

ekor.rps

Multifunctional protection unit
Volume 3 of 3: **ekor.rps-tpc**

General instructions
IG-150-EN, version 04, 03/10/16



CAUTION!

When medium-voltage equipment is operating, certain components are live, other parts may be in movement and some may reach high temperatures. Therefore, the use of this equipment poses electrical, mechanical and thermal risks.

In order to ensure an acceptable level of protection for people and property, and in compliance with applicable environmental recommendations, **Ormazabal** designs and manufactures its products according to the principle of integrated safety, based on the following criteria:

- **Elimination of hazards wherever possible.**
- **Where elimination of hazards is neither technically nor economically feasible, appropriate protection functions are incorporated in the equipment.**
- **Communication about remaining risks to facilitate the design of operating procedures which prevent such risks, training for the personnel in charge of the equipment, and the use of suitable personal protective equipment.**
- **Use of recyclable materials and establishment of procedures for the disposal of equipment and components so that once the end of their service lives is reached, they are duly processed in accordance, as far as possible, with the environmental restrictions established by the competent authorities.**

Consequently, the equipment to which the present manual refers complies with the requirements of section 11.2 of Standard IEC 62271-1. It must therefore only be operated by appropriately qualified and supervised personnel, in accordance with the requirements of standard EN 50110-1 on the safety of electrical installations and standard EN 50110-2 on activities in or near electrical installations. Personnel must be fully familiar with the instructions and warnings contained in this manual and in other recommendations of a more general nature which are applicable to the situation according to current legislation^[1].

The above must be carefully observed, as the correct and safe operation of this equipment depends not only on its design but also on general circumstances which are in general beyond the control and responsibility of the manufacturer. More specifically:

- **The equipment must be handled and transported appropriately from the factory to the place of installation.**
- **All intermediate storage should occur in conditions which do not alter or damage the characteristics of the equipment or its essential components.**
- **Service conditions must be compatible with the equipment rating.**
- **The equipment must be operated strictly in accordance with the instructions given in the manual, and the applicable operating and safety principles must be clearly understood.**
- **Maintenance should be performed properly, taking into account the actual service and environmental conditions in the place of installation.**

The manufacturer declines all liability for any significant indirect damages resulting from violation of the guarantee, under any jurisdiction, including loss of income, stoppages and costs resulting from repair or replacement of parts.

Warranty

The manufacturer guarantees this product against any defect in materials and operation during the contractual period. In the event that defects are detected, the manufacturer may opt either to repair or replace the equipment. Improper handling of this equipment and its repair by the user shall constitute a violation of the guarantee.

Registered Trademarks and Copyrights

All registered trademarks cited in this document are the property of their respective owners. The intellectual property of this manual belongs to **Ormazabal**.

^[1] For example, in Spain the "Regulation on technical conditions and guarantees for safety in high-voltage electrical installations" – Royal Decree 337/2014 is obligatory.

In view of the constant evolution in standards and design, the characteristics of the elements contained in this manual are subject to change without prior notice. These characteristics, as well as the availability of components, are subject to confirmation by **Ormazabal**.

Contents

1. Introduction	4
1.1. Protection functions	5
2. ekor.rps-tcp unit components	6
2.1. CPU module	7
2.1.1. Description	7
2.1.2. Technical characteristics.....	7
2.1.3. Connection	8
2.2. Power supply module.....	8
2.2.1. Connection.....	8
2.2.2. Technical characteristics.....	9
2.3. Digital input and output modules	9
2.3.1. Connection of the 16-DI and 16-DO module.....	9
2.3.2. Connection of the 16-DI and 8-independent DO module.....	10
2.3.3. Technical characteristics.....	10
2.4. Digital input module.....	11
2.4.1. Connection	11
2.4.2. Technical characteristics.....	11
2.5. Digital and analog input modules	12
2.5.1. Connection of the 16-DI and 7-AI module	12
2.5.2. Connection of the 16-DI and 7-AI (4 isolated AI) module).....	12
2.5.3. Technical characteristics.....	13
2.6. Protection module.....	13
2.6.1. Functional description	13
2.6.2. Hardware description	13
2.7. Human-machine interface (HMI).....	14
2.7.1. HMI functions.....	14
2.7.2. Graphic Screen.....	14
2.7.3. Light signals	15
2.7.4. Keypad	15

1. Introduction^[2]

The **ekor.rps-tcp** position control unit carries out control, protection, metering and local automation functions for any electrical positions (feeders, transformers, capacitors banks, etc.).

The **ekor.rps-tcp** unit is part of the Integrated protection and control system (SIPC), which is a solution for electrical substations full automation, according to each installation's and client's needs. It can be installed in the MAT substations, as well as in small secondary distribution substations.

One of the main advantages of **ekor.rps-tcp** units is their ability to work autonomously, allowing them to carry out their basic functions, regardless of the state of the other system elements.

ekor.rps-tcp units are made up of modular Hardware and completely configurable Software. The unit's Software is

configured with the program **SIPCON automatismos**, which allows to program automation functions, configure the graphical display, etc.

ekor.rps-tcp units can have serial and Ethernet communication ports and high data processing capacity, as it is based on a 32-bits microprocessor. Besides, it offers the possibility of having a redundant supply, IRIG-B input for synchronization, etc.

All the characteristics above make the **ekor.rps-tcp** unit a very strong and reliable solution that fulfills the most demanding needs of the substations automation systems currently installed.

