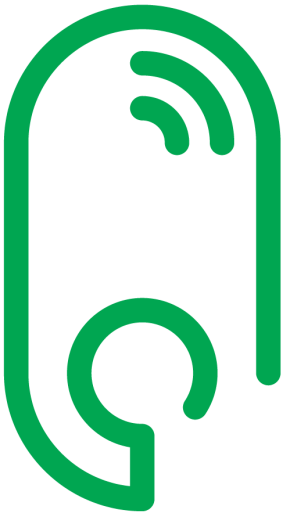
Harmony eXLhoist

Wireless Remote Control System
User Guide

(Original Document)

09/2018



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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

Table of Contents

Safety Information

Important Information

NOTICE

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

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

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book

At a Glance

Document Scope

This manual describes how to use the Wireless Remote Control System.

Validity Note

This document has been updated for the eXLhoist Firmware version V4.

The technical characteristics of the devices described in the present document also appear online. To access the information online:

Step	Action
1	Go to the Schneider Electric home page *www.schneider-electric.com*.
2	In the **Search** box type the reference of a product or the name of a product range. ● Do not include blank spaces in the reference or product range. ● To get information on grouping similar modules, use asterisks (*).
3	If you entered a reference, go to the **Product Datasheets** search results and click on the reference that interests you. If you entered the name of a product range, go to the **Product Ranges** search results and click on the product range that interests you.
4	If more than one reference appears in the **Products** search results, click on the reference that interests you.
5	Depending on the size of your screen, you may need to scroll down to see the data sheet.
6	To save or print a data sheet as a .pdf file, click **Download XXX product datasheet**.

The characteristics that are presented in the present document should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the document and online information, use the online information as your reference.

Related Documents

Title of Documentation	Reference Number
Quick Start Guide	*NHA45689*
Instruction Sheet System XARS8L	*HRB57247*
Instruction Sheet System XARS•D	*HRB57248*
Instruction Sheet Accessory Charger	*HRB57251*
Instruction Sheet Accessory Soft & Cables	*HRB57273*
Instruction Sheet Accessory Shoulder Harness	*HRB57274*
Instruction Sheet Accessory Remote Holder	*HRB57277*
Instruction Sheet Accessory Rubber Protection	*EAV52994*
Instruction Sheet Accessory Pad & Trigger	*EAV52985*
Instruction Sheet Accessory External Antenna	*EAV59906*
Instruction Sheet Added Features Card ZARCFBA01	*PHA16126*

You can download these technical publications and other technical information from our website at https://www.schneider-electric.com/en/download

Product Related Information

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, connectors or wires except under the specific conditions specified in this user guide.
- Always use a properly rated voltage sensing device to confirm that the power is off.
- Unplug the power cable from both the equipment and the power supply.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the equipment.
- Use only the specified voltage when operating this equipment and any associated products.

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

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Do not open the Remote Device.
- Do not replace internal parts of the Base Station.
- After a Base Station power off, wait until the POWER LED becomes OFF (around 20 seconds) before removing the cover.
- Always comply with the local requirements regarding installation and use of the hoisting devices.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Only use software approved by Schneider Electric for use with this equipment.
- Update your application program every time you change the hardware configuration.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE:

To increase the system security, it is recommended to use Configuration File transfer password *(see page 210)*.

Battery Warning Notes

Carefully read all instructions in this user guide, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it.

For more information, contact us at *www.schneider-electric.com* or contact your local reseller.

⚠ WARNING

EXPLOSION, FIRE, OR CHEMICAL HAZARD

- Electric devices that have reached the end of their life must be collected separately and returned to an environmentally compatible recycling facility in accordance with national law.
- In case of electrolyte leak from battery, use adapted safety equipment and put the device in a sealed package.
- If you come into contact with electrolyte, immediately thoroughly wash the involved parts with clear water and call medical assistance.
- Do not incinerate the device.
- Do not drop or hit the device.
- Do not use a damaged device.
- Do not replace Remote Device battery by yourself. In case of Remote Device battery malfunction or for any maintenance, contact us at *www.schneider-electric.com* or contact your local reseller.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE: Advice to improve battery life:

- Charge the battery before device requires it.
- Charge the battery with room temperature within 10…40 °C (50…104 °F).
- Charge the battery once in every six months if you do not use it for a long time.

Chapter 1
Wireless Remote Control System

What Is in This Chapter?

This chapter contains the following sections:

Section 1.1
Description

What Is in This Section?

This section contains the following topics:

Wireless Remote Control System Overview

Overview

The Harmony™ eXLhoist range of wireless remote control systems is an operator control station used in hoisting and material handling applications.

The Wireless Remote Control System is based on 2 types of devices:

- Remote Device, which is the operator command device to interface with the machine.
- Base Station, which is hardwired to the machine. It receives control commands from the Remote Device and transmits information to the operator.

The Wireless Remote Control System is a combination of these devices which communicate by radio transmission.

Radio Communication

Each Base Station have a unique ID managed by Schneider Electric.

Technology used permits up to 50 single systems working at same time without perturbation in a 100 x 100 meter area.

