

Ekip Signalling 10K

EMAX2 signalling unit

Installation and operation instructions



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Ekip Signalling 10K modules

Description The Ekip Signalling 10K is an external signalling accessory module that can be installed on a DIN rail.

On the front, the module has:

- Ten contacts for output signals.
- Ten or eleven digital inputs.
- A power LED, and twenty or twenty-one signalling LEDs (one for each output/input).

In order to switch the state of an input, a short-circuit must be carried out between the input and its reference available on the same connector. The signalling LEDs light up in the presence of the short-circuit for inputs, or when the contact is closed for outputs.



NOTE: *for the positioning of outputs inputs and LEDs, see the paragraph "Outputs inputs and signals".*

The module can communicate with the outside in two alternative ways:

- Via Local Bus, with a single trip unit equipped with an Ekip Supply power supply module.
- Via Link Bus, with a maximum of four trip units each equipped with an Ekip Link module.



IMPORTANT: **the module can be connected only to internal networks with one or more switchboards, to which releases or ABB Emax 2 accessories are connected. It is the installer's responsibility to ensure that all the necessary safety measures are adopted for all the connected devices (for example, the necessary access authorisations, and so on). The module cannot be connected to other networks (for example, with the purpose of monitoring the system, or the office), or to the Internet.**



NOTE:

- *Communications via Local Bus and Link Bus are alternative.*
- *For the location of the communication connectors, see the paragraph "Communication connectors".*

With communication via Local Bus, unless the trip unit is disconnected, then module contacts closing/opening is controlled by the trip unit and the information on the input status is transmitted by the module to the trip unit. In particular, the trip unit can be programmed so that:

- The closing/opening of a contact corresponds to a desired event or combination of events detected by the trip unit.
- The activation of an input corresponds to an action by the trip unit.

With multiple 10-K modules connected via Local Bus to the same trip unit, these can be at most three, and must be configured differently as a 10K-1 a 10K-2 and a 10K-3.



NOTE: *the 10K-1 and 10K-2 modules are equipped with eleven inputs (with as many LEDs, giving a total of twenty-one LEDs), while the 10K-3 module is equipped with ten inputs (with as many LEDs, giving a total of twenty LEDs).*

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With communication via Link Bus:

- The module is connected to a network on which the trip units equipped with an Ekip Link module share data packets containing information on their own state.
- The IP addresses of the trip units to which you wish to connect the module must be inserted into the module, and each contact can be programmed to be closed/opened in response to an event or combination of events regarding a trip unit connected.
- If the module receives a packet sent from a trip unit connected, the module reads the content of the packet and triggers any action that may have been programmed.

With Link Bus communication, the ports used by the module are:

Port	Service	Notes
502/tcp	Modbus TCP	When the module is used as a communication module.
18/udp	ABB proprietary	In case of exchange of fast information between ABB devices.

Compatibility and power supply The module can be installed in the presence of all Dip LCD and Touch models of the Ekip series trip units (including High, G, and G High models). The module must be powered independently from the trip units to which it's connected, and can be powered in AC or DC.



IMPORTANT: AC and DC power supplies cannot be present at the same time.



NOTE: for the positioning of the power supply inputs, see the paragraph "Power supply connectors".

Electrical characteristics The following table lists the electrical specifications of the module power supplies and outputs:

Component	Characteristics
AC power supply	• Voltage: 105...265 V AC. • Frequency: 45...66 Hz. • Power absorbed with 10 contacts closed: 10 VA.
DC power supply	• Voltage: 21.5...53 V DC. • Power absorbed with 10 contacts closed: 10W.
Output contacts	• Maximum switching power⁽¹⁾: 1250 VA. • Maximum switching voltage⁽¹⁾: 150 V DC / 250 V AC. • Breaking capacity⁽¹⁾: 2 A @ 30V DC, 0.8 A @ 50V DC, 0.2 A @ 150V DC, 4 A @ 250V AC. • Dielectric strength between open contacts and between every contact and coil: 1000 V AC (1 minute @ 50 Hz).

