ReeR

Installation use and maintenance
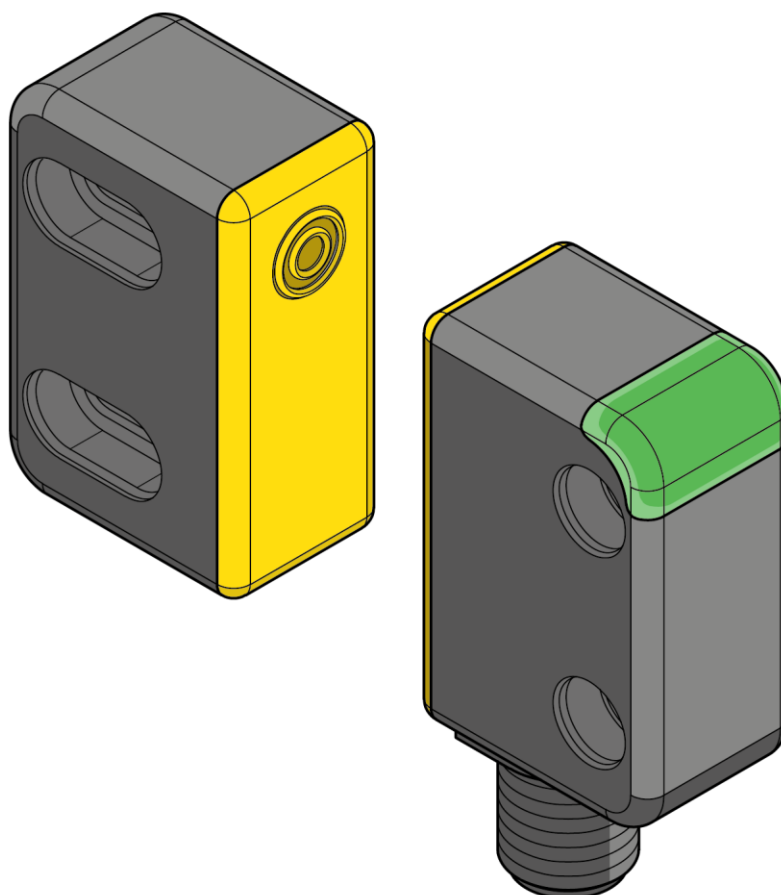
R.SAFE RFID
Safety Sensor

LIST OF CONTENTS

INTRODUCTION

Dear customer, ReeR congratulates you on purchasing this product.

PURPOSE OF THIS DOCUMENT

➢ Please read this manual before using the R-Safe RFID safety sensor

➢ Maintain the manual and the Quick Installation Guide in an easily accessible place for reference when required.

➢ This document explains the operation of the ReeR R-Safe RFID safety sensor (sensor/actuator) for guarding dangerous access points protected by mobile guards.

⚡ The tasks described in this manual are intended to be carried out only by personnel with a professional technical qualification and trained in safety technology.

The manual shows specifically:

➢ a general description of R-Safe RFID sensor

➢ a list of R-Safe RFID models

➢ the activation mode (according to EN ISO 14119:2013)

➢ the mechanical installation (according to EN 60204, IEC 60947-5-2)

➢ the electrical connections

➢ the programming procedure of the actuator by the sensor

➢ the operating modes of the device

➢ the technical specifications of the device

GLOSSARY

BREAK condition	OSSD outputs LOW – switching distance $\geq$ Sar
CLEAR condition	OSSD outputs LOW – waiting for RESTART – switching distance < Sao
GUARD condition	OSSD outputs HIGH – switching distance < Sao
GENERIC ACTUATOR (LOW)	The safety sensor accepts only Generic R-Safe RFID actuator (G)
TEACH-IN ACTUATOR (HIGH)	TEACH-IN -> The safety sensor accepts only one Teach-In R-Safe RFID actuator (T) individually configured by the sensor during the Teach-In process
UNIQUE ACTUATOR (HIGH)	The safety sensor accepts only one Unique R-Safe RFID actuator (U) previously configured by ReeR (at factory). Sensor and actuator cannot be unpaired or individually substituted
EDM	*External Device Monitoring*: control of external contactors switching through the feedback input
MTTFd	Mean Time to Dangerous Failure
OSSD	Output Signal Switching Device
PDDB	Proximity Device with a Defined Behavior under fault conditions
PFHd	Probability of a dangerous failure per Hour
PL	Performance Level
SIL	Safety Integrity Level
RISK TIME	The maximum period during which OSSD(s) modify their behavior (caused by the reaction to actuator presence and safety inputs level)
RFID	Radio Frequency Identification wireless system
RFID Actuator	Passive part of the sensor that contains the unique identification code programmed into non-volatile memory
RFID Sensor	The RFID Sensor is responsible to scan the presence of a passive actuator, using the ISO/IEC 14443-4:2018-4 protocol
Sn	*Nominal operative distance:* nominal switching distance
Sao	*Assured operative distance:* switching distance below which the ON state is defined with absolute certainty
Sar	*Assured release distance:* is the switching distance beyond which the OFF state is defined with absolute certainty
START/RESTART INTERLOCK	Interlock function (manual reset required): when starting or restarting the machine

Table 1

CONTENTS OF THE PACKAGE

➢ R-Safe RFID sensor and/or actuator (depending on the R-Safe model)

➢ This manual (or the Quick Installation Guide)

➢ Safety caps (covering the fastening screws)

SAFETY

SIMBOLOGY

⚠ This symbol indicates an important warning for personal safety. Failure to comply with this warning may result in high level risk for exposed personnel.

➜ This symbol indicates an important warning for the proper operation of the device.

PRECAUTIONS

⚠ The operations indicated in this document must only be carried out by qualified personnel. Such personnel must have the necessary requirements to be able to operate on the electronic equipment to be installed in order to avoid any risky situation. ReeR declines any liability for malfunctioning of equipment installed by unqualified staff.

⚠ Any use other than those indicated in this manual may be considered as potentially dangerous for the installer and the machine operator.

⚠ For safety reasons, please contact your country's safety authorities or the relevant industry association if necessary.

⚠ For applications in the food industry, consult the manufacturer to verify compatibility between sensor materials and chemical agents used.

⚠ For installation, observe the regulations of the standards EN 60204 / EN ISO 14119 / IEC 60947-5-2.

⚠ Disconnect the product from the power supply before starting installation.

➜ The strict and complete observance of all the standards, indications and prohibitions set forth in this manual is a prerequisite for its proper operation.
ReeR S.p.A. therefore, declines any liability in case of non-respect, even partial, of these indications.

CAUTIONS BEFORE INSTALLATION

Before installing the R-Safe RFID safety system, you must verify all of the conditions listed below:

⚠ The protection level (SIL3, Maximum SIL 3, PLe) of the RFID system must be compatible with the danger level of the system to be controlled.

⚠ Comply with standard EN ISO 14119: 2013 on interlocking devices associated with guards.

⚠ The safety system must only be used as a stop device and not as a device for controlling the machine.

⚠ The machine control must be electrically actuated.

⚠ Do not use the device in environments with intensive magnetic fields.

⚠ Protect sensor and actuator from strong shocks and vibrations.

⚠ Do not use R-Safe RFID near storages of flammable material.

FCC COMPLIANCE

This device complies with Part 15 of the FCC Standards. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

➡ This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Standards. These limits are designed to provide reasonable protection against harmful interference in a industrial installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

⚡ Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment

Radiation Exposure Statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.
This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

LIST OF APPLICABLE STANDARDS

R-Safe RFID is designed and manufactured in compliance with the following European Directives:

- ➢ 2006/42/EC "Machinery Directive"
- ➢ 2014/30/EU "Electromagnetic Compatibility Directive"
- ➢ 2014/53/EU "Radio Equipment Directive"
- ➢ 2011/65/UE "Restriction of the use of certain hazardous substances"

And complies with the following standards:

EN ISO 13849-1:2015	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design
EN ISO 14119: 2013	Safety of machinery - Interlocking devices associated with guards - Principles for design and selection
CEI EN 60204-1	Safety of machinery - Electrical equipment of machines
EN 60947-5-1: 2019	Low-Voltage Switchgear and Controlgear - Part 5: Control Circuit Devices and Switching Elements - Section 1: Electromechanical Control Circuit Devices
EN 60947-5-2: 2019	Low-Voltage Switchgear and c - Part 5: Control Circuit Devices and Switching Elements - Section 2: Proximity switches
EN 60947-5-3: 2013	Low-Voltage Switchgear and Controlgear - Part 5: Control Circuit Devices and Switching Elements - Section 3: Requirements for proximity devices with defined behavior under fault conditions (PDDB)
EN 60068-2-27: 2009	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock
EN 61508-1:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements
EN 61508-2:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 2: Requirements for electrical/electronic/programmable electronic safety-related systems
EN 61508-3:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 3: Software requirements
EN 61508-4:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 4: Definitions and abbreviations
EN IEC 62061:2021	Safety of machinery - Functional safety of safety-related control systems

Table 2

DISPOSAL OF MATERIALS

USER INFORMATION

For Countries in the European Union:
Pursuant to the Directive no. 2012/19/EU on waste electrical and electronic equipment (WEEE).

The crossed out wheelie-bin symbol on the equipment or its packaging means that when the product reaches the end of its useful life it must be collected separately from other waste.
Proper separate collection of the discarded equipment for later environment-friendly recycling, processing and disposal, helps to avoid any negative impact on the environment and health and encourages re-use and recycling of the materials the equipment is made of.
In each Member State of the European Union this product is required to be disposed of in accordance with Directive 2012/19/EU as implemented in the Member State where the product is disposed of. For further information please contact ReeR or your local dealer.

UKCA DECLARATION OF CONFORMITY

ReeR declares that R-Safe RFID safety sensors comply with following UK legislation:
  ➢ S.I. 2008 No. 1597 - The Supply of Machinery (Safety) Regulations

  ➢ S.I. 2016 No. 1101 - Electrical Equipment (Safety) Regulations

  ➢ S.I. 2016 No. 1091 - Electromagnetic Compatibility Regulations

  ➢ S.I. 2012 No. 3032 - The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations

➡ Please refer to the link https://www.reersafety.com/en/certifications/ to download the complete UKCA Declaration of Conformity.

EC DECLARATION OF CONFORMITY

ⒶReeR

$C \epsilon$

Dichiarazione CE di conformità
EC declaration of conformity

Torino, 06/09/2023

REER SpA
via Carcano 32
10153 – Torino – Italy

dichiara che i sensori di sicurezza **R-Safe RRFID** sono Dispositivi Sicurezza di:
- **SIL 3** *(secondo la Norma **EN 61508-1: 2010; EN 61508-2: 2010; EN 61508-3: 2010; EN 61508-4: 2010)***
- **Maximum SIL 3** *(secondo la Norma **EN IEC 62061: 2021)***
- **Cat.4 - PL e** *(secondo la Norma **EN ISO 13849-1: 2015)***

declares that the **R-Safe RRFID** safety sensors are Safety Equipments:
- **SIL 3** *(according the Standard **EN 61508-1: 2010; EN 61508-2: 2010; EN 61508-3: 2010; EN 61508-4: 2010)***
- **Maximum SIL 3** *(according the Standard **EN IEC 62061: 2021)***
- **Cat.4 - PL e** *(according the Standard **EN ISO 13849-1:2015)***

realizzati in conformità alle seguenti Direttive Europee:
complying with the following European Directives:

- **2006/42/EC** "Direttiva Macchine"
  "Machine Directive"
- **2011/65/EU** "RoHS – Linea Guida"
  "RoHS – Guideline "
- **2014/30/EU** "Direttiva Compatibilità Elettromagnetica"
  "Electromagnetic Compatibility Directive"
- **2014/35/EU** "Direttiva Bassa Tensione"
  "Low Voltage Directive"
- **2014/53/EU** "Direttiva Apparecchiature Radio"
  "Radio Equipment Directive"

e alle seguenti Norme: /and to the following Standards:

- **EN ISO 14119: 2013**
- **EN 60204-1: 2018**
- **EN 60947-5-1: 2019, EN 60947-5-2: 2019, EN 60947-5-3: 2013**
- **EN IEC 63000: 2018**

e sono identiche all'esemplare esaminato ed approvato con esame di tipo CE da:
and are identical to the specimen examined and approved with a CE - type approval by:

TÜV SÜD Product Service GmbH – Zertifizierstelle – Ridlerstraße 65 – 80339 – München – Germany
N.B. number: 0123 - Z10 024820 0088 Rev.01
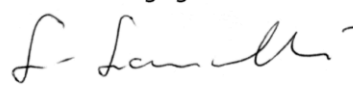
Responsabile per la documentazione tecnica: Carlo Pautasso
Responsible person for technical documentation:

Carlo Pautasso   **Simone Scaravelli**
Direttore Tecnico   Amministratore Delegato
Technical Director   *Managing Director*

GENERAL DESCRIPTION

The R-Safe RFID safety sensor consists of a passive actuator (TAG) and a active RFID reader (SENSOR):
- The RFID reader (properly mounted in front of the actuator) identification is possible via an RF signal.
- The RFID reader enquires the actuator and waits for a code to be transmitted from the actuator.
- The presence of a correct response allows the sensor to decide to set the logic level of the OSSD to high (LL1).

This product features the following electrical characteristics:
- Power supply: 24VDC
- Start/restart interlock (RESTART/AUTOMATIC)
- External relay monitoring (EDM)
- Two OSSD outputs, 300mA @ 24VDC
- Status output, 100mA @ 24VDC. Status output functionality for PLC
- Two safety inputs for serial connection
- Standalone Risk time: ≤ 55 ms

Three types of sensors are available (EN ISO 14119:2013 standard):
1) *GENERIC* -> The safety sensor accepts any ReeR RFID generic actuator (low coding level).
2) *TEACH-IN* -> The safety sensor accepts only one ReeR Teach-In R-Safe RFID actuator (T) individually paired with the the sensor during the Teach-In process (high coding level).
3) *UNIQUE* -> The safety sensor accepts only one Unique R-Safe RFID actuator (U) previously configured by ReeR (at factory). Sensor and actuator cannot be unpaired or individually substituted (high coding level).

MECHANIC

The R-Safe RFID sensor and actuator transponder are equipped with a hermetically sealed plastic housing.
The sensor is equipped with cable, connector or directly with pig-tail cable with connector for external connections.
The sensor complies with IP67 (IP69K for special models).
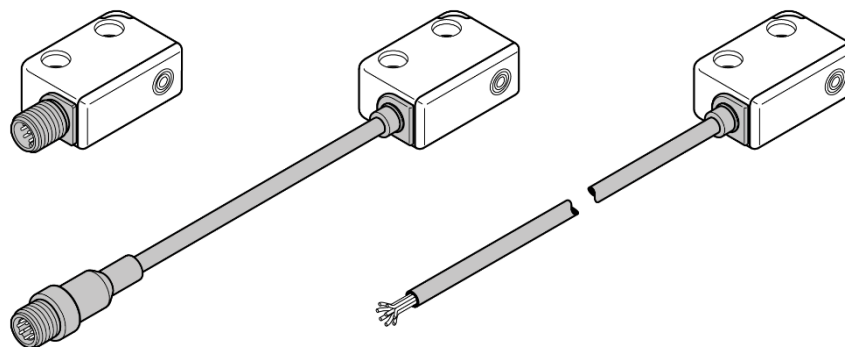
Figure 1

CODIFICATION OF R-Safe RFID MODELS

Product	Model	Mechanical Characteristics		Operating Characteristics	Wiring
		Mode	Dimensions		
RFID Combo *Sensor + Actuator*	Plus	C	S		C
					P
	Pro			G	1
			M	T	3
	Basic			U	5
					X
RFID Sensor	Plus	S	S		C
					P
	Pro			G	1
				T	3
	Basic				5
					X
RFID Actuator	-	A	S	G	No wiring
			M	T	

LEGENDA:

Plus = 8 poles	**C** = Combo	**S** = Small: Holes spacing 22mm	**G** = Generic	**C** = M12 Connector
Pro = 8 poles	**S** = Sensor		**T** = Teach-In	**P** = Pigtail
Basic = 5 poles	**A** = Actuator	**M** = Medium: (Slim Actuator) Holes spacing 40mm	**U** = Unique	**1** = 1m cable
				3 = 3m cable
		M = Medium: (Combo) with Sensor 22mm, Actuator 40mm		**5** = 5m cable
				X = 10m cable

Table 3

OPERATION

The RFID safety sensor is made up of a passive actuator (TAG) and an active RFID reader. The RFID reader must be mounted on a safety gate (or door, or mobile protection) in the front of the actuator to enable identification by means of an RF signal.

➜ It is recommended to mount the sensor on the fixed part of the safety gate in order to make wiring easier.

ACTIVATION CONDITIONS (Standard EN ISO 14119)

1) Gate closed, actuator in safe area

In this operating condition the reader/actuator distance is defined as **≤ Sao**: switching distance below which is defined the ON state; the OSSD safety outputs are active; led -> green.