Main Applications

Main applications modes are available:

- Single mode = one Remote Device commands one Base Station.
  For more information, refer to Single Mode *(see page 18)*.
- Multi Base Control (MBC) = one Remote Device commands up to two Base Stations simultaneously or individually.
  For more information, refer to MBC Mode *(see page 21)*.

Single Mode

Overview

Single Mode = one Remote Device commands one Base Station.

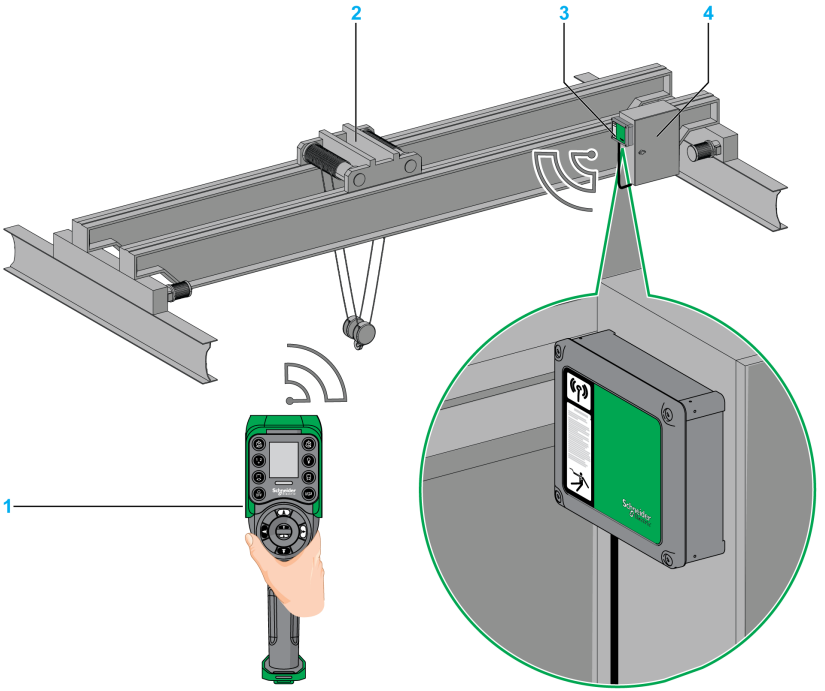
Auxiliary Selector

One auxiliary selector can be configured to select devices (hooks or trolleys):

- 3 positions (for example: for trolleys)
- 2 positions (for example: for hooks)

Example of Single with 1 Trolley

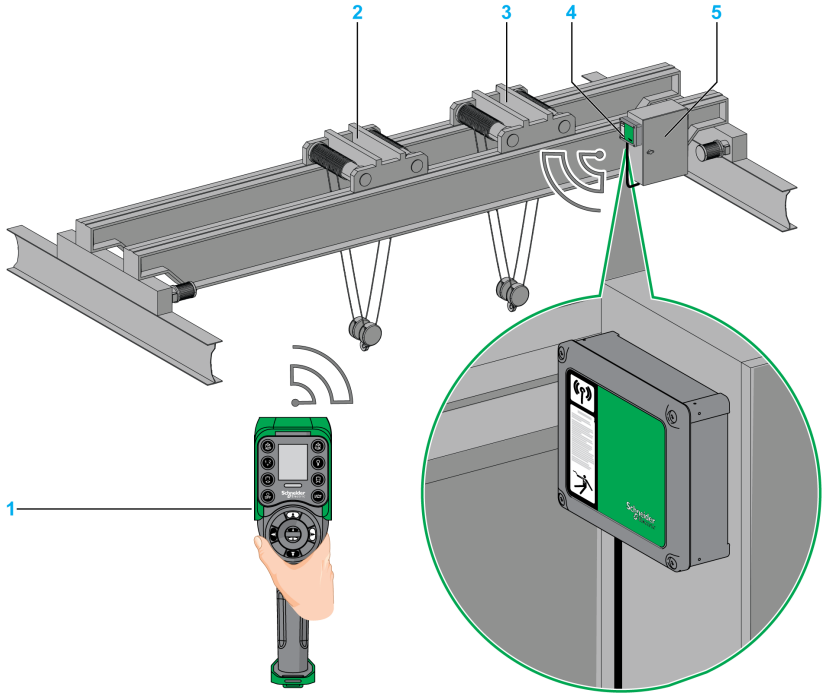
The Remote Device controls one trolley.