The **ekor.rps-tcp** unit has been designed in compliance with the requirements specified in the following standards and electrical tests:

Electrical tests	Standards	Conditions
Electrostatic discharge immunity test	IEC 61000-4-2	Class IV
Radiated radio-frequency electromagnetic field immunity test	IEC 61000-4-3	Class III
Radiated electromagnetic field from digital radio telephones immunity test	ENV 50204	
Electrical fast transient/burst immunity test	IEC 61000-4-4	Class IV
Immunity to conducted disturbances, induced by radio-frequency fields	IEC 61000-4-6	Class III
Surge immunity test	IEC 61000-4-5	Class IV
1 MHz burst immunity test	IEC 60255-22-1	Class III
Radiated emission measurement test	EN 55011	Class A, group 1
Ring wave immunity test	IEC 61000-4-12	
50 Hz power frequency magnetic field immunity test	IEC 61000-4-8	Class V
Voltage dips, short interruptions and voltage variations on DC input power port immunity test	IEC 61000-4-29	
Interruptions to and alternating component (ripple) in DC auxiliary energizing quantity of measuring relays	IEC 60255-11	
Pulse magnetic field immunity test	IEC 61000-4-9	Class V
Damped oscillatory magnetic field immunity test	IEC 61000-4-10	
Dielectric strength measurement test	IEC 60255-5	Class III
Insulation resistance measurement test	IEC 60255-5	
Voltage pulses insulation measurement test	IEC 60255-5	Class III

Table 1.1. Electrical tests

^[2] Please consult **volume I, chapter 2.2. Construction Characteristics (ekor.rps-tcp)** of the document **IG-150** to see the dimensions of the **ekor.rps-tcp** unit.

Climatic tests	Standards	Conditions
Cold test	IEC 60068-2-1	
Dry heat test	IEC 60068-2-2	
Damp heat test	IEC 60068-2-3	
Damp heat, cyclic test	IEC 60068-2-30	
Change of temperature test	IEC 60068-2-14	
Surge immunity test	IEC 61000-4-5	
1 MHz burst immunity test	IEC 60255-22-1	
Radiated emission measurement test	EN 55011	
Ring wave immunity test	IEC 61000-4-12	
50 Hz power frequency magnetic field immunity test	IEC 61000-4-8	
Voltage dips, short interruptions and voltage variations on DC input power port immunity test	IEC 61000-4-29	
Interruptions to and alternating component (ripple) in DC auxiliary energizing quantity of measuring relays	IEC 60255-11	
Pulse magnetic field immunity test	IEC 61000-4-9	
Damped oscillatory magnetic field immunity test	IEC 61000-4-10	
Dielectric strength measurement test	IEC 60255-5	
Insulation resistance measurement test	IEC 60255-5	
Voltage pulses insulation measurement test	IEC 60255-5	
Vibration test (sinusoidal)	IEC 60255-21-1	Class I
Shock and bump test	IEC 60255-21-2	Class I

Table 1.2. Climatic tests

1.1. Protection functions

- | | |
|---------------------------------------------------------|------------------------------------------------|
| 1. Phase and neutral overcurrent (3 x 50/51, 50 N/51 N) | 11. Zero-sequence overvoltage 59 N |
| 2. Phase and neutral directional overcurrent (67, 67 N) | 12. Thermal image 49 |
| 3. Sensitive neutral overcurrent (50/51 Ns) | 13. Fuse failure 68 FF |
| 4. Isolated neutral overcurrent 67 NA | 14. Frequency unit 81 M/m |
| 5. Current unbalance 46 | 15. Power protection 32 |
| 6. Open phase/broken conductor 46 FA | 16. Switch/circuit breaker monitoring 74 TC/CC |
| 7. Voltage controlled overcurrent 51 V | 17. Sincrocheck 25 |
| 8. Switch/circuit breaker failure 50 BF | 18. Recloser 79 |
| 9. Overvoltage/undervoltage 59, 27 | 19. Cold load pickup |
| 10. Voltage unbalance 47 | 20. High current lockout |

2. ekor.rps-tcp unit components

The ekor.rps-tcp is provided with a physical support, which consists of a chassis with highly reliable modular hardware

made up of different cards or modules. This feature makes the unit suitable for any electrical configurations

