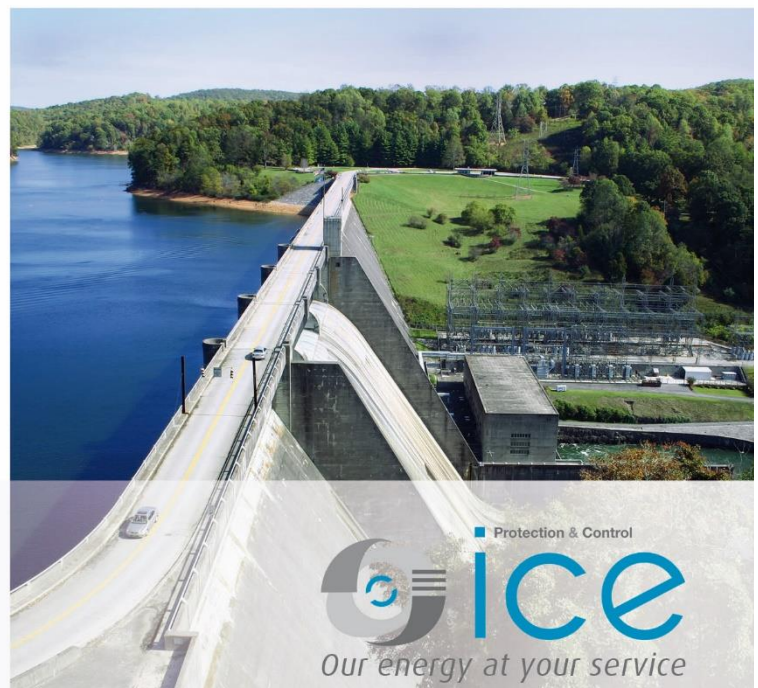


Arc Sensors Series

Instruction Booklet



TRADEMARKS



TECHNIREL

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Revision	Date	Changes	Written by	Checked by
A	01/03/2018	First issue	HWE	GBI
B	28/05/2018	Update	HWE	GBI

Read these instructions carefully and inspect the equipment to become familiar with it before trying to install, operate, service or maintain it.

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. Local safety regulations should be followed. No responsibility is assumed by ICE for any consequences arising out of the use of this material.

We reserve right to changes without further notice.



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1 ARC SENSORS

AP900 series provides choice of different types of arc sensors to be utilized in different units and different switchgear types according to specific application requirements. Available sensor types are arc light point sensors and arc light fiber optic loop sensors.

Arc light point sensors are typically installed in metal clad compartments providing quick accurate location of the faulted area. Arc light fiber loop sensors are installed typically to cover a wider protected area with one fiber when no need for more exact fault location exists.

1.1 ARC LIGHT POINT SENSOR AS01

AS01 is an arc light point sensor with a light sensitive photodiode element activated by arc light. AS01 arc sensors should be mounted in the switchgear cubicles in such a way that the light sensitive part covers the protected area as completely as possible. One sensor per closed metal clad compartment should be utilized. In open spaces, such as the bus bar section, arc sensors should be mounted maximum 2 meters apart.

The fixed light sensitivity of the AS01 sensor is 8000 Lux. Sensor does not require user settings. Detection radius is 180 degrees.



Figure 1-1: Arc sensor AS01



1.1.1 AS01 INSTALLATION AND WIRING

AS01 is installed either on the compartment wall or through wall. Example of wall mounting is seen in Figure 1-2: AS01 mounted to compartment wall.

AS01 is fixed to the wall using two screws. The same screw pattern is utilized in through wall mounting arrangement as well. Unit is turned around and the eye is pushed to the compartment to be protected and two screws are attached from the back side of the sensor. No external mounting plates are needed in any case.



Figure 1-2: AS01 mounted to compartment wall.



AS01 comes without connection cable. Connection cable installation at site is simple. Cable connectors are located beneath the covers that can be conveniently detached for fastening the sensor wires. Cover shall be attached after installing the wires. Cable connectors are located at both ends of the sensor for series connecting maximum three sensors in one line. See Figure 2-9.