⁽¹⁾ Data related to a resistive load.

Configuration using switches At installation, the module must be configured to communicate via Local Bus or Link Bus.

With communication via Local Bus, a 120 Ω termination resistor can be inserted on the communication lines.
In order to insert the termination resistor, configure the module as a 10K-1 a 10K-2 or a 10K-3, and select the communication via Link Bus, some switches positioned on the upper side of the module must be configured.
The following tables describe the possible configurations.

Switch	Termination resistor	
	No	Yes
1	OFF	ON

Switch	Ekip Signalling 10K-1	Ekip Signalling 10K-2	Ekip Signalling 10K-3	Link Bus
2	OFF	ON	OFF	ON
3	OFF	OFF	ON	ON

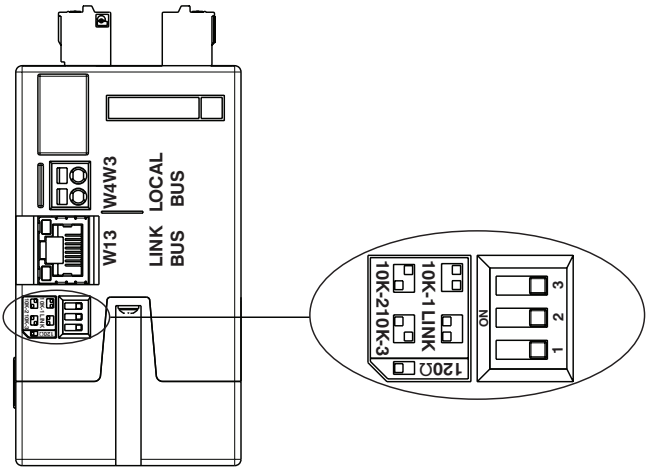


Figure 1



NOTE: the operational configuration is read only at power on. Therefore, if the module is on, it must be turned off and on in order for it to recognise a new configuration.

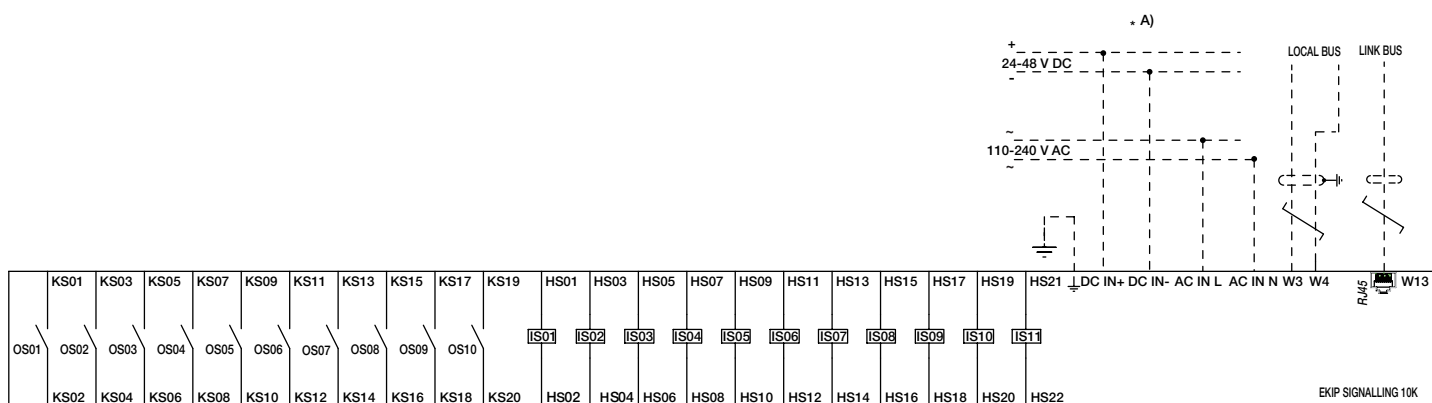
Connections The module must be mounted on a DIN rail, and connected by wiring the connectors on the module.