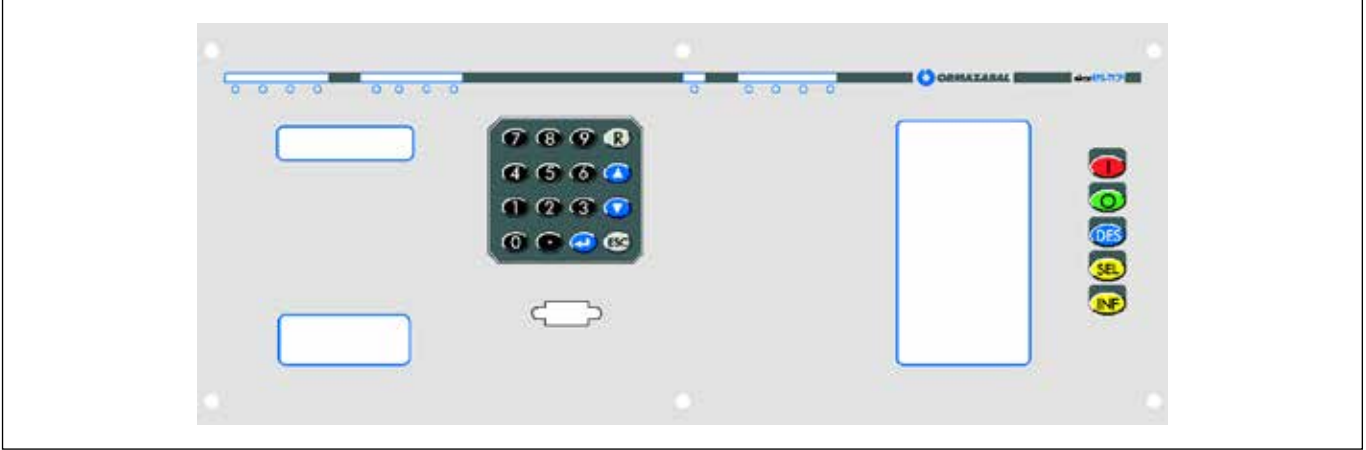


Figure 2.1. ekor.rps-tcp unit front display panel

1. CPU module with independent power supply.
2. Maximum No. of input/output modules:
 - a. 3 if the protection has an input/output extension module (preferred option).
 - b. 4 if the protection does not have an input/output extension module.
3. Protection module.
Protection functions can be accessed locally, using a keypad/display integrated in the equipment consisting of:
 - a. 2-line, 16-character liquid crystal display.
 - b. 16-key alphanumeric keypad, including recloser on/off push-button and optical indicator.
 - c. 8 programmable optical indicators which report unit operations.

- d. Front communication port: RS232.
The information is displayed in a tree menu structure, so that all functional parameters can be accessed.
4. The voltage and current acquisition for the measurement module can be done by means of:
 - a. Pin type terminals (preferred option).
 - b. Closed terminals (step: 9.5 mm).
3. The protection unit includes network parameter metering in class 0.5.
4. Optical signals.
5. Human-machine interface (HMI).
6. Operating temperature: -10 °C/55 °C
7. Extended operating temperature (as an option): -20 °C/75 °C
8. Storage temperature: -40 °C/85 °C.

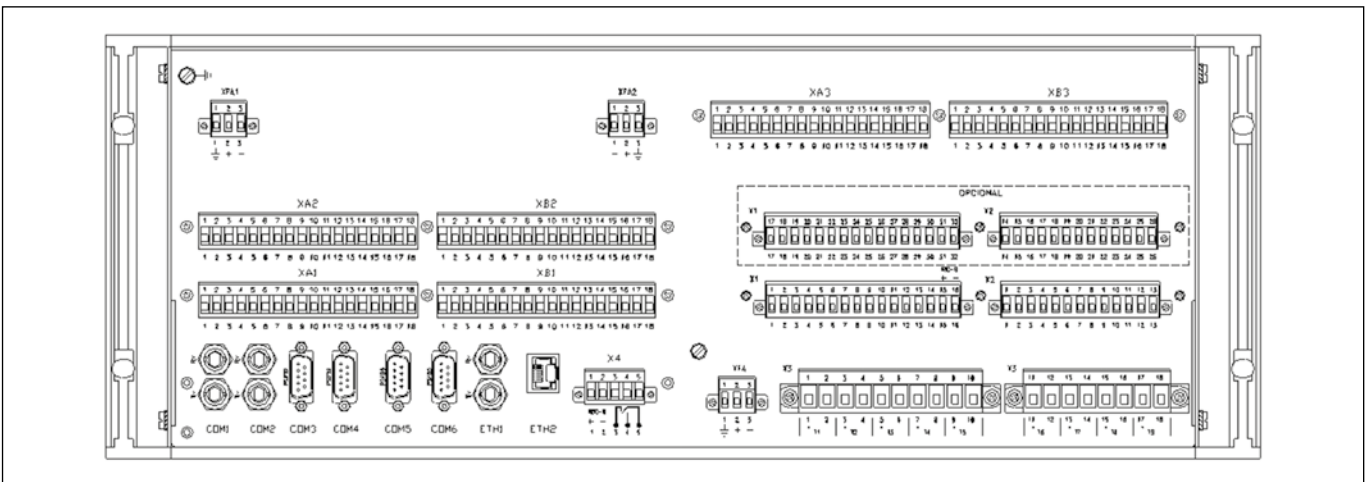


Figure 2.2. ekor.rps-tcp rear view

2.1. CPU module

The control CPU module incorporates a powerful microprocessor, which executes the automation functions involving digital and analog signals directly controlled as well as those received from the protection.

This module operates as the master terminal unit (MTU) within the **ekor.rps-tcp** unit. It monitors the equipment communications and manages the data transfer with the internal protection, metering or wave quality units and with other **ekor.rps-tcp** peripherals, such as the substation control unit (UCS) and other intelligent electronic devices (IED).

2.1.1. Description

This module monitors all the modules housed in the same **ekor.rps-tcp** unit. It also carries out the necessary Hardware/Software diagnosis and manages any data transfer via communications.

1. RS232
2. RS485
3. Glass fiber optic
4. Plastic fiber optic

This module incorporates one demodulated IRIG-B input and one digital output to indicate the Hardware state.