1.1.2 AS01 TECHNICAL DATA

Light intensity threshold	8,000Lux
Detection radius	180 degrees
Mechanical protection	IP 64
Sensor wiring arrangement	2 wires and shield
Sensor cable specification	Shielded twisted pair 0.75mm ²
Maximum sensor cable length per sensor channel	200 meters
Operating temperature	-20...+85° C



1.2 ARC LIGHT AND PRESSURE POINT SENSOR AS02

AS02 is an arc light and pressure point sensor with a light sensitive photodiode and pressure elements activated by arc light. AS02 arc sensors should be mounted in the switchgear cubicles in such a way that the light sensitive part covers the protected area as completely as possible. One sensor per closed metal clad compartment should be utilized. In open spaces, such as the bus bar section, arc sensors should be mounted maximum 2 meters apart.

The fixed light sensitivity of the AS02 sensor is 8,000 Lux and 0.2 bar above ambient pressure. Sensor does not require user settings. Detection light radius is 180 degrees.



Figure 1-3: Arc sensor AS02

1.2.1 AS02 INSTALLATION AND WIRING

AS02 is installed either on the compartment wall or through wall. Example of wall mounting is seen in Figure 1-2: AS01 mounted to compartment wall.

AS02 is fixed to the wall using two screws. The same screw pattern is utilized in through wall mounting arrangement as well. Unit is turned around and the eye is pushed to the compartment to be protected and two screws are attached from the back side of the sensor. No external mounting plates are needed in any case.



AS02 comes without connection cable. Connection cable installation at site is simple. Cable connectors are located beneath the covers that can be conveniently detached for fastening the sensor wires. Cover shall be attached after installing the wires. Cable connectors are located at both ends of the sensor for series connecting maximum three sensors in one line. See Figure 2-9.



Figure 1-4: AS02 mounted to compartment wall.



1.2.2 AS02 TECHNICAL DATA

Light intensity threshold	8,000 Lux
Detection radius	180 degrees
Pressure threshold setting (fixed ¹)	0.2 bar above ambient pressure
Mechanical protection for photodiode element	IP 60
Mechanical protection for pressure element	IP40
Sensor wiring arrangement	2 wires and shield
Sensor cable specification	Shield twisted pair 0.75mm ²
Maximum sensor cable length per sensor channel	200 meters
Operating temperature	-20...+85 ° C

¹ A standard atmospheric pressure is 1 bar.

1.3 ARC LIGHT FIBER OPTIC LOOP SENSOR AS06

AS06 is an arc light fiber optic loop sensor. AS06 fiber is a plastic fiber optic cable. AS06 sensors can be ordered in lengths of 10, 20 or 40 meters. AS06 fiber sensors are distributed through the protected switchgear cells. AS06 is not recommended to be cut and/or spliced on site. If cutting/splicing is necessary due to accidental breakage please contact your nearest ICE representative.

The fixed light sensitivity of the AS06 sensor is 8000 Lux. Sensor does not require user settings. Detection radius is 360 degrees. See Figure 1-5.



