol

Modbus	
Converter	RS485/232

### Micropro 2 - 4.1



#### Protection settings

Protection thresholds and delays are set using the adjustment dip switches.  
The running load is displayed in amperes

#### Overload protection

True RMS long time protection.  
Thermal memory: thermal image before and after tripping.  
The long time setting "OFF" enable 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 reliability

#### Last fault tripping history

On digital display last fault history can be viewed.

- 28 Grounding protection time setting and alarm indicator
- 29 Grounding protection current setting and alarm indicator
- 30 Fault trip indicator
- 31 Grounding protection fault indicator
- 32 Test action indicator

- 1 Reset button
- 2 Rated current label
- 3 Current display
- 4 Current and time units
- 5 Phase ground & the maximum phase current
- 6 Current view selection key
- 7 Overload fault trip indicator
- 8 Short circuit fault trip delay indicator
- 9 Clear reset button
- 10 Short current instantaneous fault trip indicator
- 11 Long delay overload current protection setting and alarm button
- 12 Overload protection long delay time setting indicator
- 13 Short circuit current of the short time delay
- 14 Short circuit protection short delay time setting indicator
- 15 Short circuit current instantaneous protection and alarm indicator
- 16 Troubleshooting button
- 17 Spare key
- 18 Load monitoring and alarm indicator 2 current set
- 19 Set the value of the reduced bond
- 20 Set the value of the increased bond
- 21 Panel power jack
- 22 Setting storage switch
- 23 Storage indicator
- 24 Do not trip test button
- 25 Trip test button
- 26 Parameter setting selection key
- 27 Load monitoring a current setting and alarm indicator



### Micropro 2 - 4.1



#### Over Load Protection

Current Setting (A)  $I_r = I_n \times$  0.4 ..... 1, OFF

#### Tripping between 1.05 and 1.2 x $I_r$

Time setting	tr (s)	15	30	60	120	240	OFF
Time delay (s)	1.5xlr	15	30	60	120	240	480
	2xlr	8.4	16.9	33.8	67.5	135	270
	7.2xlr	0.65	1.3	2.6	5.2	10.4	20.8

Thermal memory 300 min  
Output DO single alarm Available

#### Short time Isd

Pick-up (A)  $I_{sd} = I_r \times$  0.4 ..... 15, OFF

Time setting	tsd (s)	0.1	0.2	0.3	0.4
Time delay (ms) Accuracy $\pm$ 40ms	$I^2t$ on $I > 8I_r$	100	200	300	400
	$I^2t$ on $I \leq 8I_r$	$t = \frac{(8I_r)^2}{I^2} \times \text{tsd}$			

#### Instantaneous li

Pick-up (A)  $I_i = I_n \times$  1 ..... 50kA, OFF  
Time setting Instantaneous

#### Earth fault Ig

Pick-up (A)  $I_g = I_n \times$  0.2 ..... 1, OFF

Time setting	tg (s)	0.1	0.2	0.4	OFF
Time delay (ms) Accuracy $\pm$ 40ms	tg (s)	0.1	0.2	0.3	0.4
	Min. (ms)	60	160	255	340
	Max. (ms)	140	240	345	460

#### Indication, Monitoring & Control

- Power On Led indicator
  - Overload LED indicator
  - Overload trip LED indicator
  - Short circuit trip LED indicator
  - Earth fault trip LED indicator
  - Trip history
  - Thresholds and delay setting by dip switches
  - Test function
  - Load monitoring
- (Earlier terminology Long time Ir1, Short Time Ir2, Instantaneous Ir3, Earth fault Ir4)

Micropro 2 - 3.1

Micropro2-3.1 type relay is pull switch coding switch and tuning method is simple, easy and intuitive.

Protection settings

Protection thresholds and delays are set using adjustable coding switch

Overload protection

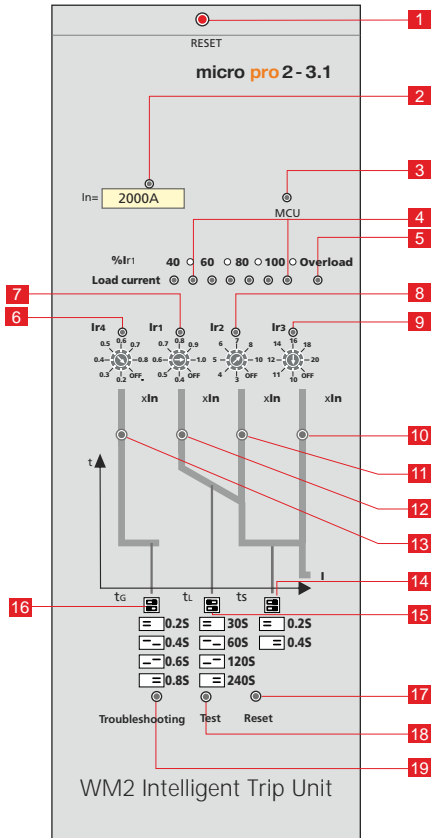
True RMS long time protection with adjustable threshold setting

Short circuit protection

Short time (RMS) protection with adjustable threshold setting

Earth fault protection

True RMS earth fault protection with adjustable threshold and delay settings



- 1 Reset button
- 2 Rated current value
- 3 Power ON button
- 4 Current beam for long time
- 5 Overload indicator
- 6 Grounding protection current setting coding switch
- 7 Overload protection long delay current setting switch
- 8 Short circuit current of the short time delay setting coding switch
- 9 Short circuit current coding switch transient protection
- 10 Short circuit transient protection fault indicator
- 11 Short time delay short circuit fault indicator
- 12 Long delay overload protection fault indicator
- 13 Grounding protection fault indicator
- 14 Short circuit protection short delay time stubbs switch setting
- 15 Overload protection long delay time setting slide switch
- 16 Grounding protection time setting slide switch
- 17 Reset button
- 18 Test release button
- 19 Troubleshooting button

### Micropro 2 - 3.1



#### Over Load Protection

Current Setting (A)  $I_r = I_n \times$  0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1 OFF

#### Tripping between 1.05 and 1.2 x $I_r$

Time setting	tg (s)	30	60	120	240
Time delay (s)	1.5 x $I_r$	30	60	120	240
	2 x $I_r$	16.9	33.8	67.5	135
	7.2 x $I_r$	1.3	2.6	5.2	10.4

Thermal memory 30 min  
Output DO single alarm Optional

#### Short time $I_{sd}$

Pick-up (A)  $I_{sd} = I_r \times$  3, 4, 5, 6, 7, 8, 10, OFF  
Time setting  $t_{sd}$  (s) 0.2, 0.4  
constant time-lag

#### Instantaneous $I_i$

Pick-up (A)  $I_i = I_n \times$  10, 11, 12, 14, 16, 18, 20, OFF  
Time delay (s) Instantaneous

#### Earth fault $I_g$

Pick-up (A)  $I_g = I_n \times$  0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, OFF

Time delay (s) constant time-lag	tg (s)	0.2	0.4	0.6	0.8
	Min. (ms)	160	340	510	680
	Max. (ms)	240	460	690	920

#### Indication, Monitoring & Control

- Power On Led Indicator
  - Overload LED indicator
  - Overload trip LED indicator
  - Short circuit trip LED indicator
  - Earth Fault trip LED indicator
- (Earlier terminology Long time  $I_{r1}$ , Short Time  $I_{r2}$ , Instantaneous  $I_{r3}$ , Earth fault  $I_{r4}$ )

N



RESET

micropro2-4:1  
Intelligent Trip Unit

Set Load1 Load2 Check

Test Adjust

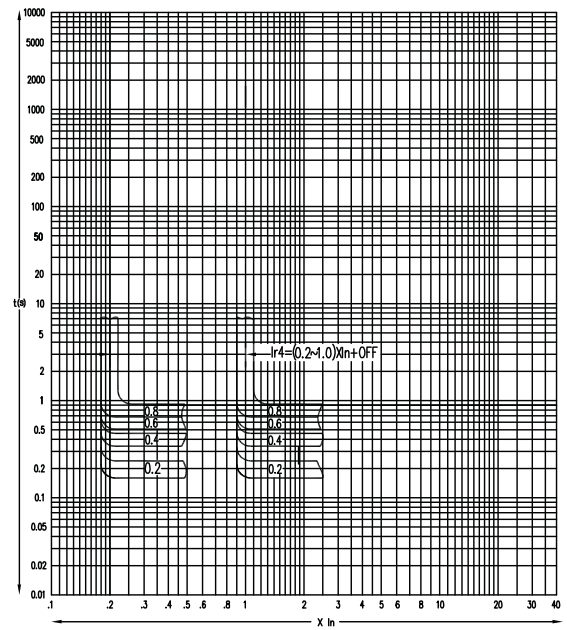
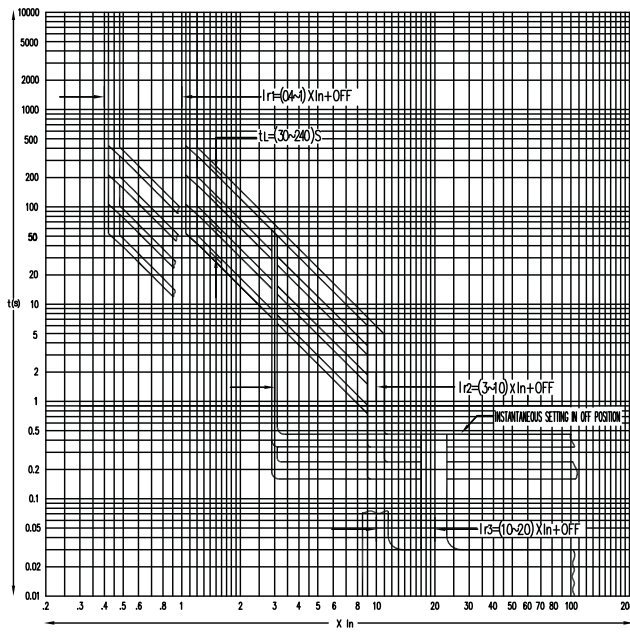


PUSH OFF

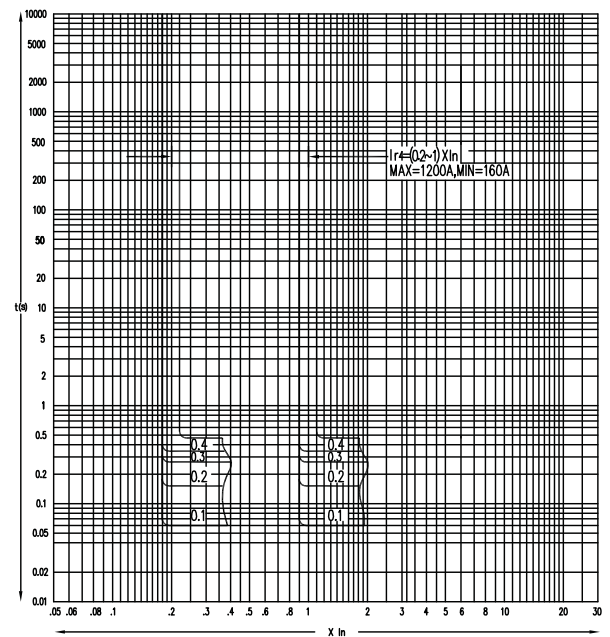
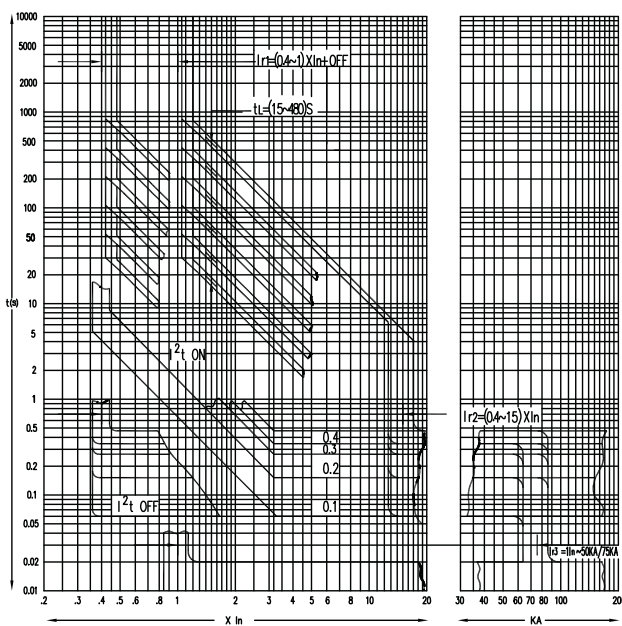
OFF

<b>Release</b>	
Not included	<input type="radio"/> MP2 - 3.1 <input type="radio"/> M
<b>Electrical Auxiliaries</b>	
<b>Auxiliaries Switch</b>	
Not included	<input type="radio"/> 4NO + 4NC <input type="radio"/> 2
<b>Closing Coil</b>	
Not included	<input type="radio"/> 220V AC <input type="radio"/> 415V /
<b>Shunt Coil</b>	
Not included	<input type="radio"/> 220V AC <input type="radio"/> 415V /
<b>Motor</b>	
Not included	<input type="radio"/> 110V AC/DC <input type="radio"/> 25
<b>UVT without delay</b>	
Not included	<input type="radio"/> 220V AC <input type="radio"/> 41
<b>UVT with delay</b>	
Not included	<input type="radio"/> 220V AC <input type="radio"/> 41
Delay : Adjustable with 1, 3 and 5sec.	

