

We touch your **electricity** everyday!

ARCPRO V_I

ARC Protection Relay



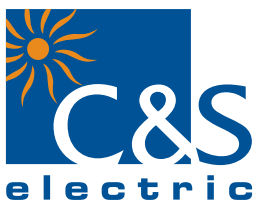
Line sensor



Point sensor

ARCPRO V_I

Catalog



PMD Division



Overview

Arc fault protection is used for detecting the arcing faults on low voltage panels, MCC's, Busbars, switchgear and associated cable boxes.

Conventional current based protection techniques like short circuits are at times challenged by the nature of arcing faults and can result in slow protection clearance times. Slow protection clearance times increase the risk of fire and increase the degree of damage to plant and equipment.

By employing an optical detection technique, Arc Protection, results in fast clearance of arcing faults.

Application

Switchgear ARC Flash Protection

Risk of Arc fault damage exists at the CB cable termination and in the CB chamber itself. The CB cable termination is particularly at risk due to in grace of moisture and rodent damage.

Figure 1 & 2 shows an application where a single line sensor is applied for the protection of the Cable box, CT chamber and CB chamber using three sensors.

In this configuration, one Arc trip output is used to trip the feeder circuit breaker in the event of an Arc fault in the Cable box/CT chamber.

In Figure 2, Arcpro is detecting the Arc fault and giving the signal to a over-current relay in the feeder which trips the circuit breaker.

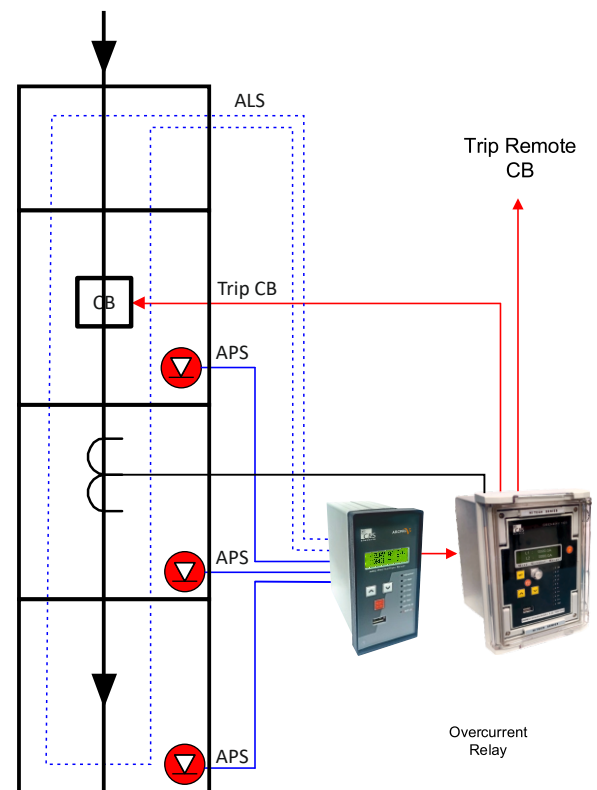


Figure 1 : ARC point sensors with current check

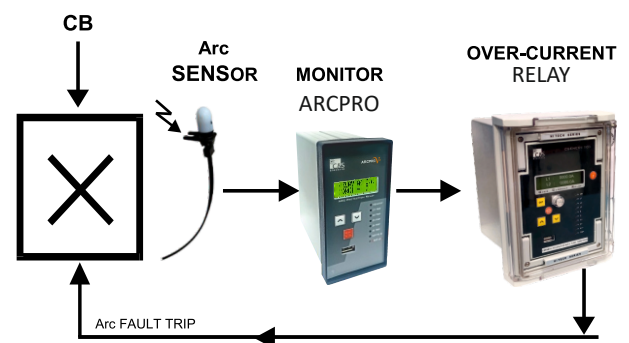


Figure 2 : ARC sensors in co-ordination with over current relay

Features

High speed arc fault detection with a state of the art of electronics in association with special optical fibres and sensors.

