

ACE969TP-2 and ACE969FO-2 Network interfaces

ACE969TP-2 and ACE969FO-2

Function

The ACE969 multi-protocol communication interfaces are for Sepam series 20, Sepam series 40, Sepam series 60 and Sepam series 80.

They have two communication ports to connect a Sepam to two independent communication networks:

- The S-LAN (Supervisory Local Area Network) port is used to connect Sepam to a communication network dedicated to supervision, using one of the three following protocols:

- IEC 60870-5-103
- DNP3
- Modbus RTU.

The communication protocol is selected at the time of Sepam parameter setting.

- The E-LAN (Engineering Local Area Network) port, reserved for Sepam remote parameter setting and operation using the SFT2841 software.

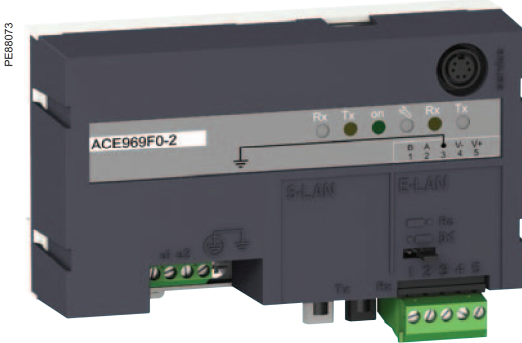
There are two versions of the ACE969 interfaces, which are identical except for the S-LAN port:

- ACE969TP-2 (Twisted Pair), for connection to an S-LAN network using a 2-wire RS 485 serial link
- ACE969FO-2 (Fiber Optic), for connection to an S-LAN network using a fiber-optic connection (star or ring).

The E-LAN port is always a 2-wire RS485 type port.



ACE969TP-2 communication interface.



ACE969FO-2 communication interface.

ACE969TP-2 and ACE969FO-2 network interfaces

Characteristics

ACE969TP-2 and ACE969FO-2 module

Technical characteristics

Weight	0.285 kg (0.628 lb)	
Assembly	On symmetrical DIN rail	
Operating temperature	-25°C to +70°C (-13°F to +158°F)	
Environmental characteristics	Same characteristics as Sepam base units	

Power supply

Voltage	24 to 250 V DC	110 to 240 V AC
Range	-20%/+10%	-20%/+10%
Maximum consumption	2 W	3 VA
Inrush current	< 10 A 100 μs	
Acceptable ripple content	12%	
Acceptable momentary outages	20 ms	

2-wire RS 485 communication ports

Electrical interface

Standard	EIA 2-wire RS 485 differential
Distributed power supply	ACE969-2 not required (built-in)

Fiber optic communication port

Fiber optic interface

Fiber type	Graded-index multimode silica
Wavelength	820 nm (invisible infra-red)
Type of connector	ST (BFOC bayonet fiber optic connector)

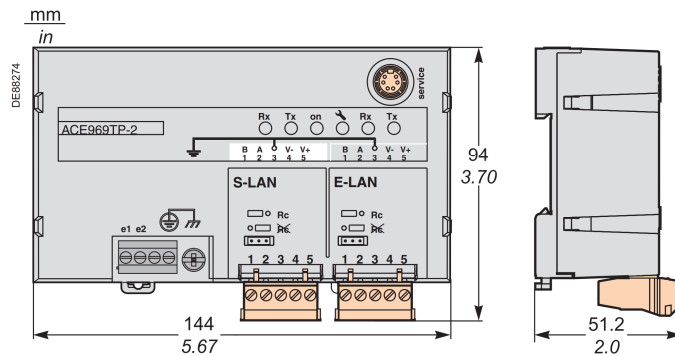
Maximum length of fiber optic network

Fiber diameter (μm)	Numerical aperture (NA)	Attenuation (dBm/km)	Minimum optical power available (dBm)	Maximum fiber length
50/125	0.2	2.7	5.6	700 m (2300 ft)
62.5/125	0.275	3.2	9.4	1800 m (5900 ft)
100/140	0.3	4	14.9	2800 m (9200 ft)
200 (HCS)	0.37	6	19.2	2600 m (8500 ft)

- Maximum length calculated with:
- Minimum optical power available
 - Maximum fiber attenuation
 - Losses in 2 ST connectors: 0.6 dBm
 - Optical power margin: 3 dBm (according to IEC 60870 standard).