2) Gate open, actuator leaving safe area

In this operating condition the reader/actuator distance is defined as **> Sao**: switching distance at which the ON state is about to end; the OSSD safety outputs are still active but once the limit zone Sar is reached, they will be switched OFF; led -> green or red

3) Gate fully open, actuator in hazardous area

In this operating condition the reader/actuator distance is defined as **≥ Sar**: switching distance at which the OSSD safety outputs are switched OFF and RFID signals the hazardous situation; led -> red
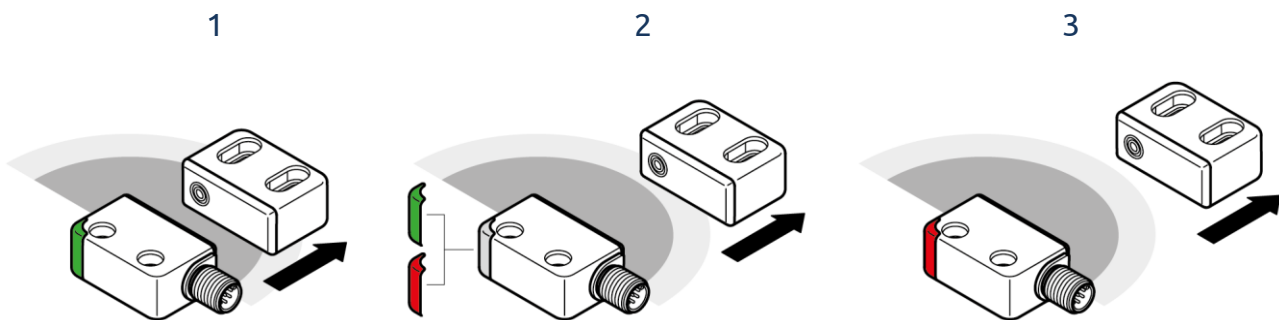
Figure 2 - Activation conditions

ACTIVACTION DISTANCES (Standard EN ISO 14119)

The following figure shows the activation distances in function of the three axis (X, Y, Z):

- **X axis:** Sao = 10mm; Sar = 25mm
- **Y axis:** Sao = 5mm; Sar = 25mm
- **Z axis:** Sao = 5mm; Sar = 25mm
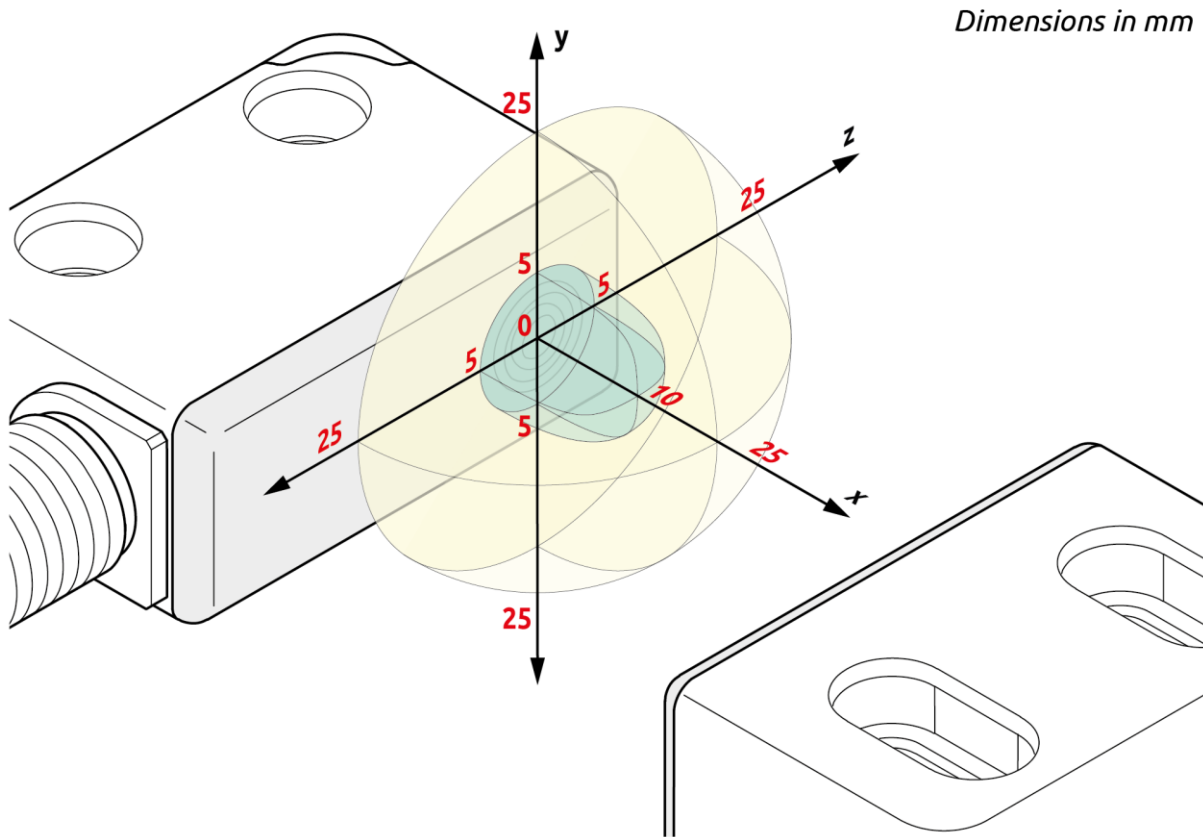
Figure 3 - Activation distances

LEGENDA:

Sao	Assured operating distance
Sar	Assured release distance

OSSD outputs - logical states and activation distance

The following figure shows the electrical operation of the OSSD outputs and the STATUS and EDM signals as a function of the SENSOR/ACTUATOR actuation distance (refer to the *"ELECTRICAL CONNECTIONS"* section for the pinout of the device):
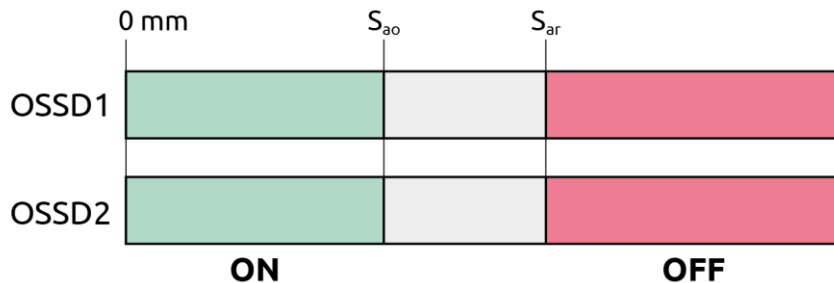
Figure 4 - OSSD outputs - logic levels

Figure 5 - OSSD / EDM / STATUS - logic levels

➡ When connecting high inductive loads to OSSDs, use suitable voltage suppressors on the outputs.

⚡ In safety conditions (assured operating distance), the Sensor provides a voltage of 24VDC on both outputs. Therefore, the established load must be connected between both output and the 0VDC.

Figure 6 - Correct load connection on OSSDs

INSTALLATION

MECHANICAL INSTALLATION

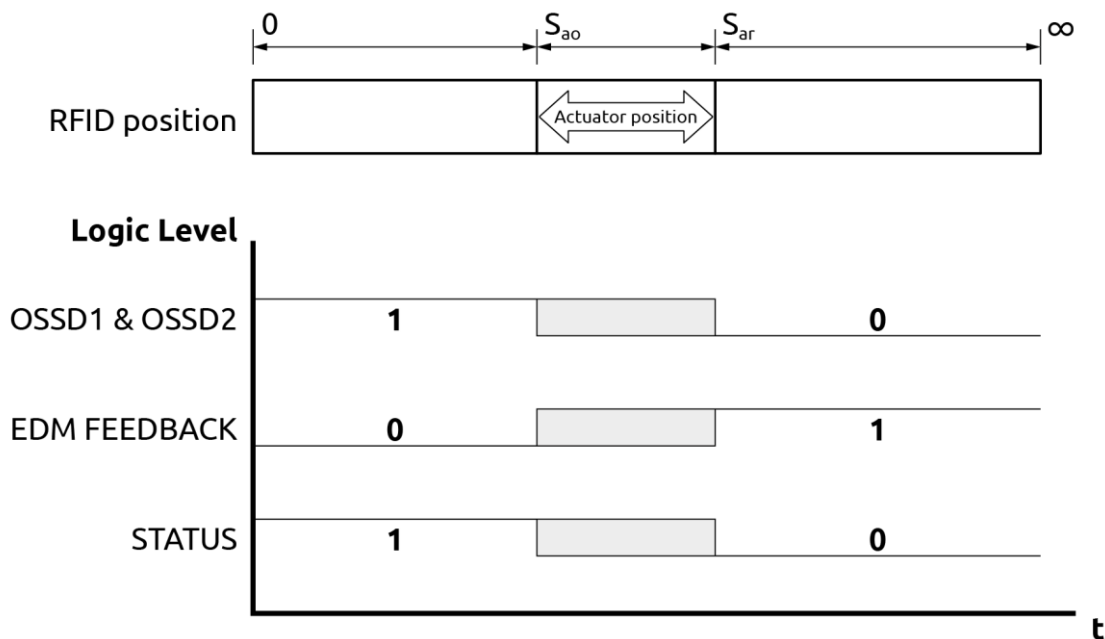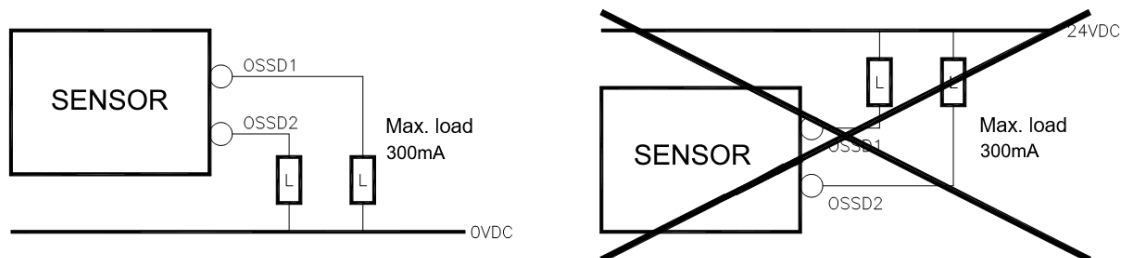### Precautions

- ⚡ Before installing the product, it is important to perform a specific risk analysis in accordance with the requirements of the Machinery Directive (2006/42/EC).
- ⚡ ReeR guarantees the functional safety of R-Safe RFID, but is not responsible for the performance of the system in which it is installed.
- ⚡ Respect the correct activation direction described below.
- ⚡ Remove power supply from the product before proceeding with mechanical installation.
- ⚡ It is not permitted to fix sensor and actuator with less than two screws (EN ISO 14119).
- ⚡ Follow the installation rules described in the standard EN ISO 14119.
- ⚡ The use of anti-unscrewing screws is mandatory (EN ISO 14119).
- ⚡ Fasten the devices to the gate using M4 x 20 screws or alternatively 3.5 x 19 cylinder head self-threading screws with a tightening torque of 0.8 ... 1.5Nm.

Assembly

Place the sensor and actuator as shown in the following figures.
Follow the instructions below in particular:

- ➡ Mount the sensor to the fixed part of the safety gate/door and the actuator to the moving part.
- ➡ For actuation direction 1, place the sensor and actuator facing each other with the centering marks at a distance *d* corresponding to: **6mm < d < 10mm**
- ➡ For actuation directions 2 and 3, place the sensor and actuator facing each other with the centering marks at a distance *d* corresponding to: **2mm < d < 10mm**
- ➡ At the end of the assembly, plug the supplied caps into the housing of the fixing screws as shown in the assembly diagram. These plugs reduce the risk of tampering with the product as indicated in the EN ISO 14119 standard.
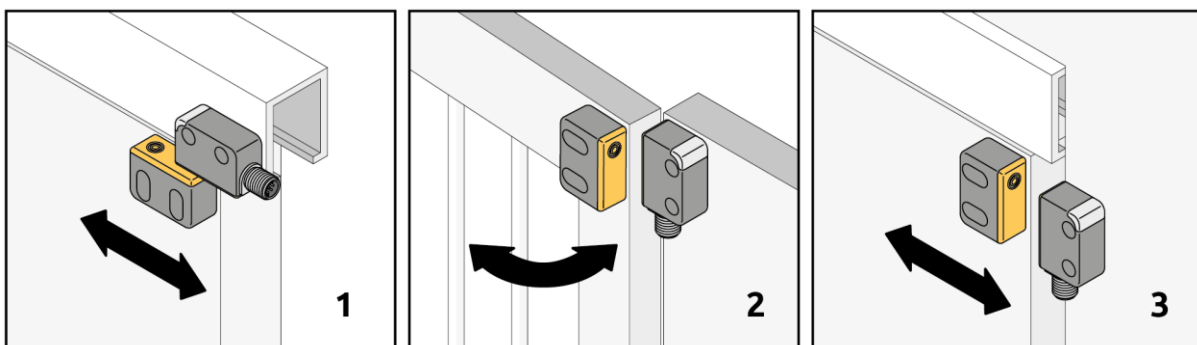
Figure 7 - Actuation direction

- ➡ For each type of installation, check carefully that the sensor activation side lobes do not cause an unintentional activation / deactivation *(-> "Areas of electromagnetic interference")*.
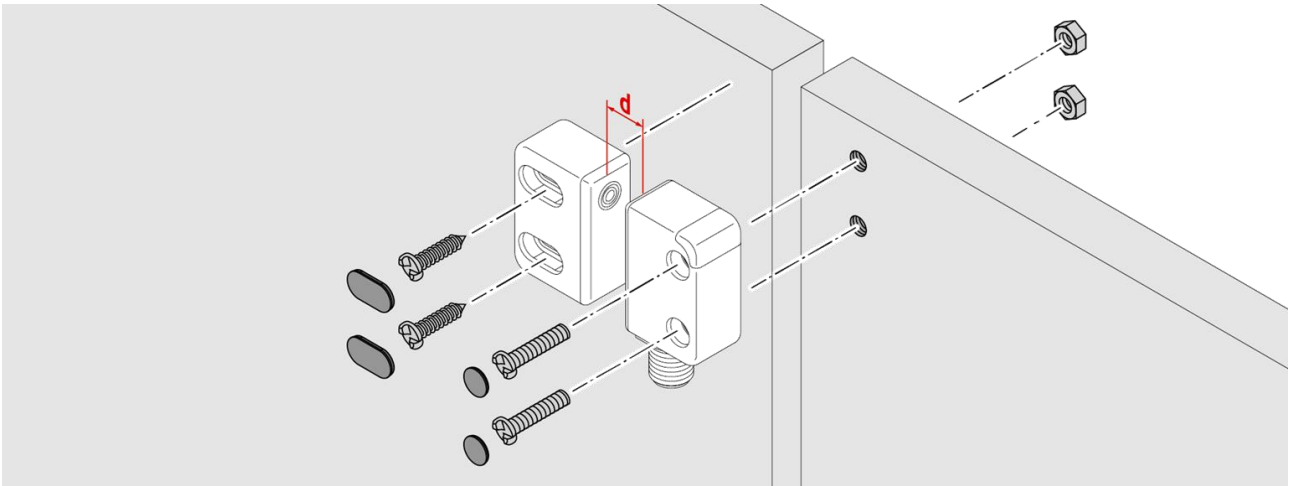
Figure 8 - Standard Actuator Assembly
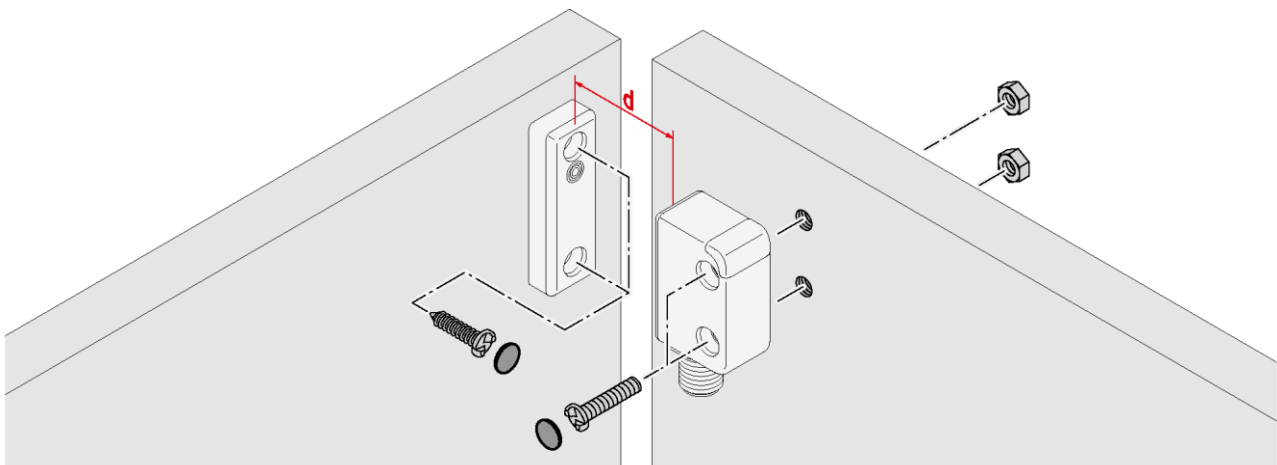
Figure 9 - Slim Actuator Assembly

Safety doors/gates with 78mm hole spacing

If the product must be installed on safety doors/gates with a hole spacing of 78mm, ReeR provides a specific fixing bracket with a hole spacing = 78mm ("22TO78" ReeR code: 1295110) -> *"ACCESSORIES"*.

➡ Fix the bracket to the safety door and the product to the bracket using the provided screws.
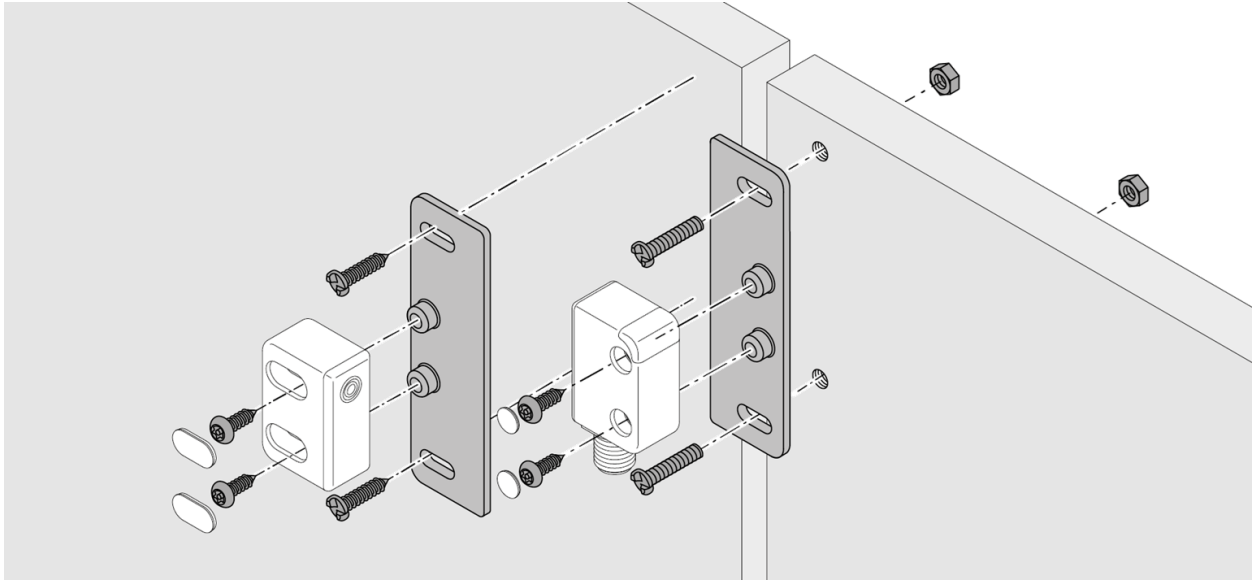
Figure 10 - Assembly with a hole spacing of 78mm

Areas of electromagnetic interference

The side lobes of the sensor field may influence the transponder behavior, depending on the actuator position.