With communication via Local Bus, the communication lines on the module must be connected to the corresponding lines on the power supply module of the trip unit.

On the contrary, with communication via Link Bus, the Link Bus connector on the module must be connected to an Ethernet switch.

For the wirings:

- For the Local Bus, Belden type 3105A or equivalent cables must be used, that is with a pair of twisted and shielded cables, with a characteristic impedance equal to 120 Ω . The screen of the cables must be connected to earth on one side of the connection, on the trip unit side. The maximum recommended length for the connection is 15 m.
- For communication via Link Bus, a cable of type Cat.6 S/FTP must be used (Cat.6 with S/FTP double shielding).



A) See the paragraph "Compatibility and power supply".



NOTE: the 10K-3 module is equipped with ten inputs; therefore, unlike the 10K-1 and 10K-2 modules, it doesn't have pins H S21 and H S22 and LED I S11.

Access via Local Bus Access via Local Bus allows the module to be shown on the display of the trip unit to which the module is connected.

In order to show the module on the display of the trip unit, the module must be powered, configured through switches as a 10K-1 a 10K-2 or a 10K-3 (see the paragraph "Configuration using switches"), and connected correctly to the trip unit, and the Local Bus must be enabled on the trip unit. Then the presence of the module activates on display additional menus, that allow information on the module and the inputs and outputs status to be displayed.

The following table illustrates the path to access information on the module:

	Protection Unit		
	Circuit breaker		
	Modules	...	
		Ekip Signalling 10K-1	Info
			Input
			Output
		Ekip Signalling 10K-2	⁽¹⁾
		Ekip Signalling 10K-3	⁽¹⁾
	Power Controller		

⁽¹⁾ Like the Ekip Signalling 10K-1 menu.

The information on the module that can be displayed is:

- The serial number and the software version.
- The logical state of the inputs ("Off" if not active, "On" if active).
- The state of the output contacts ("Open" if open, "Closed" if closed).

For operation with communication via Local Bus, the module can be configured only with the Ekip Connect application and an Ekip T&P module connected to the trip unit (see the manuals [1SDH000999R0002](#) and [1SDH001000R0002](#)).

The following table illustrates the configuration parameters of the inputs, and their possible values:

Parameter	Selectable values	Default	Description
Polarity	Active Closed Active Open	Active Closed	• Active Closed = To be considered active, the input must be short-circuited to its reference. • Active Open = To be considered active, the input must be floating.
Delay	0.00...100.00 s in steps of 0.01 s	0.10 s	Delay time after the input has changed state, before the change of state is validated (if the input is reset before this time has elapsed, the change of state is invalidated). If 0.00 s is selected, the value assigned to the parameter is 300 µs.

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The following table illustrates the configuration parameters of the outputs, and their possible values:

Parameter	Selectable values	Default	Description
Contact Type	Normally Open Normally Closed	Normally Open	• Normally Open = Normally open contact. • Normally Closed = Normally closed contact.
Latched	OFF ON	OFF	• OFF = Self-latching disabled: the output is deactivated when the event disappears. • ON = Self-latching enabled: when the event disappears, the output is kept active for at least the selected time. ! IMPORTANT: if the output is used for the Power Controller function ⁽¹⁾, self-latching must not be enabled.
Signal Source	• None • L prealarm • L timing • S timing • L trip • S trip • G trip • I Trip • Any trip • Any alarm • Threshold1 I1 ⁽²⁾ • Threshold2 I1 ⁽²⁾ • CB Open • CB Closed • Local Bus Not Active ⁽³⁾ • Custom ⁽⁴⁾	None	Event in response to which the output must be activated, that is the contact must be: • Closed, if set as normally open. • Open, if set as normally closed.
Delay	0.00...100.00 s in steps of 0.01 s	0.00 s	Delay time after the selected event has taken place, before the output is activated (if the event disappears before this time has elapsed, the output is not activated). If 0.00 s is selected, the value assigned to the parameter is 300 µs.
min Activation Time	0 ms 100 ms 200 ms Power Controller	0 ms	• With self-latching enabled, the minimum time in which the output is kept active (when the selected time is exceeded, the output is kept active as long as the event that activated it persists). • The Power Controller value can be selected only if the output is used for the Power Controller function ⁽¹⁾. Then the output is kept active for a fixed time typical of the function, regardless of the persistence of the event that activated it. • In case of disconnection, the min Activation Time is ignored, and the outputs programmed to be activated in the event of disconnection are kept active for at least 200 ms. ! IMPORTANT: if the output is not used for the Power Controller function, the Power Controller value must not be selected.

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⁽¹⁾ See the manual [1SDH001316R0002](#).

⁽²⁾ The events Threshold1 I1 and Threshold2 I1 correspond to the activation of the thresholds 1 and 2 related to current I1; see the Touch protections in the manual [1SDH001316R0002](#).

⁽³⁾ With communication via Local Bus, the Local Bus Not Active event corresponds to the communication absent condition (e.g. because of Local Bus deactivation, or physical disconnection).

⁽⁴⁾ The Custom event is a combination of default events, which can be modified using the Ekip Connect application to match the closing/opening of the contact to a wide range of combinations of the trip unit status bits.



IMPORTANT: if the trip unit is disconnected for at least 8 s, the outputs are deactivated, except those programmed to be activated in case of disconnection. Normal operation is restored at reconnection.

The following table illustrates the actions that can be programmed on the trip unit (indicated as Functions on Ekip Connect), and that can be performed in case of an input activation, or a combination of active and inactive inputs.

Action	Description
EXTERNAL TRIP	Execution of a trip.
TRIP RESET	Reset of the trip signal.
SWITCH ON SET B	Feasible with Dual Set enabled, switching of the protections configuration from A to B ⁽¹⁾ .
SWITCH ON LOCAL	Switching of the connection from remote to local.
SIGNALLING RESET	Reset of the signals.
ENERGY RESET	Reset of the energy counters ⁽²⁾ .
YO COMMAND	Trip command of the opening coil.
YC COMMAND	Trip command of the closing coil.

⁽¹⁾ See the Hi-Touch protections in the manual [1SDH001316R0002](#).

⁽²⁾ See the Measuring measurements in the manual [1SDH001316R0002](#).

Access via Link Bus Via Link Bus, the module can be configured only with the Ekip Connect application, by running the Ethernet scan and selecting the module from the devices found.

From Ekip Connect, at most three accesses to the module are possible.

With the Ekip Connect application and the Ethernet scan, various pages are available, in which you can:

- Display information on the module.
- Insert the TAG Name, in order to facilitate the module recognition in subsequent Ethernet scans.
- Connect the module to up to four devices (actors) connected to the network.
- Protect the configuration of the module.
- Configure the inputs and the outputs.
- Enable/disable the LED Alive option (see the paragraph "Outputs inputs and signals").

Information

The information on the module that can be displayed is:

- The serial number and the software version.
- The IP address, the Network Mask, and the Gateway address.
- The MAC address.
- The logical state of the inputs ("Off" if not active, "On" if active).
- The state of the output contacts ("Open" if open, "Closed" if closed).