- High Speed Arc detection time (<2msec)
- Four Point sensor inputs (model dependent)
- One Line sensor input
- Five Zones configuration with sensor input and DO output
- ARC detection and recording with date and time stamp
- Compact and slim in size
- Continuous arc sensor health supervision
- Self-supervision with alarm Contact
- Five Fault record with Date & Time stamp
- Wide range Aux supply suitable for AC/DC

Description

The ARCPRO ARC flash relay is fast response solution that reduces arc fault damage by detecting the light from arc flash and rapidly tripping the corresponding zone.

The ARCPRO is equipped with one line ARC detection sensor and four optical point sensor. The Arc port are capable of responding Arc trip detection within 1ms and high speed output is capable of responding as fast as less than 1ms.

LCD/Keypad user high speed based friendly HMI helps user to configure the relay and monitor the arc event conveniently.

Healthy LED's

A front panel green LED is provided to indicate when the relay is powered up also its hardware is healthy and all connected arc sensors are operating correctly. Should any of the sensors become disconnected the associated red supervision LED will be illuminated. Healthy sensors will continue to operate normally.

Supervision of Sensors

Relay keep sending the heart beat signal on every 10 seconds to all the sensors and keep checking the healthiness as well as inter connection.

The supervision alarm contact will cause the alarm contact to drop out signal, when all monitored circuits are in the HEALTHY condition.

FAILURE of a supervision circuit will cause an alarm condition to

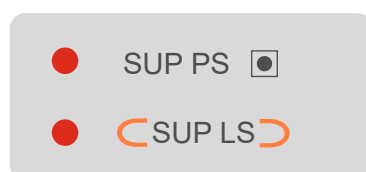


Figure 3 : Supervision LED indications for Sensors

○ SUP PS : Point Sensors

○ ◐ SUP LS ◑ : Line Sensor *

* (Model dependent)

Arc Trip Indication

Zone wise LEDs are provided to indicate an arc trip event and the type of sensor to assist with fault location.

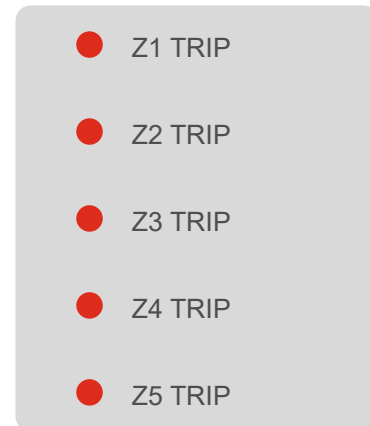


Figure 4 : Trip LED indications ARC fault monitor

This trip indication will remain latched until the front reset input is activated. The associated output trip contact(s) will also operate till the fault persists.

RESET of Fault

In case of any trip or fault or supervision error occurred, when attended and after removing the fault, then by pressing the Reset switch for >2sec. the fault will get reset. It will reset the contacts as well as front fault LEDs.

ARC Sensors

Point Sensor

The Point sensor is suitable for application in discrete compartments in metal clad switchgear and cable duct. when as Arc is detected by any point sensor, ARCPRO sense it and rapidly trip the zone output associated with that particular sensor. Length of fibre cable is available as per ordering information.



Figure 5 : Point Sensor

Line Sensor (Model Dependent)

The line sensor may be applied to protect large area where multiple point sensor would otherwise be required.

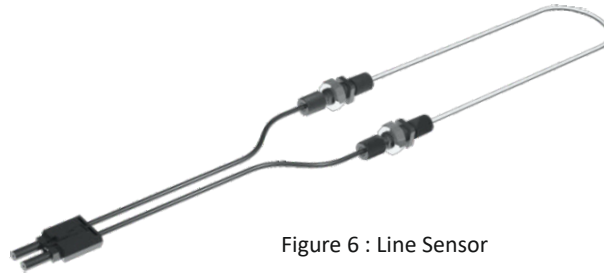


Figure 6 : Line Sensor

Any Arc happens in the whole length of this fibre sensor, it detects and generate the trip signal.