Micropro 2 - 3.1



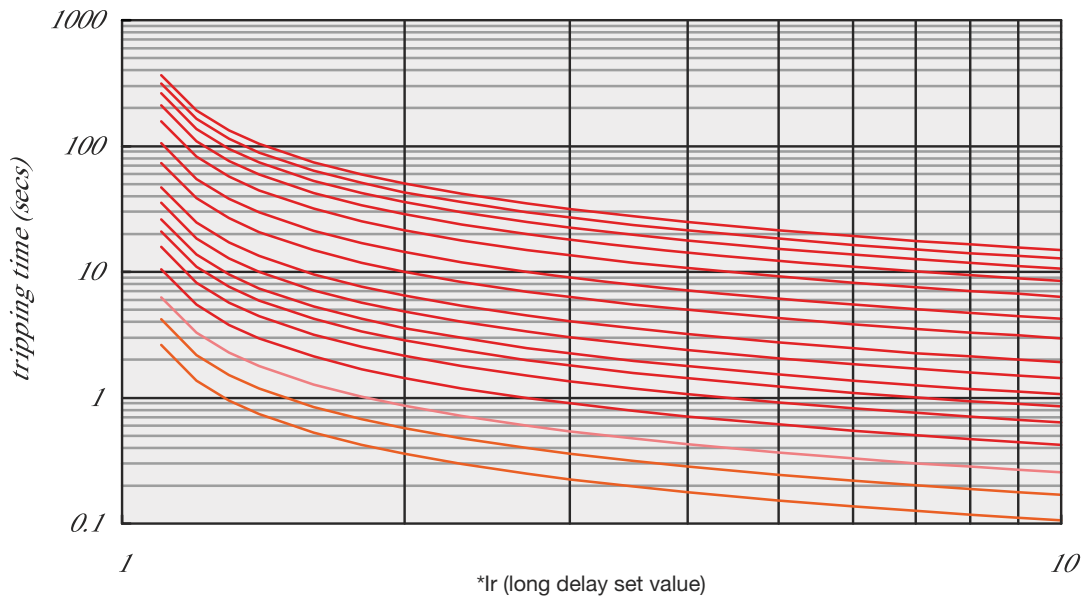
Micropro 2 - 4.1



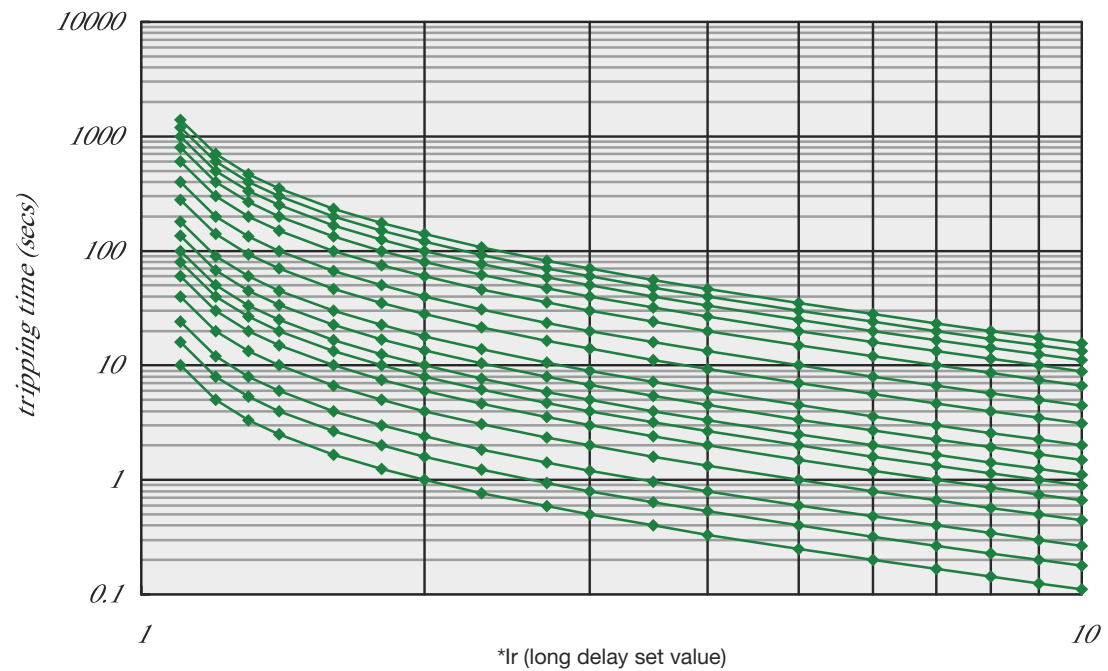
# Characteristics Curve

Micropro 2 - 7.1

**Chart A2**  
Standard inverse time lag



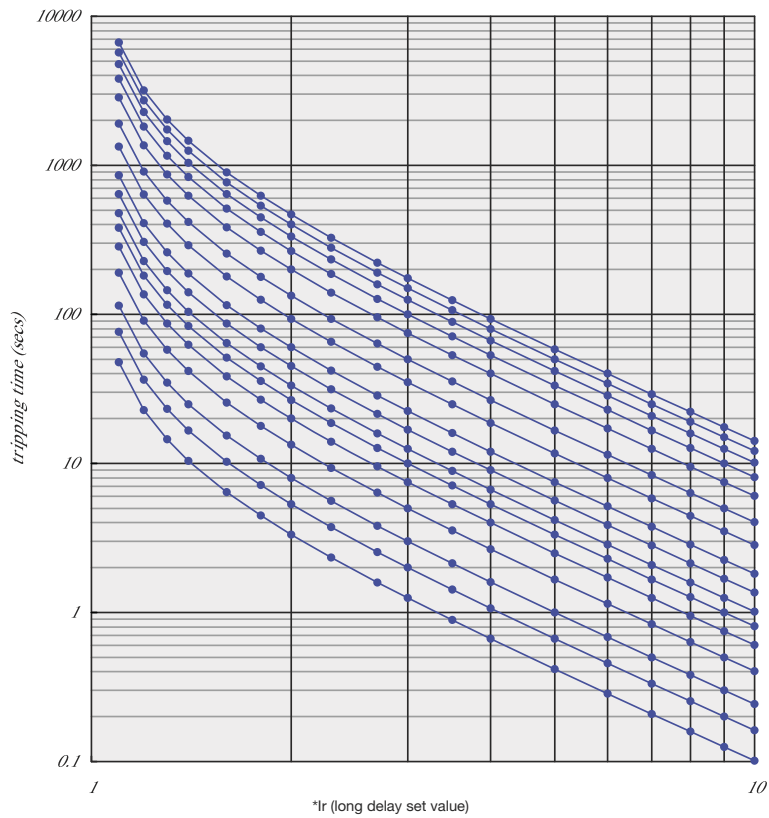
**Chart A3**  
Very inverse time lag



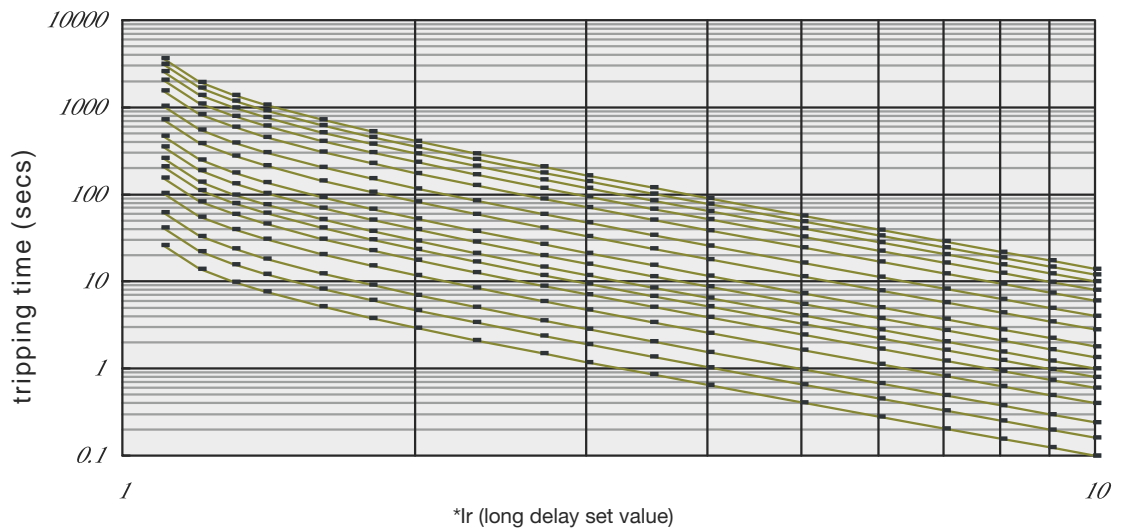
## Characteristics Curve

**Micropro 2 - 7.1**

**Chart A4**  
Extremely inverse time lag (distributing protection)



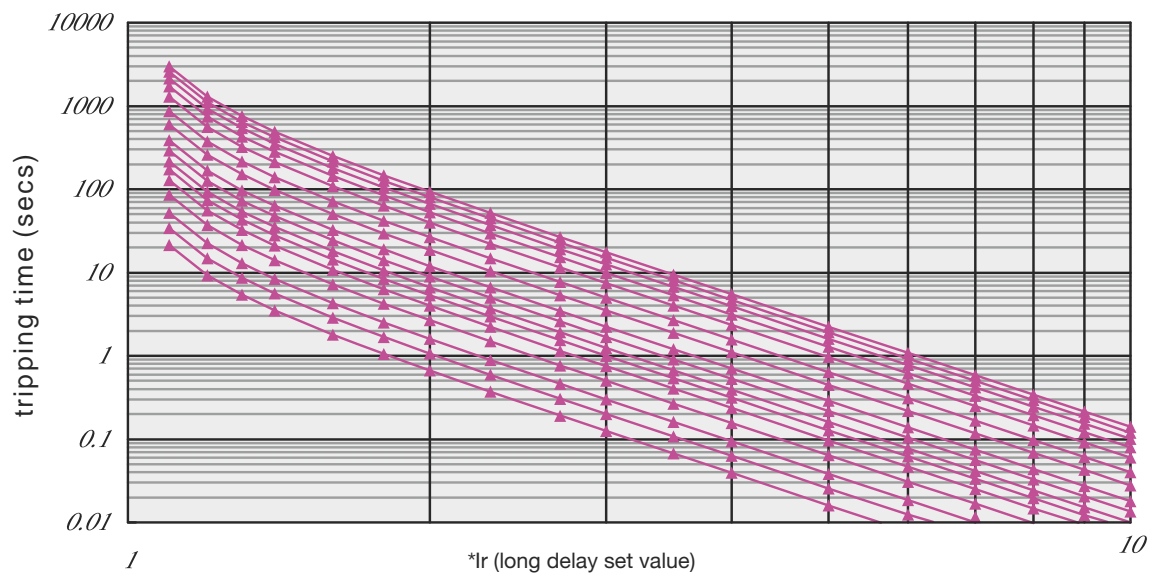
**Chart A5**  
Extremely inverse time lag (generator protection)