➡ To avoid influence of the side lobes, observe the specified distances between sensor and actuator.
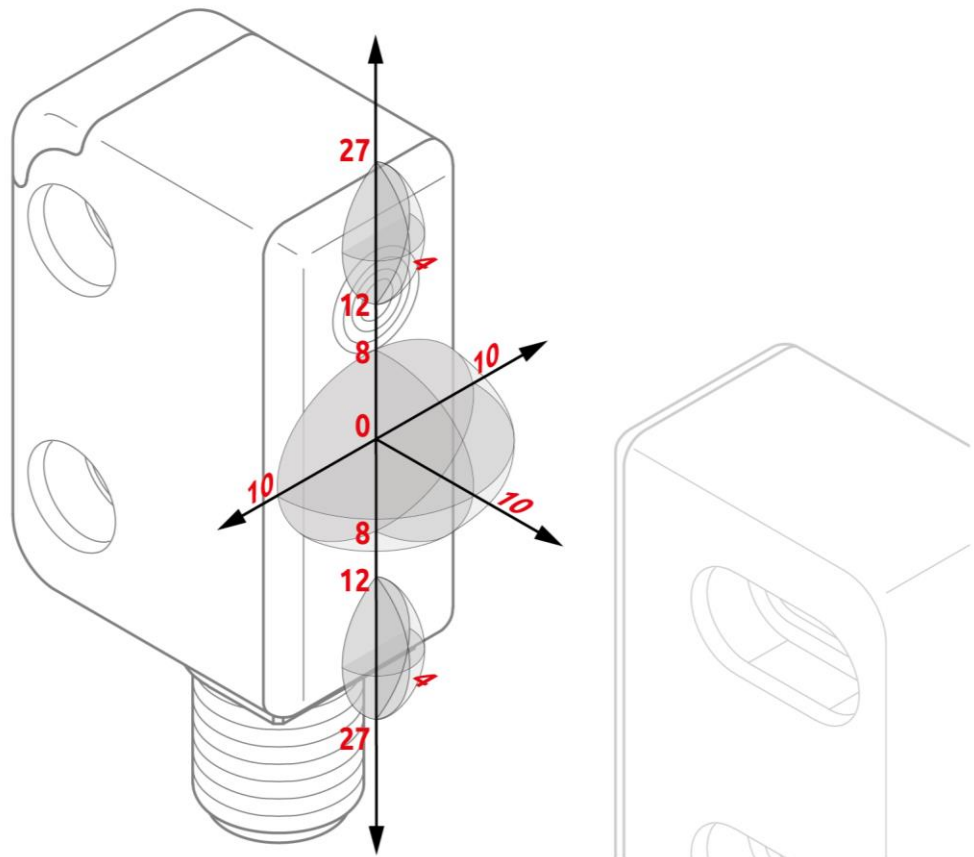
Figure 11 - Detection field of the sensor

Multiple systems

With applications involving multiple sensors mounted close together, a minimum distance L = 150mm between the sensors must be observed in order to avoid interference (Figure 12).
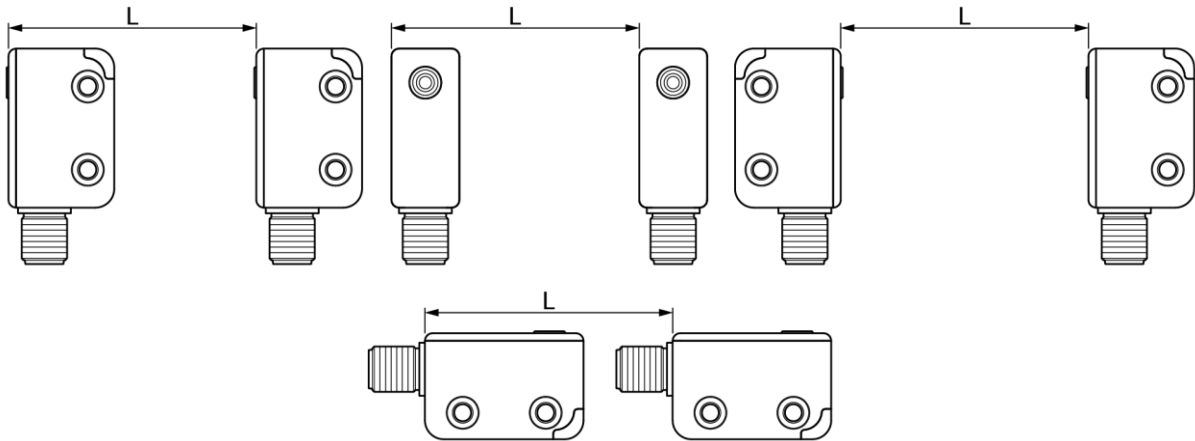
Figure 12

➜ With gate closed, make sure that the SENSOR/ACTUATOR distance is **Sao** *(-> TECHNICAL SPECIFICATIONS).*

➜ With gate opened, make sure that the SENSOR/ACTUATOR distance is **Sar** (with a protected area that does not present any danger to the operator) *(-> TECHNICAL SPECIFICATIONS).*

➜ The nominal values of the OSSD's switch-on and switch-off distances are stated assuming a non-magnetic material support for the actuator and sensor. These reference values may vary depending on the support materials used.

➜ At the end of the assembly, plug the supplied caps into the housing of the fixing screws as shown in the assembly diagram. These plugs reduce the risk of tampering with the product as indicated in the EN ISO 14119 standard.

ELECTRICAL CONNECTIONS

Precautions

➡ Carry out all connections before supplying power to the product.

➡ The 0VDC connection must be common to all system components.

➡ Make sure that the connector is screwed in all the way to ensure correct operation of the product.

➡ The R-Safe RFID sensor must be supplied with a voltage of 24VDC +/- 20 %. (IEC 60947-5-2).

Warnings concerning connecting cables

➡ Conductor size: 0.25 ... 2.5 mm^2.

➡ We recommend the use of separate power supplies for the product and for other electrical power equipment (electric motors, inverters, frequency converters) or other sources of disturbance.

➡ For connections longer than 20m, use cables with a cross-section of at least 0.5mm^2 (AWG16), (1mm^2 with lengths over 50m).

R-Safe RFID Basic models Pinout
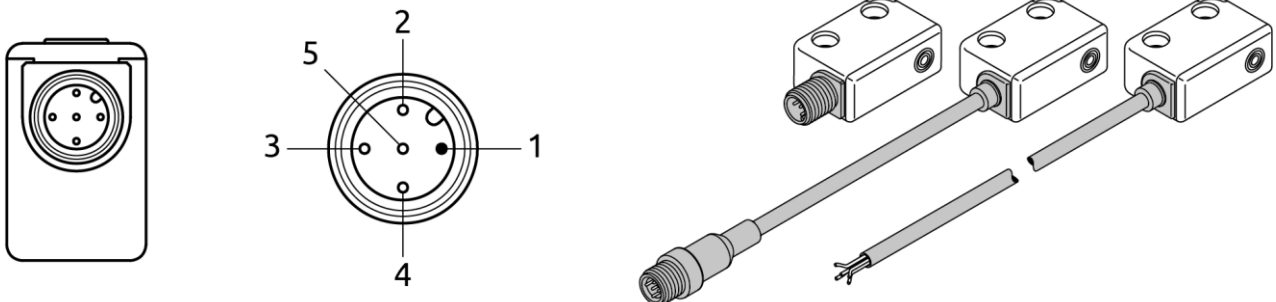
M12 - 5 POLES CONNECTOR / CABLE					
NUMBER	COLOR	SIGNAL	TYPE	DESCRIPTION	ELECTRICAL LEVEL
1	Brown	24VDC	Input	24VDC power supply	19,2VDC … 28,8VDC
2	White	OSSD1	Output	Safety output OSSD1	PNP active high
3	Blue	0VDC	Input	0VDC power supply	0VDC
4	Black	OSSD2	Output	Safety output OSSD2	PNP active high
5	Grey	STATUS	Output	Sensor status output	PNP active high

Table 4 - R-Safe Basic models Pinout

R-Safe Pro/Plus models Pinout

M12 - 8 POLES CONNECTOR / CABLE					
NUMBER	**COLOR**	**SIGNAL**	**TYPE**	**DESCRIPTION**	**ELECTRICAL LEVEL**
1	Brown	**24VDC**	Input	24VDC power supply	19,2VDC … 28,8VDC
2	White	**INPUT1**	Input	OSSD input for serial connection 1	Digital input
3	Blue	**0VDC**	Input	0VDC power supply	0VDC
4	Black	**OSSD1**	Output	Safety output OSSD1	PNP active high
5	Grey	**STATUS**	Output	Sensor status output	PNP active high
6	Pink	**INPUT2**	Input	OSSD input for serial connection 2	Digital input
7	Violet	**OSSD2**	Output	Safety output OSSD2	PNP active high
8	Orange	**EDM**	Input	Feedback K1K2	Digital input

Table 5 - R-Safe Pro models Pinout

M12 - 8 POLES CONNECTOR / CABLE					
NUMBER	**COLOR**	**SIGNAL**	**TYPE**	**DESCRIPTION**	**ELECTRICAL LEVEL**
1	Brown	**24VDC**	Input	24VDC power supply	19,2VDC … 28,8VDC
2	White	**INPUT1**	Input	OSSD input for serial connection 1	Digital input
3	Blue	**0VDC**	Input	0VDC power supply	0VDC
4	Black	**OSSD1**	Output	Safety output OSSD1	PNP active high
5	Grey	**STATUS**	Output	Sensor status output / Serial connection output	PNP active high
6	Pink	**INPUT2**	Input	OSSD input for serial connection 2	Digital input
7	Violet	**OSSD2**	Output	Safety output OSSD2	PNP active high
8	Orange	**EDM/RESTART/SERIAL**	Input	Feedback K1K2 / Restart / Serial connection input	Digital input

Table 6 - R-Safe Plus models Pinout

Maximum cable lengths and connections

RFID Connector models (max. 260m)

Depending on the length of the links of the serial chain and single connections, it is mandatory to ensure that the connecting cables have a 0.25mm^2 cross-section and the power supply is 24VDC, as shown in the following table:

Connection Type	Length	Power supply Voltage	Power supply Auxiliary	Max. Load Current	Note
Serial connection	≤160m	24VDC	None	-	-
Serial connection	>160m ≤260m	24VDC	Yes	-	Auxiliary power supply cable required
Single sensor	≤50m	24VDC	None	0.5A	-
Single sensor	≤100m	24VDC	None	0.25A	-
Single sensor	>50m <100m	24VDC	Yes	0.5A	Auxiliary power supply cable required

Table 7

RFID cable models (max. 200m)

Depending on the length of the links of the serial chain and single connections, it is mandatory to ensure that the connecting cables have a 0.14mm^2 cross-section and the power supply is 24VDC, as shown in the following table:

Connection Type	Length	Power supply Voltage	Power supply Auxiliary	Max. Load Current	Note
Serial connection	≤80m	24VDC	None	-	
Serial connection	>80m ≤200m	24VDC	Yes	-	Auxiliary power supply cable required
Single sensor	≤30m	24VDC	None	0.5A	
Single sensor	≤60m	24VDC	None	0.25A	
Single sensor	>30m <80m	24VDC	Yes	0.5A	Auxiliary power supply cable required

Table 8

OPERATING MODES (R-Safe RFID Basic)

AUTOMATIC MODE

When the sensor is configured in "Automatic" the device behavior is the following:
- A safety gate opening (sensor/actuator distance **≥ Sar**) will deactivate the OSSD outputs.
- At the safety gate closure (sensor/actuator distance **≤ Sao)** will reactivate the OSSD outputs.
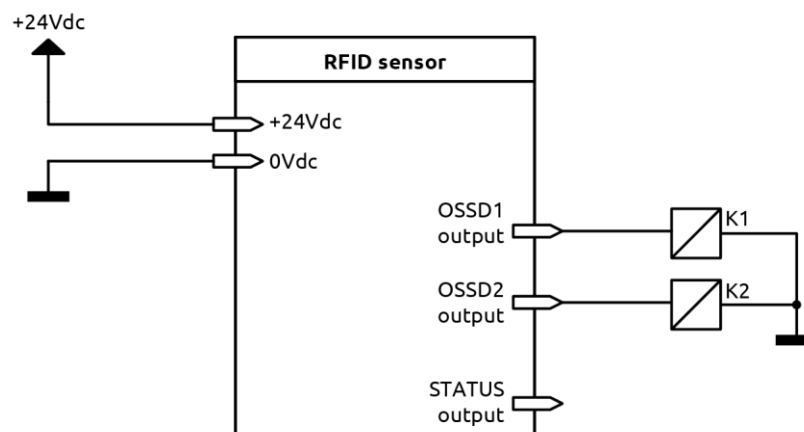

Figure 13 - Automatic mode

➡ Respect the pinout described in Table 4

OPERATING MODES (R-Safe RFID Pro)

AUTOMATIC MODE (R-Safe RFID Pro)

Limitations concerning the use of Automatic mode

> ⚡ Use in manual mode (start/restart interlock activated) is mandatory if the safety device monitors a guard to protect a hazardous area and a person, after passing the guard, can stand in the hazardous area without being detected.

Automatic mode with EDM (standalone)

In "Automatic mode with EDM", the "EDM input" terminal must be connected to 24VDC through N.C. K1/K2 contact (in this way monitoring of the external contacts is enabled).

- A safety gate opening (reader/actuator distance **≥ Sar)** will deactivate the OSSD outputs.
- The safety gate closure (reader/actuator distance **≤ Sao)** will reactivate the OSSD outputs only if the EDM signal is correct.

The following figure shows the connections to perform to enable the monitoring of the K1/K2 external contacts.
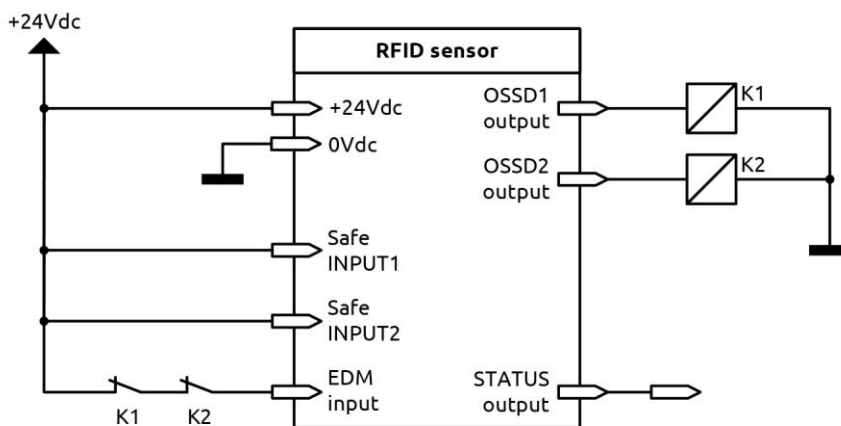
Figure 14 - Automatic mode with EDM

SIGNAL / (pin)	CONNECTED TO / (pin)
INPUT 1 / (2)	24VDC / (1)
INPUT 2 / (6)	24VDC / (1)
EDM input / (8)	24VDC / (1) - through the N.C. contact series of K1/K2

Table 9 - Automatic mode with EDM

The following table illustrates the electrical behavior of the EDM input with reference to the OSSD condition:

OSSD outputs (pin 4, 7)	EDM input (pin 8)
OFF	Closed contact
ON	Open contact

Table 10 – EDM input

➡ The time allowed to elapse from the activation of the OSSD outputs and the opening of the FBK contacts must be t <500ms (Figure 15).

Figure 15 - Correct EDM timing

Automatic mode without EDM (standalone)

When the sensor is configured in "Automatic without EDM" the monitoring of external K1/K2 contacts is disabled, the "EDM input" must be connected directly to +24VDC.