The following table illustrates the information on the module:

Information	Description
IP address	It's the address assigned to the module at the moment of connection to the network. It consists of four bytes (for a total of 32 bits), each of which can have value from 0 to 255. By default, allocation is dynamic. With dynamic allocation, the module waits to receive the IP address from a DHCP server. Without a DHCP server, the module adopts an Autoconfiguration IP address in the range 169.254.xxx.xxx, calculated in a pseudo-random way so that it's the same at every power on. Alternatively, it's possible to enable the Static IP address option, that allows the IP address to be forced. Then it's necessary to make sure that the inserted IP address is different from the ones of the other devices connected to the same network.
Network Mask	It's the subnet mask, and it identifies the method to recognize the subnet to which the module belongs, with the possibility to search for the module within a defined set of recipients. If the Static IP address option is enabled, the correct Network Mask must also be inserted.
Gateway address	It's the IP address of the node to which the module is connected, in the presence of multiple subnets. If the Static IP address option is enabled, the correct Gateway address must also be inserted.
MAC address	It's the address assigned by ABB, having an OUI equal to ac:d3:64.

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Connection

In order to connect the module to devices (actors) connected to the network, four positions are available with values from 0 to 3.

In each position it's possible to insert the IP address of a trip unit equipped with an Ekip Link module, the IP address of the module, or a null value (meaning no IP address inserted).



NOTE: *except for the null value, it's not possible to insert the same IP address in more than one position.*

If a trip unit of which the IP address is inserted results disconnected for at least 8 s, this is signalled both by Ekip Connect, and by the module through the power LED with two quick flashes and a pause.

Protection

The module can be protected in two ways:

- By changing access from remote to local.
- By password.

With local access:

- All further modifications performed from Ekip Connect are prevented.
- In order to restore remote access, the switches of the module must be positioned to OFF for at least 1 s, and repositioned to ON (see the paragraph "Configuration using switches").



NOTE: *to restore remote access, after the commutation of the switches, it's not necessary to turn the module off and on.*

In order to protect the module by password, access must be remote, and the "Password Required" operating mode must be selected instead of the "Standard mode" one: then, any modification from Ekip Connect can be performed only after the password insertion. The password:

- Has a default value equal to 1.
- Can be modified only in "Password Required" mode, by selecting the "Change Password" command and filling the "Insert new password" field.
- Can have only a numerical value between 0 and 99999.
- Can be reset (with restoration of the default value), by positioning the switches to OFF for at least 1 s, and repositioning them to ON (see the paragraph "Configuration using switches").



NOTE:

- *If any zero is inserted before the numerical value of the password, it's ignored.*
- *To reset the password, after the commutation of the switches, it's not necessary to turn the module off and on.*

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Inputs and outputs

The configuration of inputs and outputs is identical to that via Local Bus (see the paragraph "Access via Local Bus"). Precisely:

- The setting of the Polarity and Delay parameters for the inputs, and of the Contact Type, Latched, Signal Source, Delay, and min Activation Time parameters for the outputs.
- The possibility to match the activation of an output to a wide range of combinations of a trip unit status bits, or to its disconnection.

In addition:

- For each output, an actor - that is, one of the four available positions for the insertion of the IP addresses - must be selected (by default, the position 0 is selected).
- Each output can be programmed to be activated at the disconnection of any combination of the trip units selected and of the Ethernet cable (physical disconnection).
- By selecting the actor corresponding to the IP address of the module, the output can be programmed to be activated on the basis of the module status bits (e.g. the state of inputs and/or outputs).



NOTE: *to program the activation of an output in case of disconnection, the actor to which the output has to be associated must not be selected by setting the Actor Number parameter. Instead, the trip units and the module must be selected via the Signal Source menu, setting to 1 the bits associated to the actor disconnection events (to select the trip units for which disconnection must be signalled) and to the physical disconnection event (to signal the disconnection of the module). If the output is programmed to be activated in case of disconnection (of one or more trip units and/or the module), the value assigned to the Actor Number parameter is ignored.*



IMPORTANT: **the outputs programmed to be activated in case of disconnection are activated if the disconnection persists for at least 8 s.**