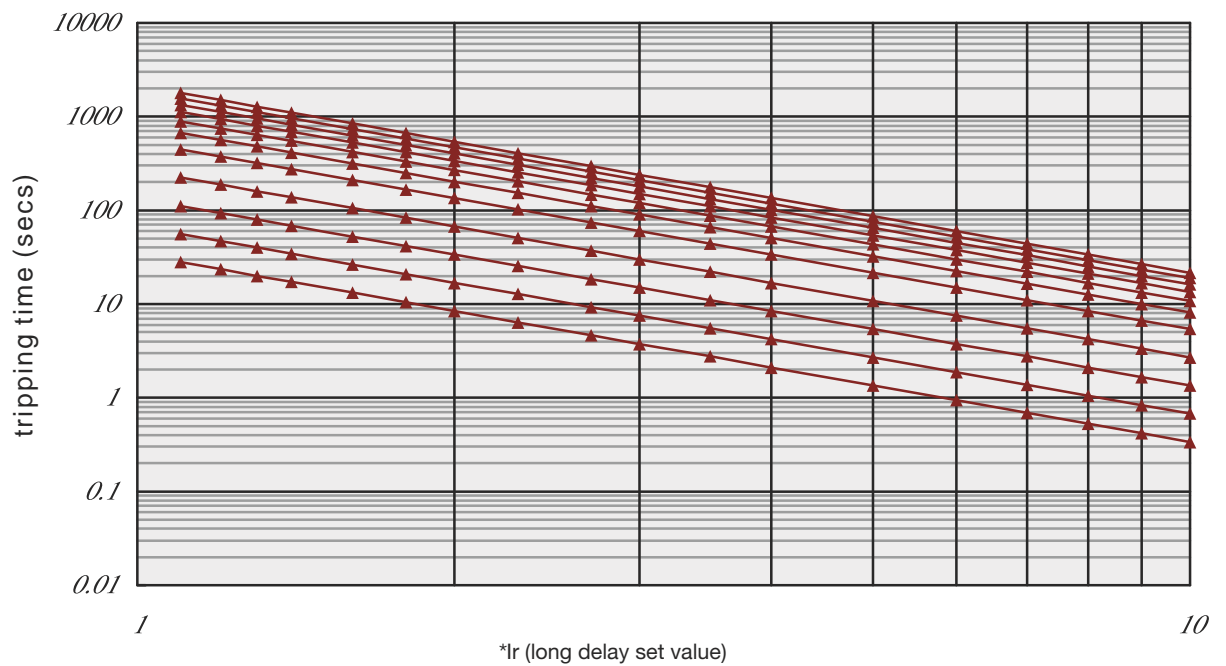
## Characteristics Curve

Micropro 2 - 7.1

**Chart A6**  
High voltage fuse compatible



**Chart A7**  
Extreme inverse time curve



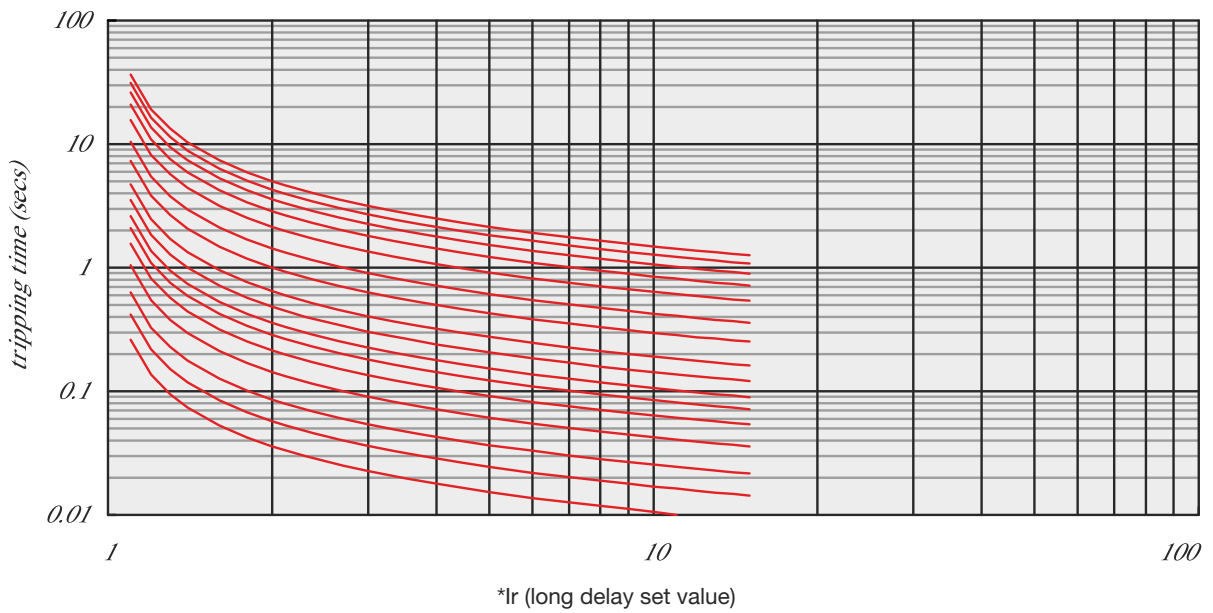


# Characteristics Curve

## Micropro 2 - 7.1

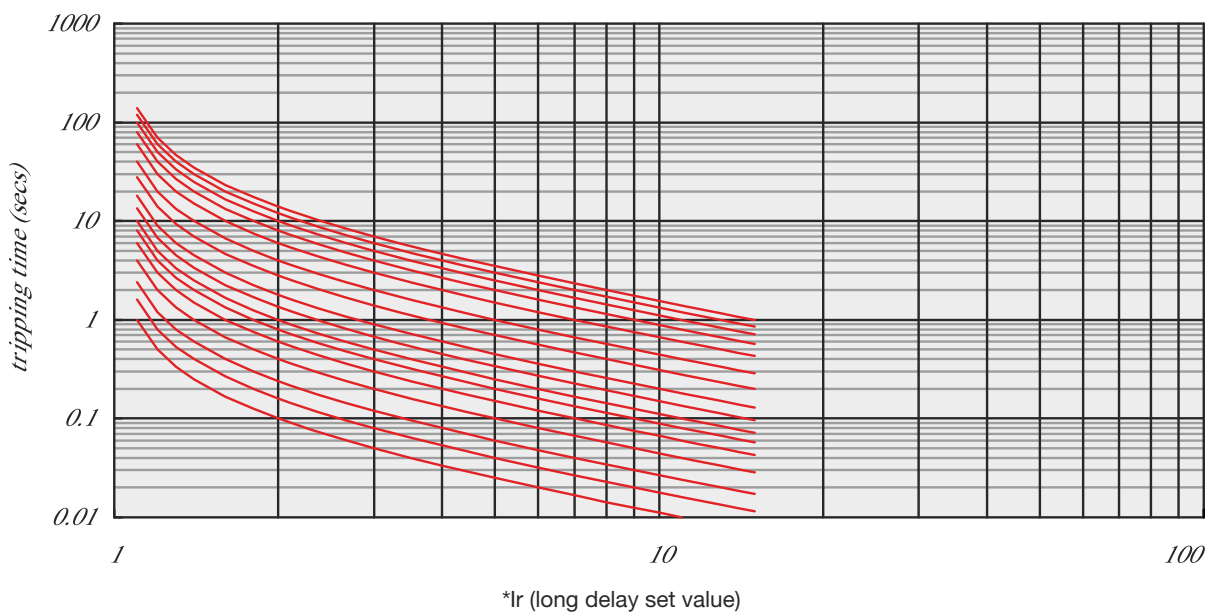
**Chart S1**

Short delay reverse time lag - standard reverse time lag



**Chart S2**

Sort time delay reverse time lag - fast reverse time lag

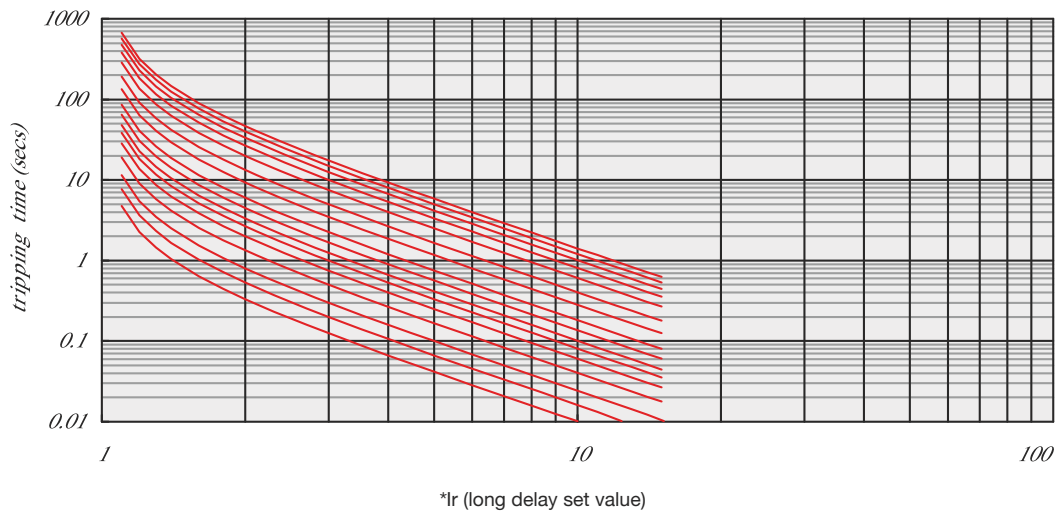


## Characteristics Curve

### Micropro 2 - 7.1

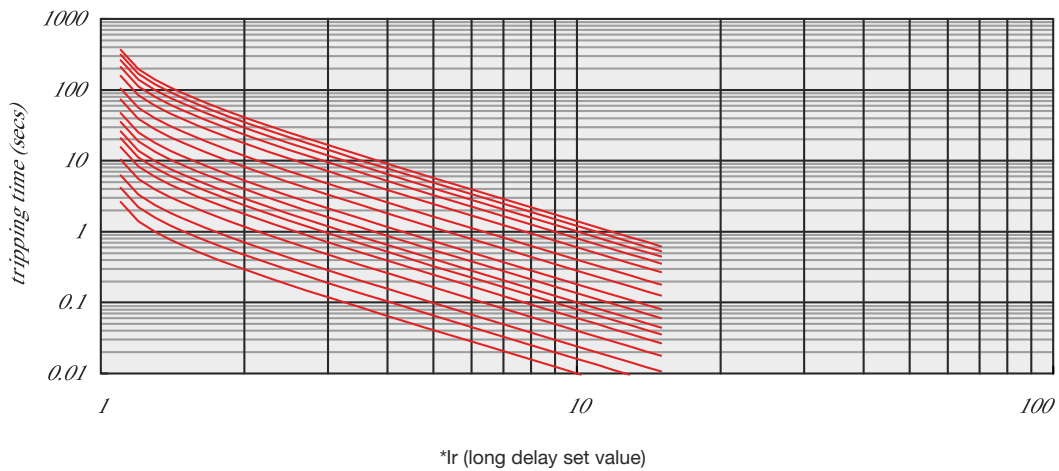
**Chart S3**

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



**Chart S4**

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

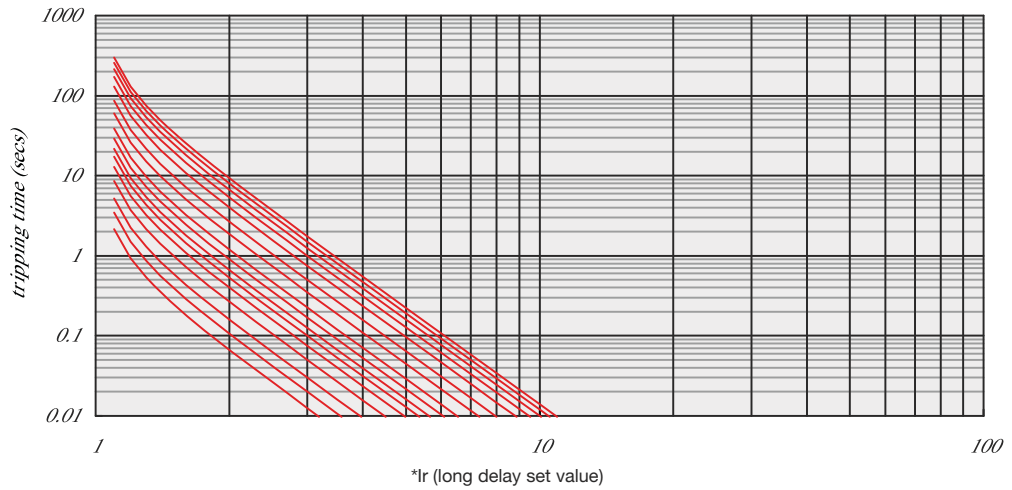


# Characteristics Curve

## Micropro 2 - 7.1

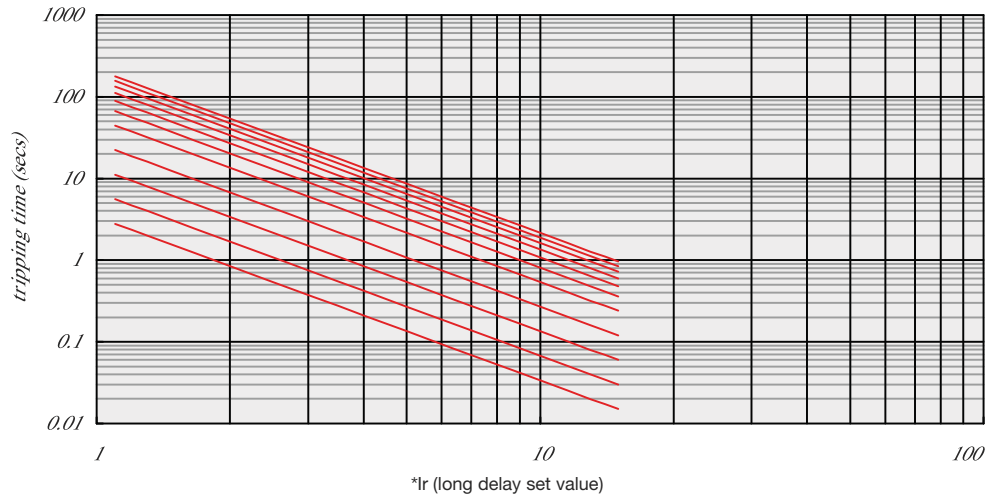