The Arc sensor has three parts. First is Sensor part, which consist of transparent fibre cable with translucent jacket for line sensor. Second is the link fibre consist of fibre optic cable with black jacket to extend the length of the sensor to reach up-to the switch gear compartment which need to protect from Arc flash and the Third part is the optical coupler which interface between both the sensor part and link fibre.

See the accessories ordering information for more details.

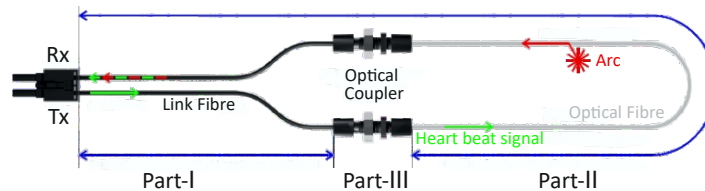


Figure 7 : Components of Arc Sensors

Trip Outputs

Output Type	5 Potential free contacts 1 High speed Output (potential contact)
Operating mode	Auto Trip & Manual Reset
Trip contact operate time (flash to contact closure time)	<6ms (for Mechanical Relay) <2ms (for HSO)
Potential Free Contact Rating	
Rated voltage	250V AC/ 30V DC (Relay)
Make current	Max. 30A & carry for 3S (Relay) at rated voltage
Carry capacity	8A continuous (Relay)
Breaking Characteristics	
Breaking capacity AC (Relay only)	1500VA resistive 1500VA inductive (PF=0.5) 220V AC, 5A (cos phi <=0.6)
Breaking capacity DC (Relay only)	135V DC, 0.3A (L/R=30ms) 250V DC, 50W resistive or 25W inductive (L/R=40ms)
Durability (Relay only)	
Loaded contact	10,000 operation minimum
Unloaded contact	30,000 operation minimum
High speed output Contact Rating (HSO)	
Contact Voltage Rating	20-300V AC/DC
Contact rating	Continuous : 1 Amp For 3 msec : 8 Amp

Technical Data

Aux. Supply

Aux. Supply Range	18 - 280V AC/DC +5%
Burden - Maximum	15W at 110V DC

ARC Fault Point Sensor Inputs

Number of Sensors	4
Connection	Duplex Optical fibre

ARC Fault Line Sensor Input (Model dependent)

Number of Sensors	1
Connection	Duplex Optical fibre

Communication

Front communication	Through USB port
Rear communication	MODBUS on RS-485

Electrical Tests

AC and DC Voltage Dips

IEC 60255-26

Dip to 0% of residual voltage	DC: 20 ms AC: 1 cycle 50/60 Hz
Dip to 40% of residual voltage	DC: 200 ms AC: 10/12 cycles 50/60 Hz
Dip to 70% of residual voltage	DC: 500 ms AC: 25/30 cycles 50/60 Hz

Electro-magnetic Compatibility (EMC)

Electrostatic Discharge

IEC 60255-26

Type	Level
Air Discharge	8 kV

Radiated Electromagnetic Field

IEC 60255-26

Port	Enclosure
Test Identification	Test specification
Frequency sweep	10 V rms, 80 to 1000 MHz 1400 to 2700 MHz
Spot frequencies	10 V rms, 80, 160, 380, 450, 900, 1850 & 2150 MHz

AC and DC Voltage Interruptions

IEC 60255 -26

Drop to 0% of residual voltage	DC: 5 s AC: 250/300 cycles 50/60 Hz
--------------------------------	--

Fast Transients

IEC 60255-26

Type	Level
Port	Aux power supply
5/50ns, 5kHz repetitive	4kV peak

AC component in DC (Ripple)

IEC 60255-26

15% of rated DC value	100/120 Hz, Sinusoidal
-----------------------	------------------------

Surge Immunity

IEC 60255-26

Type	Level
Port	Aux power supply
Line to Earth	4.0 kV peak
Line to Line	2.0 kV peak

Clearance and Creepage Distances

IEC 60255 -27

Pollution degree	2
Overvoltage category	III
Rated insulation voltage	300 V rms or dc

Insulation

IEC 60255-27

Type	Level 3
Between any terminal and earth	5 kV 1.2/50 μ s 0.5 J 3 pulses of each polarity 2.0 kV ac rms for 1 minute
Across normally open contacts	1.0 kV AC RMS for 1 min