Example for a 62.5/125 μm fiber
 $L_{max} = (9.4 - 3 - 0.6)/3.2 = 1.8 \text{ km (1.12 mi)}$.

Dimensions

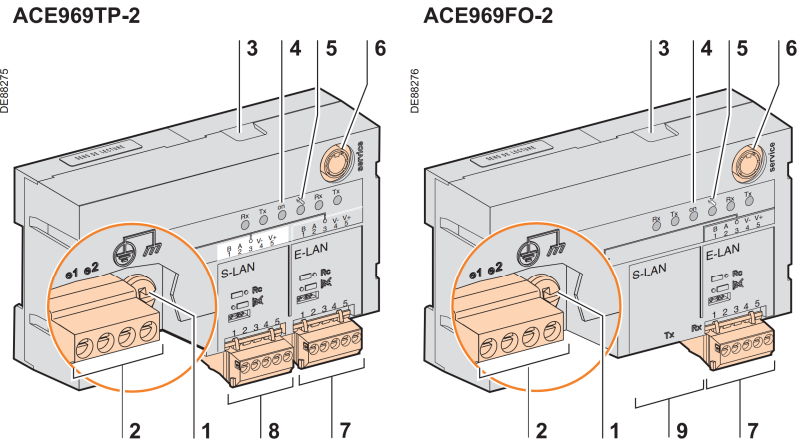


ACE969TP-2 and ACE969FO-2 network interfaces

Description

ACE969-2 communication interfaces

- 1 Grounding/earthing terminal using supplied braid
- 2 Power-supply terminal block
- 3 RJ45 connector to connect the interface to the base unit with a CCA612 cord
- 4 Green LED: ACE969-2 energized
- 5 Red LED: ACE969-2 interface status
 - LED off = ACE969-2 set up and communication operational
 - LED flashing = ACE969-2 not set up or setup incorrect
 - LED remains on = ACE969-2 has faulted
- 6 Service connector: reserved for software upgrades
- 7 E-LAN 2-wire RS485 communication port (ACE969TP-2 and ACE969FO-2)
- 8 S-LAN 2-wire RS485 communication port (ACE969TP-2)
- 9 S-LAN fiber-optic communication port (ACE969FO-2).

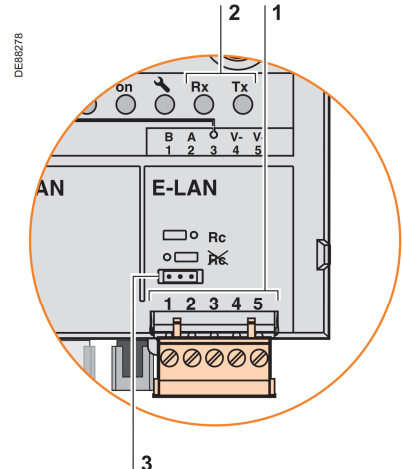
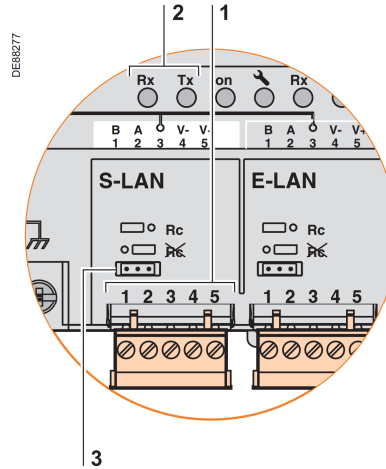


2-wire RS485 communication ports

- 1 Draw-out terminal block, with two rows of connections to the RS485 2-wire network:
 - 2 black terminals: connection of RS485 twisted-pair (2 wires)
 - 2 green terminals: connection of twisted-pair for distributed power supply
- 2 Indication LEDs:
 - flashing Tx LED: Sepam sending
 - flashing Rx LED: Sepam receiving.
- 3 Jumper for RS485 network line-end impedance matching with load resistor ($R_c = 150 \Omega$), to be set to:
 - $\overline{R_c}$, if the interface is not at the line end (default position)
 - R_c , if the interface is at the line end.