And up to two Ethernet communication ports which can be chosen out of:

In addition, it has high communication capacity and flexibility, as it can have up to 6 serial communication ports which can be chosen out of:

1. Glass fiber optic
2. RJ45

By default, it has:

1. 2 FOC and 1 RS232

2.1.2. Technical characteristics

This module has the following characteristics:

1. 1 32-bit microprocessor, 66 MHz clock.
2. 8 Mbytes SDRAM memory for variables and Firmware execution and application.
3. 1 Mbyte SRAM memory to store settings, agony variables, etc.
4. 4 Mbyte FLASH memory for Firmware, settings, application and backup.
5. Demodulated IRIG-B input.
6. 1 switched digital output for Hardware status indication.
7. Up to 6 serial communication ports which can be chosen out of:
 - a. RS232
 - b. RS485
 - c. Glass fiber optic FOG
 - d. Plastic fiber optic FOP

8. Characteristics of the serial communication:
 - a. Communication mode: Half duplex or full duplex
 - b. Baud rate: 600 to 115 200 bps
9. Up to 2 Ethernet communication ports which can be chosen out of:
 - a. Fiber optic (100 Base-Fx)
 - Baud rate: 10/100 Mb
 - Glass fiber optic multimode: 62.5/125 mm
 - Connector: ST (optionally SC)
 - Min. optical power transmitter output: - 20 dbm
 - Reception max. optical power: - 31 dbm
 - Distance: 1.5 km
 - b. RJ45 (10/100 Base-Tx)
 - Baud rate: 10/100 Mb
 - Isolation: 500 V_{ca}
10. Communication capacity: 10/100 Mbps Half duplex

2.1.3. Connection

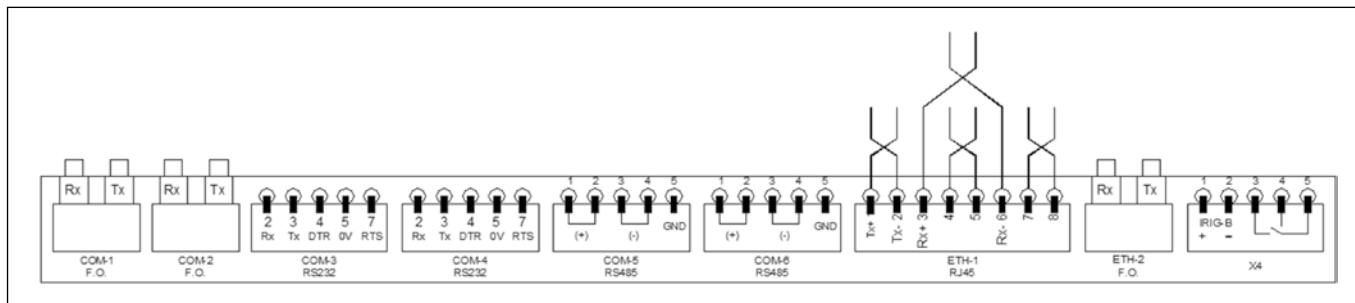


Figure 2.3. ekor.rps-tcp connection diagram

2.2. Power supply module

The ekor.rps-tcp unit has power supply module independent of the CPU. This module can have one or two power supplies on the same module, providing redundant power supply.

The power supply module only occupies one slot in the relay's chassis, whether if has one (single PS) or two power supplies (redundant PS).

The power supply generates 2 internal voltages: +5 V_{dc} to feed the CPU and the digital inputs (DI) and +6 V_{dc} to feed the digital outputs (DO).

There are the following power supply modules, both single and redundant:

1. 24 – 48 V_{dc} power supply (15 W)
2. 125 – 220 V_{dc} power supply (22 W)

2.2.1. Connection

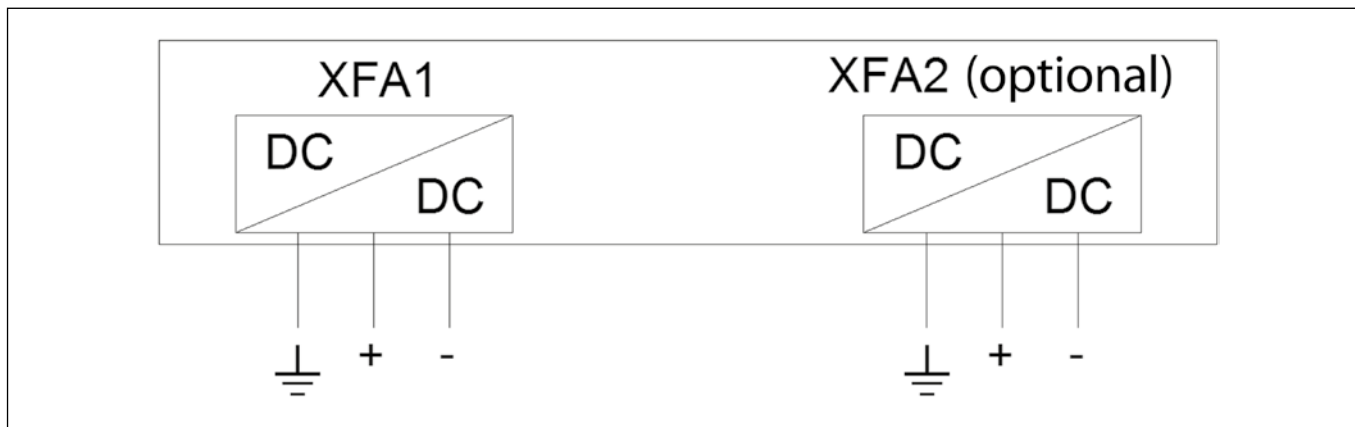


Figure 2.4. Power supply module connection

2.2.2. Technical characteristics

125 – 220 V_{dc} power supply module (preferred option)