Conducted Disturbance Induced by RF Fields

IEC 60255-26

Port	Aux power supply
Frequency sweep	10 V rms, 0.15 to 80 MHz

Weight : 900 gms (approx)

PC Communication



Figure 8 : Configuration through PC software (PC suite)

Relay Configuration

Front End configuration

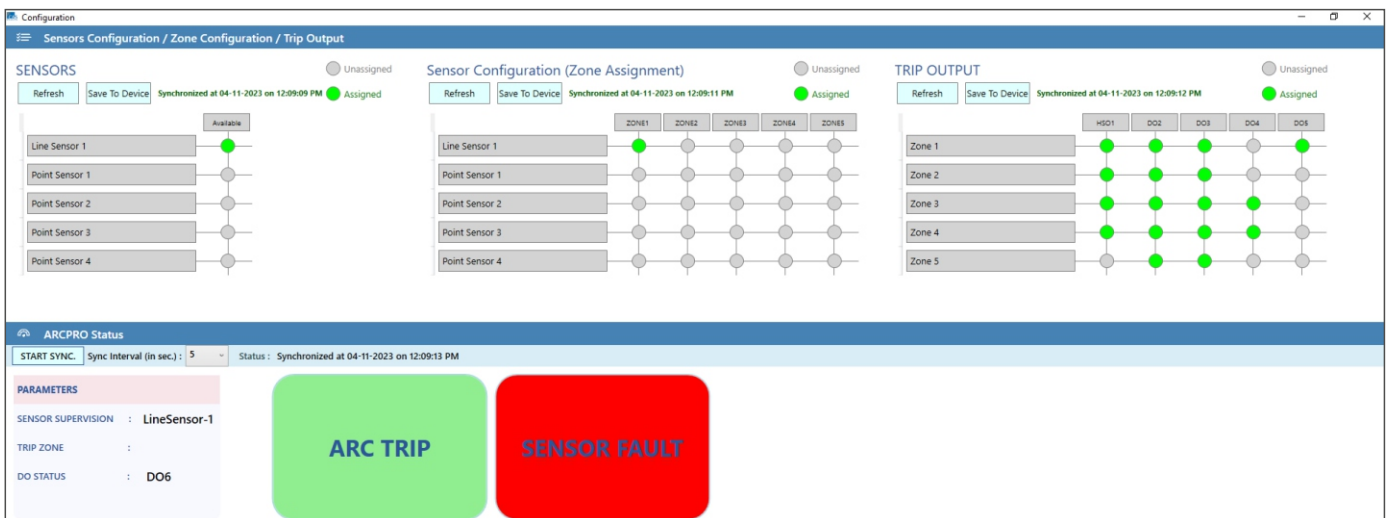


Figure 9 : Front End configuration

Fault Record

ARCPRO records last 5 faults in its non-volatile memory with date & time stamp. Each records has the information as shown in the picture below. User can retrieve the fault records both using PC suite or from the relay itself through front keys.

C&S Electric Limited | PC Suite - ARCPRO V1 | Version 1.0.0.18

Go Back

C&S Fault Records

Number of records to display: 5 (Please select a number of your choice)

Proceed Export To Excel CSV

Synchronized at 11-11-2024 on 10:00:06 AM

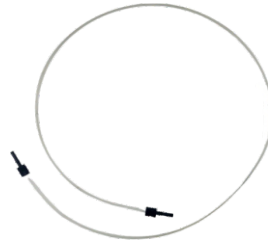
Fault No	Fault Date-Phase	Fault Name	Fault Category
1	Wed, 06 Nov 2024 10:23:08:000 AM	P4 ARC	ARC
2	Tue, 05 Nov 2024 03:25:17:000 PM	P4 SUP	SUP
3	Tue, 05 Nov 2024 02:47:48:000 PM	P4 ARC	ARC
4	Tue, 05 Nov 2024 02:47:47:000 PM	P4 ARC	ARC
5	Tue, 05 Nov 2024 02:47:12:000 PM	P4 ARC	ARC