- A safety gate opening (reader/actuator distance **≥ Sar**) will deactivate the OSSD outputs.
- At the safety gate closure (reader/actuator distance **≤ Sao)** will reactivate the OSSD outputs.
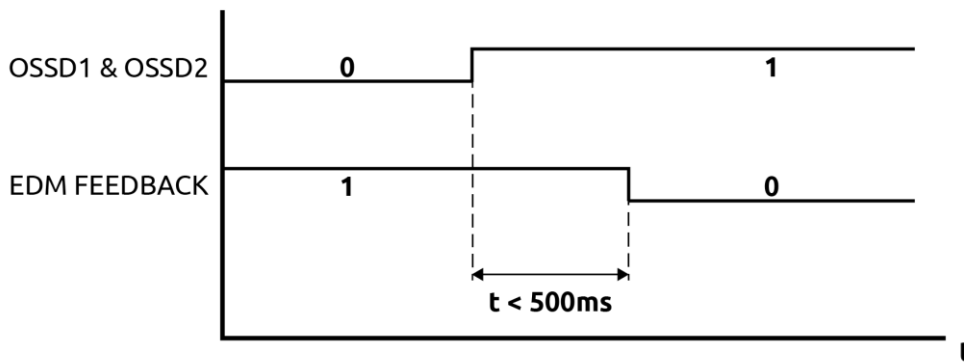

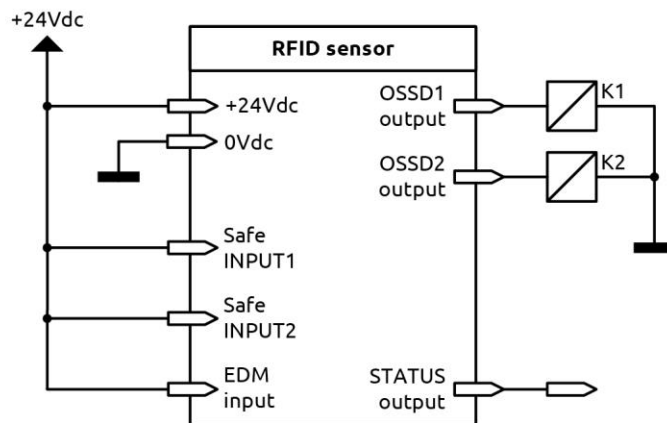*Figure 16 - Automatic mode - without EDM*

SIGNAL / (pin)	CONNECTED TO / (pin)
INPUT 1 / (2)	24VDC / (1)
INPUT 2 / (6)	24VDC / (1)
EDM input / (8)	24VDC / (1)

Table 11 - Automatic mode - without EDM

SERIAL CONNECTION MODE (R-safe RFID Pro)

Configuration of a serial connection (with EDM monitoring)

In this serial connection mode with EDM monitoring it is mandatory to configure the sensors as in the following diagram.
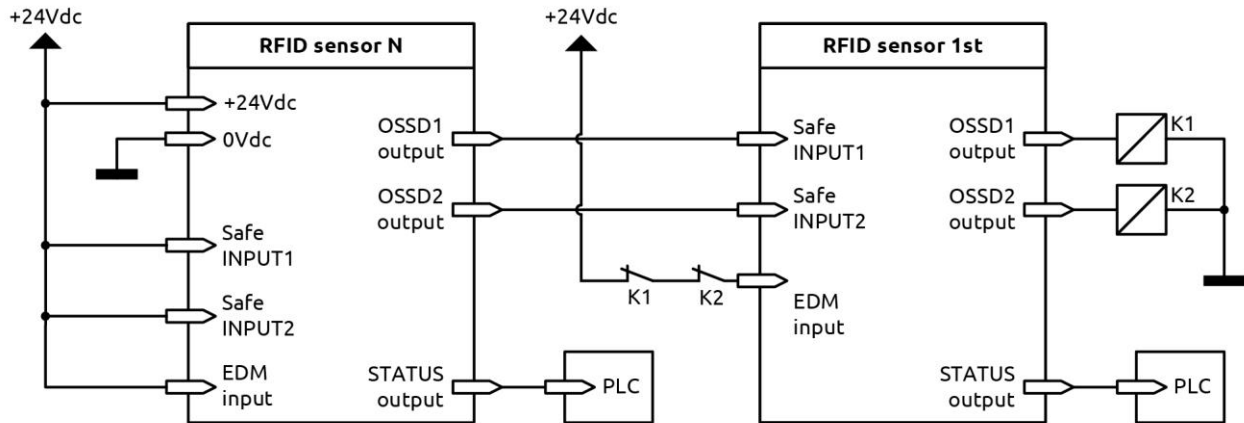

Figure 17 - Serial connection with EDM

FIRST SENSOR (1st)	
SIGNAL / (pin)	**CONNECTED TO / (pin)**
INPUT 1 / (2)	OSSD1 / (4) sensor n
INPUT 2 / (6)	OSSD2 / (7) sensor n
EDM input / (8)	24VDC / (1) - through the N.C. contact series of K1/K2
OSSD1 / (4)	Load K1
OSSD2 / (7)	Load K2
STATUS output / (5)	PLC input

SENSOR n	
SIGNAL / (pin)	**CONNECTED TO / (pin)**
INPUT 1 / (2)	24VDC / (1)
INPUT 2 / (6)	24VDC / (1)
EDM input / (8)	24VDC / (1)
OSSD1 / (4)	INPUT 1 / (2) preceding sensor
OSSD2 / (7)	INPUT 2 / (6) preceding sensor
STATUS output / (5)	PLC input

Table 12 - Serial connection (R-safe RFID Pro) with EDM monitoring

Configuration of a serial connection (without EDM monitoring)

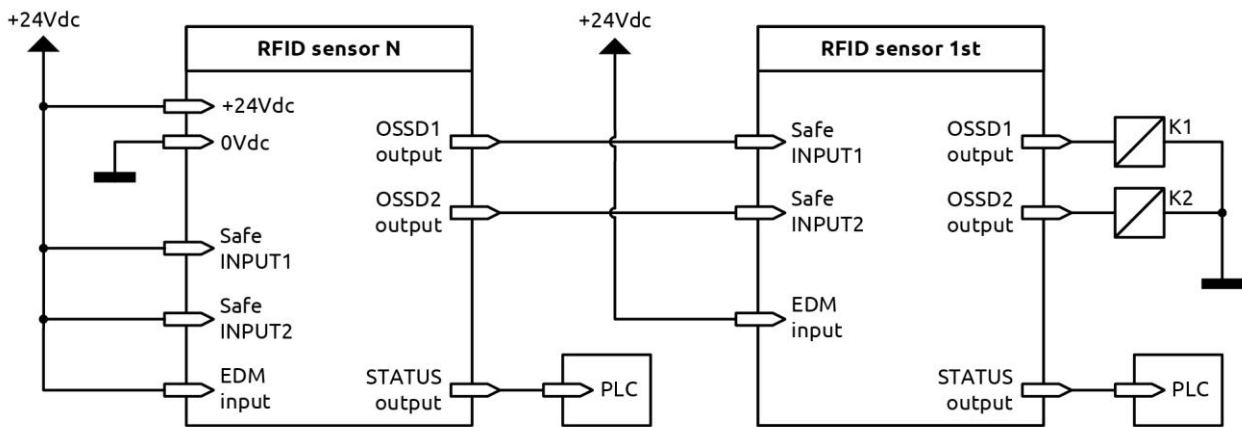In this serial connection mode, it is mandatory to configure the sensors as in the following diagram.

Figure 18 - Serial connection without EDM

FIRST SENSOR (1st)	
SIGNAL / (pin)	**CONNECTED TO / (pin)**
INPUT 1 / (2)	OSSD1 / (4) sensor n
INPUT 2 / (6)	OSSD2 / (7) sensor n
EDM INPUT / (8)	24VDC / (1)
OSSD1 / (4)	Load K1
OSSD2 / (7)	Load K2
STATUS output / (5)	PLC input

| SENSOR n	
SIGNAL / (pin)	**CONNECTED TO / (pin)**
INPUT 1 / (2)	24VDC / (1)
INPUT 2 / (6)	24VDC / (1)
EDM INPUT / (8)	24VDC / (1)
OSSD1 / (4)	INPUT 1 / (2) preceding sensor
OSSD2 / (7)	INPUT 2 / (6) preceding sensor
STATUS output / (5)	PLC input

Table 13 - Serial connection (R-safe RFID Pro) without EDM monitoring

In serial mode a <u>maximum to 16</u> R-Safe RFID Pro sensors can be connected in series.

➡ For a quicker and safe connection, ReeR recommends using its splitter connectors as showed in Figure 19, Figure 21 and Figure 23.

➡ If one or more sensor is deactivated <u>(actuation distance = Sar)</u> all downstream sensors outputs will be deactivated with the programmable controller opening its OSSD outputs.

➡ The "STATUS" signal provides information of the OSSD condition.

➡ Serial connection: with an increase of the *length* and of the *current drawn* (load + sensors), there corresponds a voltage drop in the system. Should this voltage be less than 20 VDC, an additional power supply must be provided.

The following schematic shows an example of series connection of 3 sensors (using the ReeR CRY12-B, CRY12- TP splitter connectors) with a Programmable Logic Controller.

SERIAL mode connection using "Splitter" connectors - sample
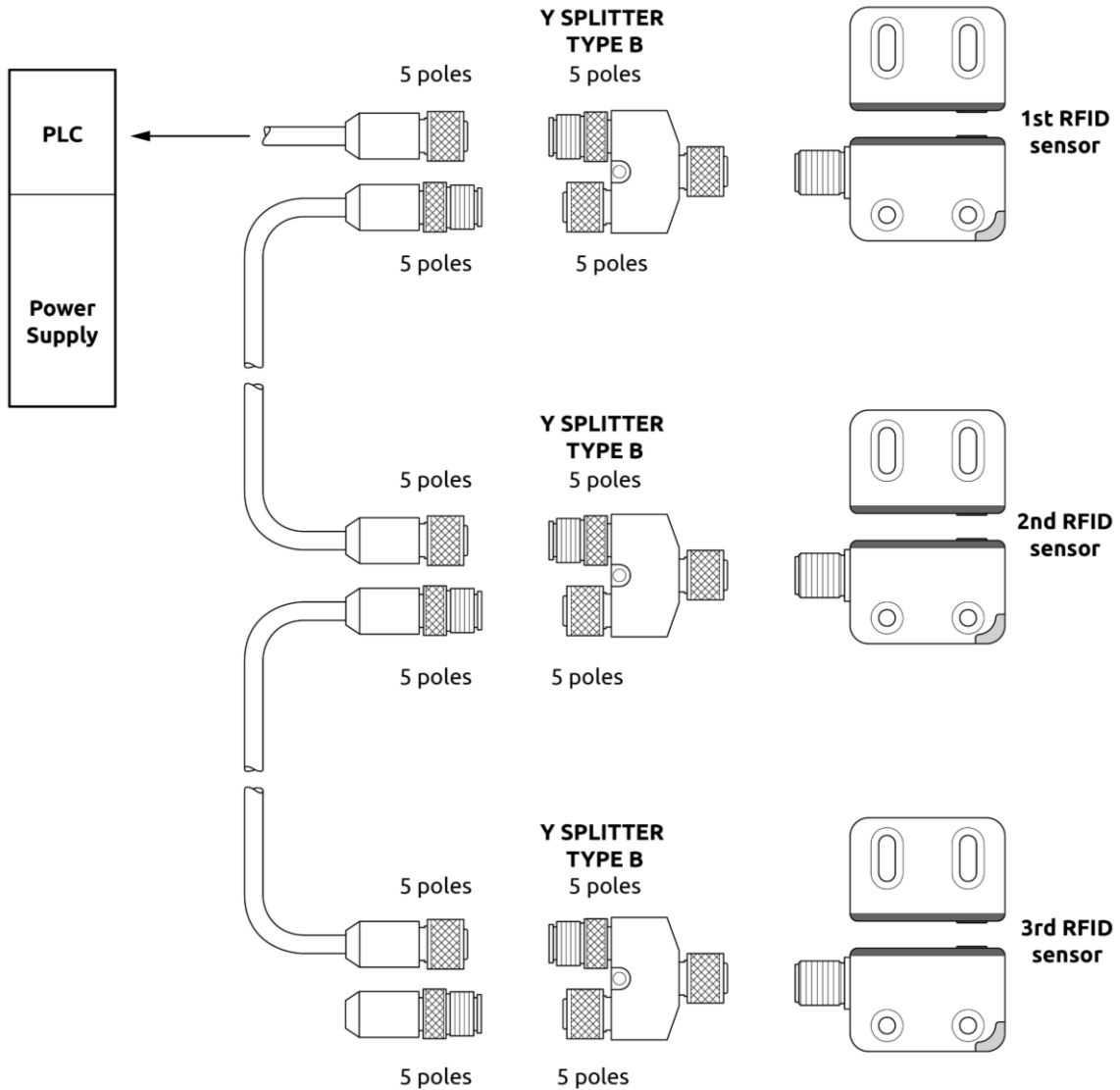
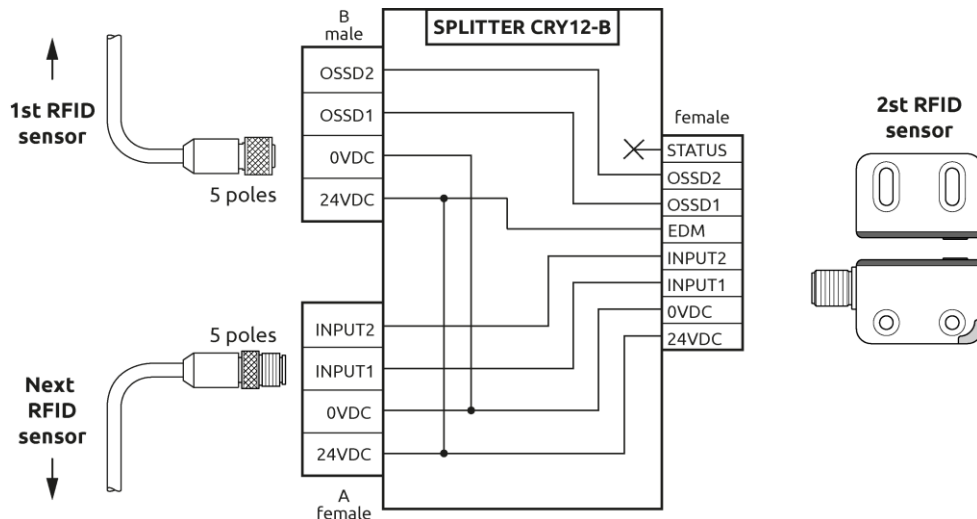*Figure 19 - Serial mode using "Splitter" connectors (R-Safe RFID Pro)*

Figure 20 - Splitter connector CRY12-B (splitter connector for R-Safe RFID Pro)

⚡ In order to guarantee the highest level of safety (PL e), it is necessary to include a safety device (PLe), such as a safety module or programmable controller (e.g., ReeR MOSAIC M1S) at the end of the chain to evaluate the condition of the static OSSD outputs.

SERIAL mode connection with EDM/STATUS signals, using "Splitter" connectors

When it is necessary to use the STATUS signal or external relay control (EDM) in a serial connection, use the splitter connectors as indicated in the following figures. (Please refer to *"ACCESSORIES"* section for the correct order codes).
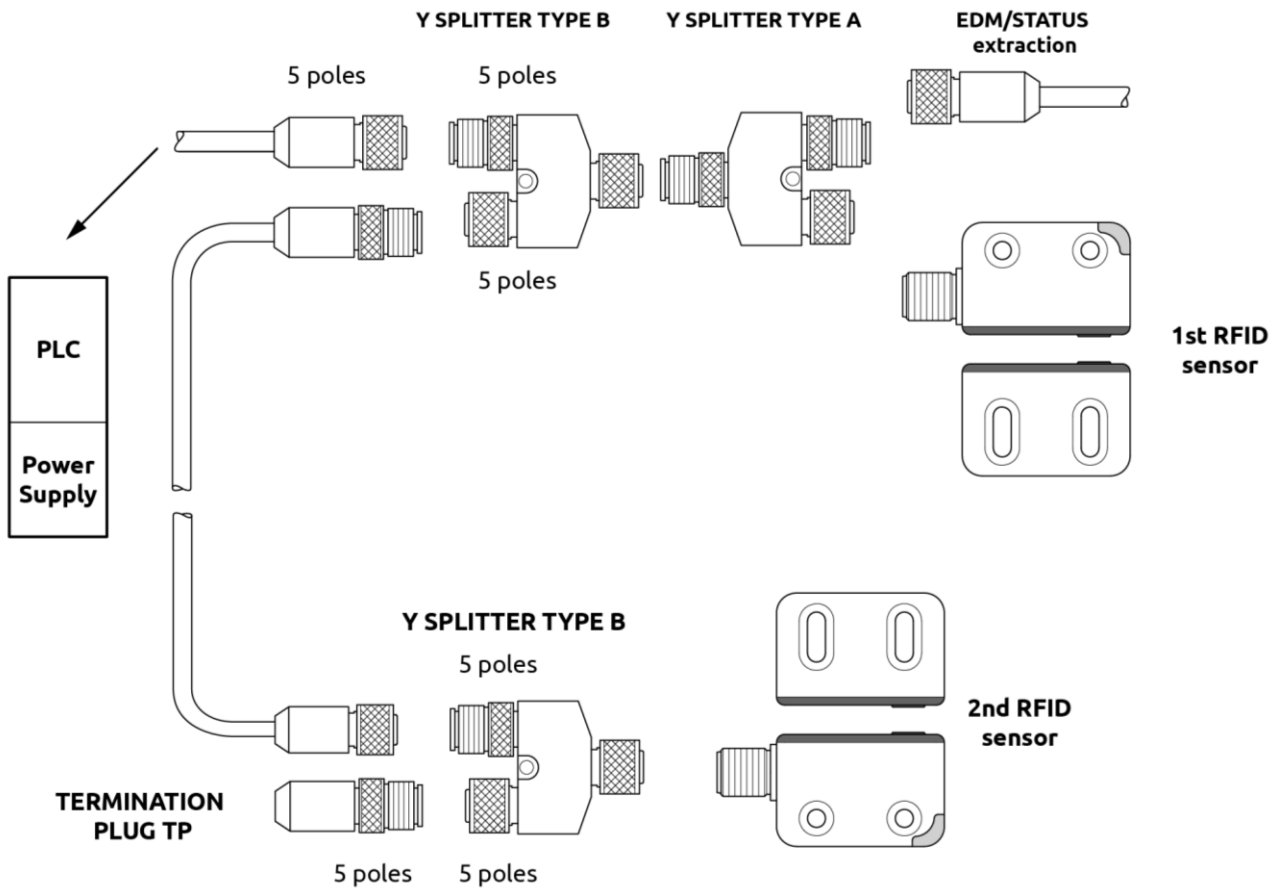

Figure 21 - Serial mode with STATUS / EDM (R-Safe RFID Pro)
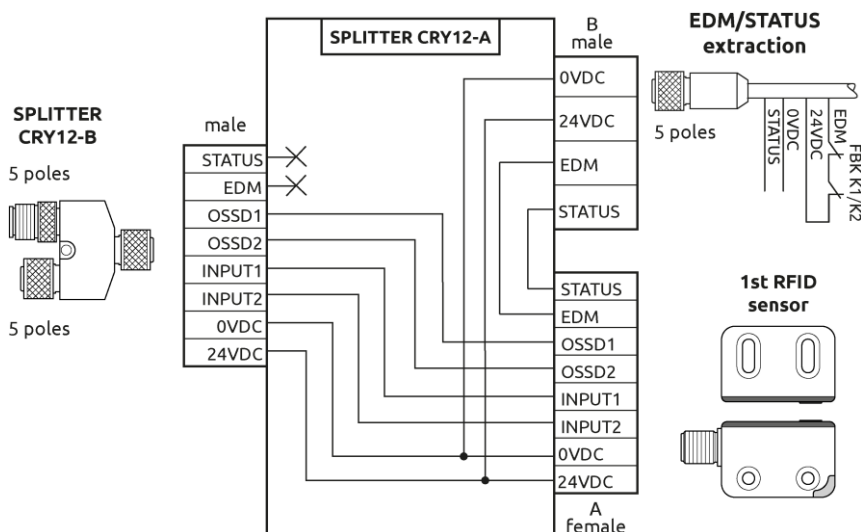

Figure 22 - Splitter connector CRY12-A (STATUS/EDM for R-Safe RFID Pro)