S-LAN port (ACE969TP)

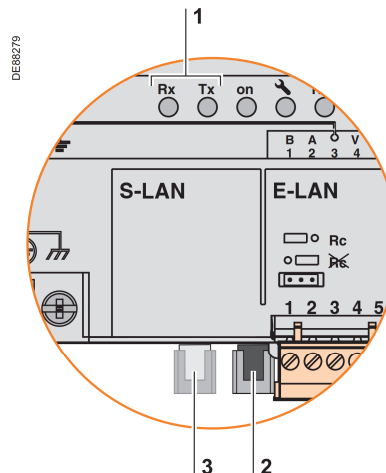
E-LAN port (ACE969TP or ACE969FO)



Fiber-optic communication port

- 1 Indication LEDs:
 - flashing Tx LED: Sepam sending
 - flashing Rx LED: Sepam receiving.
- 2 Rx, female ST-type connector (Sepam receiving)
- 3 Tx, female ST-type connector (Sepam sending).

S-LAN port (ACE969FO)



ACE969TP-2 and ACE969FO-2 network interfaces

Connection

Power supply and Sepam

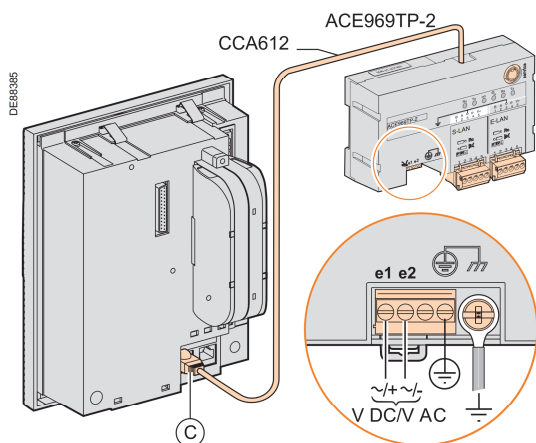
- The ACE969-2 interface connects to connector C on the Sepam base unit using a CCA612 cord (length = 3 m or 9.84 ft, white RJ45 fittings)
- The ACE969-2 interface must be supplied with 24 to 250 V DC or 110 to 240 V AC.

⚠ CAUTION

HAZARD OF ELECTRIC SHOCK, ELECTRIC ARC OR BURNS

- Only qualified personnel should install this equipment. Such work should be performed only after reading this entire set of instructions and checking the technical characteristics of the device.
- NEVER work alone.
- Turn off all power supplying this equipment before working on or inside it. Consider all sources of power, including the possibility of backfeeding.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Start by connecting the device to the protective earth and to the functional earth.
- Screw tight all terminals, even those not in use.

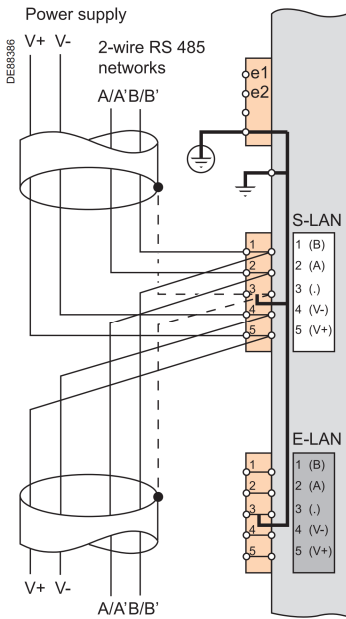
Failure to follow these instructions will result in death or serious injury.