Figure 10 : Fault Record

Typical Installation of Sensors with ARCPRO Relays



Point Sensor



Line Sensor

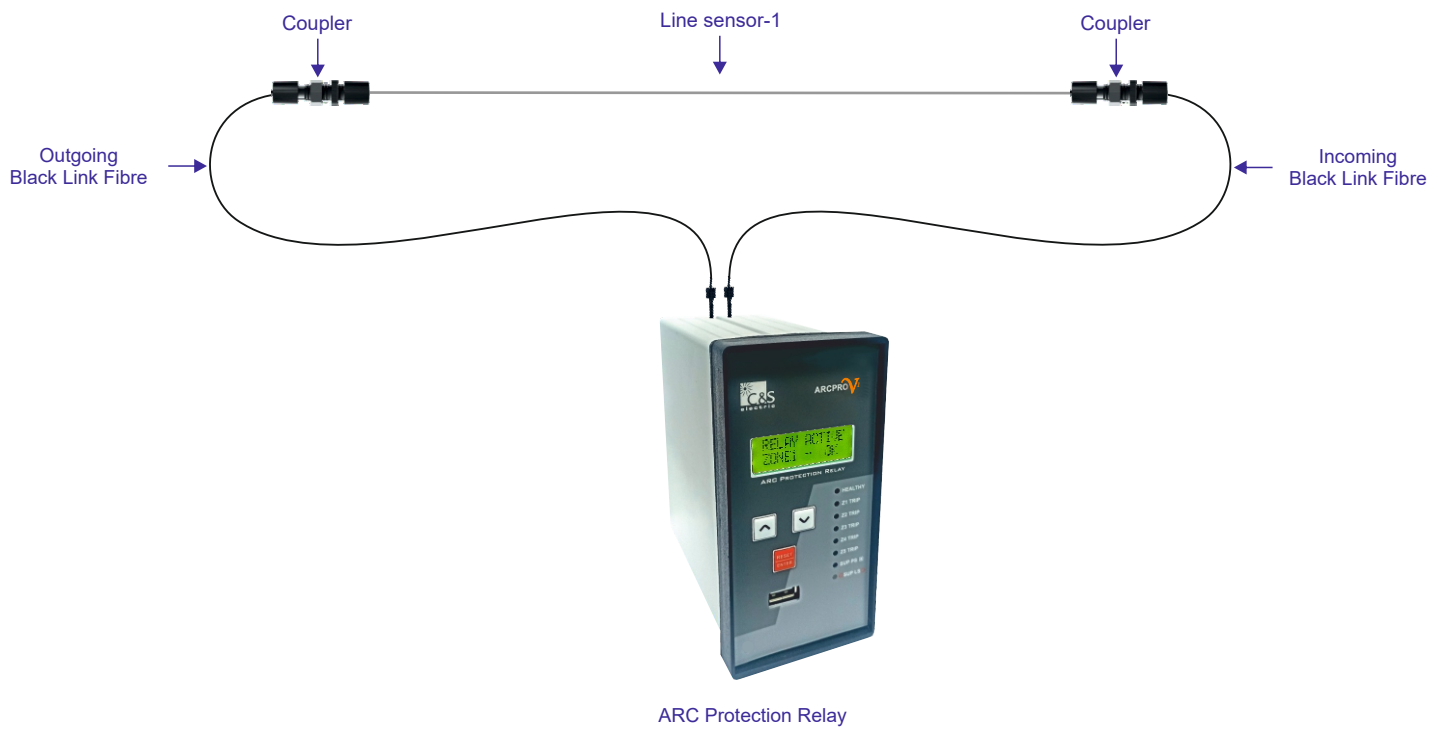


Optical Fibre Couplers



Black Link Fibre Assembly

Example : Using One Line Sensors



Back Terminal View (Model dependent)

(Note : All Sensor Ports are covered with Rubber cap, so that they should not get trigger with any unwanted high intensity light. Once installation of sensor starts, then only remove the corresponding cap).