1. Input voltage range:	80 – 310 V _{dc}
2. Operating temperature:	
a. 70 % power	- 40 °C at + 85 °C
b. 100 % power	- 40 °C at + 60 °C
3. Primary/secondary isolation	3 kV
4. Input voltage range	70 %
5. Operation frequency	132 kHz
6. Generated voltage	+ 5 V _{dc} and + 6 V _{dc}
7. Power	22 W

24 – 48 V_{dc} power supply module

1. Input voltage range:	15 – 80 V _{dc}
2. Operating temperature:	
a. 60 % power	- 40 °C at + 85 °C
b. 100 % power	- 40 °C at + 60 °C
3. Primary/secondary isolation	3 kV
4. Rated consumption output	70 %
5. Operation frequency	166 kHz
6. Generated voltage	+ 5 V _{dc} and + 6 V _{dc}
7. Power	15 W

In both cases, the power supplies are provided with:

1. Protection against input voltage polarization reversal
2. Protection against output shortcircuit

2.3. Digital input and output modules

Digital input and output modules are used for onsite data collection and as a command output interface.

There are two different digital input and output modules:

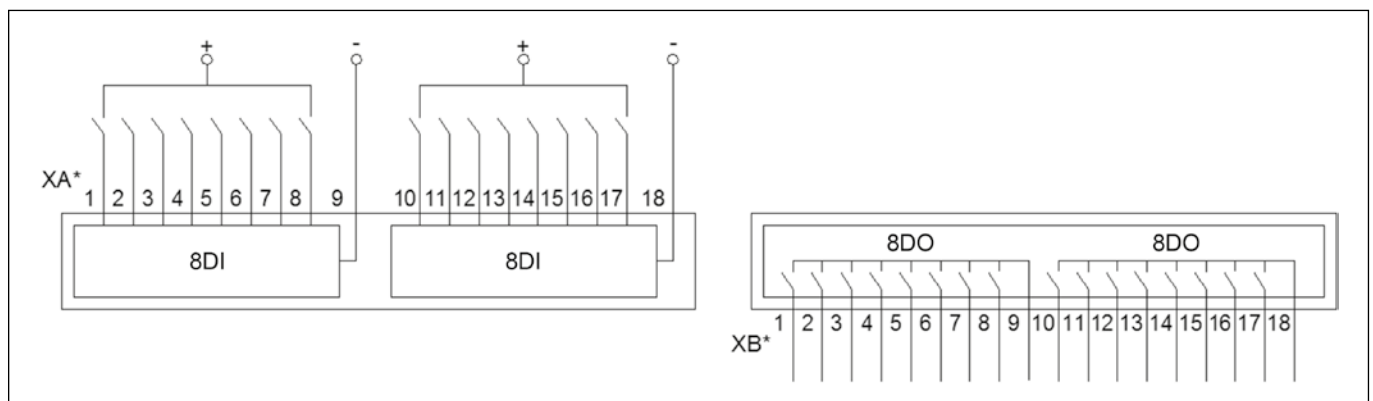
1. Module with 16 DI with a common point every 8 inputs + 16 DO with a common point every 8 outputs. The **ekor.rps-tcp** unit has two modules of this type.
2. Module with 16 DI with a common point every 8 inputs + 8 independent DO. The **ekor.rps-tcp** unit has one module of this type.

The status of the various elements (circuit breakers, disconnectors, recloser, etc.) can be collected by digital inputs or by energy pulses.

The digital outputs allow to control the operation of the different elements (circuit breakers, disconnectors, recloser, etc.).

Each input and output status is indicated on the relay's graphical display.

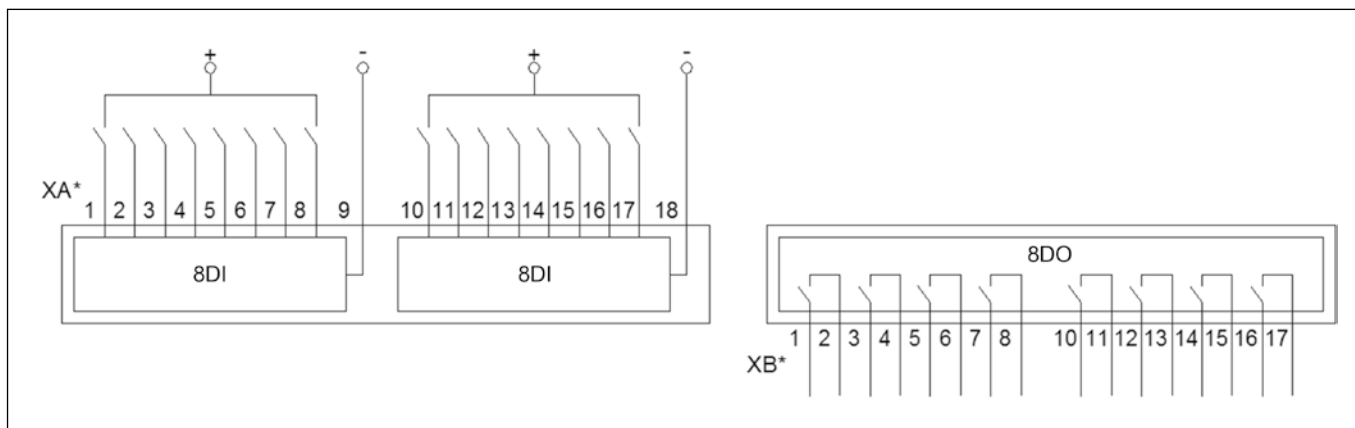
2.3.1. Connection of the 16-DI and 16-DO module



* Depends on the position of the card within the relay.