Terminals	Type	Wiring
e1-e2 - supply	Screw terminals	<ul style="list-style-type: none"> ■ Wiring with no fittings: <ul style="list-style-type: none"> □ 1 wire with maximum cross-section 0.2 to 2.5 mm² (≥ AWG 24-12) or 2 wires with maximum cross-section 0.2 to 1 mm² (≥ AWG 24-18) □ stripped length: 8 to 10 mm (0.31 to 0.39 in) ■ Wiring with fittings: <ul style="list-style-type: none"> □ recommended wiring with Schneider Electric fitting: <ul style="list-style-type: none"> - DZ5CE015D for 1 wire 1.5 mm² (AWG 16) - DZ5CE025D for 1 wire 2.5 mm² (AWG 12) - AZ5DE010D for 2 wires 1 mm² (AWG 18) □ tube length: 8.2 mm (0.32 in) □ stripped length: 8 mm (0.31 in).
Protective earth	Screw terminal	1 green/yellow wire, max. length 3 m (9.8 ft) and max. cross-section 2.5 mm ² (AWG 12)
Functional earth	4 mm (0.16 in) ring lug	Earthing braid, supplied for connection to cubicle grounding

ACE969TP-2 and ACE969FO-2 network interfaces

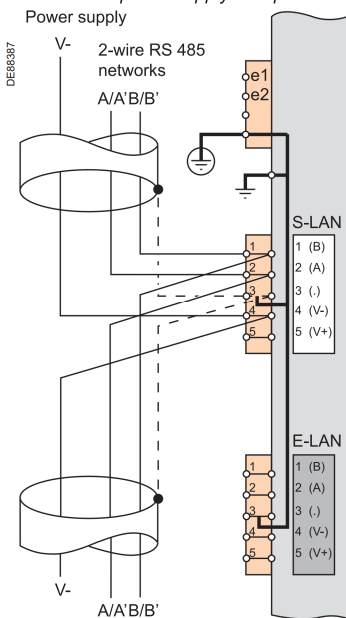
Connection



2-wire RS 485 communication ports (S-LAN or E-LAN)

- Connection of the RS 485 twisted pair (S-LAN or E-LAN) to terminals A and B.
- In case of ACE 969TP wired with ACE969TP-2:
 - connection of twisted pair for distributed power supply to terminals 5(V+) et 4(V-).
 - In case of ACE969TP-2 only:
 - connexion only on the terminal 4(V-) (ground continuity)
 - no need of external power supply.
 - The cable shields must be connected to the terminals marked 3(.) on the connection terminal blocks.
 - Terminal marked 3(.) are linked by an internal connection to the earthing terminals of the ACETP-2 interface (protective an functional earthing): Ie the shielding of the RS 485 cables is earthed as well.
 - On the ACE960TP-2 interface, the cable clamps for the S-LAN and E-LAN RS 485 networks are earthed by the terminal 3.

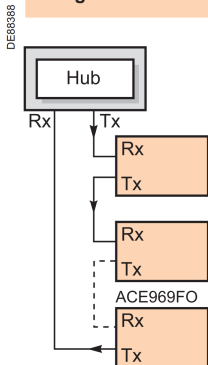
If ACE969TP and ACE969TP-2 are used together, the external power supply is required.



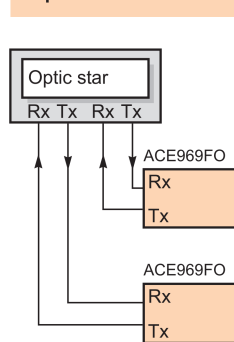
If ACE969TP-2 is used alone, the external power supply is not required, the V- connectors on the modules must be interconnected.

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Ring connection



Optic star connection



Fiber optic communication port (S-LAN)

CAUTION

HAZARD OF BLINDING

Never look directly into the fiber optic.

Failure to follow this instruction can cause serious injury.

The fiber optic connection can be made:

- point-to-point to an optic star system
 - in a ring system (active echo).
- The sending and receiving fiber optic fibers must be equipped with male ST type connectors.
The fiber optics are screw-locked to Rx and Tx connectors.