1 Remote Device
2 Trolley
3 Base Station
4 Electrical cabinet

Example of Single with 2 Trolleys

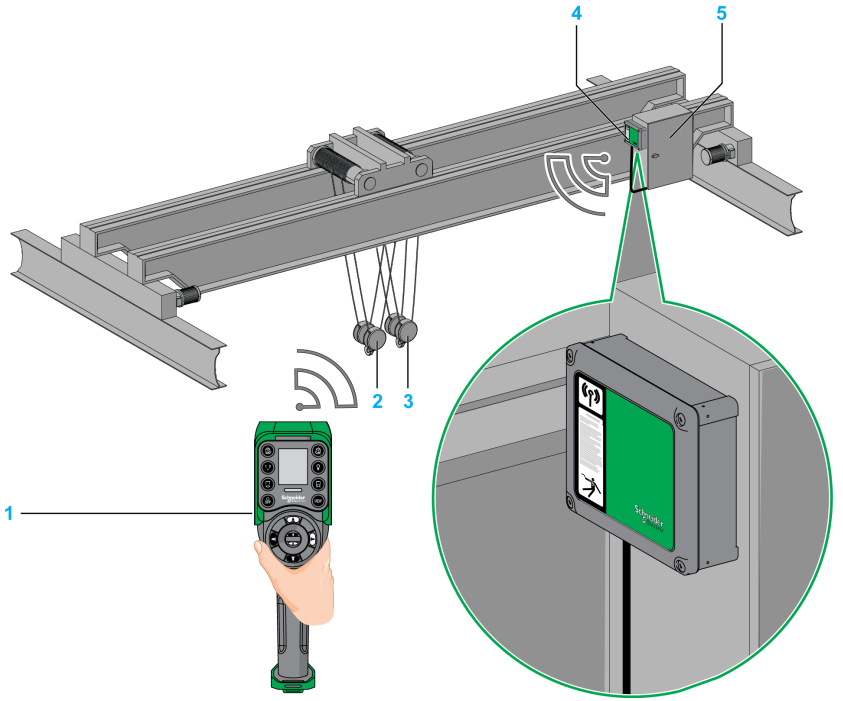
By using the auxiliary selector button (3 positions), the Remote Device separately controls the trolley 1, trolley 1+2 or the trolley 2.



1 Remote Device
2 Trolley 1
3 Trolley 2
4 Base Station
5 Electrical cabinet

Example of Single with 2 Hooks

By using the auxiliary selector button (2 positions), the Remote Device separately controls the hook 1 or the hook 2.



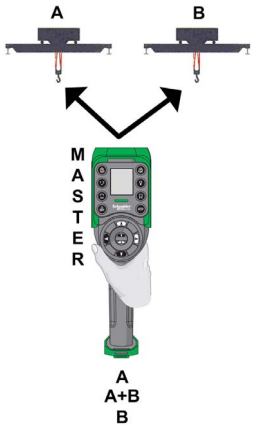
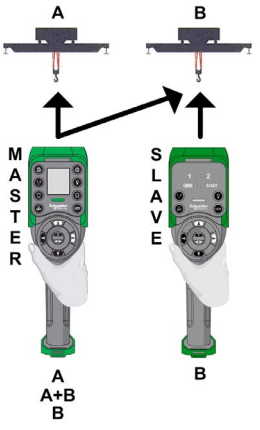
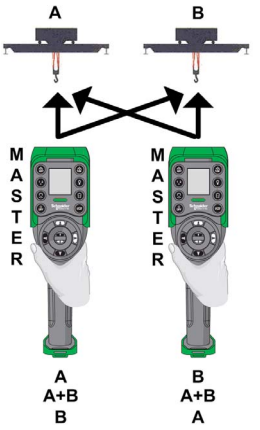
1 Remote Device
2 Hook 1
3 Hook 2
4 Base Station
5 Electrical cabinet

Multi Base Control Mode

Overview

Multi Base Control (MBC) = one Remote Device commands one or two Base Stations.

There are 4 kinds of Multi Base Control (MBC) configuration:

STANDALONE	MASTER / SLAVE	MASTER / MASTER	LARGE CRANE
			
One Master Remote Device controls 2 machines simultaneously or individually (Base Station A, B, or A+B).	The Master Remote Device controls 2 machines simultaneously or individually (Base Station A, B, or A+B). The Slave Remote Device can only control one machine (Base Station B).	Identical to Master/slave except that both Remote Devices can be the Master Remote Device.	One Master Remote Device controls 2 machines simultaneously (Base Station A+B).

On a Master Remote Device, a base selector button allows you to choose one of the following:

- “A”: The Remote Device communicates only with Base Station A as if it was in single/slave mode
- “B”: The Remote Device communicates only with Base Station B as if it was in single/slave mode.
- “A+B”: The Remote Device communicates simultaneously with both Base Station A and Base Station B. The 2 Base Stations are controlled simultaneously.

Auxiliary Selector

Up to 2 Auxiliary selectors can be configured to select devices (hooks or trolleys):