Figure 2.5. Connection of the 16-DI and 16-DO module

2.3.2. Connection of the 16-DI and 8-independent DO module



* Depends on the position of the card within the relay.

Figure 2.6. Connection of the 16-DI and 8-independent DO module

2.3.3. Technical characteristics

Digital inputs

1. Galvanic isolation by means of opto-isolators
2. Surveillance circuit checking the following:
 - a. Module's supply voltage
 - b. Module access supervision
3. Digital inputs voltage

a. 24 V _{dc} DI	18 – 34 V _{dc}
b. 48 V _{dc} DI	36 – 60 V _{dc}
c. 110 – 125 V _{dc} DI	86 – 160 V _{dc}
d. 220 V _{dc} DI	165 – 264 V _{dc}
4. Continuous overvoltage: 30 %
5. Overvoltages (10 s): 44 %
6. Input type: Externally-fed contact
7. Rated consumption per input: 3 mA
8. Anti-bouncing digital filter: 1 ms

Digital outputs

1. Outputs with potential-free contacts
2. Surveillance circuit checking the following:
 - a. Module's supply voltage
 - b. Module access supervision. Digital outputs are deactivated if the module is not accessed within 100 ms
 - c. Selection, checking and execution system at hardware level for each output individually
4. Module's consumption: 90 mA at 5 V_{dc}
5. Additional consumption per active DI: 1 mA at 5 V_{dc}
6. Additional consumption per active DO: 100 mA at 6 V_{dc}

Relays contacts:

1. Breaking capacity (L/R = 40 ms)

a. 48 V _{dc}	0.5 A
b. 125 V _{dc}	0.3 A
c. 220 V _{dc}	0.2 A
2. Making capacity (0.5 s): 30 A
3. Steady current: 8 A
4. Current (1 s): 50 A
5. Contacts: Potential-free

2.4. Digital input module

As an option, the unit can have a 32 digital input module that allows digital data collection from the installation's external contacts to the **ekor.rps-tcp** relay.

The status of the different elements (circuit breakers, disconnectors, recloser, etc.) can be collected by digital inputs or by energy pulses.

Each input status is indicated on the relay's graphical display.

2.4.1. Connection

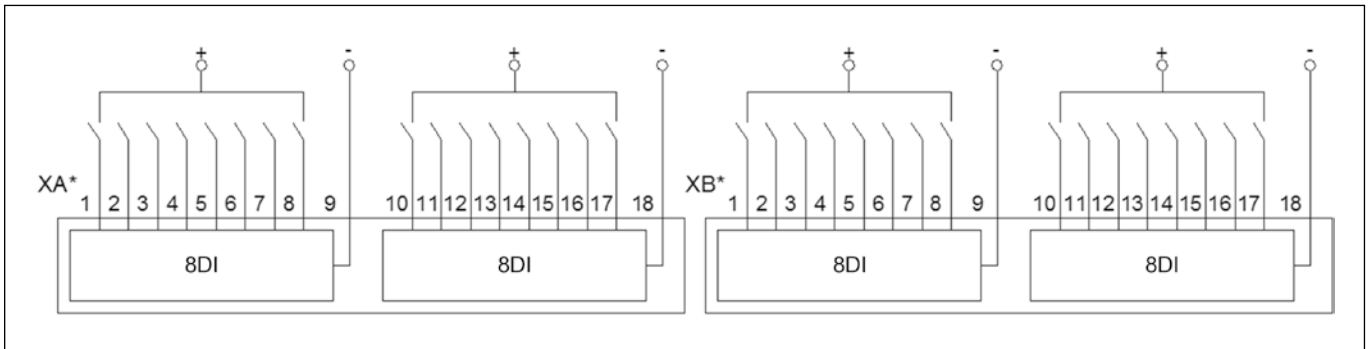


Figure 2.7. Connection of the digital input module in **ekor.rps-tcp**

2.4.2. Technical characteristics

This module has the following characteristics:

- | | | | | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------|--------------------------|-------------------------|---------------------------------|--------------------------|---------------------------|---------------------------|
| <ol style="list-style-type: none"> 1. 32 digital inputs with one independent common point every 8 inputs 2. Galvanic isolation by means of opto-isolators 3. Surveillance circuit checking the following: <ol style="list-style-type: none"> a. Module's supply voltage b. Module access supervision 3. Module's consumption: 25 mA at 5 V_{dc} 4. Additional consumption per active DI: 1 mA at 5 V_{dc} | <ol style="list-style-type: none"> 5. Digital inputs voltage <table border="0" style="margin-left: 20px;"> <tbody> <tr> <td>a. 24 V_{dc} DI</td> <td>18 – 34 V_{dc}</td> </tr> <tr> <td>b. 48 V_{dc} DI</td> <td>36 – 60 V_{dc}</td> </tr> <tr> <td>c. 110 – 125 V_{dc} DI</td> <td>86 – 160 V_{dc}</td> </tr> <tr> <td>d. 220 V_{dc} DI</td> <td>165 – 264 V_{dc}</td> </tr> </tbody> </table> 7. Continuous overvoltage 30 % 8. Overvoltages (10 s) 44 % 9. Input type Externally-fed contact 10. Rated consumption per input 3 mA 11. Anti-bouncing digital filter 1 ms | a. 24 V _{dc} DI | 18 – 34 V _{dc} | b. 48 V _{dc} DI | 36 – 60 V _{dc} | c. 110 – 125 V _{dc} DI | 86 – 160 V _{dc} | d. 220 V _{dc} DI | 165 – 264 V _{dc} |
| a. 24 V _{dc} DI | 18 – 34 V _{dc} | | | | | | | | |
| b. 48 V _{dc} DI | 36 – 60 V _{dc} | | | | | | | | |
| c. 110 – 125 V _{dc} DI | 86 – 160 V _{dc} | | | | | | | | |
| d. 220 V _{dc} DI | 165 – 264 V _{dc} | | | | | | | | |

2.5. Digital and analog input modules

As an option, the **ekor.rps-tcp** unit can have a digital and analog input module to adapt analog data from metering converters (voltage, current, temperature, etc.) and to collect digital data of the **ekor.rps-tcp** unit.