**Chart S5**

Short delay reverse time lag - high voltage fuse compatible



**Chart S6**

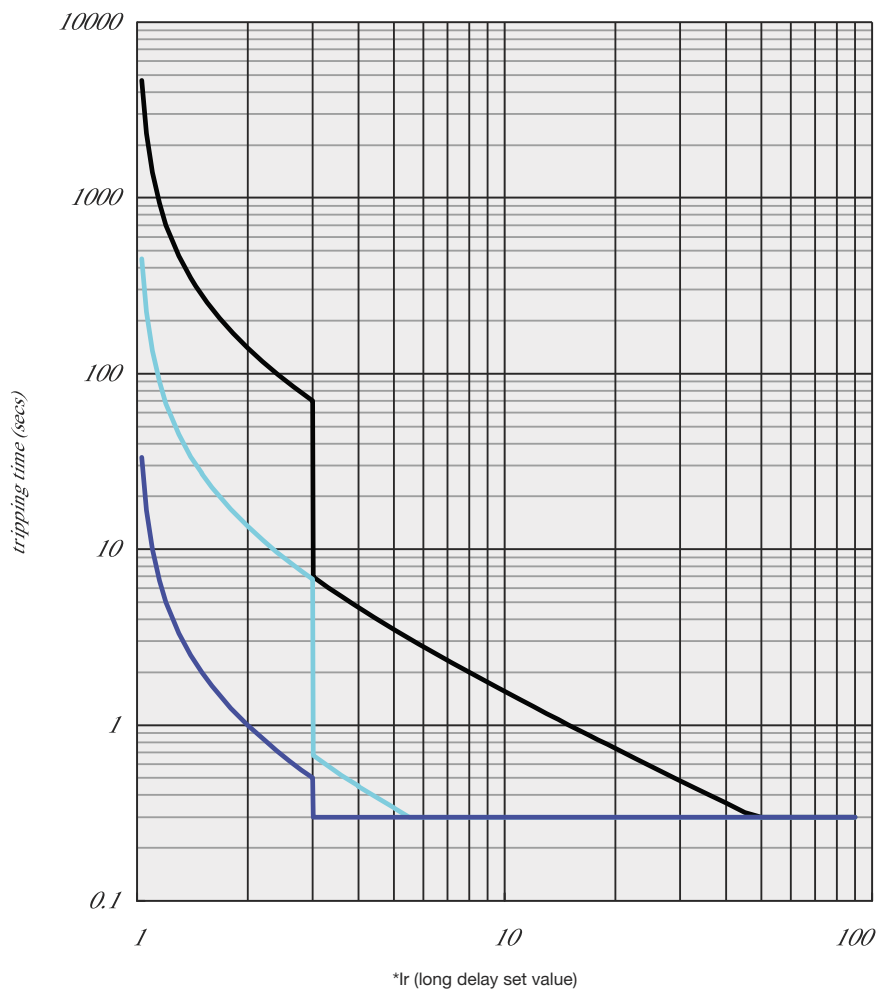
Short time reverse time lag - common use reverse time lag



## Characteristics Curve

Micropro 2 - 7.1

**Chart C1**  
Protection example of reverse time lag



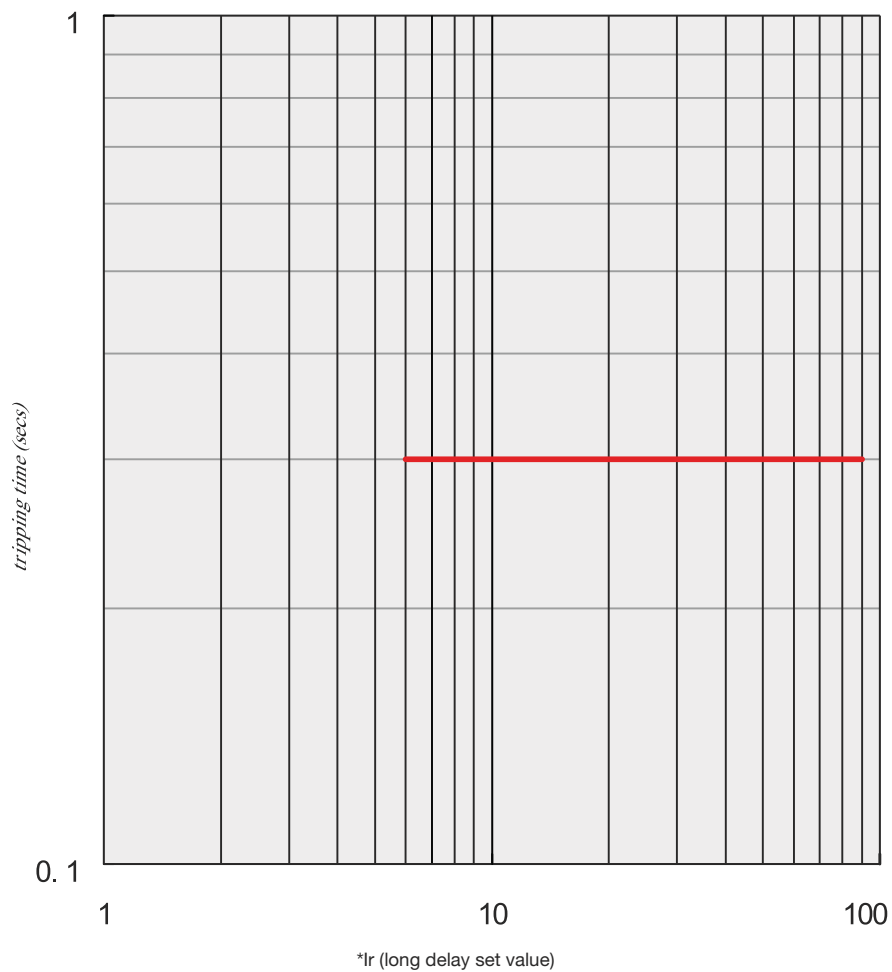
The curve above bases on the set value below:

- Curve type = fast reverse time lag
- Curve speed = C1, C8 and C16
- Operation set value of short delay reverse time lag =  $3 \times I_{set}$
- Delay time of short delay fixed time lag set value = 0.3 S

## Characteristics Curve

### Micropro 2 - 7.1

**Chart C2**  
Protection example of fixed time lag



The curve above bases on the fixed value below:

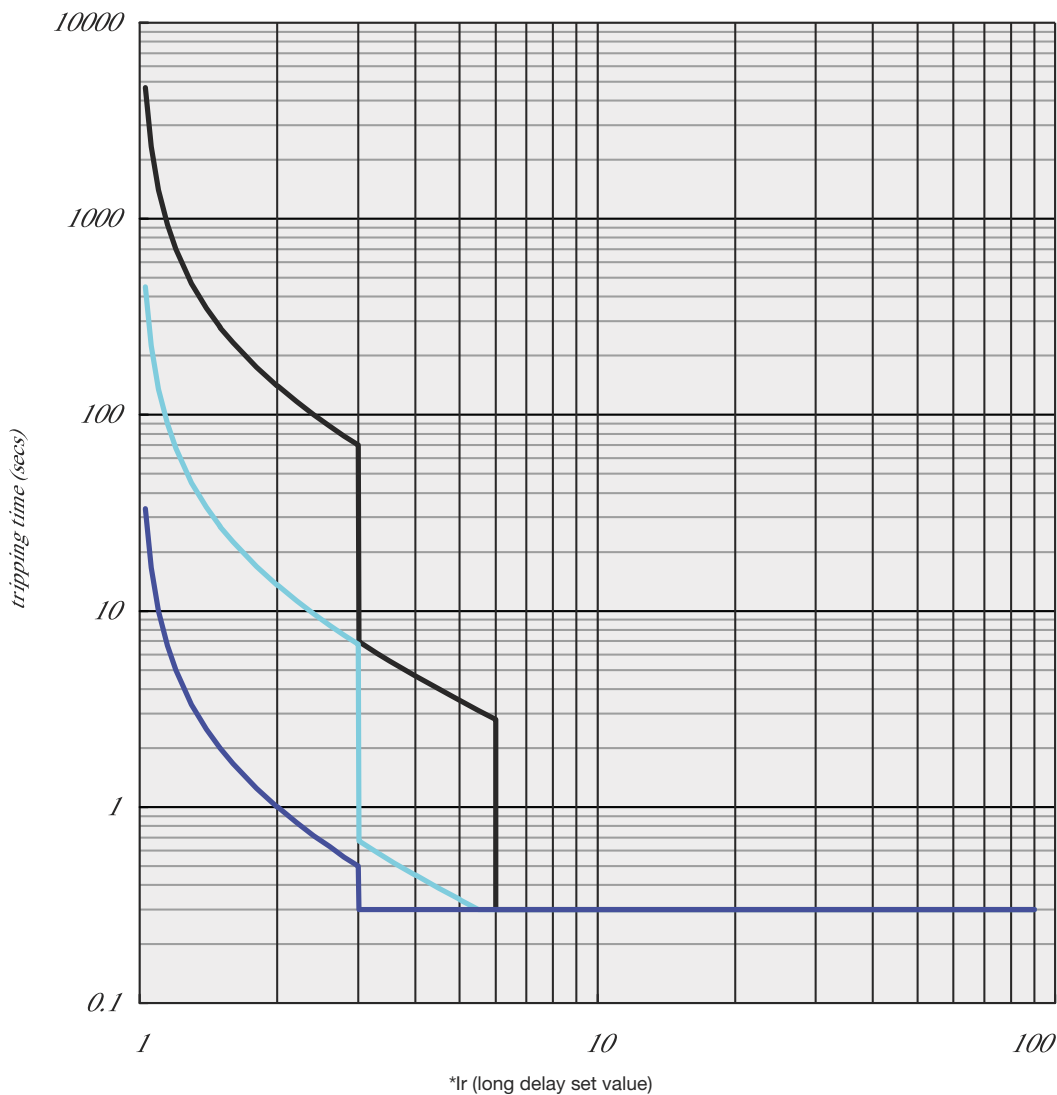
- Delay time of short delay fixed time lag set value =  $6 \times I_r$
- Delay time of short delay fixed time lag set value = 0.3 S