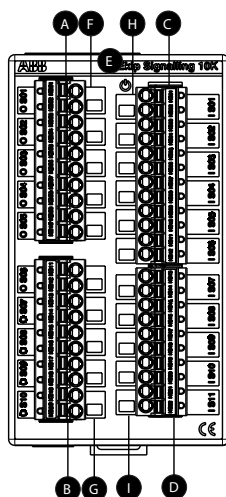


NOTE: *if a trip unit results disconnected from the network, only the outputs associated to the trip unit are deactivated (except those programmed to be activated in case of disconnection of the trip unit, that are activated). On the contrary, if it's the module that disconnects from the network, all the outputs are deactivated (except all those programmed to be activated in case of disconnection, of the module and/or of the trip units). In both cases, normal operation is restored on reconnection (of the trip unit in the first case, of the module in the second).*

Outputs inputs and signals

The outputs and the inputs are accessible on the connectors positioned on the front of the module.

The following table illustrates the pins of these connectors:



Position	Pin	Description
A	KS01, KS02	Pins of the output contact O S01.
	KS03, KS04	Pins of the output contact O S02.
	KS05, KS06	Pins of the output contact O S03.
	KS07, KS08	Pins of the output contact O S04.
	KS09, KS10	Pins of the output contact O S05.
B	KS11, KS12	Pins of the output contact O S06.
	KS13, KS14	Pins of the output contact O S07.
	KS15, KS16	Pins of the output contact O S08.
	KS17, KS18	Pins of the output contact O S09.
	KS19, KS20	Pins of the output contact O S10.
C	HS01, HS02	Input I S01 and its reference.
	HS03, HS04	Input I S02 and its reference.
	HS05, HS06	Input I S03 and its reference.
	HS07, HS08	Input I S04 and its reference.
	HS09, HS10	Input I S05 and its reference.
	HS11, HS12	Input I S06 and its reference.
D	HS13, HS14	Input I S07 and its reference.
	HS15, HS16	Input I S08 and its reference.
	HS17, HS18	Input I S09 and its reference.
	HS19, HS20	Input I S10 and its reference.
	HS21, HS22	Not present on the 10K-3, input I S11 and its reference.

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The following table illustrates the signals related to the outputs, and their meaning:

Position	LED	Description
E	-	Power LED, green. The possible states are: • Off: power supply absent. • On, fixed: power supply present, and communication via Local Bus/Link Bus active (with LED Alive option disabled ⁽¹⁾). • On, flashing once per second: power supply present, and communication via Local Bus/Link Bus active (with LED Alive option enabled ⁽¹⁾). • On, with two quick flashes per second: power supply present, and communication via Local Bus/Link Bus absent (e.g. because of Local Bus deactivation, or trip unit disconnection ⁽²⁾, or physical disconnection) ⁽³⁾.
F	O S01	Signalling LED of the contact O S01 status, green. The possible states are: • Off: contact open. • On, fixed: contact closed.
	O S02	Signalling LED of the contact O S02 status, green. The possible states are: • Off: contact open. • On, fixed: contact closed.
	O S03	Signalling LED of the contact O S03 status, green. The possible states are: • Off: contact open. • On, fixed: contact closed.
	O S04	Signalling LED of the contact O S04 status, green. The possible states are: • Off: contact open. • On, fixed: contact closed.
	O S05	Signalling LED of the contact O S05 status, green. The possible states are: • Off: contact open. • On, fixed: contact closed.
G	O S06	Signalling LED of the contact O S06 status, green. The possible states are: • Off: contact open. • On, fixed: contact closed.
	O S07	Signalling LED of the contact O S07 status, green. The possible states are: • Off: contact open. • On, fixed: contact closed.
	O S08	Signalling LED of the contact O S08 status, green. The possible states are: • Off: contact open. • On, fixed: contact closed.
	O S09	Signalling LED of the contact O S09 status, green. The possible states are: • Off: contact open. • On, fixed: contact closed.
	O S10	Signalling LED of the contact O S10 status, green. The possible states are: • Off: contact open. • On, fixed: contact closed.