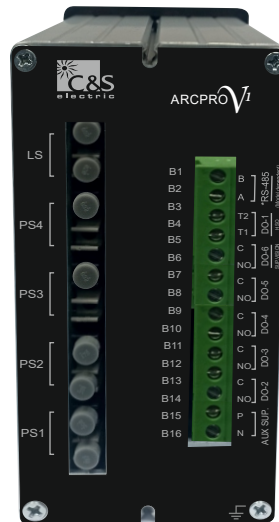


Figure 16

NOTE: There is no Polarity in the Line/Point Sensor Inputs.

Connection Diagram

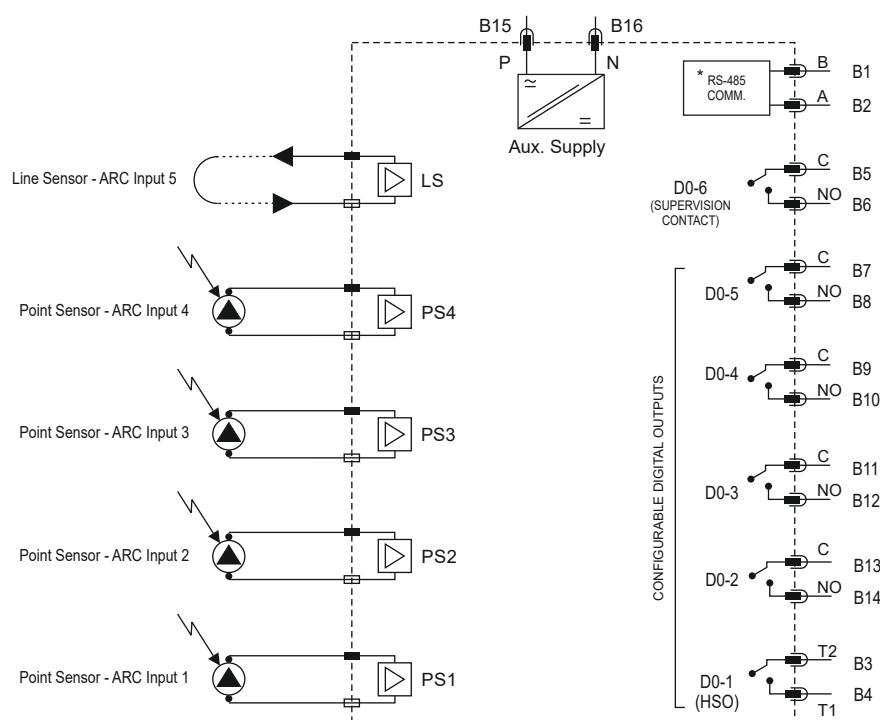


Figure 17

* Model dependent

(All the dimensions are in mm, Gen. Tol. : +1.0 mm)