## Characteristics Curve

Micropro 2 - 7.1

**Chart C3**

Example curve of reverse time lag, fixed time lag



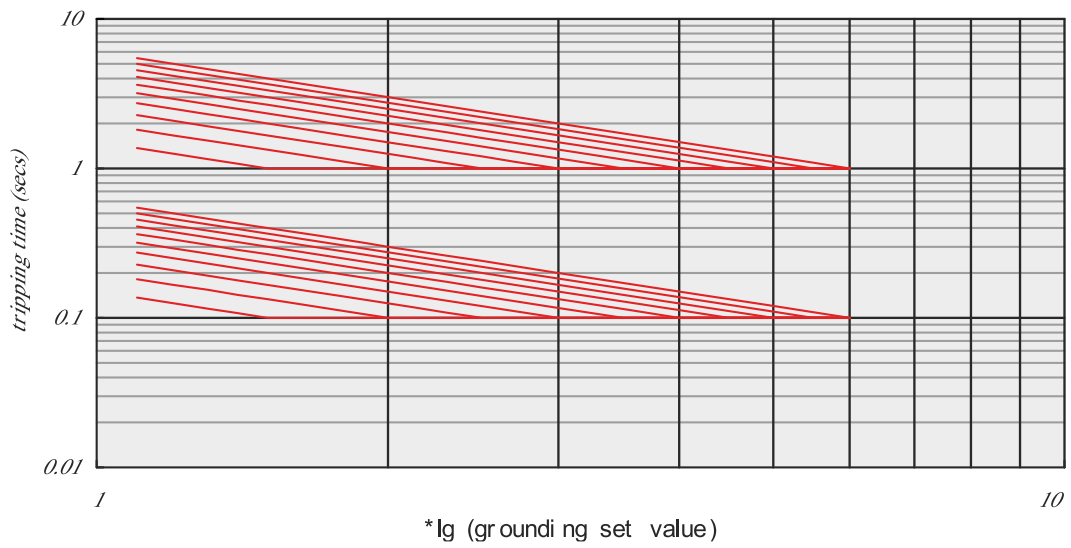
The curve above bases on the set value below:

- Curve type = fast reverse time lag
- Curve speed = C1, C8 and C16 (C1 fastest)
- Operation set value of short delay reverse time lag =  $3 \times I_{set}$
- Operating set value of short delay fixed time lag =  $6 \times I_r$
- Delay time of short delay fixed time lag set value = 0.3 S

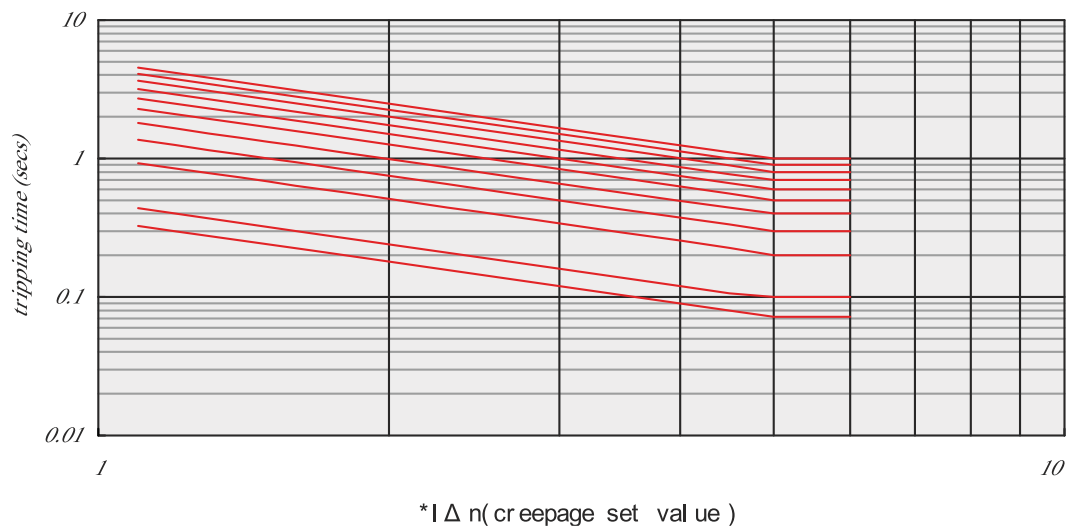
## Characteristics Curve

### Micropro 2 - 7.1

**Chart G1**  
Ground protection



**Chart G1**  
Creepage protection





## Communication

### Modbus / RS-485

- Operation Mode : Differential
- Distance : 1.2 km
- Cable : General RS-485 Shielded twist 2 pair cable
- Baud rate : 9600 bps, 19200 bps, 38400 bps
- Transmission Method : Half-duplex
- Termination : 100 Ω

### Profibus - DP

- Profibus-DP Module is installed separately (optional)
- Operation Mode : Differential
- Distance : 1.2 km
- Cable : Profibus-DP Shielded twist 2 pair cable
- Baud rate : 9600 bps~ 12Mbps
- Transmission Method : Half-duplex
- Termination : 100
- Standard : EN 50170/DIN19245

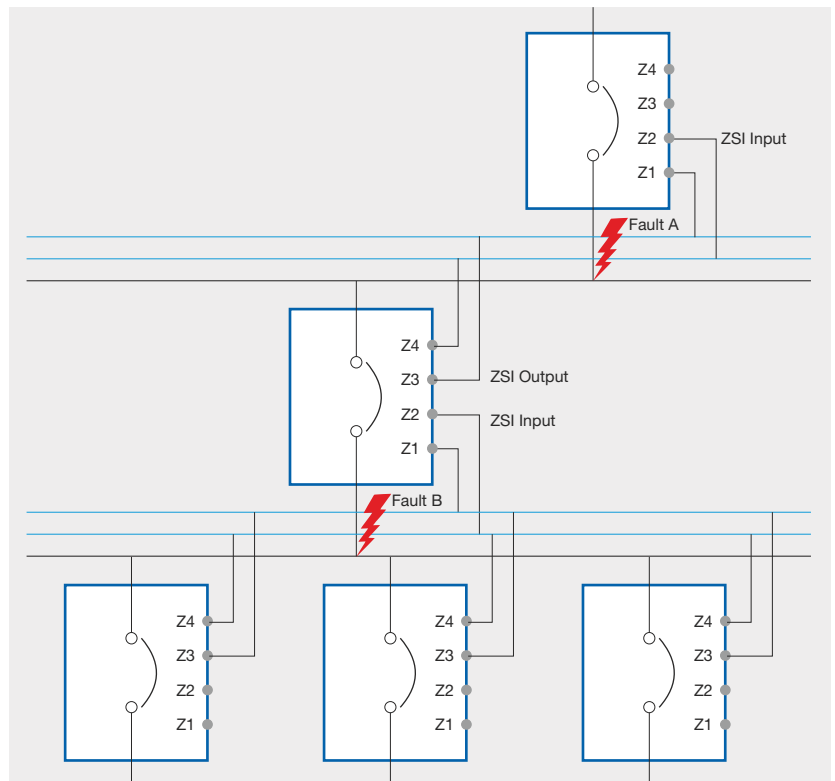


## ZSI - (micropro2)

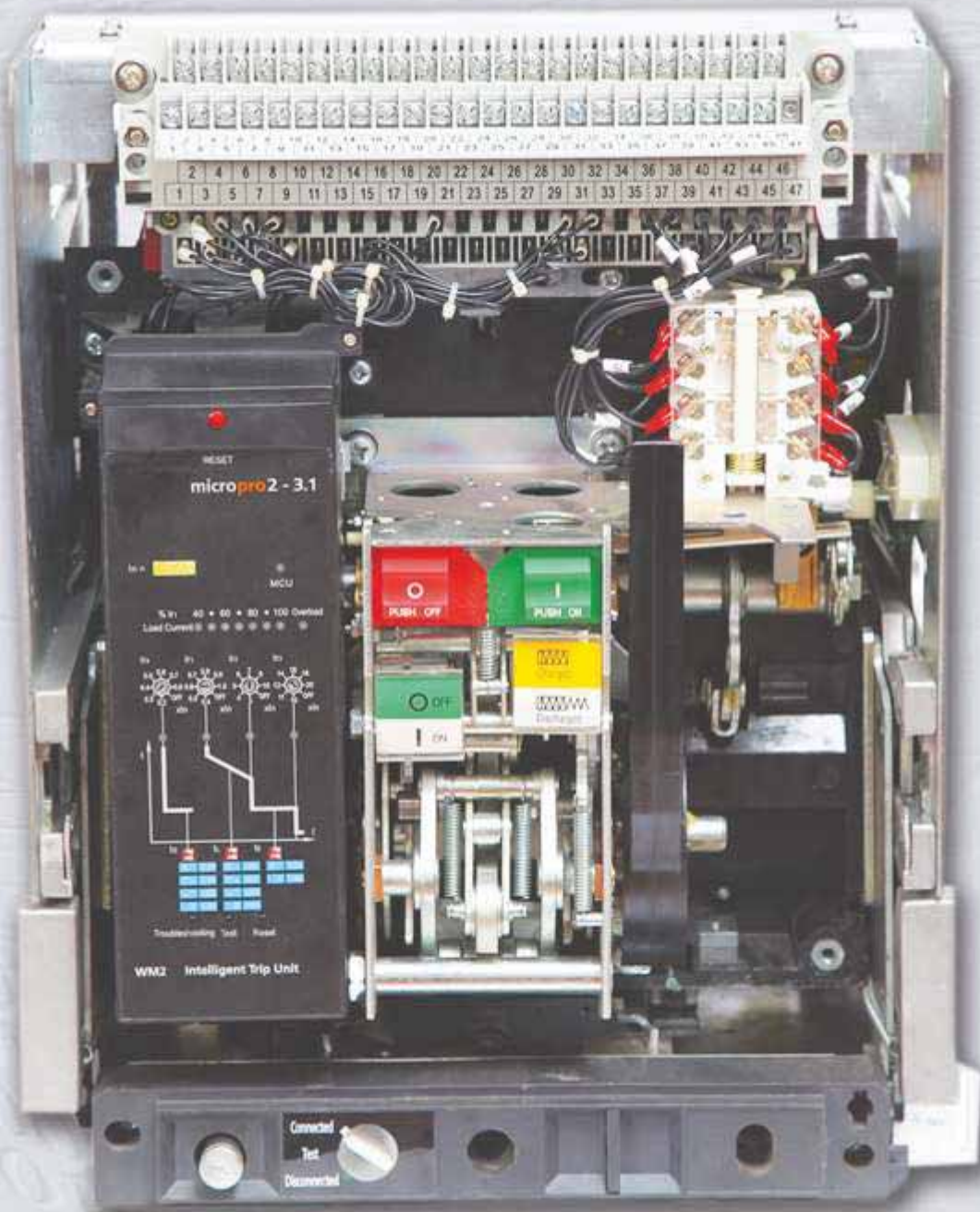
### ZSI – Zone Selective Interlocking (micropro2)

Zone selective interlocking drops delay time that eliminates fault for breakers. It minimize the shock that all kind of electric machineres get under fault conditions.

- In case of that short time-delay or ground fault accident occurs at ZSI built in system, the breaker at accident site sends ZSI signal to halt upstream breaker's operation.
- To eliminate a breakdown, trip relay of ACB at accident site activates trip operation without time delay.
- The upstream breaker that received ZSI signal adhere to pre-set short time delay or ground fault time-delay for protective coordination in the system. However upstream breaker that did not receive its signal will trip instantaneously
- Fpor ordinary ZSI operations it should arrange operation time accordingly so that downstream breaker will react before upstream ones under overcurrent/short time delay/ ground fault situations.
- ZSI connecting lines need to be Max. 3m.



- 1) Occurrence of fault A
  - Only **Breaker 1** performs instantaneous trip operation
- 2) Occurrence of fault B
  - **Breaker 2** perform instantaneous trip operation, breaker 1 perform trip operation after prearranged delay time
  - But if **Breaker 2** did not break the fault normally, breaker 1 perform instantaneous trip operation to protect system.



## Snap-in type Accessories

- Spring charging motor
- Opening / closing coil
- Under voltage release



## Auxiliaries for remote operation



### Electrical charging device (Motor)

**Basic Function**

The electrical charging device (motor) automatically charges & recharges the spring mechanism.

**Features**

- Voltages available - 220V AC (50Hz), 415V AC (50Hz), 110V DC, 220V DC.
- Consumption - 85VA for AC, 85W for DC



### Opening release, closing release

**Basic Function**

- Opening release instantaneously opens the circuit breaker when energized.
- Closing release instantaneously closes the circuit breaker when energized.