⁽¹⁾ The LED Alive option with communication via Local Bus is the one set on the trip unit, with communication via Link Bus it's the one set on the module.

⁽²⁾ With communication via Link Bus, absence of communication is signalled if any trip unit associated to the module is disconnected.

⁽³⁾ The absence of communication is signalled if it persists for at least 8 s.

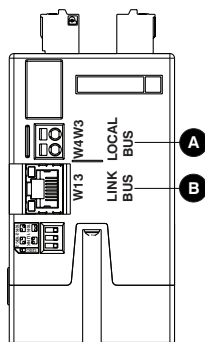
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The following table illustrates the signals related to the inputs, and their meaning:

Position	LED	Description
H	I S01	Signalling LED of the input I S01 physical status, green. The possible states are: • Off: input floating. • On, fixed: short-circuit between pins HS01 and HS02
	I S02	Signalling LED of the input I S02 physical status, green. The possible states are: • Off: input floating. • On, fixed: short-circuit between pins HS03 and HS04.
	I S03	Signalling LED of the input I S03 physical status, green. The possible states are: • Off: input floating. • On, fixed: short-circuit between pins HS05 and HS06.
	I S04	Signalling LED of the input I S04 physical status, green. The possible states are: • Off: input floating. • On, fixed: short-circuit between pins HS07 and HS08.
	I S05	Signalling LED of the input I S05 physical status, green. The possible states are: • Off: input floating. • On, fixed: short-circuit between pins HS09 and HS10.
	I S06	Signalling LED of the input I S06 physical status, green. The possible states are: • Off: input floating. • On, fixed: short-circuit between pins HS11 and HS12.
I	I S07	Signalling LED of the input I S07 physical status, green. The possible states are: • Off: input floating. • On, fixed: short-circuit between pins HS13 and HS14.
	I S08	Signalling LED of the input I S08 physical status, green. The possible states are: • Off: input floating. • On, fixed: short-circuit between pins HS15 and HS16.
	I S09	Signalling LED of the input I S09 physical status, green. The possible states are: • Off: input floating. • On, fixed: short-circuit between pins HS17 and HS18.
	I S10	Signalling LED of the input I S10 physical status, green. The possible states are: • Off: input floating. • On, fixed: short-circuit between pins HS19 and HS20.
	I S11	Not present on the 10K-3, signalling LED of the input I S11 physical status, green. The possible states are: • Off: input floating. • On, fixed: short-circuit between pins HS21 and HS22.

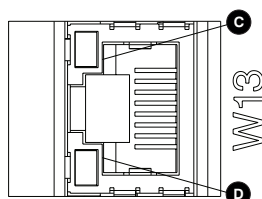
Communication connectors

The communication connectors are positioned on the upper side of the module. The following table illustrates the communication connectors:



Position	Name	Description
A	Local Bus W3	Line H of the Local Bus
	Local Bus W4	Line L of the Local Bus
B	Link Bus W13	Link Bus Connector

The following table illustrates the possible signals on connector W13, and their meaning:

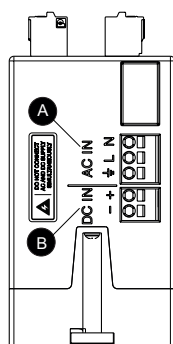


Position	Description
C	Link LED, green. The possible states are: • Off: connection error (signal absent). • On, fixed: correct connection.
D	Activity LED, yellow. The possible states are: • Off: absence of activity on the line. • On, fixed or flashing: activity present on the line (reception and/or transmission).

Power supply connectors

The power supply connectors are positioned on the lower side of the module.

The following table illustrates the power supply inputs:



Position	Name	Description
A	AC IN N	AC power input
	AC IN L	AC power input
		Earth connection
B	DC IN +	DC + power input
	DC IN -	DC - power input