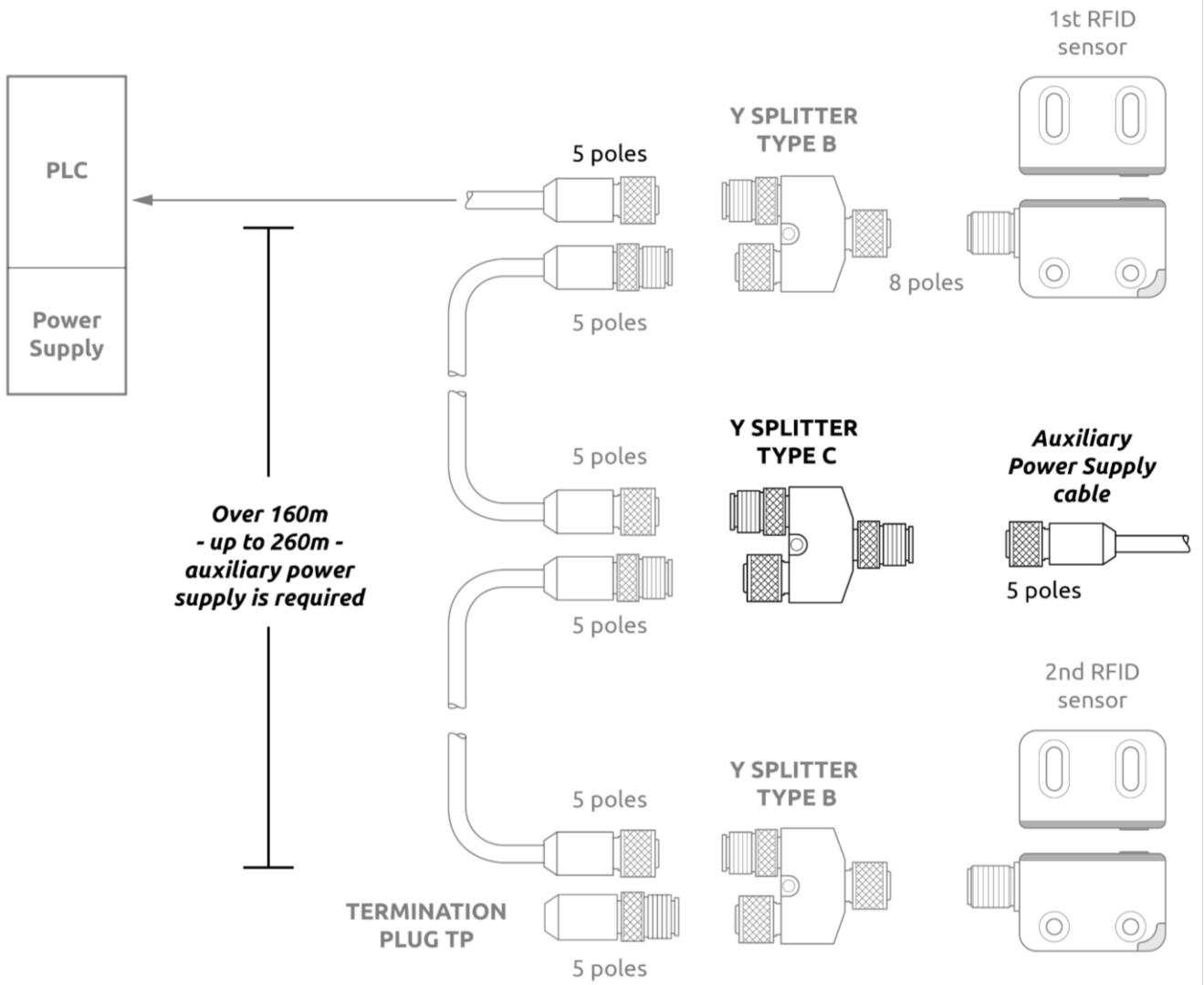## Special connection for the auxiliary power supply - sample

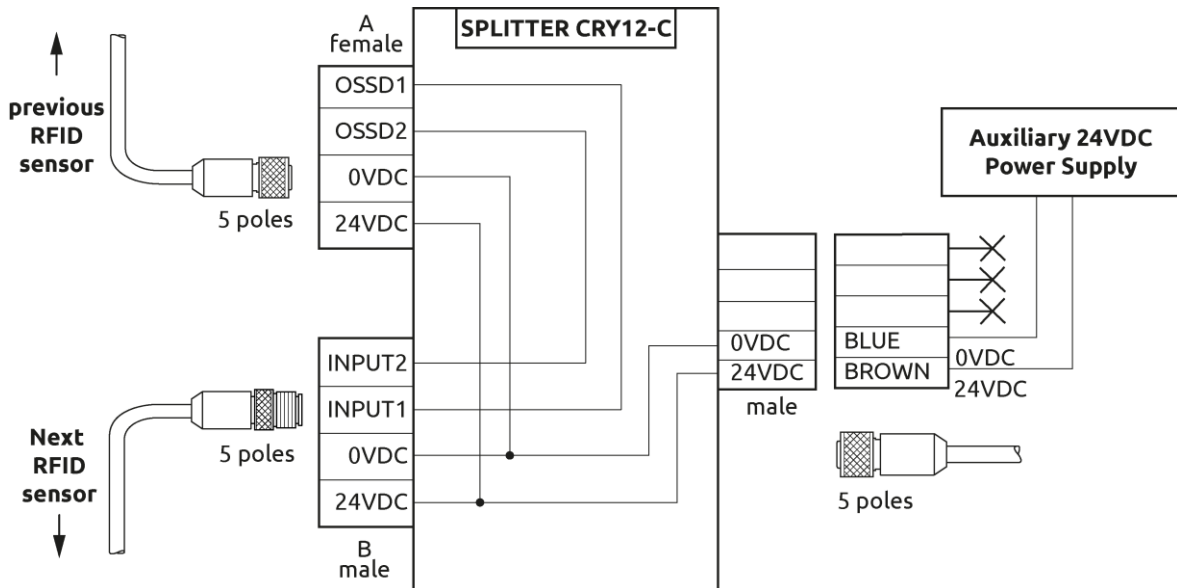*Figure 23 - Auxiliary power supply (R-Safe RFID Pro)*

Figure 24 - Splitter connector CRY12-C (Auxiliary 24VDC for R-Safe RFID Pro)

OPERATING MODES (R-Safe RFID Plus)

MANUAL MODE

⚡ Use in manual mode (start/restart interlock activated) is mandatory if the safety device monitors a guard to protect a hazardous area and a person, after passing the guard, can stand in the hazardous area without being detected.

⚡ The RESTART control button must be installed outside the hazardous area in a position where the hazardous area and the entire working area concerned are clearly visible.

Manual mode with EDM

➡ R-Safe RFID can operate in MANUAL MODE using an external RESTART command.

▪ A safety gate opening (reader/actuator distance **≥ Sar)** will deactivate the OSSD outputs.

▪ At the safety gate closure (reader/actuator distance **≤ Sao**), to reactivate the OSSD outputs it will be necessary to press the N.O. RESTART button connected to 24VDC and release it.

➡ The EDM input is only recognized as properly set if, after the sensor activation and after setting the safety inputs, at least one valid start pulse is detected.

➡ Use an external normally open pushbutton, whose temporary closure generates the RESTART command (sequence 0 → 1 → 0).

➡ The RESTART command must be connected in series with the K1/K2 control contacts of the external contactors connected to 24VDC (pin 8).
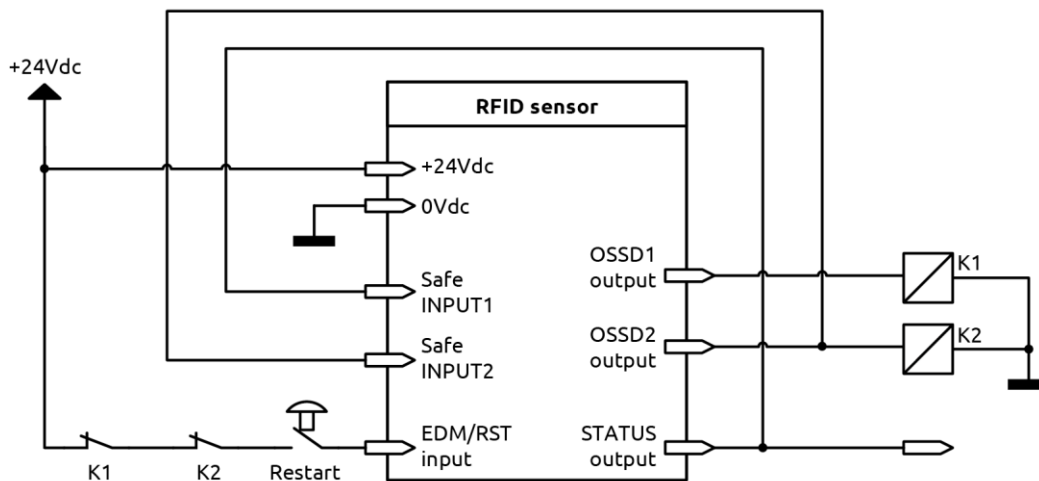
Figure 25 - Manual mode with EDM

SIGNAL / (pin)	CONNECTED TO / (pin)
INPUT 1 / (2)	STATUS / (5)
INPUT 2 / (6)	OSSD2 / (7)
EDM/RST input / (8)	24VDC / (1) - through the N.C. contact series of K1/K2 and RESTART command

Table 14 - Manual mode with EDM

Manual mode without EDM

➜ R-Safe RFID can operate in MANUAL MODE using an external RESTART command.

- A safety gate opening (reader/actuator distance **≥ Sar)** will deactivate the OSSD outputs.
- At the safety gate closure (reader/actuator distance **≤ Sao),** to reactivate the OSSD outputs it will be necessary to press the N.O. RESTART button connected to 24VDC and release it.

➜ Use an external normally open pushbutton, whose temporary closure generates the RESTART command (sequence $0 \rightarrow 1 \rightarrow 0$).

➜ The RESTART command must be connected to 24VDC (pin 8).
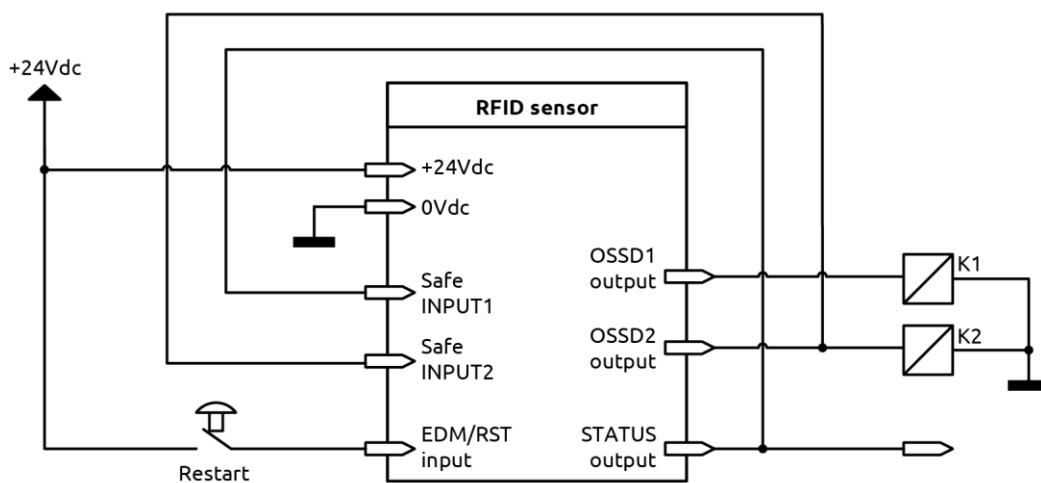
Figure 26 - Manual mode without EDM

SIGNAL / (pin)	CONNECTED TO / (pin)
INPUT 1 / (2)	STATUS / (5)
INPUT 2 / (6)	OSSD2 / (7)
EDM/RST input / (8)	24VDC / (1) - through the RESTART command

Table 15 - Manual mode without EDM

Correct RESTART pulse

The valid start pulse is detected when after a rising edge, a falling edge between 30ms and 5s is detected:
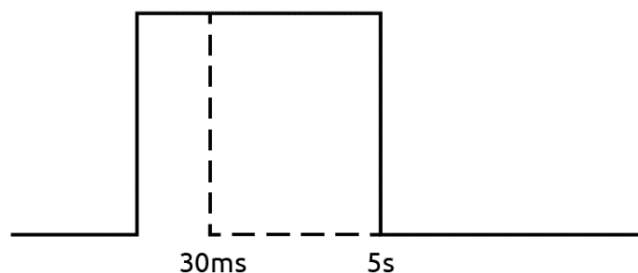
Figure 27 - Correct RESTART pulse

AUTOMATIC MODE

Limitations concerning the use of Automatic mode

⚡ Use in manual mode (start/restart interlock activated) is mandatory if the safety device monitors a guard to protect a hazardous area and a person, after passing the guard, can stand in the hazardous area without being detected.

Automatic mode with EDM

In "Automatic mode with EDM", the "EDM input" terminal must be connected to 24VDC through N.C. K1/K2 contact (in this way monitoring of the external contacts is enabled).

- A safety gate opening (reader/actuator distance **≥ Sar)** will deactivate the OSSD outputs.
- The safety gate closure (reader/actuator distance **≤ Sao)** will reactivate the OSSD outputs only if the EDM signal is correct.

The following figure shows the connections to perform in order to enable the monitoring of the K1/K2 external contacts.
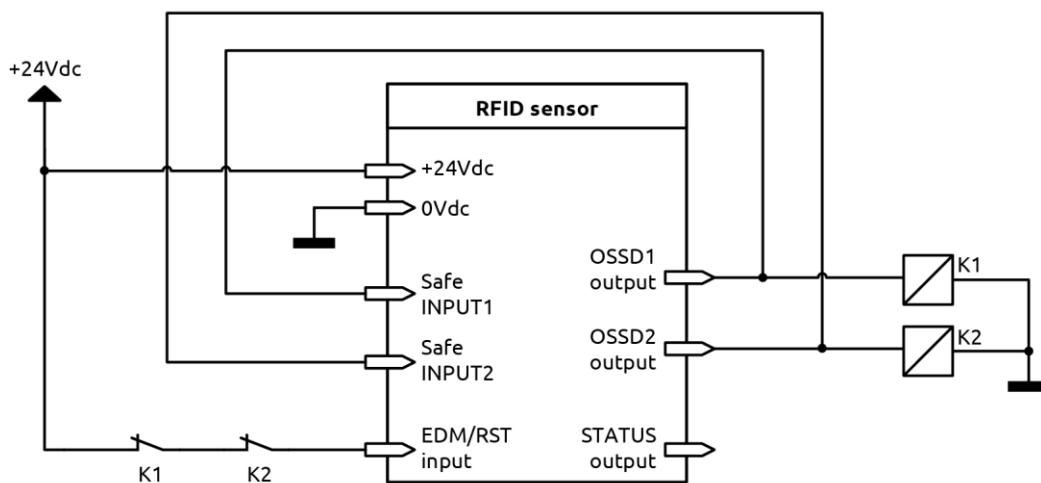

Figure 28 - Automatic mode with EDM

SIGNAL / (pin)	CONNECTED TO / (pin)
INPUT 1 / (2)	OSSD1 / (4)
INPUT 2 / (6)	OSSD2 / (7)
EDM/RST INPUT / (8)	24VDC / (1) - through the N.C. contact series of K1/K2

Table 16 - Automatic mode with EDM

The following table illustrates the electrical behavior of the EDM input with reference to the OSSD condition:

OSSD outputs (pin 4, 7)	EDM input (pin 8)
OFF	Closed contact
ON	Open contact

Table 17 – EDM input

➔ The time allowed to elapse from the activation of the OSSD outputs and the opening of the FBK contacts must be t <500ms (Figure 29).
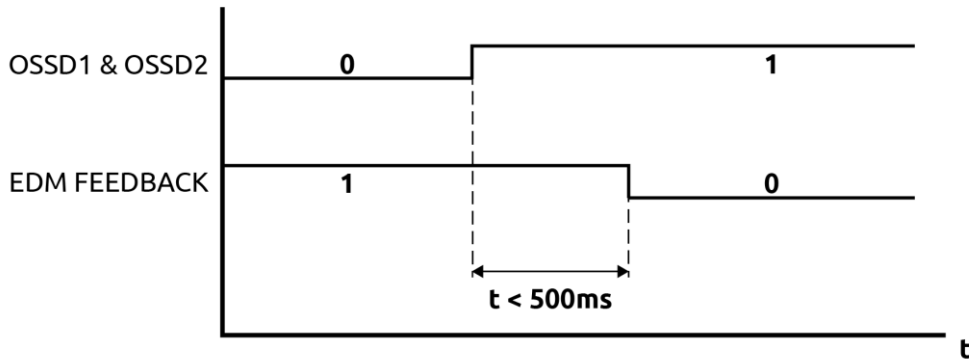
Figure 29 - Correct EDM timing

Automatic mode without EDM

When the sensor is configured IN "Automatic without EDM" the monitoring of external K1/K2 contacts is disabled, the "EDM input" must be connected directly to +24VDC.

- A safety gate opening (reader/actuator distance **≥ Sar**) will deactivate the OSSD outputs.
- At the safety gate closure (reader/actuator distance **≤ Sao)** will reactivate the OSSD outputs.

Figure 30 - Automatic mode - no EDM

SIGNAL / (pin)	CONNECTED TO / (pin)
INPUT 1 / (2)	OSSD2 / (7)
INPUT 2 / (6)	OSSD1 / (4)
EDM/RST INPUT / (8)	24VDC / (1)

Table 18

SERIAL CONNECTION MODE (R-safe RFID Plus)

Configuration as first sensor in a serial connection

In the serial connection mode it is mandatory to configure the first sensor as in the following diagram to enable the communication protocol.