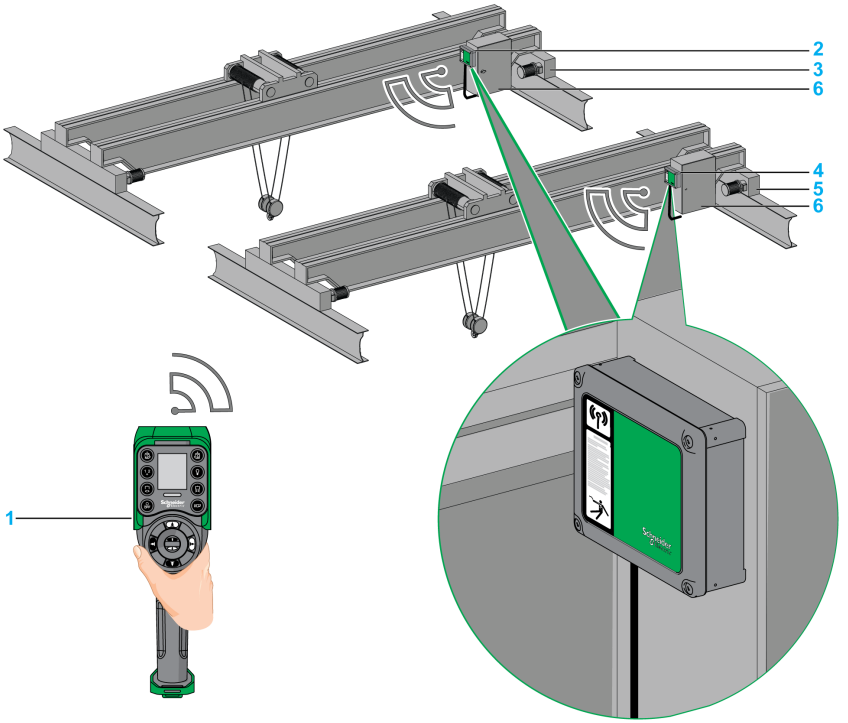
- 3 positions (for example: for trolleys)
- 2 positions (for example: for hooks)

Auxiliary selector button of the Remote Device can be assigned to:

- 2 Base Stations (same action to the 2 Base Stations in the same time).
- 1 Base Station (each Auxiliary selector of Base Stations is assigned to a different Auxiliary selector button of the Remote device).
- 1 Auxiliary selector can be assigned to only one Base Station.

Example of Multi Base Control with 1 Trolley Per Base Station

By using the Base selector button, the Remote Device separately controls the bridge A, bridge A+B, or the bridge B.

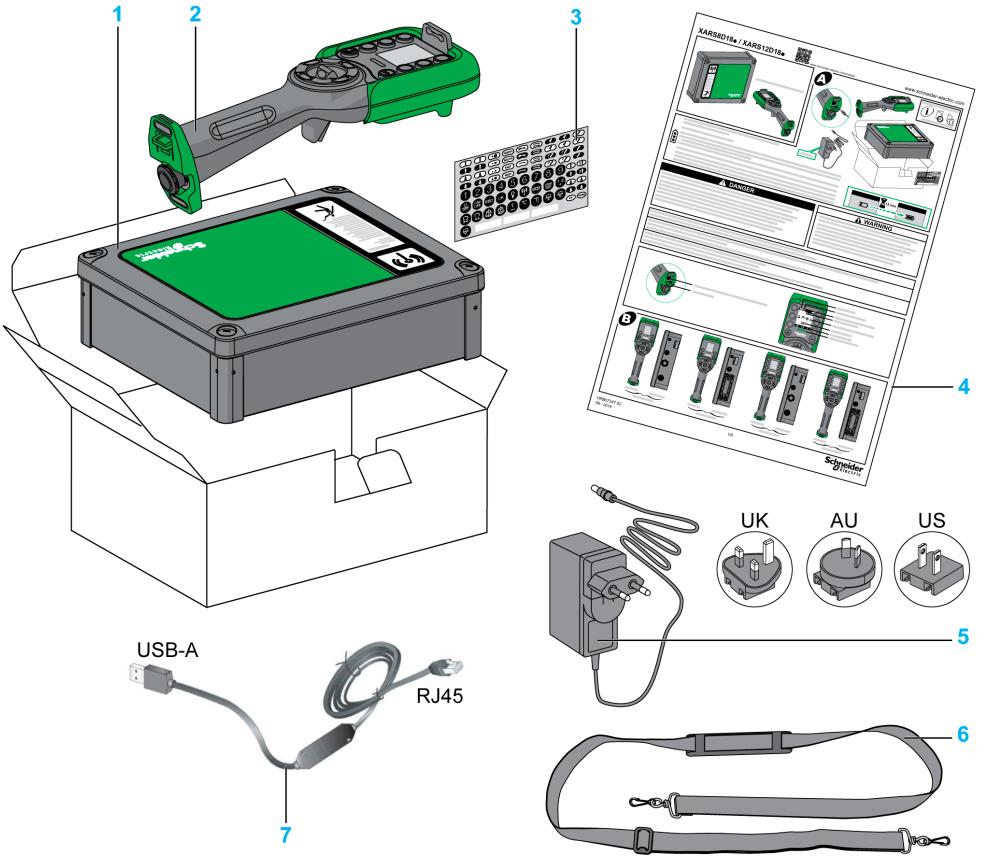


1 Remote Device
2 Base Station A
3 Bridge A
4 Base Station B
5 Bridge B
6 Electrical cabinets

Package Contents

Overview

Applicable items that could be included in the XARS package:



1 Base Station
2 Remote Device
3 Set of labels to customize the Remote Device buttons
4 Instruction Sheet and Quick Start Guide
5 Charger of the Remote Device battery (included in starting kits)
6 Shoulder belt for the Remote Device (included in starting kits)
7 Cable to connect the Remote Device to a PC (included in starting kits)

Section 1.2
Parts Identification

What Is in This Section?