**Features**

- Voltages available – 220V AC (50Hz), 415V AC (50Hz), 220V DC.
- Consumption - 24VA for 220V AC, 36VA for 415V AC, 24W for 220V DC.
- Reliable operating voltage range of opening release is 70% - 110%.
- Reliable operating voltage range of closing release is 85% - 110%.



### Under voltage release

**Basic Function**

- The Under voltage release instantaneously opens the circuit breaker when the supply voltage drops.
- The delay block eliminate the nuisance tripping during short voltage dips.

**Features**

- Voltages available – 220V AC (50Hz), 415V AC (50Hz)
- Consumption - 24VA for 220V AC, 36VA for 415V AC,
- Characteristics of Under voltage release of circuit breaker

Type		Under-voltage release	Under-voltage release
Operating time of release		Time delay 0, 0.3, 0.6, 1, 3, 5S	instantaneous
Operating voltage value of release	35-70%Ue	It is able to open the circuit breaker	
Within of delay time; when the source voltage recovers to 85%Ue	35%Ue	Circuit breaker is unable to close	
	85%-110%Ue	Circuit breaker is able to close reliably	
		Circuit breaker does not open	

**Note:** Accuracy of delay time is ±10%.

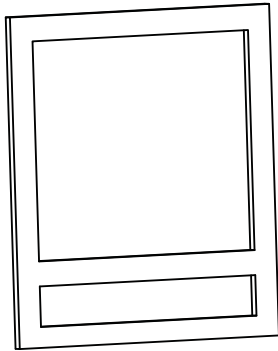
### Mechanical accessories



#### Mechanical Interlock

##### Basic Function

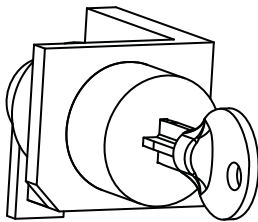
It is used to interlock closing & trip between two or three breakers mechanically so as to prevent unintended operation at the same time.



#### Panel door ingress seal

##### Basic Function

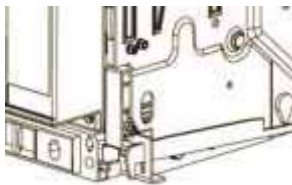
Panel door ingress seal increases the degree of protection to IPXX & IPXX in fix & drawout ACB simultaneously.



#### Keylock

##### Basic Function

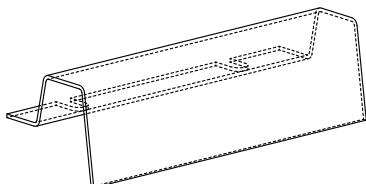
- The key lock inhibits local & remote closing of circuit breaker.
- Interlocking can be achieved by using '2 locks with 1 key' & '3 locks with 2 keys'.



#### Door Interlock

##### Basic Function

- This device inhibits opening of the cubicle door when the circuit breaker is in 'Connected' or 'Test' position.
- It may be mounted on the left or right-hand side of the chassis.



#### Auxiliary Terminal Shield

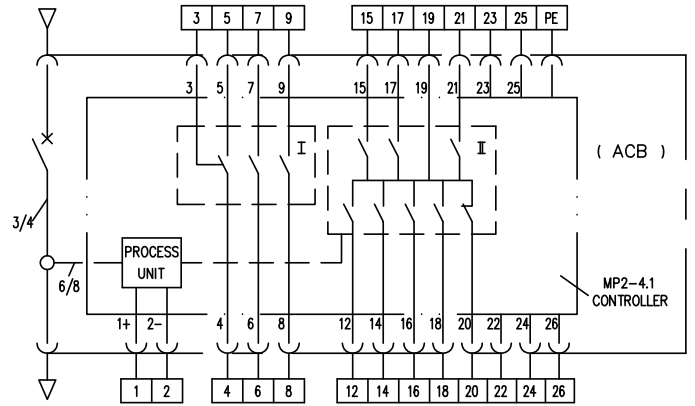
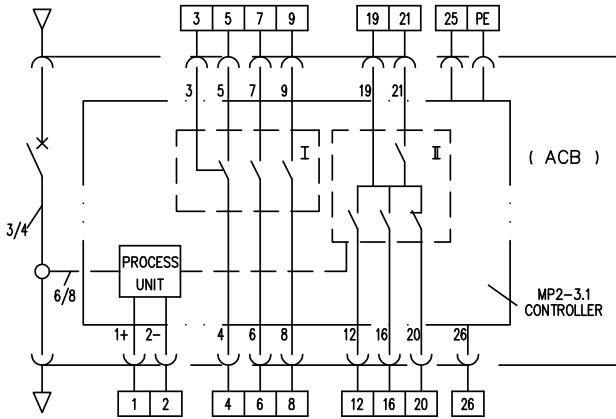
##### Basic Function

This shield prevents access to the terminal block of the electrical auxiliaries.

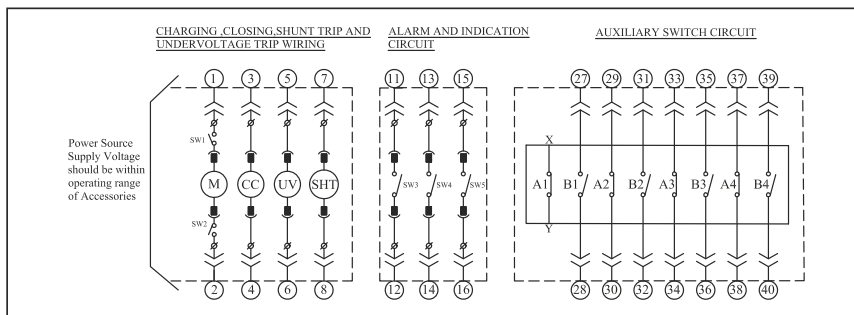
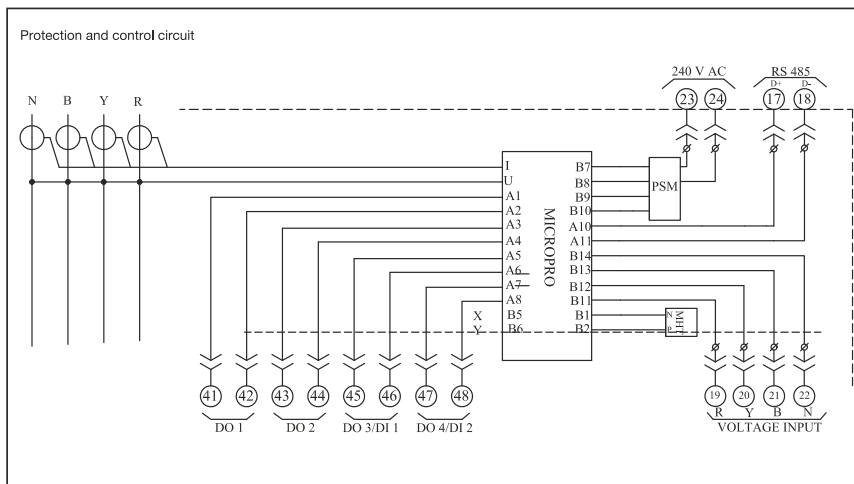
# Electrical Diagram

## Micropro 2 - 3.1

## Micropro 2 - 3.1



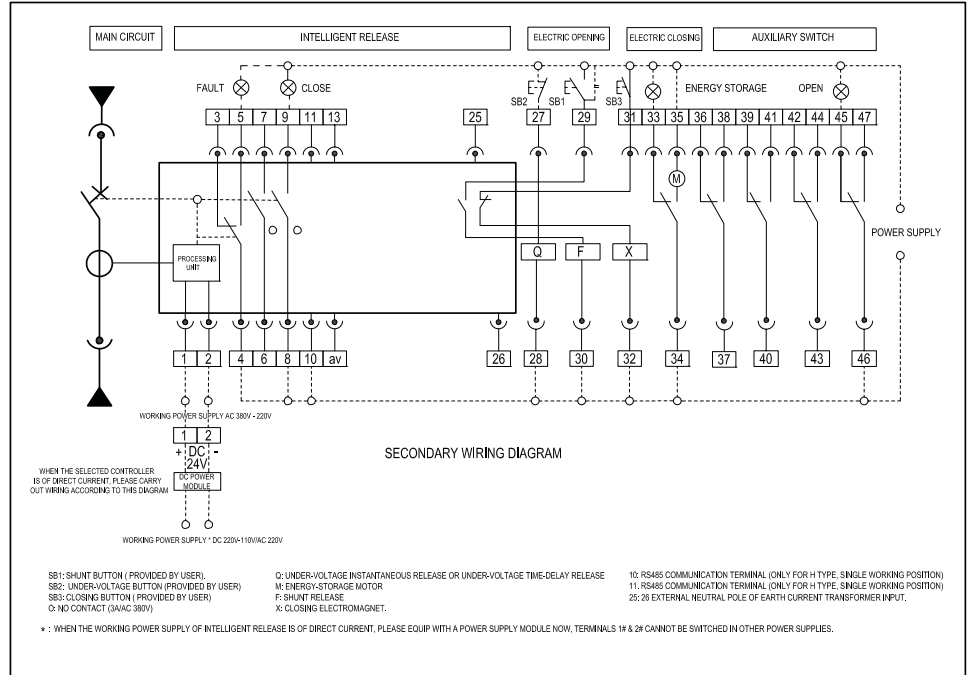
## Micropro 2 - 7.1



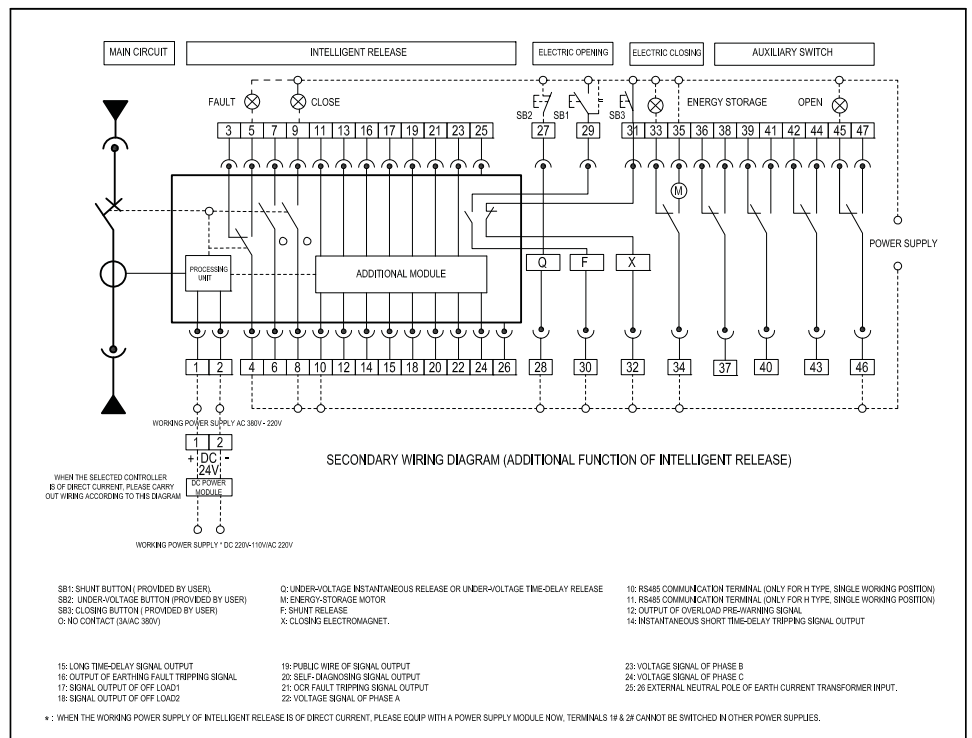
- PLUG AND SOCKET CONNECTION
  - BREAKER WIRING
  - ISOLATING CONTACT
- NOTE : SW2 WILL BE USED ONLY FOR DC MOTOR
- SW1 -- Motor CutOFF Switch
  - SW2 -- Motor CutOFF Switch(DC)
  - SW3 -- Trip Indication Switch
  - SW4 -- Charge Indication Switch
  - SW5 -- OCR Switch
  - SW6 -- MCR Switch
- M -- Charging Motor
  - CC -- Closing Coil
  - UVT -- Under Voltage Trip Coil
  - SHT -- Shunt Trip Coil
  - MHT -- Magnetic Held Trigger Device