Dimensions

Front View

Side View

Back View

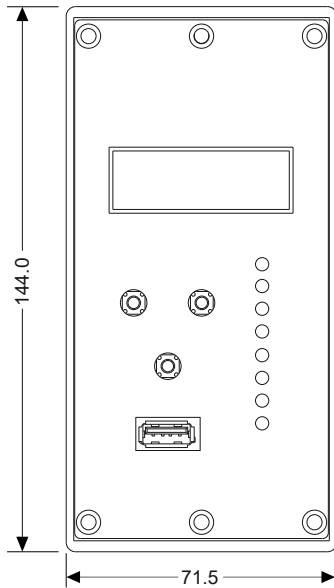


Figure 11

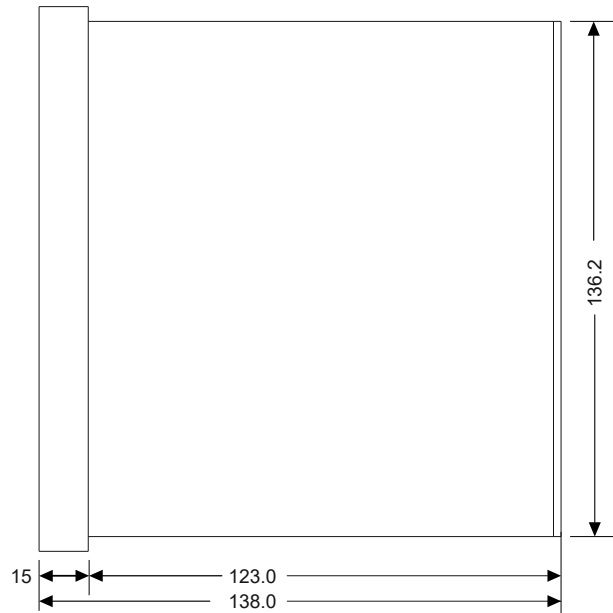


Figure 12

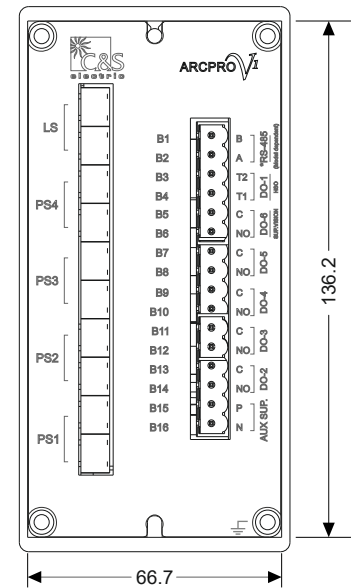
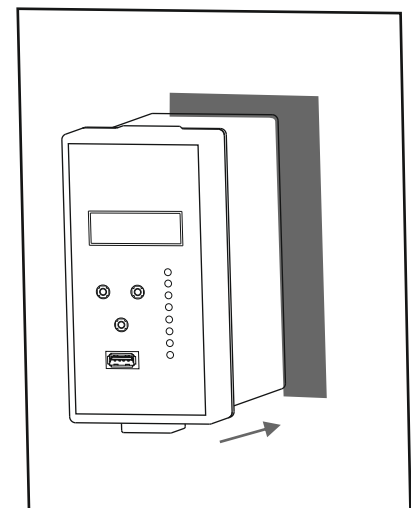
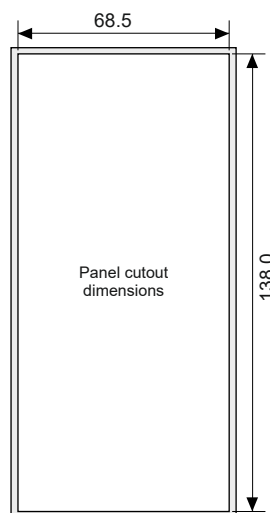
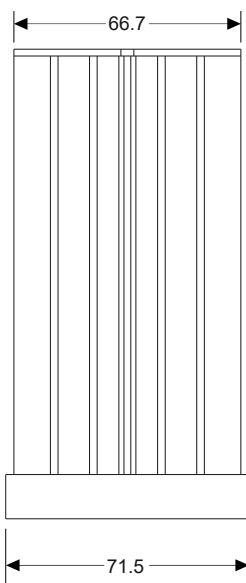