This section contains the following topics:

Wireless Remote Control System Overview

Wireless Remote Control System Overview

The Wireless Remote Control System is a combination of 2 kinds of devices:

Base Station:

References	ZARB12W•	ZARB12H•	ZARB18W•	ZARB18H•
Connectors	Cable gland for wires	Industrial plug	Cable gland for wires	Industrial plug
Nb. of inputs	0		18	
Nb. of relays	12		18	

Remote Device:

Features	ZART8L•	ZART8D•	ZART12D•
Number of configurable buttons	8	8	12
Operator interface	LEDs	Display	Display

Systems and Starting Kits

Therefore, 3 levels of complexity for Wireless Remote Control System:

Complexity level description	Reference		
	Wireless Remote Control System	Remote Device	Base Station
Basic system: For simple applications, which include up to 2 auxiliary buttons	XARS8L12W	ZART8L	ZARB12W
	XARS8L12H	ZART8L	ZARB12H
Extended system: For adapted applications which include up to 2 auxiliary buttons	XARS8D18W	ZART8D	ZARB18W
	XARS8D18H	ZART8D	ZARB18H
Complex system: For complex applications which include up to 6 auxiliary buttons	XARS12D18W	ZART12D	ZARB18W
	XARS12D18H	ZART12D	ZARB18H

Starting kits:

Reference		
Starting Kit	**System**	**Accessories**
XARSK8L12W	XARS8L12W	ZARC01 + ZARC02
XARSK8L12H	XARS8L12H	ZARC01 + ZARC02
XARSK8D18W	XARS8D18W	ZARC01 + ZARC02
XARSK8D18H	XARS8D18H	ZARC01 + ZARC02
XARSK12D18W	XARS12D18W	ZARC01 + ZARC02
XARSK12D18H	XARS12D18H	ZARC01 + ZARC02

NOTE: These systems and starting kits do not include MBC (Multiple Base Control) function. For MBC function, it is needed to buy the Remote Device and Base Station separately *(see page 26)*.

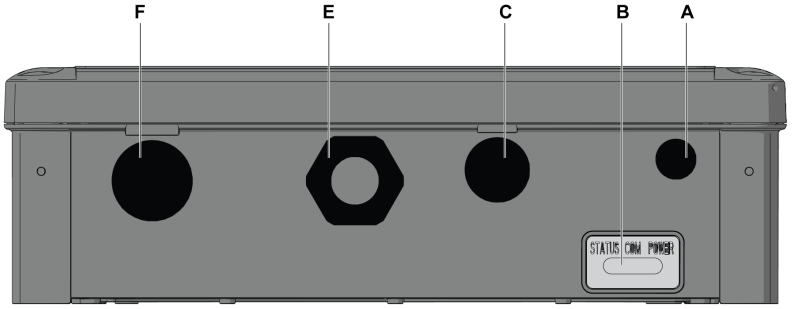
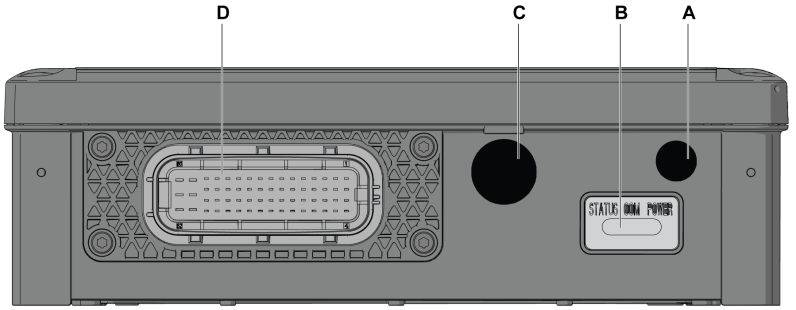
Multi Base Control

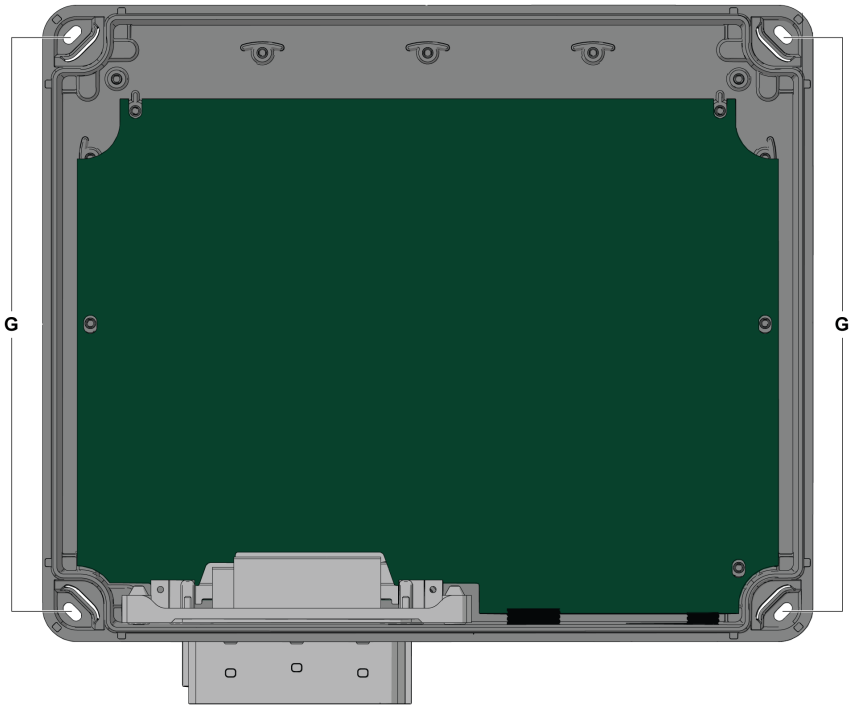
Remote Devices and Base Stations references:

Reference		Single Mode	MBC Mode	
			Slave	**Master**
Remote Device	ZART8L	✓		
	ZART8D	✓		
	ZART12D	✓		
	ZART8LM	✓	✓	
	ZART8DM	✓	✓	✓
	ZART12DM	✓	✓	✓
Base Station	ZARB12W	✓		
	ZARB12H	✓		
	ZARB18W	✓		
	ZARB18H	✓		
	ZARB18WM	✓	✓	
	ZARB18HM	✓	✓	

Base Station Parts Identification and Main Features

Base Station Parts Identification

Side	Description
Bottom ZARB•W•	
Bottom ZARB•H•	

Side	Description
Front without the cover	

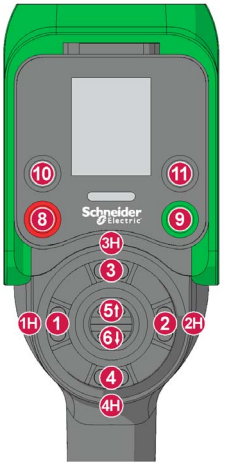
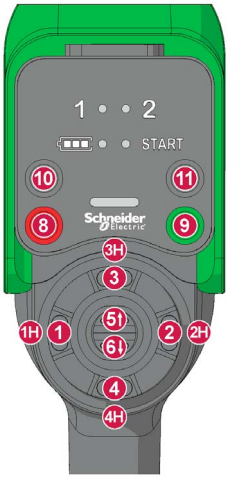
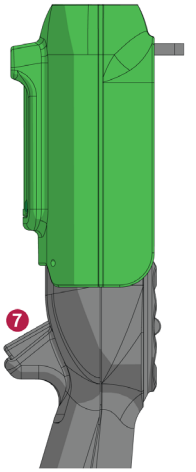
Part	Description
A	M12 for external antenna (covered by cap)
B	Status LEDs
C	M20 for the safeguarding function input wires (covered by cap)
D	62 pins connector (covered by cap)
E	M25 for output wires (covered by cable gland)
F	M25 for detected applicative alarms input wires (covered by cap)
G	4 holes for standard mounting on support

Base Station Main Features

References		ZARB12W•	ZARB12H•	ZARB18W•	ZARB18H•
Radio communication via internal antenna		Yes			
External antenna connector		Yes			
Connections		Screw terminals	Industrial plug	Screw terminals	Industrial plug
Q0 safety relays outputs		2 (Q0_A, Q0_B)			
IN0 / S2_S3 feedback loop terminals for mirror contacts from safety actuator		1			
Configurable inputs for detected applicative alarms		0		6 (IN1…IN6)	
Inputs dedicated for safeguarding function		0		12 (IN7…IN18)	
Motion & auxiliary standard relays		12 (Q1…Q12)		18 (Q1…Q18)	
Power supply		24…240 Vac 50/60 Hz 24…240 Vdc	24…48 Vac 50/60 Hz 24…48 Vdc	24…240 Vac 50/60 Hz 24…240 Vdc	24…48 Vac 50/60 Hz 24…48 Vdc
Current consumption	AC	535 mA (24 V)…250 mA (240 V)	535 mA (24 V)…312 mA (48 V)	535 mA (24 V)…250 mA (240 V)	535 mA (24 V)…312 mA (48 V)
	DC	328 mA (24 V)…44 mA (240 V)	328 mA (24 V)…155 mA (48 V)	328 mA (24 V)…44 mA (240 V)	328 mA (24 V)…155 mA (48 V)
System earthing		TN, TT			
Q0_A contact voltage		24…240 Vac/dc	24…48 Vac/dc	24…240 Vac/dc	24…48 Vac/dc
Q0_B contact voltage					
Motion / auxiliary contact voltage used by group					
Motion / auxiliary relay group		• Q1…Q3 • Q4…Q6 • Q7…Q9 • Q10…Q12		• Q1…Q3 • Q4…Q6 • Q7…Q9 • Q10…Q12 • Q13…Q16	
Motion / auxiliary relay in NO+NC type		-		Q17, Q18	