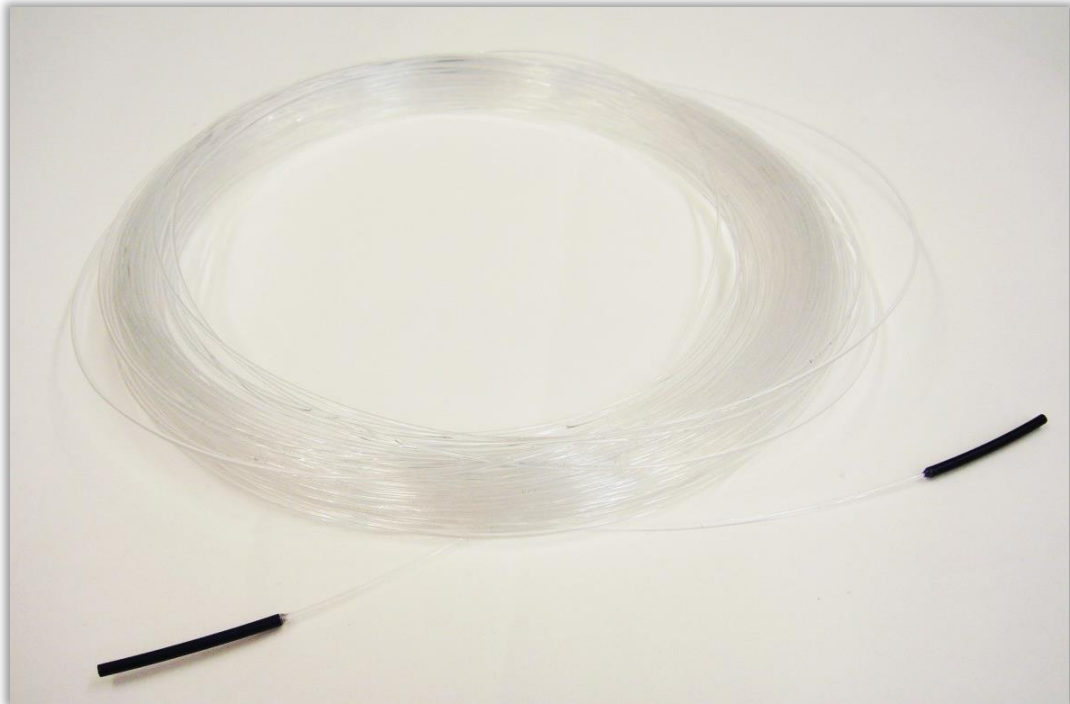


Figure 1-5: AS06 arc light fiber optic loop sensor

Note: On request AS06 ends can be covered with black rubber part for any requested portion to avoid light detection outside the protected zone. For more information consult your nearest ICE representative.

1.3.1 AS06 TECHNICAL DATA

Light intensity threshold	8000Lux
Detection radius	360 degrees
Maximum length	40 meters
Diameter	1 millimeter
Bending radius	5 centimeters
Operating temperature	-10...+85 ° C



1.4 ARC LIGHT FIBER OPTIC LOOP SENSOR AS07

AS07 is an arc light fiber optic loop sensor. AS07 fiber is a robust fiber optic cable providing practically unlimited bending radius. AS07 contains hundreds of glass fiber drains covered by a plastic tube making it extremely strong. AS07 sensors can be ordered in pre-manufactured lengths of 20-50 meters. AS07 fiber sensors are distributed through the protected switchgear cells. AS07 is not recommended to be cut and/or spliced on site. If cutting/splicing is necessary due to accidental breakage please contact your nearest ICE representative.

The fixed light sensitivity of the AS07 sensor is 8000 LUX. Sensor does not require user settings. Detection radius is 360 degrees. See Figure 1-4.



Figure 1-6: AS07 arc light fiber optic loop sensor

Note: On request AS07 ends can be covered with black rubber part for any requested portion to avoid light detection outside the protected zone. For more information consult your nearest ICE representative.



1.4.1 AS07 TECHNICAL DATA

Light intensity threshold	8000Lux
Detection radius	360 degrees
Maximum length	50 meters
Diameter	1.2 millimeters
Bending radius	1 centimeter
Operating temperature	-40...+85 °C

1.5 SENSOR TYPE DEPENDENCIES

Different sensor types can be utilized in different arc flash protection units of the AP900 series. The table below describes the dependencies.

	AS01	AS02	AS06	AS07
AP901	Yes	Yes	Yes (with fiber option)	Yes (with fiber option)
AP902	No	No	Yes	Yes
AP910P	Yes	Yes	Yes (with fiber option)	Yes (with fiber option)
AP910F	No	No	Yes	Yes

Table 1-1: Arc sensor dependencies



2 SENSOR CONNECTION

2.1.1 ARC LIGHT POINT SENSOR AS01 CONNECTION

- 1) Open the sensor side-covers, then detach the pluggable connectors from the sensor PCB, and prepare the twisted shielded pair cable connecting. See Figure 2-1.



Figure 2-1



2) Before connecting the cable to connector, make sure that the connecting order is right (+, signal, shield). The appropriate pins information is shown on the blue bottom part of the sensor. Plug the wires into connector and fasten them by using the screw driver. See Figure 2-2.



Figure 2-2



3) Connect the other end of the cable to a sensor channel on the AP901 or AP910P unit. See Figure 2-3.