Figure 31 - First sensor in a serial connection

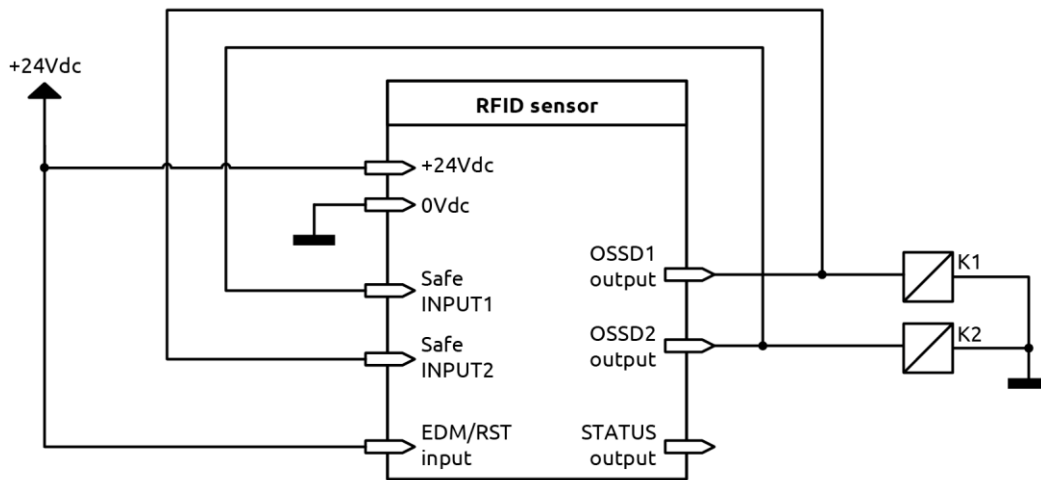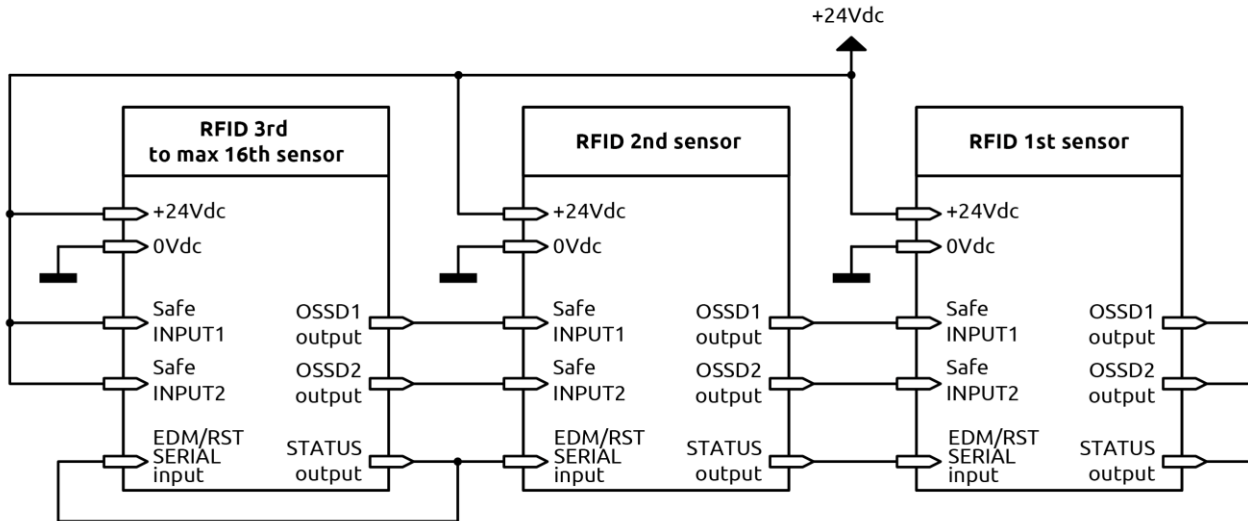| SIGNAL / (pin)	CONNECTED TO / (pin)
INPUT 1 / (2)	24VDC / (1)
INPUT 2 / (6)	24VDC / (1)
EDM/RST/SERIAL input / (8)	STATUS / (5)

Table 19 - First sensor in a serial connection

In serial mode a <u>maximum to 16</u> R-Safe RFID Plus sensors can be connected in series.

➡ For a quicker and safe connection, ReeR recommends using its splitter connectors as showed in Figure 32 and Figure 33.

➡ In serial connection, the device can only operate in <u>Automatic</u> operation mode.

➡ If one or more sensor is deactivated <u>(actuation distance = Sar)</u> all downstream sensors outputs will be deactivated with the programmable controller opening its OSSD outputs.

➡ The next two sections extend the information on the use of the "STATUS" signal in serial mode.

➡ Serial connection: with an increase of the *length* and of the *current drawn* (load + sensors), there corresponds a voltage drop in the system. Should this voltage be less than 20 VDC, an additional power supply must be provided.

The following schematic shows an example of series connection of 4 sensors (using the ReeR splitter connectors) with a Programmable Logic Controller.

SERIAL mode connection using "Splitter" connectors - sample
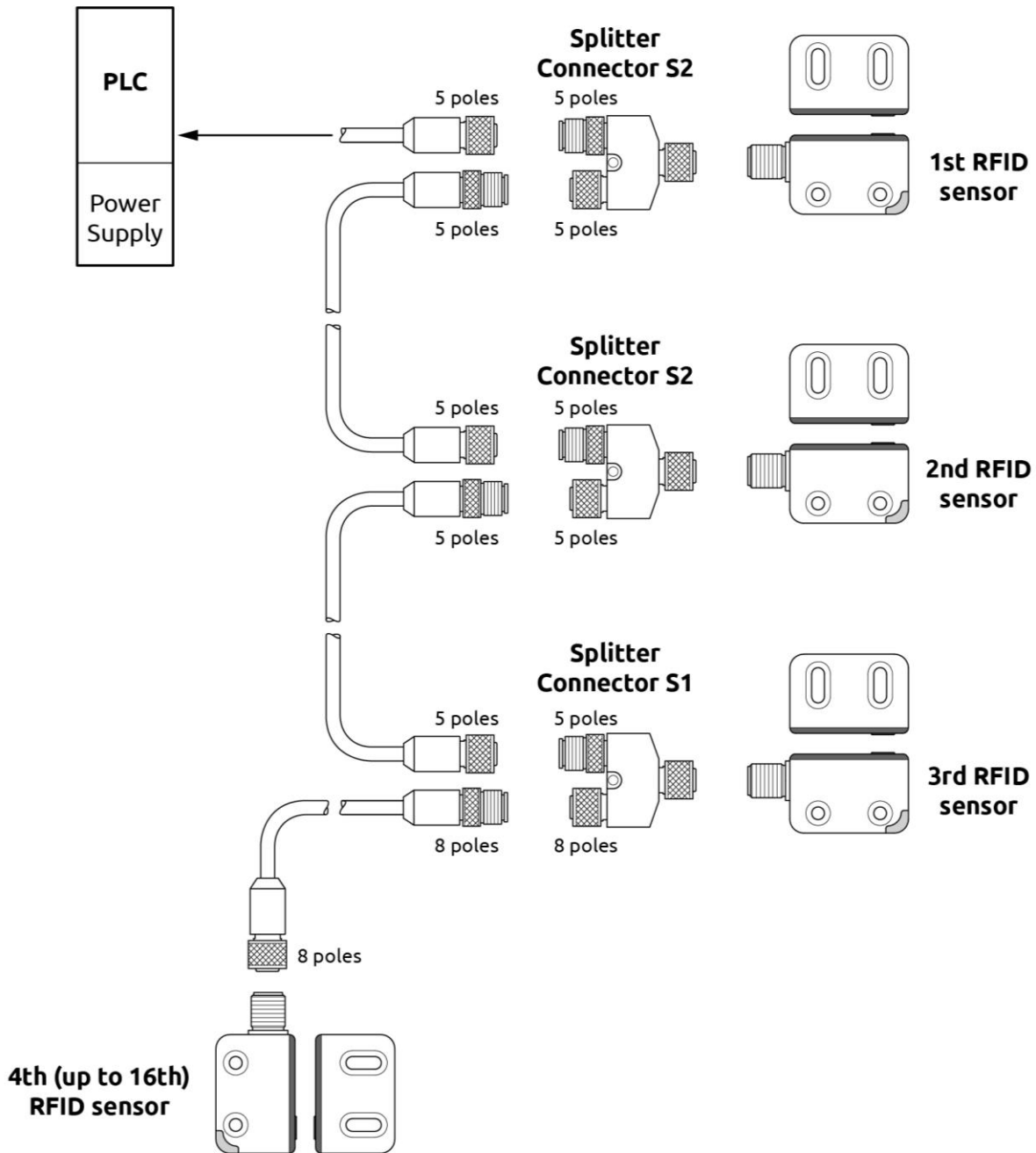
Figure 32 - Serial mode (Automatic)

> ⚡ In order to guarantee the highest level of safety (PL e), it is necessary to include a safety device (PLe), such as a safety module or programmable controller (e.g., ReeR MOSAIC M1S) at the end of the chain to evaluate the condition of the static OSSD outputs.

SERIAL mode connection using "Splitter" connectors - schematic

Figure 33 - Serial mode wiring (Automatic)

Special connection for the auxiliary power supply
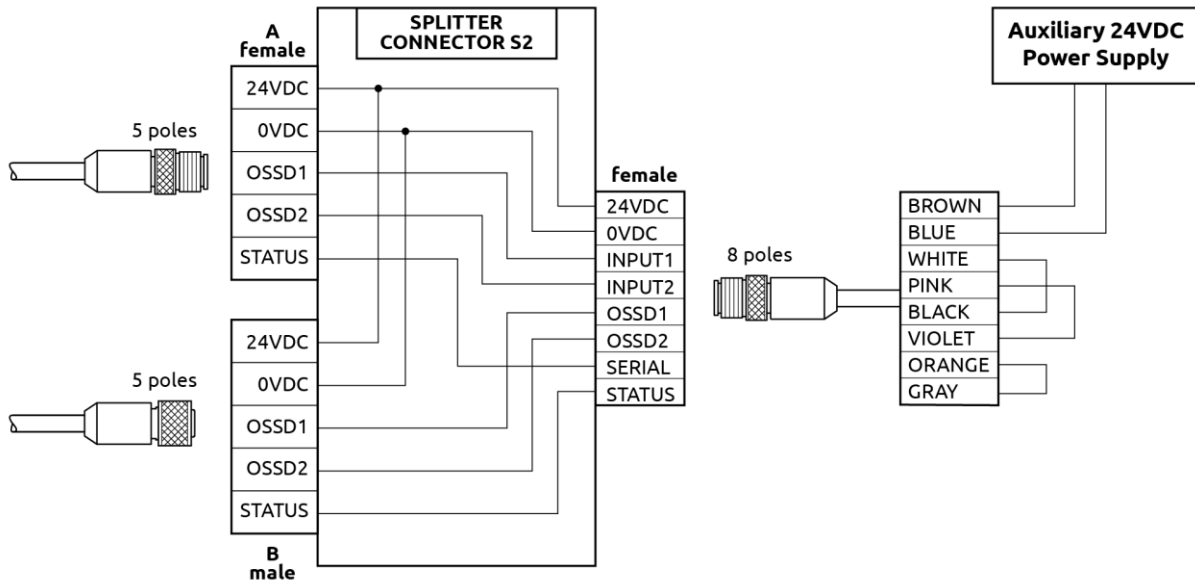
Figure 34 - Special connection for the auxiliary power supply

SERIAL mode connection using "Splitter" connectors
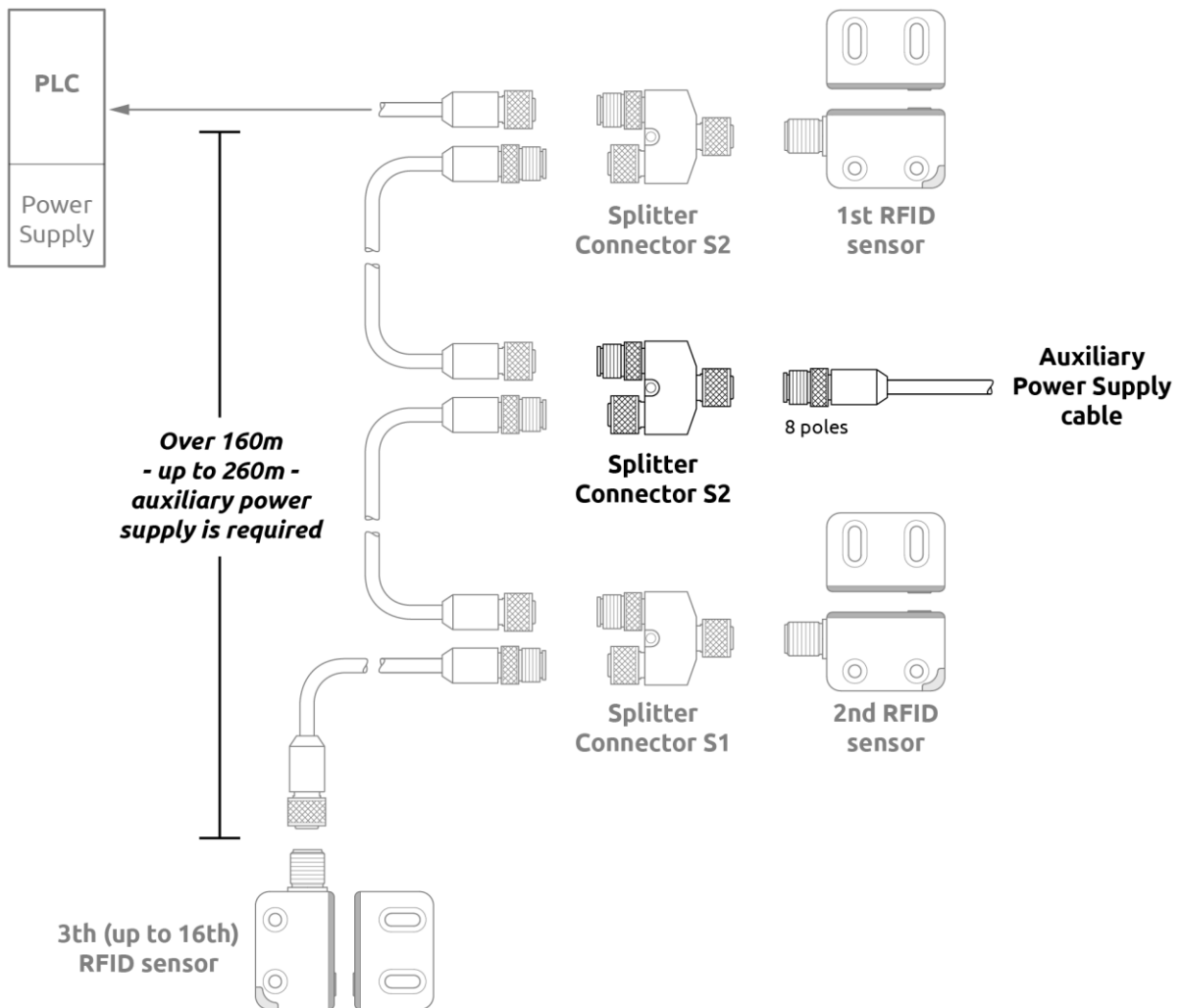
Figure 35 - Auxiliary power supply

STATUS output transmission protocol (R-Safe RFID Plus)

A system STATUS output is available in the RFID sensor for diagnostics. The output signal is a 24 VDC square waveform (Figure 36) that corresponds to the status of the sensor chain.
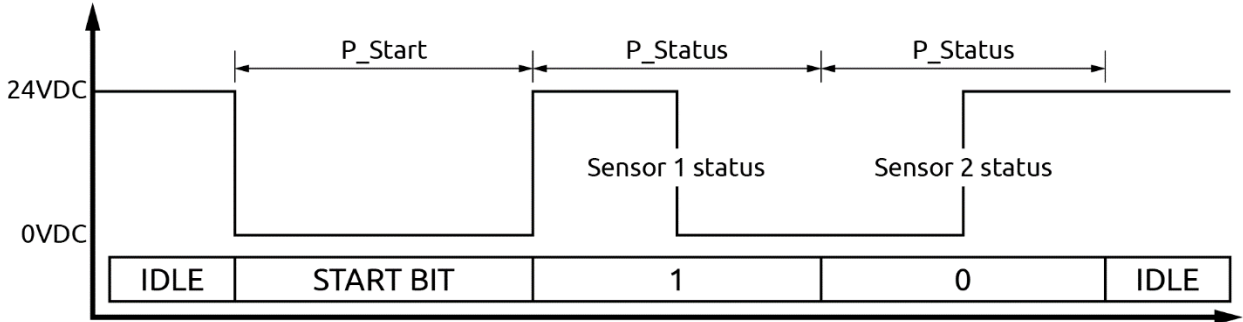
Figure 36 - STATUS serial asynchronous transmission