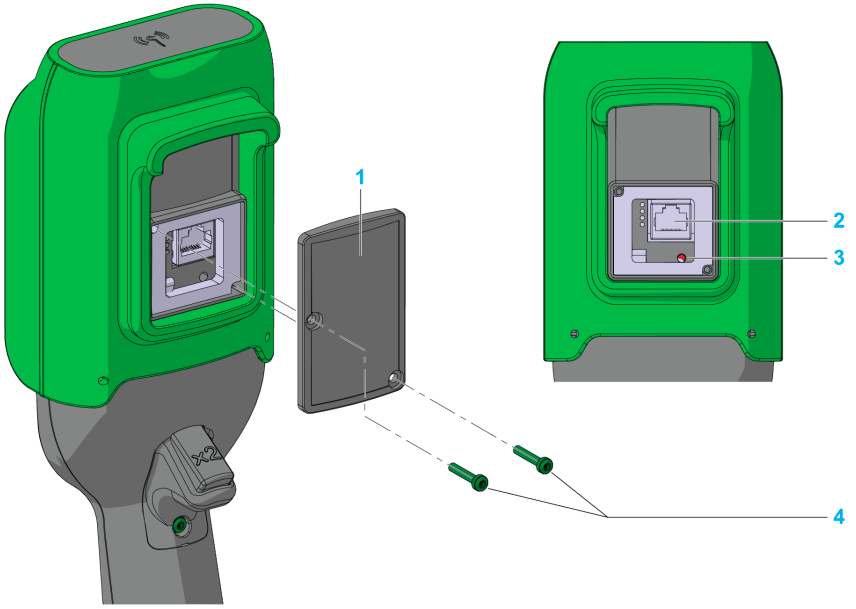
Remote Device Parts Identification and Main Features

Remote Device Views Parts Identification

ZART8D•	ZART12D•	ZART8L•	ZART•
			

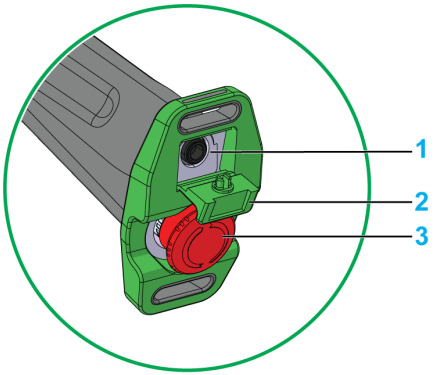
Part	Description
1, 1H, 2, 2H, 3, 3H, 4, 4H, 5, 6	Motion buttons
7	Trigger button
8	OFF/STOP button
9	ON/START/Horn button
10, 11, 12, 13, 14, 15	Auxiliary buttons

Remote Device Rear View Parts Identification



Part	Description
1	Cover
2	RJ45 socket
3	Reset button
4	2 Torx screws, diameter 3.5 mm (0.14 in)

Remote Device Bottom View Parts Identification



Part	Description
1	Remote Device battery charge connector
2	Protective plug
3	E-STOP button

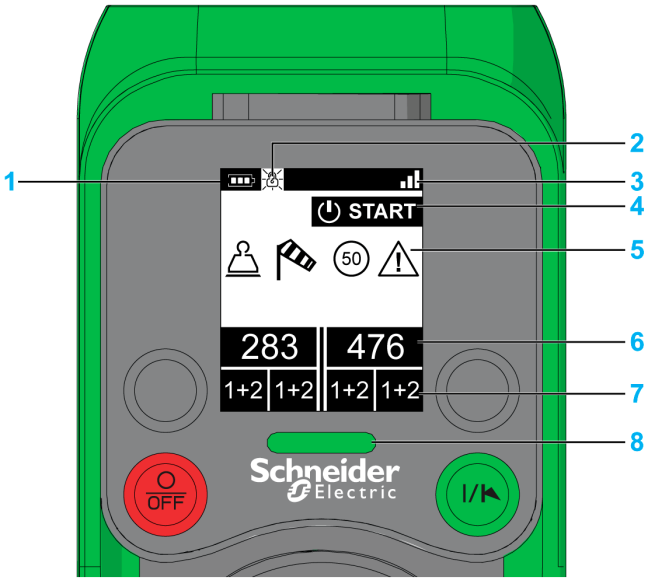
⚠ DANGER

OBSTRUCTED PUSH-BUTTON MOTION

Ensure push-button will fully operate.

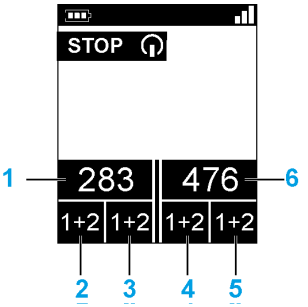
Failure to follow these instructions will result in death or serious injury.

ZART•D• Display Parts Identification



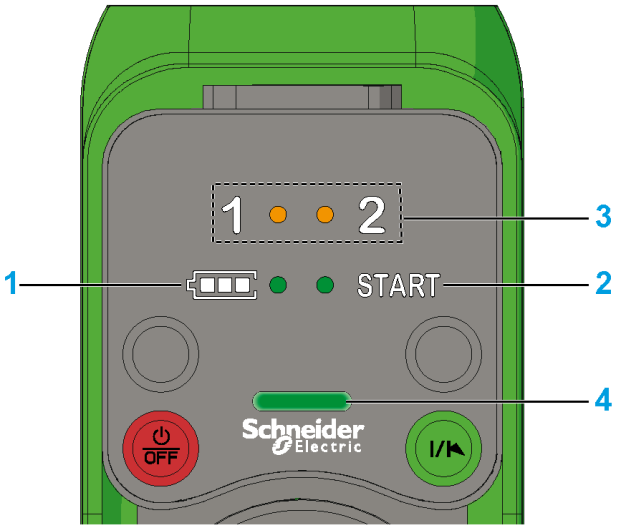
Part	Description
1	Battery level *(see page 177)*
2	Padlock displayed when a password is requested. Padlock displayed when a password is requested for: ● Configuration File transfer *(see page 210)* ● E-STOP reset or START access *(see page 223)*
3	Radio communication level *(see page 178)*
4	Operating status *(see page 130)*
5	Detected applicative alarms *(see page 180)*
6	Base Station labels
7	Auxiliary Selector status
8	E-STOP LED *(see page 179)*