There are two different digital and analog input modules:

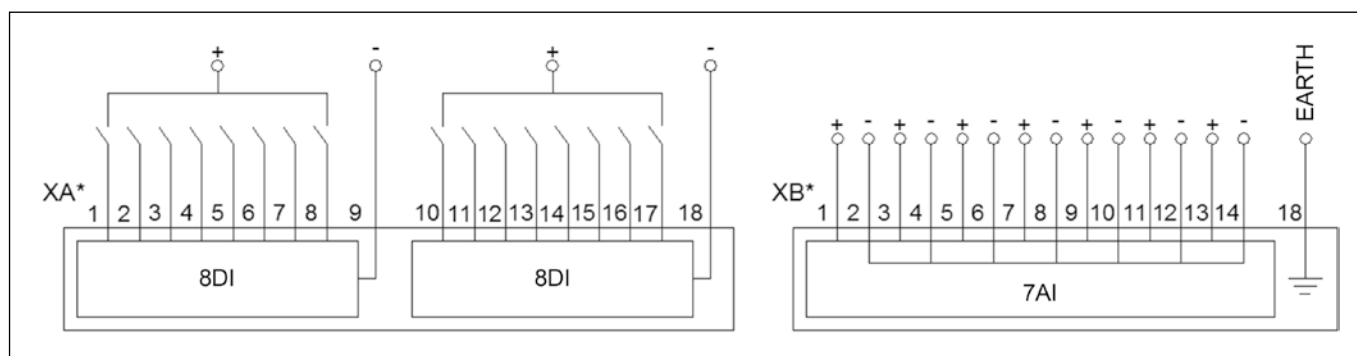
1. Module with 16 DI with a common point every 8 inputs + 7 AI with a common point.
2. Module with 16 DI with a common point every 8 inputs + 3 AI with a common point + 4 isolated AI.

The status of the different elements (circuit breakers, disconnectors, recloser, etc.) can be collected by digital inputs or by energy pulses.

The analog inputs collect voltage and current measurements from the metering converters. Other variables, such as the temperature of machine windings (collected through PT-100 probes), pressure, level, etc., can also be monitored. Isolated input modules allow to collect measurements that need to be isolated from each other, such as battery input/output current, battery voltage, etc.

Each digital input status is indicated on the relay's graphical display.

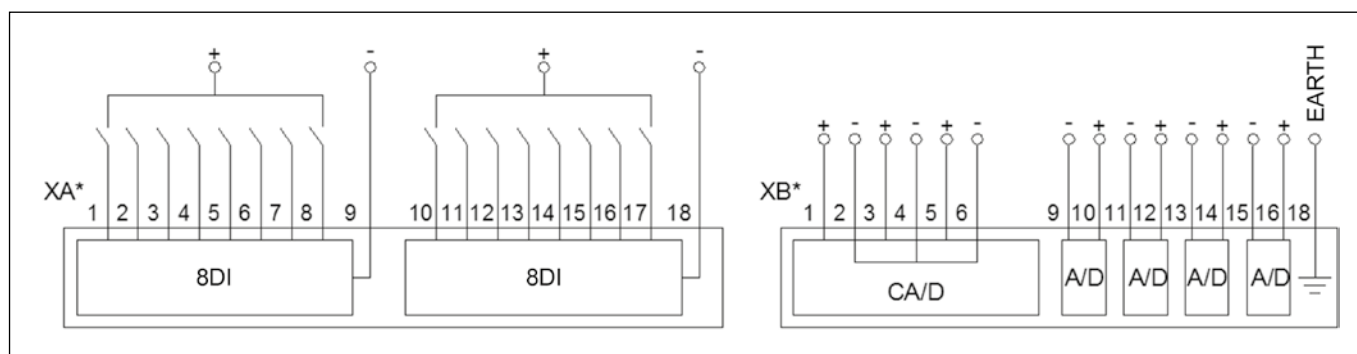
2.5.1. Connection of the 16-DI and 7-AI module



* Depends on the position of the card within the relay.

Figure 2.8. Connection of the 1-DI and 7-AI module

2.5.2. Connection of the 16-DI and 7-AI (4 isolated AI) module



* Depends on the position of the card within the relay.