# Identifying Electrical Auxiliaries

## Electrical Diagram-additional features

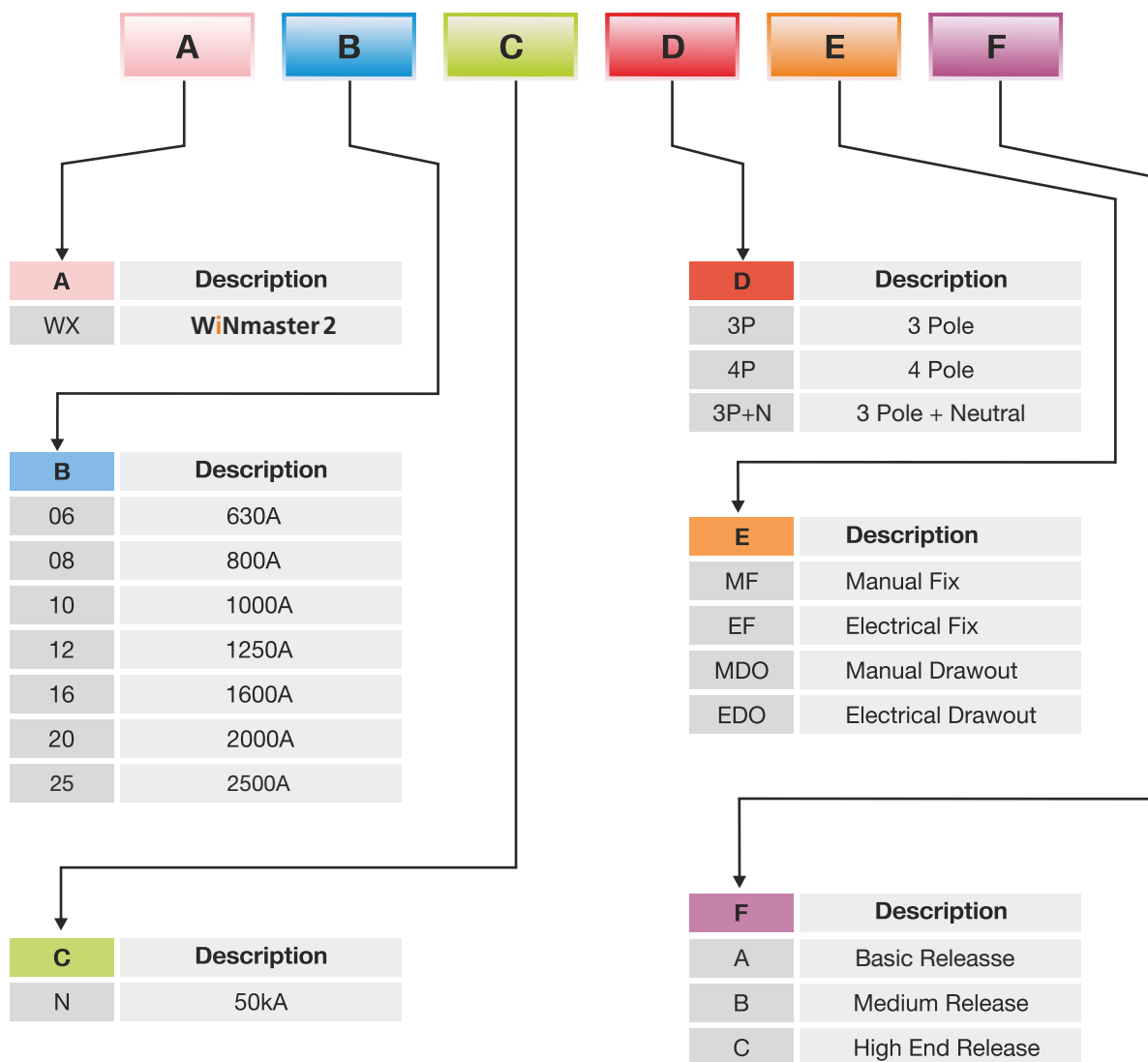


## Electrical Diagram



## Identifying WX ACB

### Model Description



**Example:** WX ACB of 630A, 4 Pole, 50kA Electric Drawout with medium release;  
product code shall be:

A	B	C	D	E	F
WX	06	N	4P	EDO	B



## Nomenclature

### Rating

WiNmaster 2 WX series Intelligent Circuit Breaker offer current ratings from 630A to 2500A. The new generation intelligent controller provided basic protection of distribution network with specialized function like Measurement, Maintenance and Man-Machine interface.

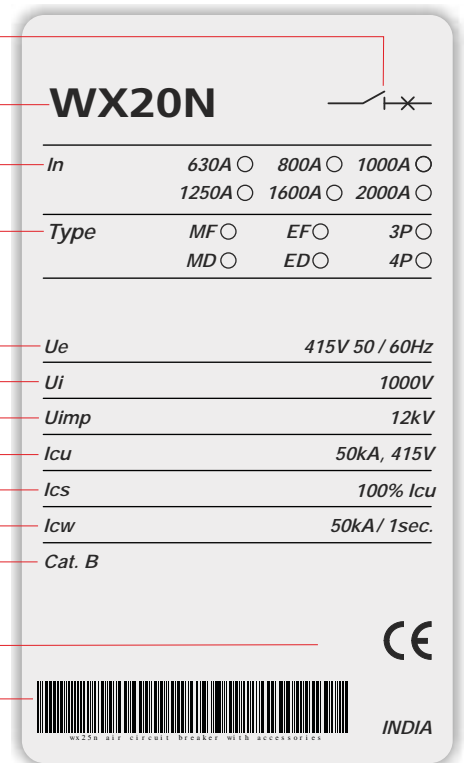
- 1 Manufacturer Logo
- 2 Brand Name
- 3 Applicable standards
- 4 Utilization Category
- 5 Qrcode

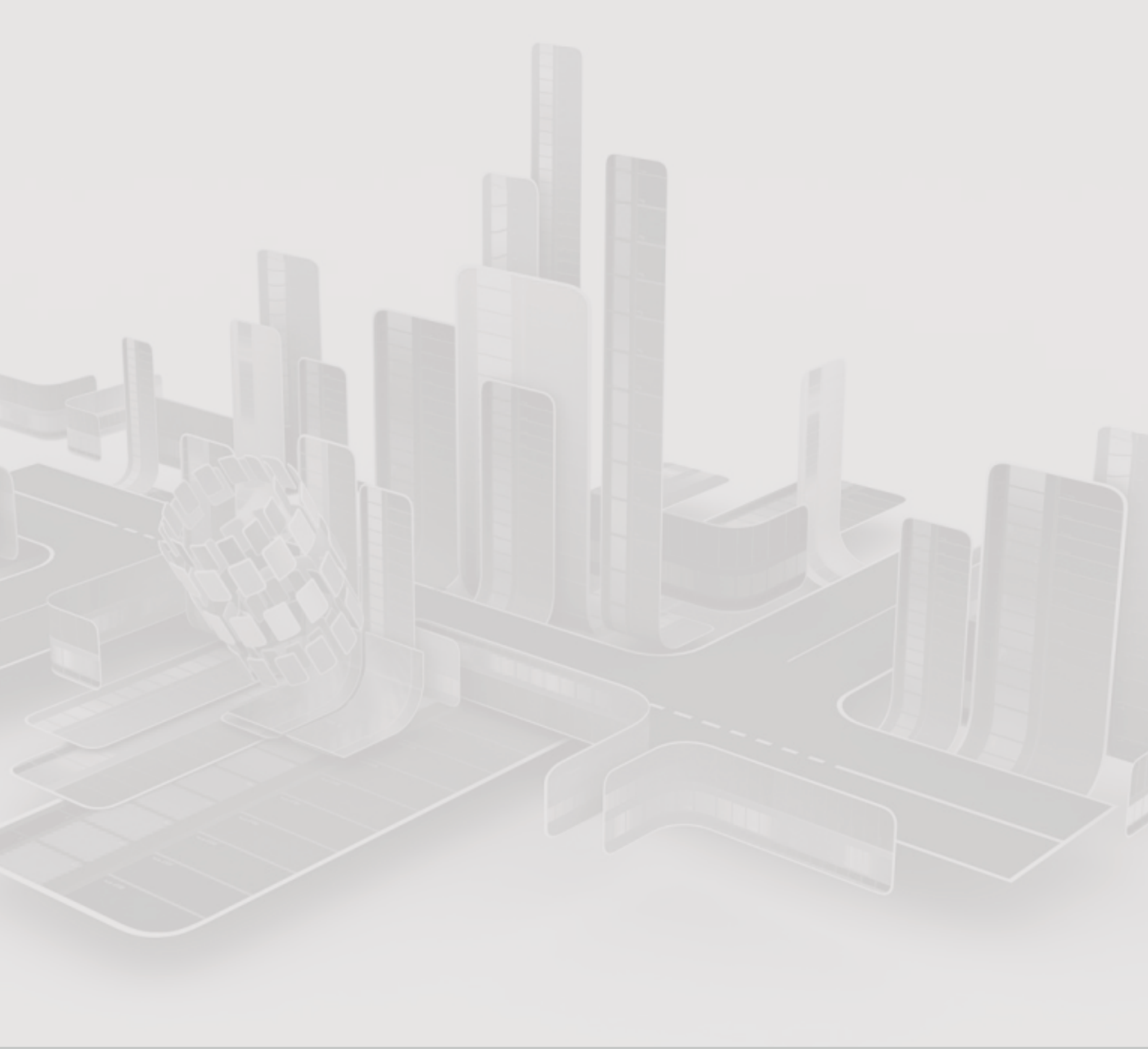
- 1
- 2
- 3
- 4



- 1 Suitability for isolation
- 2 ACB Code
- 3 Rated current
- 4 ACB Type
- 5 Rated operational voltage
- 6 Rated insulation voltage
- 7 Rated impulse voltage
- 8 Ultimate breaking capacity
- 9 Rated service breaking capacity
- 10 Rated short-time breaking capacity
- 11 ACB Cat.
- 12 CE Marking
- 13 Barcode

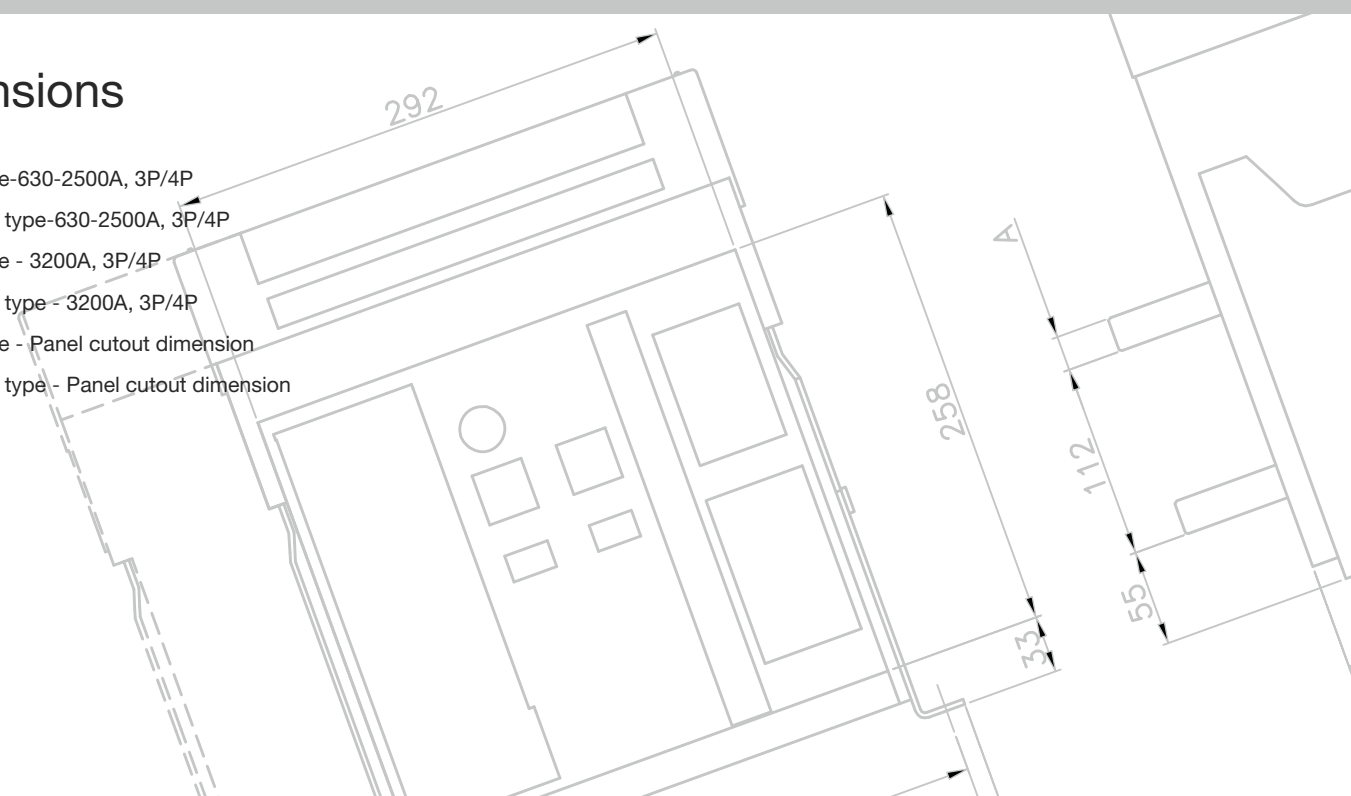
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13