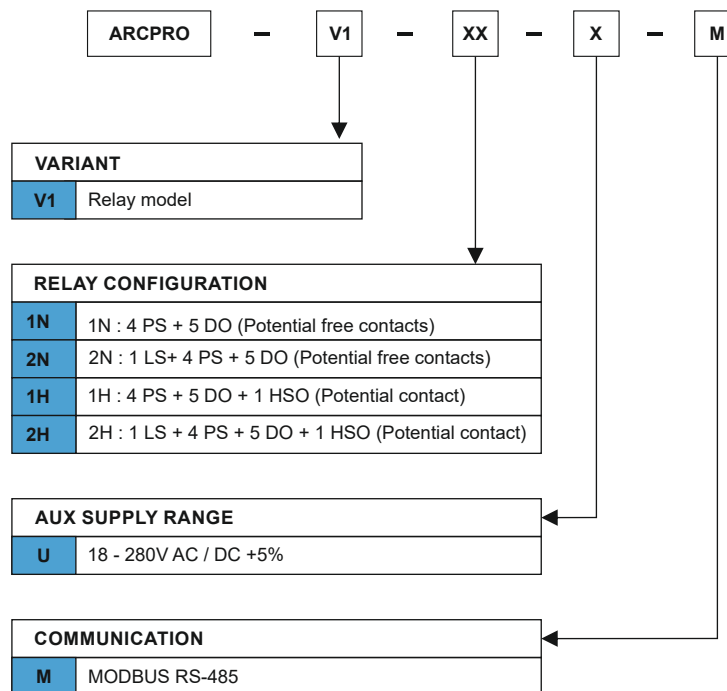
Figure 13

Top View

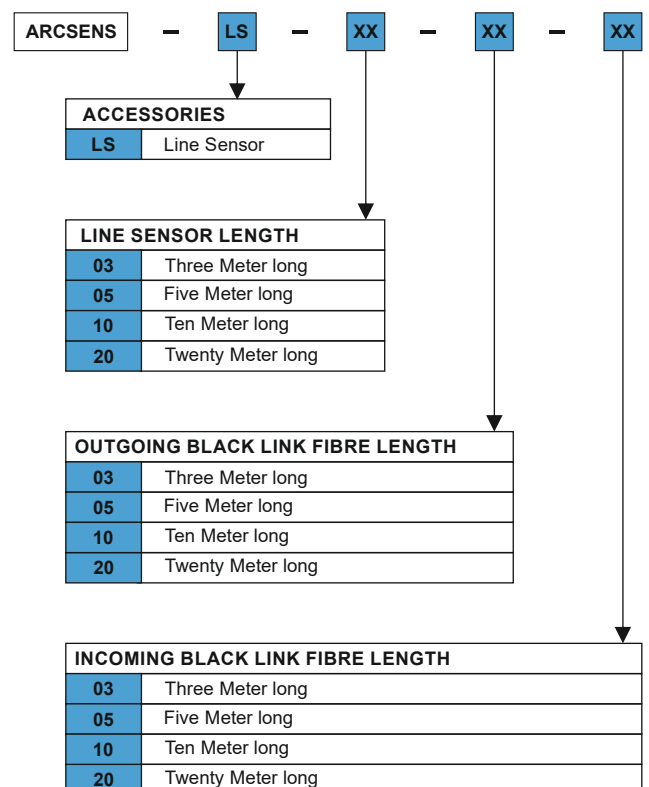
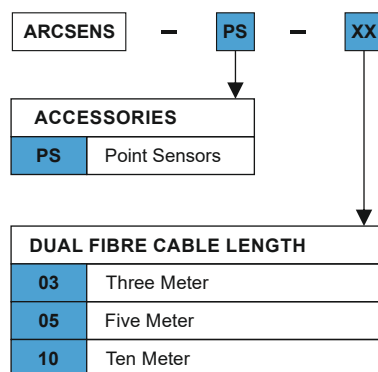
Panel cut out Dimension



Relay Ordering Information



Accessories Ordering Information



[illegible]

The content in this document are not binding and is for general information.
C&S reserves the right to change the design, content or specification contained in this, without prior notice.

Branch	Phone	Fax	E-mail
Ahmedabad	+91-79-615651 22/23/24	+91-79-61565130	cspc.ahemdabad@cselectric.co.in
Bangalore	+91-80-305703 72/73, 30570347	+91-2558-4839	bangalore@cselectric.co.in
Bhubaneswar	+91-674-2507265	+91-674 2507265	bhubaneswar@cselectric.co.in
Chennai	+91-44-33534501,33534521-23	----	chennaiteam@cselectric.co.in
Cochin	+91-484-3071717	+91-484-3071716	----
Delhi	+91-11-338490 00/10/11	+91-11-30838826	sales.pmd@cselectric.co.in
Hyderabad	+91-40-485340 80/82	----	hyderabad@cselectric.co.in
Kolkata	+91-33-392121 19-21	----	----
Mumbai	+91-22-241147 27/28	----	mumbaiteam@cselectric.co.in
Pune:	+91-20-242505 18/19	+91-20-30283244	pune@cselectric.co.in

We touch your electricity everyday!