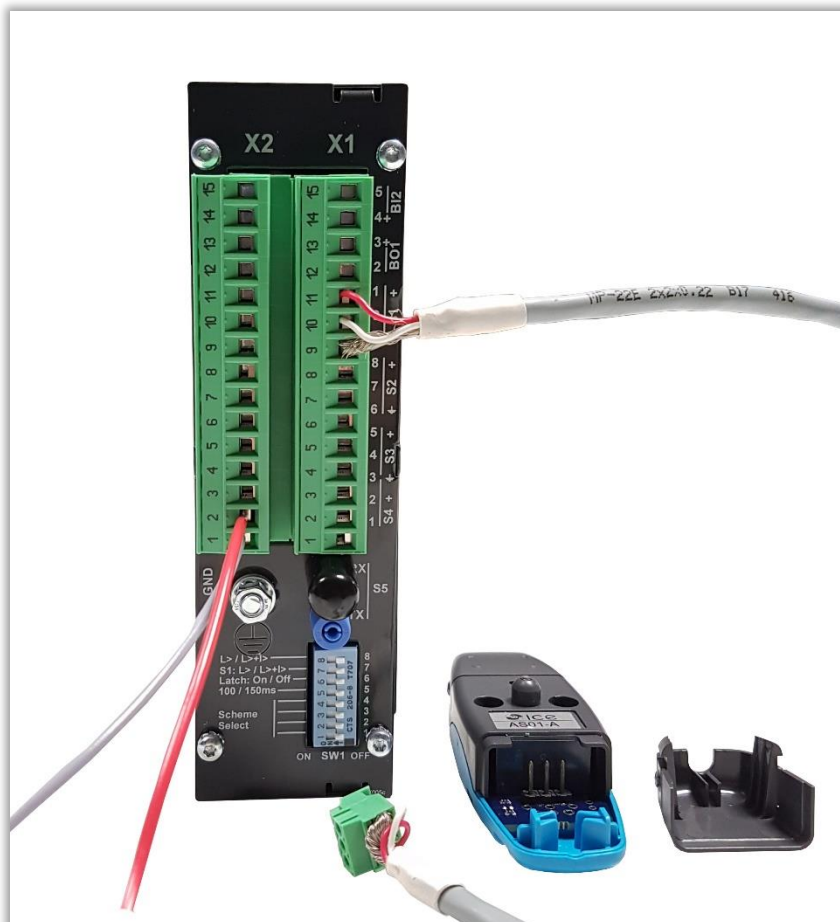


Figure 2-3



4) Check the front panel of the unit, only POWER LED turns on at this moment.

See Figure 2-4.

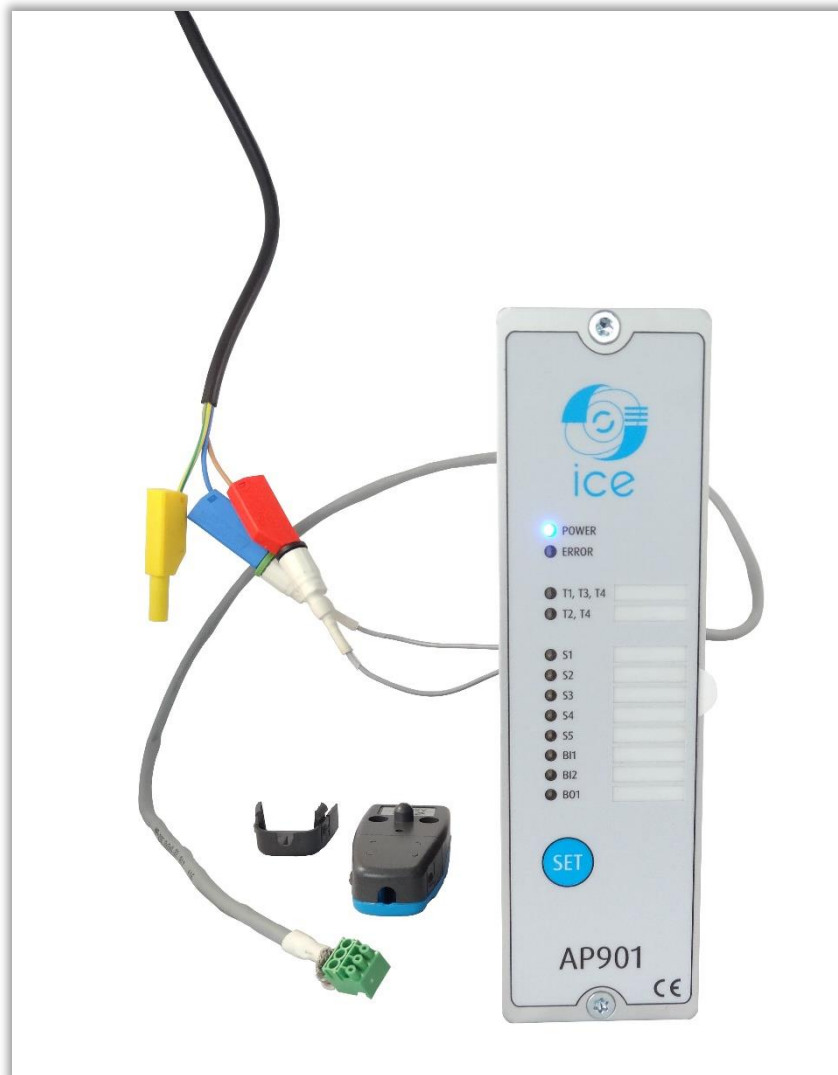


Figure 2-4



5) Attach the connector back to the sensor PCB. See Figure 2-5.