Figure 2.9. Connection of the 16-DI and 7-AI (4 isolated AI) module

2.5.3. Technical characteristics

Digital inputs

1. Galvanic isolation by means of opto-isolators
2. Surveillance circuit checking the following:
 - a. Module's supply voltage
 - b. Module access supervision
3. Digital inputs voltage

a. 24 V _{dc} DI	18 – 34 V _{dc}
b. 48 V _{dc} DI	36 – 60 V _{dc}
c. 110 – 125-V _{dc} DI	86 – 160 V _{dc}
d. 220 V _{dc} DI	165 – 264 V _{dc}
4. Continuous overvoltage 30 %
5. Overvoltages (10 s) 44 %
6. Input type Externally-fed contact
7. Rated consumption per input 3 mA
8. Anti-bouncing digital filter 1 ms

Analog inputs

- | | |
|------------------------|---------------------------|
| 1. Measurement range | ± 2.5 mA, ± 5 mA, ± 20 mA |
| 2. Resolution | 11 bits plus sign |
| 3. Accuracy | 0.2 % at 25 °C |
| 4. Connection type | 2 wires per measurement |
| 5. Isolation | |
| a. With internal logic | 2500 V _{ca} |
| b. Between inputs | |
| - Standard | NO |
| - Isolated | 1000 V _{ca} |

2.6. Protection module

2.6.1. Functional description

The **ekor.rps-tcp** unit houses the **ekor.rps** multifunctional protection unit.

2.6.2. Hardware description

The protection module inside the **ekor.rps-tcp** unit has its own power supply independent of the unit's power supply.

This module has an RS232 front communication port for easy access to all functions. In addition, the **ekor.rps-tcp** unit rear ports provide local or remote access to the protection, allowing its **integration in an integrated protection and control system**.

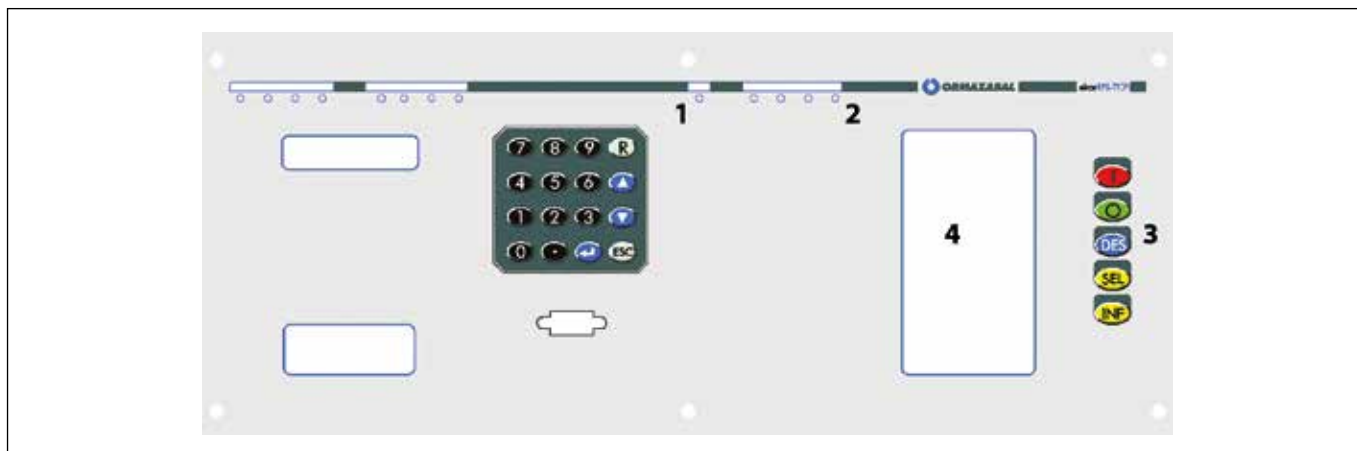
From the point of view of the digital inputs/outputs, the protection module is provided with input/output cards to collect digital signals.



The protection model is selected as if it was an independent protection but indicating that it is integrated in the **ekor.rps-tcp** unit.

2.7. Human-machine interface (HMI)

The human-machine interface (HMI) consists of:



1	1 two-colour status Led
2	4 configurable Leds
3	5 keys for graphical display control and selection systems commands execution
4	Graphic screen with contrast that can be adjusted using the keypad

Figure 2.10. Human-machine interface (HMI)

2.7.1. HMI functions

The main functions of the **ekor.rps-tcp** unit HMI are the following:

1. Display of the status of the circuit breakers and disconnectors.
2. Execution of local commands on the associated circuit breakers and disconnectors.
3. Operation on the local automatism (recloser, capacitor bank battery automatic function, etc.).
4. Display of the voltage or current values of the unit.

5. Display of the status of up to 64 alarms with programmable text (8 screens with 8 alarms per screen).
6. Display of the status of the digital inputs and outputs incorporated into the unit's cards.

The HMI is suitable for any type of topological configuration, depending on the installation characteristics.

The status of the elements on the display is refreshed every 5 minutes, even if no changes are detected in that period.

2.7.2. Graphic Screen

The HMI has a graphic screen with the following characteristics:

1. Dimensions: 60 x 112 mm
2. Resolution: 240 x 128 pixels
3. Led illumination
4. Black text on green-yellow background






2.7.3. Light signals

The HMI is provided with the following light signals:

1. 1 two-colour status Led:
 - a. Green Led: Correct operation
 - b. Red Led: Incorrect operation
 - c. Slow flickering: Unit without configuration
 - d. Fast flickering: Configuration in progress
2. 4 Leds that usually indicate the following:
 - a. LOC: Local mode
 - b. FCOM: Communications failure alarm
 - c. DEF: Fault alarm
 - d. ORD: Command output Indication

2.7.4. Keypad

The HMI has 5 buttons with the following functions:

	Close/in service/automatic/remote control
	Open/out of service/manual/local
	Discharge
	Selection
	Information

Subject to change
without prior notice

For further information,
contact **Ormazabal**.

**Ormazabal
Protection &
Automation**

IGORRE
Spain



www.ormazabal.com