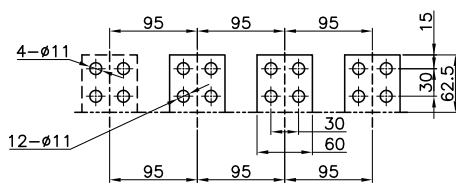
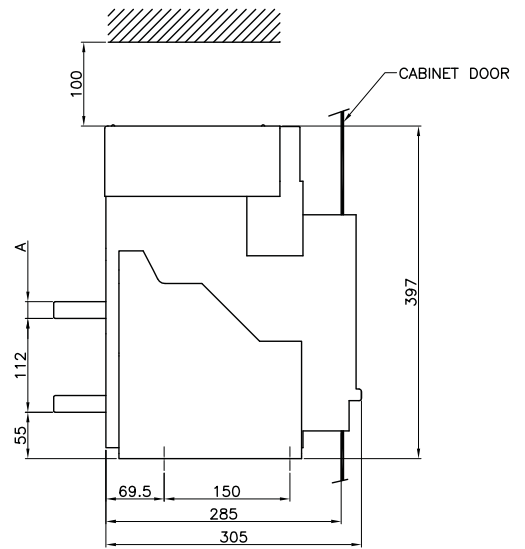
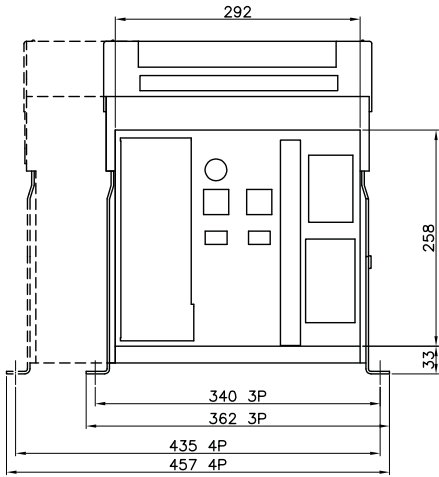


## Dimensions

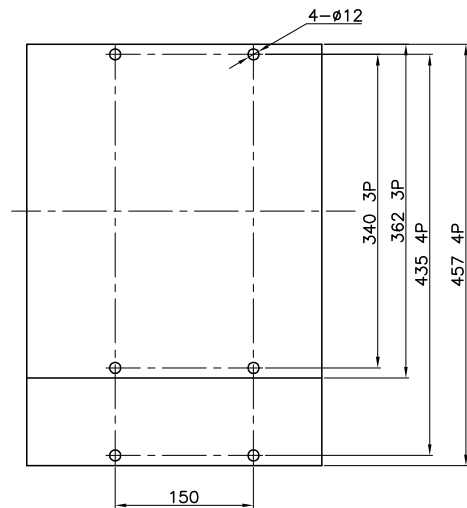
- Fixed type-630-2500A, 3P/4P
- Draw-out type-630-2500A, 3P/4P
- Fixed type - 3200A, 3P/4P
- Draw-out type - 3200A, 3P/4P
- Fixed type - Panel cutout dimension
- Draw-out type - Panel cutout dimension



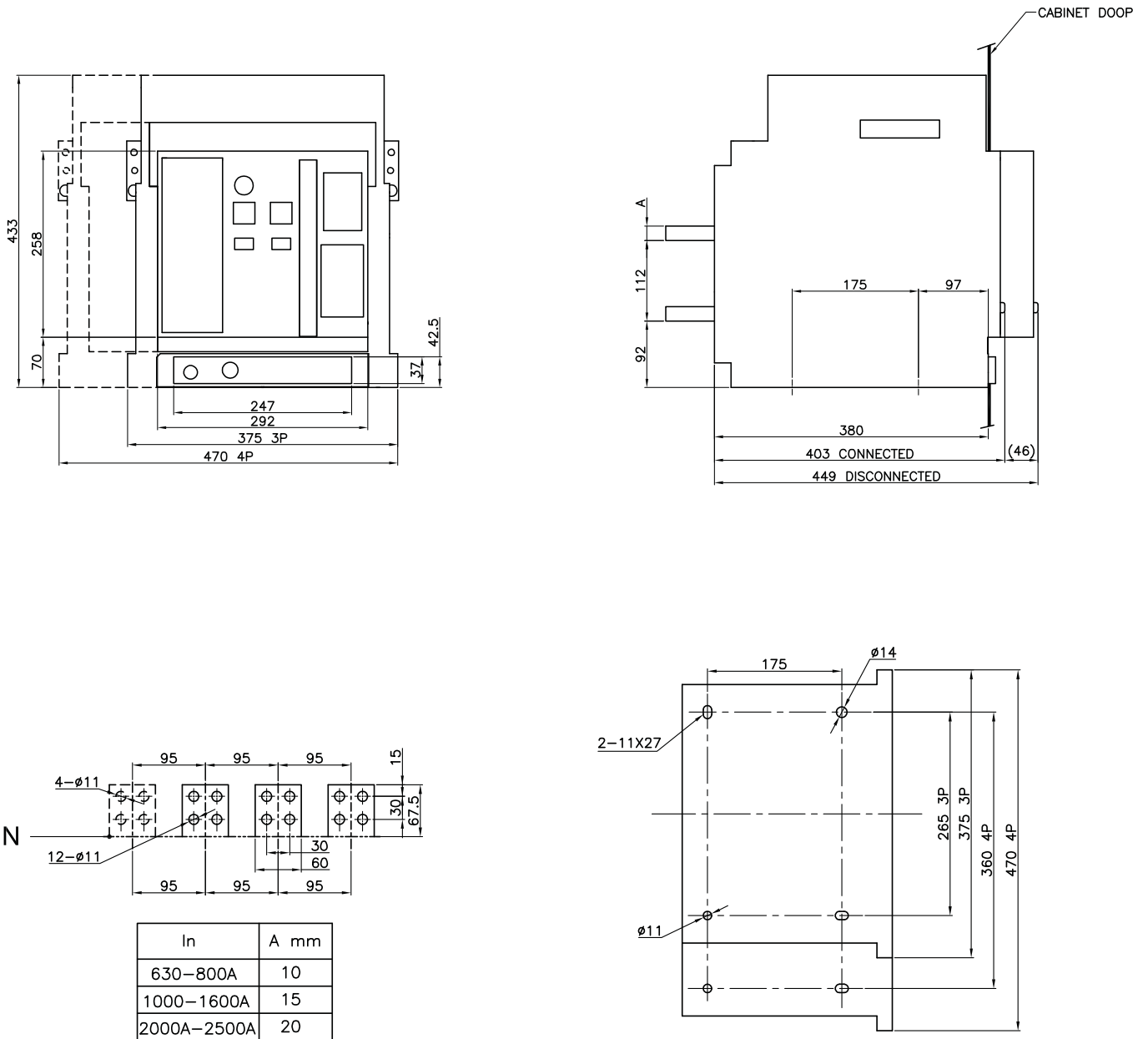
### Fixed type-630-2500A, 3P/4P

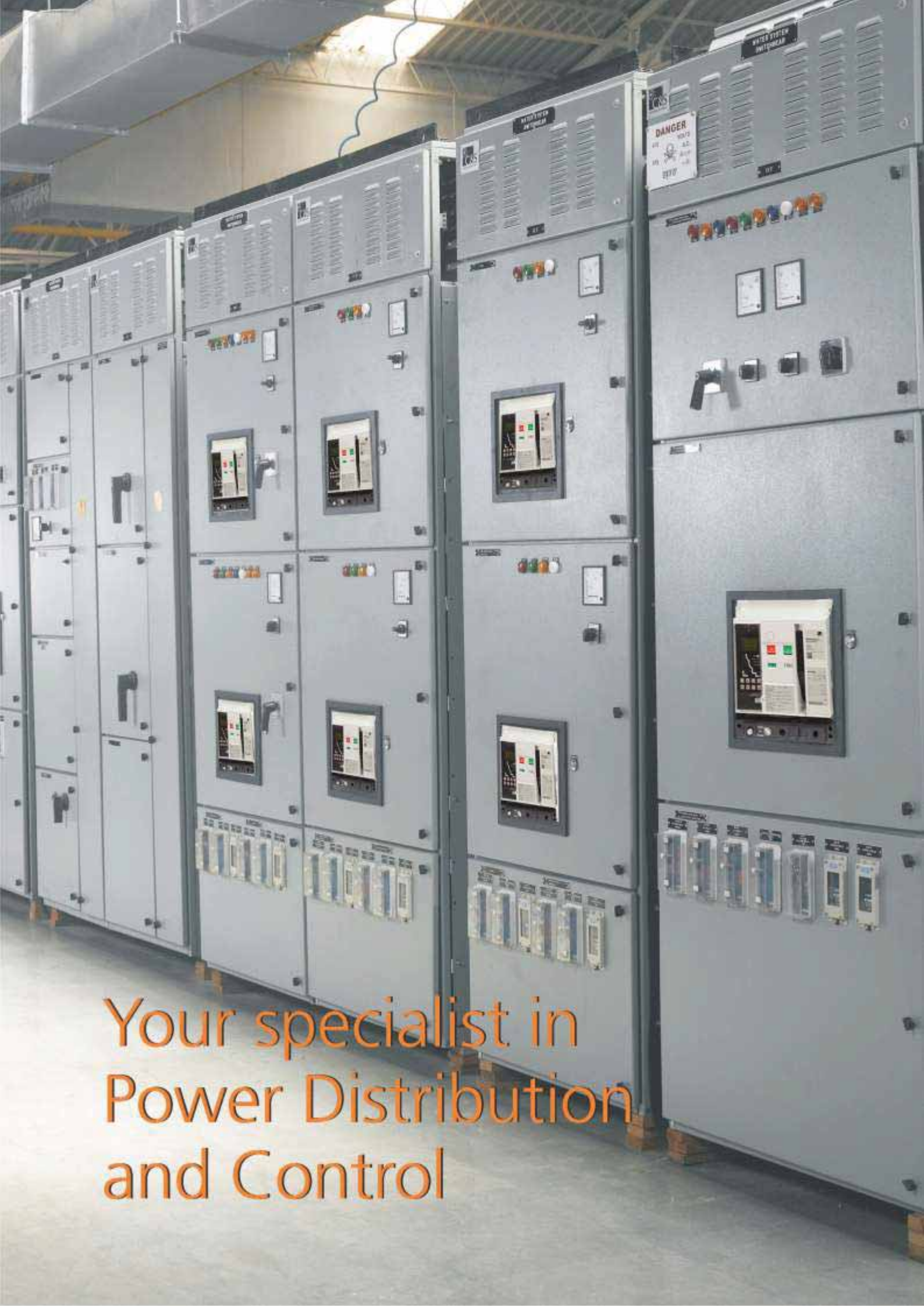


In	A mm
630-800A	10
1000-1600A	15
2000A-2500A	20



### Draw-out type-630-2500A, 3P/4P





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Power Distribution  
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Air Circuit Breaker

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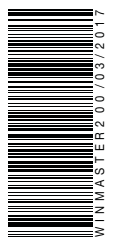
## **C&S Electric Ltd.**

222, Okhla Industrial Estate, Phase-III, New Delhi - 110020, INDIA

Tel. : +91-11-3384 9000 - 09

Fax: +91-11-2684 7342

E-mail : [cmo@cselectric.co.in](mailto:cmo@cselectric.co.in)



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