Figure 2-5



6) After connecting the sensor to unit, the ERROR LED turns on, and the appropriate sensor channel LED starts to blink (e.g. S1 LED). See Figure 2-6.

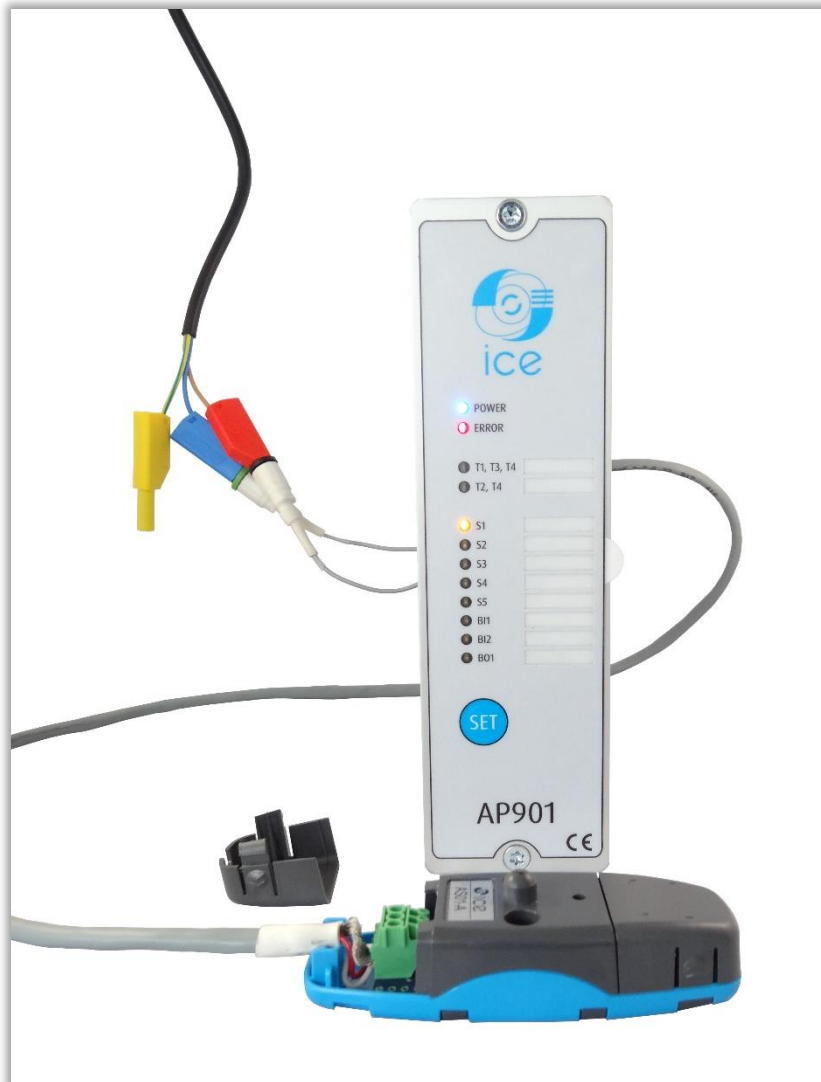


Figure 2-6



7) Press and hold the SET push button on the front panel for 2 seconds in order to run system auto-configuration setting. See Figure 2-7. The unit memorizes the sensor amount and Binary input lines connected (if any).



Figure 2-7



8) After completing the system auto-configuration setting, close both end side-covers back. See Figure 2-8.



Figure 2-8



9) A maximum amount of 3 arc sensors can be daisy-chained to the same sensor input on the AP901 unit. See Figure 2-9.



Figure 2-9

The Auto Configuration is a part of the Self Supervision Function which is making sure that all connections and sensors at all time are fully functional and ready to operate.