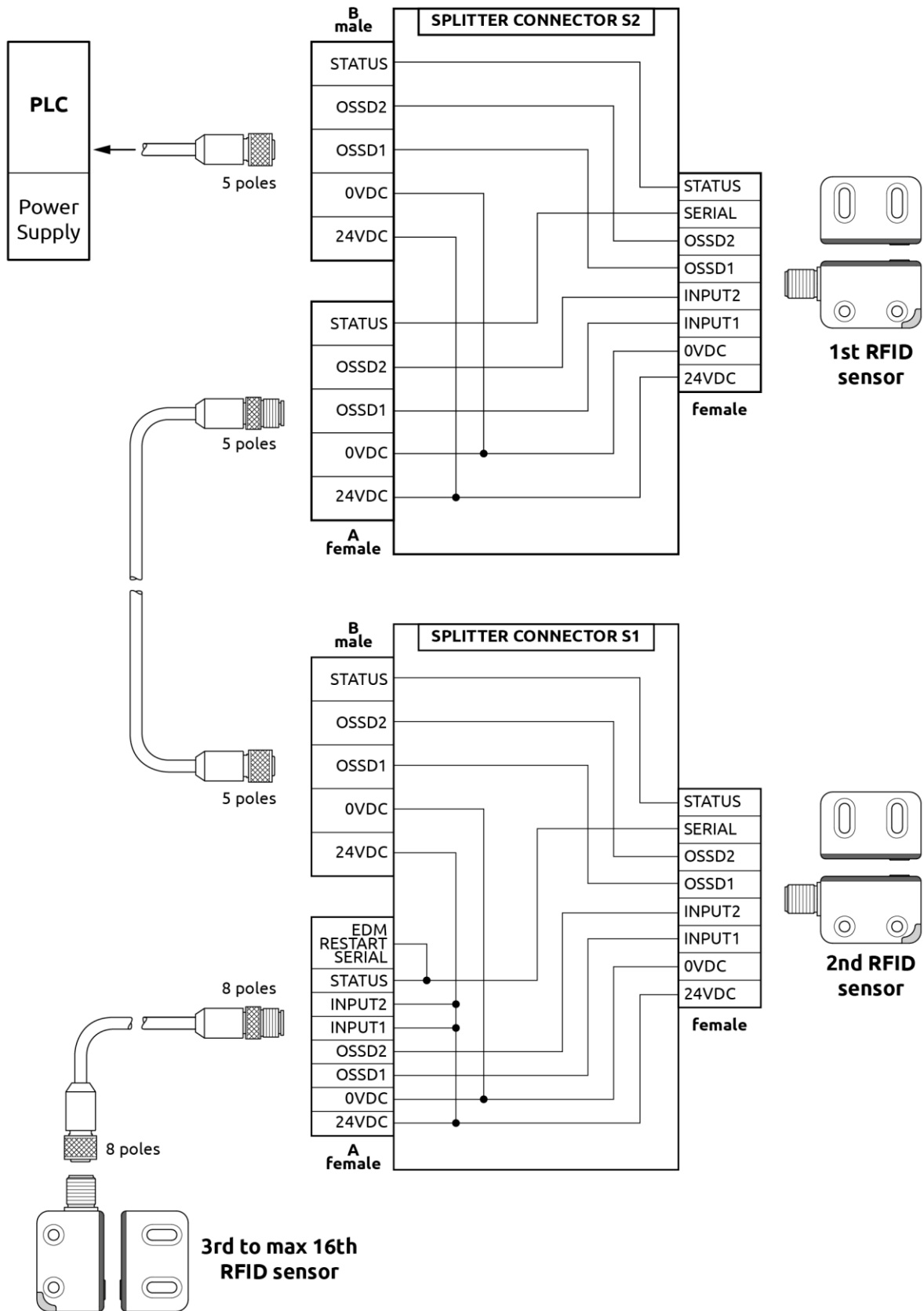➜ The timing requirements for data transmission are not critical to the safety of the device, as "STATUS" is not a safety signal. The following table shows the timing requirements.
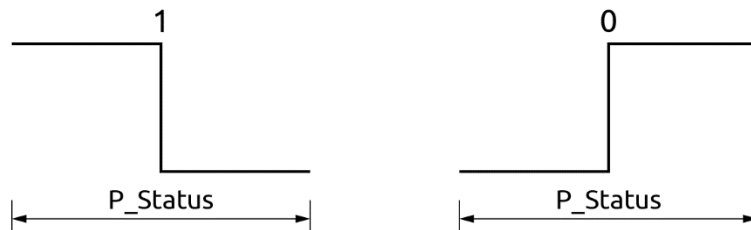
Figure 37 - Serial bit encoding

Time requirement	Description	Bit Timing (ms)
IDLE	High level	Continuous
P_Start	Low level	150 ±10
P_status center Bit 0	Rise edge	150 ±10
P_status center Bit 1	Fall edge	150 ±10
Intercharacter	High Level	≥ 5000

Table 20 - Serial status timing requirements

STATUS IN SERIAL MODE (R-Safe RFID Plus)

The serial output waveform containing the sensor's STATUS is shown in "Figure 39" for three sensors connected in serial modality. The first and second sensors are in CLEAR status with the actuator inside the Sao distance. The third sensor has its transponder at the Sar distance; therefore, it is in BREAK status.
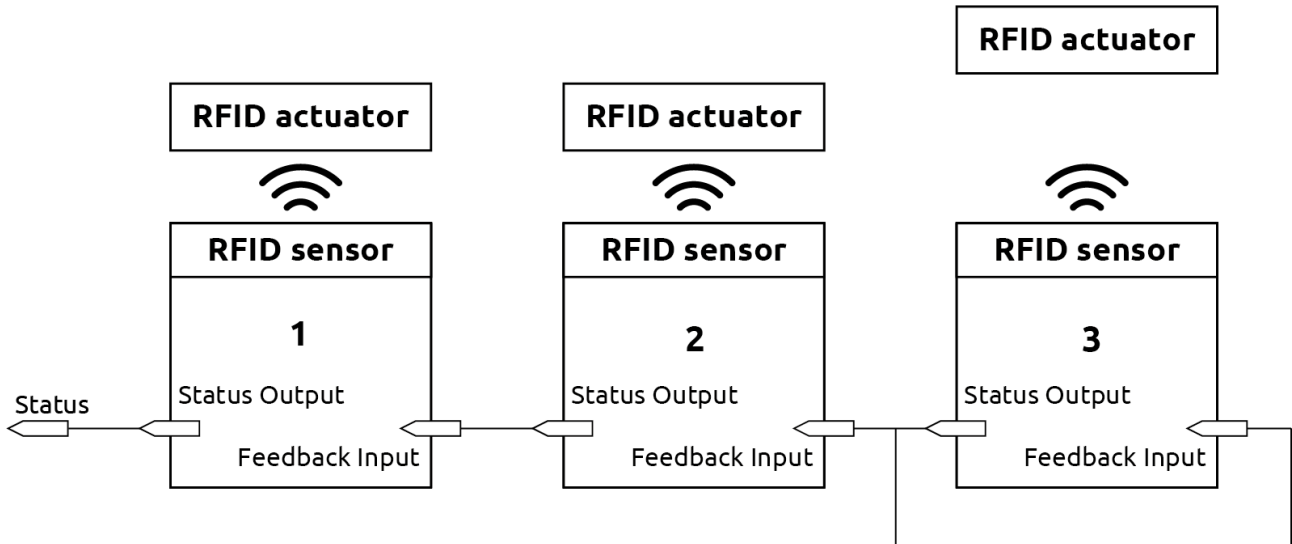
Figure 38 - STATUS signal in serial mode
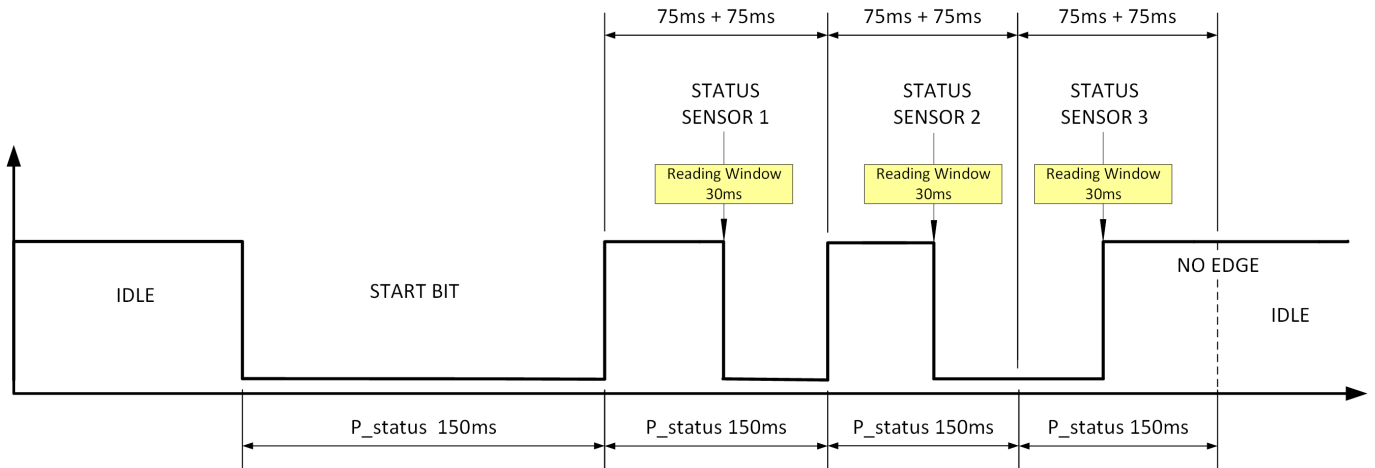
Figure 39 - Serial STATUS waveform output

INPUT/OUTPUT

SAFETY INPUTS (R-safe RFID Plus/Pro)

INPUT1 / INPUT2
RFID Pro and RFID Plus are equipped with two PNP active high safety inputs.
The INPUT1 / INPUT2 input are used to receive the external OSSD's signal from another sensor (when a serial connection is requested).

EXTERNAL DEVICE MONITORING / RESTART
The EDM/RESTART (Plus), EDM (Pro) input is used to monitor the feedback connection of any external contactors (connector pin 8). This signal is PNP active high.

STATUS OUTPUT

The system has a status digital output with the following characteristic:
- PNP active high, 0 … +24VDC
- Maximum load: 100 mA
- Overload protection

➡ In "Plus" models the Status output provides real-time information about the status of the sensor.

➡ In "Pro" models the Status output provides real-time information about the OSSDs condition.

➡ The different signals are described in a more detailed way in Table 24 and Table 25.

➡ When several R-Safe RFIDs are connected in series, please refer to the "STATUS output transmission protocol (R-Safe RFID Plus)" section for the use of the STATUS output.

⚡ The status output has no safety-related function.

OSSD SAFETY OUTPUTS

Two static outputs (connector pin 4 and 7) are provided, based on the C-type interface for which functional safety aspects are ensured by an internal dynamic test (ZVEI Classification - CB24I).

Electrical characteristics of OSSD safety outputs

The OSSD requirements listed in the table below are required by IEC 60947-5-2.

	VALUE	NOTE
Off-state current	≤ 0.5 mA	@ 24VDC
Voltage drop	≤ 3,5V DC	@ 24VDC
Load capacitance	300 nF	@ VCC max … VCC min

Table 21 - OSSD safety outputs

OSSD dynamic tests

R-Safe RFID performs a dynamic test on OSSD outputs (ZVEI Classification - CB24I). According to ZVEI sources of interface type C are subdivided into classes according to the timing characteristics of the test pulses.
The test pulses time is shown in the following figure.
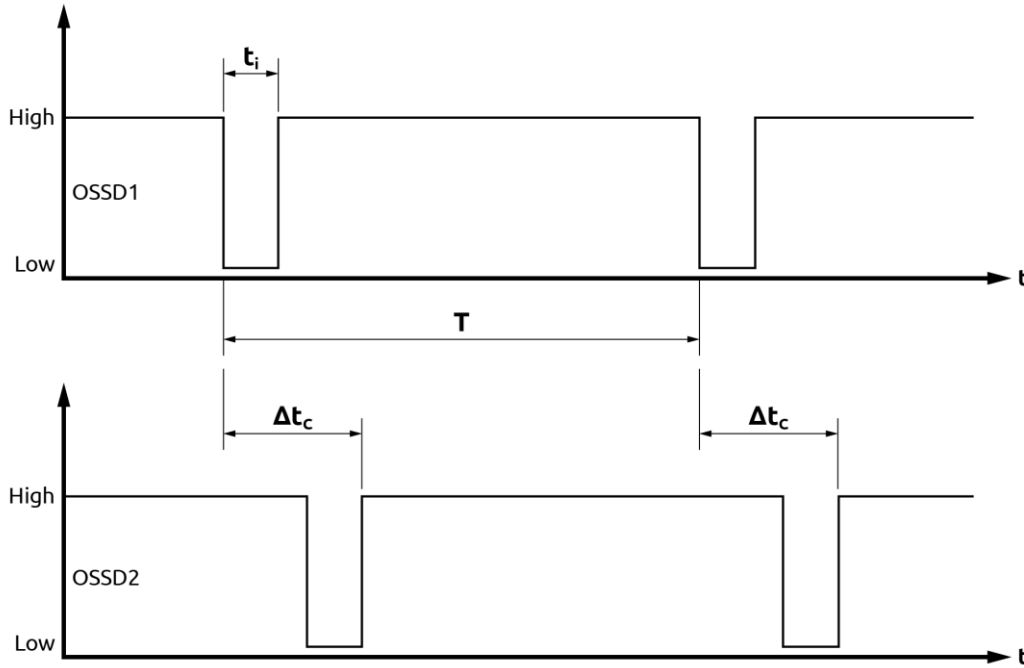
Figure 40 - Timing of OSSD test pulses

The requirements for test pulses are listed in the following table (ZVEI Classification - CB24I):

ZVEI Classification	Test pulse duration (t_i)	Maximum duration (t_i)	Minimum duration (t_i)
Class 2	100 μs	120 μs	80 μs
	Phase shift (Δtc)	Maximum shift (Δtc)	Minimum shift (Δt_c)
	500 ms	510 ms	490 ms
	Test pulse interval (T)	Maximum interval (T)	Minimum interval (T)
	1s	1.1 ms	0.9 ms

Table 22 - Timing requirements for OSSD pulse test

LED SIGNALS

The R-Safe RFID sensor provides a multi-colored LED to notify its condition in real time.
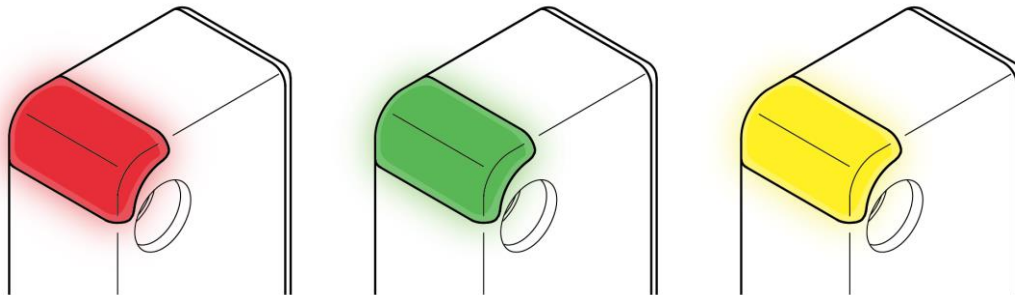
CONFIGURED MODE (POWER UP)	LED COLOR	NUMBER OF BLINKS (PLUS)
Single sensor with EDM in AUTO mode	Yellow	2
Single sensor without EDM in AUTO mode	Yellow	3
Single sensor in MANUAL mode	Yellow	4
First sensor of serial connection	Yellow	5
Sensor of serial connection	Yellow	6

Table 23 - RFID operating mode signals (at power up)

COLOR (NORMAL OPERATION)	SENSOR STATUS	MEANING	STATUS OUTPUT
RED	BREAK	OSSD outputs LOW	Low level
GREEN	GUARD	OSSD outputs HIGH	High level
YELLOW	RESTART	Waiting for Restart	-
GREEN / RED - Blinking	GUARD / INPUT OFF	One or more sensors in the chain is in BREAK state	-
Blinking GREEN	PROGRAMMING	Actuator programming (TEACH-IN)	-
Blinking YELLOW	CONFIG	Configuration type (-> Table 23)	-
Blinking RED	FAIL	Error condition	(see Table 25)

Table 24 - RFID status signals (in normal operation)

ERROR (DIAGNOSTIC)	COLOR	BLINKING	STATUS PULSES	CORRECTIVE ACTION
OSSD outputs error	Red	1	1	Check OSSD connections (4, 7)
Safety input incongruency	Red	2	2	Check sensor series connections (Input 2, 6 / OSSD 4, 7)
EDM error	Red	3	3	Check EDM connections (8)
Overvoltage detected	Red	4	4	Check connections / Send product to ReeR
Internal error	Red	5	5	Send product to ReeR
Teach-in procedure counter overflow	Red	6	6	Maximun number of automatic teach-in procedures reached. Use through-wire procedure. In case of Basic model replace the sensor.
Incorrect wire Configuration	Red	7	7	Check connections
Antenna overvoltage detected	Red	10	10	Send product to ReeR

Table 25 - RFID error signals (Status pulses in stand-alone operation)

TECHNICAL FEATURES

SAFETY CHARACTERISTICS	VALUE	STANDARD
PL	PL e	ISO 13849-1
Category	4	
PFHd	2.18E-09	IEC 61508-1
SFF	99.5%	
DC	High	
SIL	3	
Maximum SIL	3	EN 62061
Hardware fault tolerance (HFT)	1	EN ISO 13849-1 EN 62061
Mission time	20 years	
Coding Low	Yes Type Generic	EN ISO 14119-1
Coding High	Yes Teach-in / Unique types	

ELECTRICAL CHARACTERISTICS	VALUE	STANDARD
Rated Power supply	24 VDC +/-20%	IEC 60947-5-2
Power consumption	0.5 W	
Protection class	III	IEC 60947-5-2
Rated surge voltage	Max 1 kV	IEC 60947-5-2
Rated insulation voltage	Max 300 V	IEC 60947-5-2
EDM	FBK input for external relay monitoring	EN 61131-2
Safety input	2 / Active High	EN 61131-2
OSSD safety outputs (n° / type)	2 / 300 mA@24VDC	Active High
STATUS output (n° / type)	1 / 100 mA@24VDC	Active High
Restart	N.O. Restart input in series with EDM	
EMC	according to EN 60947-5-3	

MECHANICAL CHARACTERISTICS	VALUE	STANDARD
Housing material	Nylon	UL
Cover material	Nylon	UL
Assured release sensing distance (Sar)	25 mm	
Assured operating distance (Sao)	10mm (X axis); 5mm (Y axis); 5mm (Z axis) -> "ACTIVACTION DISTANCES (Standard EN ISO 14119)"	
Nominal operating distance (Sn)	12mm (X axis); 6mm (Y axis); 6mm (Z axis)	
Repeat accuracy	$\leq$ 10% of the effective operating distance	
Hysteresis	$\leq$ 20% of the effective operating distance	
Frequency of operating cycles	max 1Hz	
Free Zone	50 mm	EN ISO 14119-1
Minimum mounting distance between sensors	150 mm	EN ISO 14119-1
Mounting type	Fitting with M4 x 20 anti-unscrewing screws	UNI 5931
Connector	M12x1: 5-pin (BASIC); 8-pin (PRO/PLUS)	
Connection cable length	30 m	
Weight	Cable: 200 g / Connector: 80 g	

ENVIRONMENTAL CHARACTERISTICS	VALUE	STANDARD
Operating temperature	-25 … +70 °C	IEC 60068-2
Storage temperature	-25 … +70 °C	IEC 60068-2
Altitude	2000 m	EN 60947-1
Humidity	50% @70°C / 90% @20°C	IEC 60068-2
Pollution degree	2	EN 60947-1
Protection degree	IP65/IP67	EN 60947-1 EN 60529:1991 + A1:2000 + A2:2013
Shock resistance	30g / 11ms	IEC 60068-2-27
Vibration	10 … 55Hz	IEC 60068-2-27
Vibration amplitude	1 mm	IEC 60068-2-27
Vibration cycle duration	5 min	IEC 60068-2-6
Air pressure	860 … 1060 hPa	IEC 60068-2
FCC Certification	FCC ID: 2A93E-RSAFE	FCC Part 5 §15

| TIME CHARACTERISTICS	VALUE	STANDARD
Switch-on delay	10s typical, 15s max.	
Standalone Risk time	≤ 55ms (Stand-alone device)	EN 60947-5-3
Additional Risk time (series connection)	≤ 12ms (Additional risk time delay per device)	
Risk time for 4 sensors Risk time for 8 sensors Risk time for 16 sensors	Rt= 55ms+(3x12ms) = 91ms Rt= 55ms+(7x12ms) = 139ms Rt= 55ms+(15x12ms) = 235ms	
Switch-on time (actuator)	≤ 250ms	

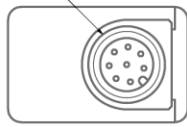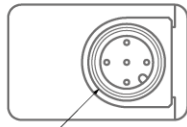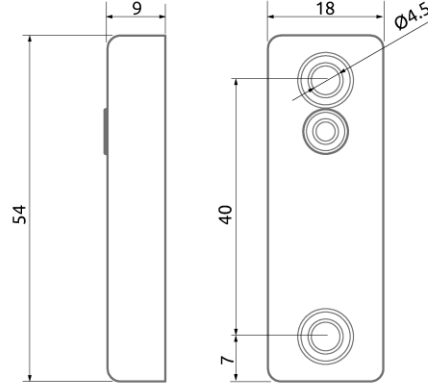| PRODUCT TRACEABILITY |
|---|
| On each R-Safe product (sensor or actuator) is present a serial number.
It makes it possible to identify the product and get the all relevant information and the traceability information from ReeR SpA. |

MECHANICAL DIMENSIONS
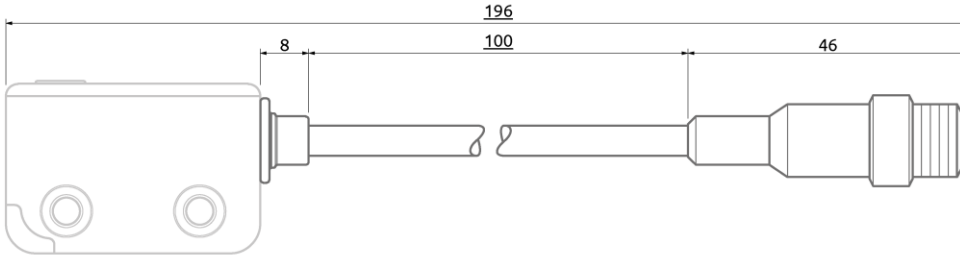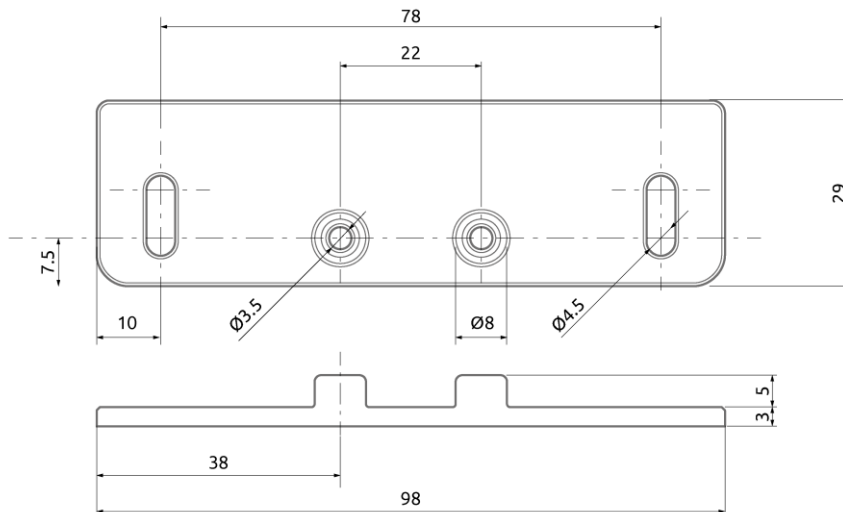
SENSOR
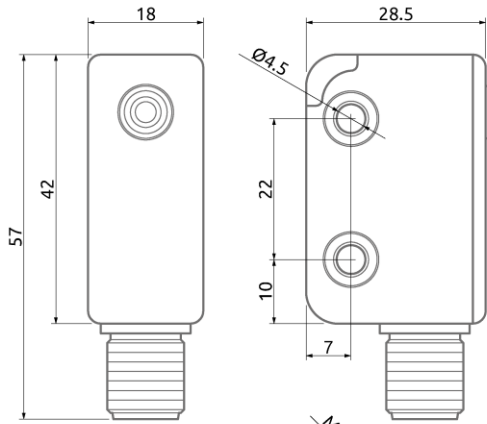
ACTUATOR
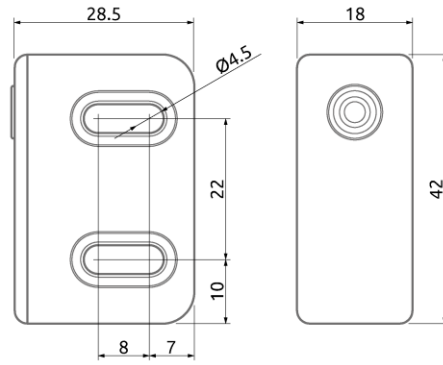
PLUS / PRO

BASIC

ACTUATOR SLIM

SENSOR - PIGTAIL VERSION

FIXING BRACKET - 22TO78

(Dimensions in mm)

MAINTENANCE

TEACH-IN PROCEDURE

The **teach-in** coding sensor can be only programmed (by the user during the start-up phase) using a TEACH-IN coding actuator.
It is possible to pair the new RFID actuator in two ways:

1. Teach-in automatic procedure: memorization through side-by-side actuator recognition (up to 3 times).
2. Teach-in through wire procedure: memorization through wire configuration.

Teach-in automatic procedure

For start-up teach-in automatic procedure, it is necessary to to proceed as follows:
  ➢ Place the actuator in front of the sensor (at a distance $\leq$ 2mm) (Figure 41, condition A).
  ➢ Power on the R-Safe RFID sensor.
  ➢ The sensor reads the actuator code and starts the pairing process (Figure 41, condition B).
  ➢ The procedure will be completed after 5 seconds (Figure 41, condition C).

➜ The code memorization (condition B) will not start if the sensor and the actuator were previously paired.

➜ This procedure will take about 5 seconds. The above procedure can only take place 3 times, after which it reverts to the through wire teach-in procedure.

➜ All the conditions are signaled in real-time by the multicolor LED based on the RFID sensor.

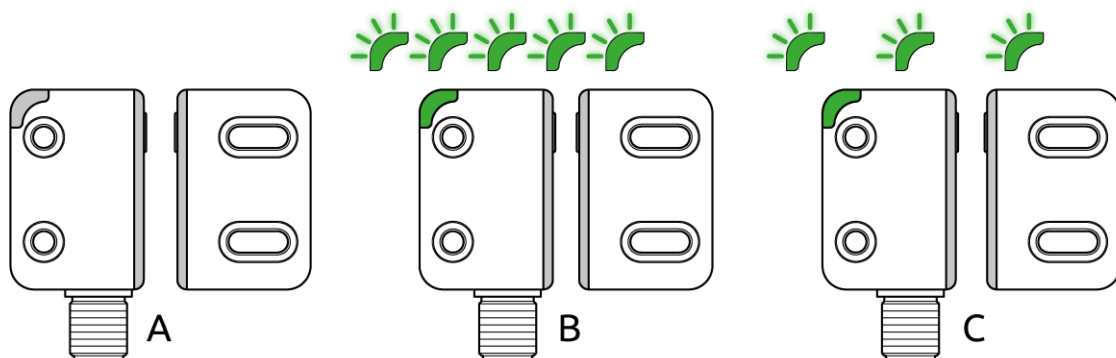*Figure 41 - Automatic teach-in signals*

CONDITION A	CONDITION B (fast blinking)	CONDITION C (slow blinking)
INITIAL POSITION	SWITCHED ON, PAIRING PROCESS	PAIRED, WAITING FOR A RESTART

Table 26 - Teach-in procedure

Teach-in through wire procedure

➔ This configuration is valid for R-Safe RFID Pro and R-Safe RFID Plus models only

For <u>teach-in through wire</u> procedure, the sensor must be wired following the configuration in the section ("Configuration for teaching a new ID to the sensor").

➢ Power on the R-Safe RFID sensor (Figure 42, condition A).
➢ After power on, the sensor will be ready for pairing with the actuator (Figure 42, condition B).
➢ When the actuator is approaching the RFID sensor at a distance $\leq$ 2mm, the sensor is programmed after 5 seconds (Figure 42, condition C).

➔ All the conditions are signaled in real-time by the multicolor LED based on the RFID sensor.

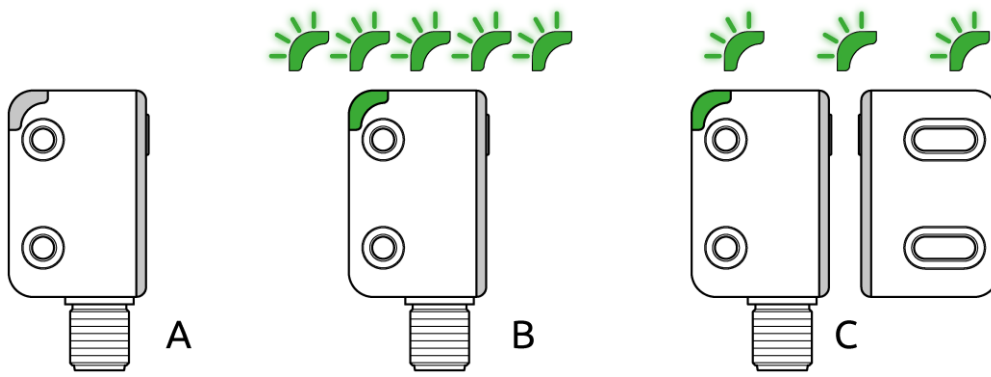*Figure 42 - Teach-in signals*

CONDITION A	CONDITION B (fast blinking)	CONDITION C (slow blinking)
WAITING FOR POWER ON	SWITCHED ON, WAITING FOR PROGRAMMING	PROGRAMMED, WAITING FOR A RESTART

Table 27 - Teach-in procedure

Configuration for teaching a new ID to the sensor

For the **"teach-in"** model, the sensor can be programmed with a new ID.
This function will be realized by the user during the start-up phase *(-> TEACH-IN PROCEDURE)*, configuring the sensor as in the following diagram.

➜ This configuration is valid for R-Safe RFID Pro and R-Safe RFID Plus models only
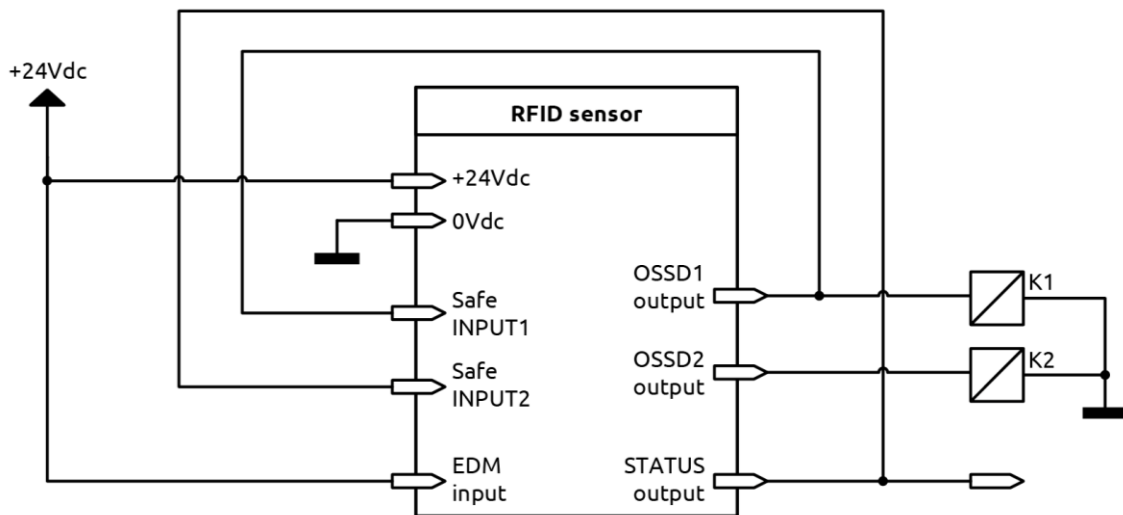

Figure 43 - Enabling new ID assignment

SIGNAL / (pin)	CONNECTED TO / (pin)
INPUT 1 / (2)	OSSD1 / (4)
INPUT 2 / (6)	STATUS / (5)
EDM INPUT / (8)	24VDC / (1)

Table 28 - Enabling new ID assignment

CHECKLIST AFTER INSTALLATION

The R-Safe RFID safety sensor is able to detect in real time the faults.
To guarantee the system perfect operation perform the following checks at start up and at least every year:

OPERATION / CONTROL	COMPLETE
1. *Verify the correct fixing of the device (sensor and actuator)*	☐
2. *Verify that anti-unscrewing screws and safety caps are well mounted*	☐
3. *Verify that the activation/deactivation distances are correct*	☐
4. *Verify that the connector is well screwed*	☐
5. *Verify that the sensor's LED lights on correctly*	☐
6. *Operate a complete System Test (i.e. opening the safety gate and verifying that the hazardous machine stop its operation)*	☐
7. *With a series configuration perform the above controls for ALL the sensors*	☐

ACCESSORIES

MODEL	ITEM	CODE
5 poles connectors		
CFM5P3	2 Male/Female connectors - Straight M12, 5poles with 3m cable	1390908
CFM5P5	2 Male/Female connectors - Straight M12, 5poles with 5m cable	1390909
CFM5P10	2 Male/Female connectors - Straight M12, 5poles with 10m cable	1390911
CD3	Female connector - Straight M12, 5poles with 3m cable	1330969
CD5	Female connector - Straight M12, 5poles with 5m cable	1330950
CD10	Female connector - Straight M12, 5poles with 10m cable	1330956
8 poles connectors		
CFM8P2	2 Male/Female connectors - Straight M12, 8poles with 2m cable	1295108
CFM8P3	2 Male/Female connectors - Straight M12, 8poles with 3m cable	1295100
CFM8P5	2 Male/Female connectors - Straight M12, 8poles with 5m cable	1295101
CFM8P10	2 Male/Female connectors - Straight M12, 8poles with 10m cable	1295102
CFM8P20	2 Male/Female connectors - Straight M12, 8poles with 20m cable	1295109
CF8P2	Female connector - Straight M12, 8poles with 2m cable for RRFID PRO/PLUS	1295118
CF8P3	Female connector - Straight M12, 8poles with 3m cable for RRFID PRO/PLUS	1295103
CF8P5	Female connector - Straight M12, 8poles with 5m cable for RRFID PRO/PLUS	1295104
CF8P10	Female connector - Straight M12, 8poles with 10m cable for RRFID PRO/PLUS	1295105
CF8P20	Female connector - Straight M12, 8poles with 20m cable for RRFID PRO/PLUS	1295119
CF8P25	Female connector - Straight M12, 8poles with 25m cable for RRFID PRO/PLUS	1295121
Splitter connectors		
CRY12-TP	Termination Plug for MRFID/RRFID PRO	1292402
CRY12-A	Y splitter **Type A**, for series connections of MRFID/RRFID PRO Status Output in Series Connections	1292404
CRY12-B	Y splitter **Type B**, for series connections of MRFID/RRFID PRO	1292403
CRY12-C	Y splitter **Type C**, for series connections of MRFID/RRFID PRO Additional Voltage Supply in Series Connections	1292405
CRY12-S1	Splitter connector M12, 8-8-5 poles, Female-Male-Female **S1** for RRFID PLUS	1295106
CRY12-S2	Splitter connector M12, 8-5-5 poles, Female-Male-Female **S2** for RRFID PLUS	1295107
Fixing accessories		
22TO78 2/ST/BIT	R-Safe 2 x 22TO78, 78mm Adapter, Self-Tapping Screws, Fixing Insert BIT	1295110
22TO78 10/ST	R-Safe 10 x 22TO78, 78mm Adapter, Self-Tapping Screws	1295111
4/ST/BIT	R-Safe 4 x Self-Tapping Screws, with BIT Fixing Insert	1295112
20/ST	R-Safe 20 x Self-Tapping Screws	1295113
40/ST	R-Safe 40 x Self-Tapping Screws	1295114
4/M4/BIT	R-Safe 4 x M4 Screws, with BIT Fixing Insert	1295115
20/M4	R-Safe 20 x M4 Screws	1295116
40/M4	R-Safe 40 x M4 Screws	1295117

WARRANTY

ReeR guarantees that every new R-Safe RFID system is free from defects in materials and manufacturing
for a period of 12 (twelve) months from the time it is released by the factory if used under normal conditions.
During this period, ReeR is committed to eliminate any defects in the product by repairing or replacing defective parts, completely free of charge, both for material and labour.
However, ReeR reserves the right to proceed, instead of repairing it, to replace the entire defective equipment with one having the same or equal characteristics.
The validity of the warranty is subject to the following conditions:

➡ The failure must be reported by the user to ReeR within twelve months from the date of delivery of the product.

➡ The equipment and its components are in the same condition as delivered by ReeR.

➡ Failure or malfunction has not originated directly or indirectly from:

> ➢ Use for inappropriate purposes;
>
> ➢ Failure to comply with the rules of use;
>
> ➢ Negligence, lack of expertise, incorrect maintenance;
>
> ➢ Repairs, modifications, adaptations not performed by ReeR personnel, tampering, etc.;
>
> ➢ Accidents or shocks (even if due to transport or causes of force majeure);
>
> ➢ Other causes independent of ReeR.

The repair will be carried out at the ReeR laboratories where the material must be delivered or shipped:
the shipping costs and the risks of any damage or loss of material during shipment are the responsibility of the customer.
All replaced products and components become ReeR property.
ReeR does not recognize any other warranties or rights except those expressly described above; in no case can claims for damages for expenses, activity interruption, or other factors or circumstances be made in any way related to the failure of the product or one of its parts.

⚡ The strict and complete observance of all the standards, indications and prohibitions set forth in this manual is an essential requirement for the proper operation of the light curtain. ReeR s.p.a., therefore, disclaims any liability in case of non-respect, even partial, of these indications.

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