Base Stations labels and Auxiliary selectors states:



Part	Description
1	Label of the primary Base Station(1)
2	State of the Auxiliary selector S1 associated to the primary Base Station(2)
3	State of the Auxiliary selector S2 associated to the primary Base Station(2)
4	State of the Auxiliary selector S1 associated to the secondary Base Station(2)
5	State of the Auxiliary selector S2 associated to the secondary Base Station(2)
6	Label of the secondary Base Station(1)
1 For more information, refer to MBC Base selector *(see page 150)* **2** For more information, refer to Auxiliary selector *(see page 152)*	

ZART8L• Display Parts Identification



Part	Description
1	Battery level LED
2	START LED
3	Auxiliary Selector S1 LEDs
4	E-STOP LED

For more information, refer to ZART8L• diagnostic *(see page 182)*.

Remote Device Functionalities

Description	ZART8L•	ZART8D•	ZART12D•
Number of configurable buttons	8	8	12
OFF/STOP button	Yes		
ON/START/Horn button	Yes		
Motion & Stop function	Yes		
2 or 3 positions selector (1, 1+2, 2)	Yes		
E-STOP function	Yes		
Optional E-STOP RESET sequence	Yes		
Optional START Access sequence	Yes		
Optional automatic STOP function after a timeout	Yes		
Optional automatic Power OFF function after a timeout	Yes		
Information LEDs	Yes	No	
Display function	No	Yes	
Vibrate facility function in case of detected applicative alarms	No	Yes	
Embedded accelerometer	Yes		

Section 1.3
Description and Safety Function Capability

What Is in This Section?

This section contains the following topics:

Certifications and Standards

Environment

The Wireless Remote Control System devices are compliant with:

- WEEE, directive 2002/96/EC
- REACH, regulation 1907/2006
- RoHS, directive 2011/65/EU

Overall Standards

Criteria	Level
Principles of design for safety	EN IEC 60204-1 EN ISO 13849-1 EN ISO 13849-2 EN IEC 62061 EN IEC 61508 EN ISO 13850
Specific standards for hoisting applications	EN IEC 60204-32 EN 13557
Low voltage equipment	EN IEC 61010-1 EN IEC 60947-5-1 EN IEC 60947-5-4 EN IEC 60947-5-5
Electromagnetic compatibility	IEC 61000-6-2
Transmission frame format	EN 60870-5-1

Local Standards and Certifications

Schneider Electric submitted this product for independent testing and qualification by third party listing agencies.

Criteria	Description
CE marking	Machinery directive 2006/42/EC Low voltage directive 2006/95/EC EMC directive 2004/108/EC R&TTE directive 1999/05/EC
Low voltage equipment	EN 50178
European specific standards for hoisting applications	EN 13557 EN 12077-2
European specific standards for hoisting machines	EN 15011 (overhead traveling cranes) EN 14439 (tower cranes) EN 14492 (block hoists and winches)
Countries certifications (electrical devices)	UL508 CSA C22-2 n°14 EAC
Standards for radio frequencies	ETSI EN 301 489 -1 ETSI EN 301 489 -3 ETSI EN 301 489-17 ETSI EN 300 440-2 ETSI EN 300 328 FCC part 15 RSS GEN issue 3 RSS 210 issue 8 ARIB STD-T81

Radio Frequencies Certification

The eXLhoist devices obtained the radio frequency conformity delivered by the following certification organisms:

Certification organism	Certification organism country	Certification marks
CNC	Argentina	See on *www.schneider-electric.com*.
RCM	Australia/New-Zealand	See on the device
ANATEL	Brazil	See on *www.schneider-electric.com*.
IC	Canada	See on the device
SUBTEL	Chile	See on the device
SRRC	China SRRC	See on the device
-	Hong Kong	Ready for importation.
Government of India	India	See on *www.schneider-electric.com*.
Technical Conformity Mark	Japan	See on the device
SIRIM	Malaysia	See on the device
COFETEL	Mexico	See on the device
ASEP	Panama	See on *www.schneider-electric.com*.
ICASA	Republic of South Africa	See on the device
EAC	Russia	See on the device
-	Saudi Arabia	Ready for importation.
IDA	Singapore	**Complies with IDA Standards DA105331**
KCC	South Korea	See on the device
NCC	Taiwan	See on the device
NTC SDoC	Thailand	See on *www.schneider-electric.com*.
R&TTE	UE	See on the device
FCC	USA	See on the device

For Multi Base Control (MBC) references, certification is on going.

Accessories

Base Station Accessories

Reference	Description
ZARC03	External antenna for Base Station: The use of this accessory allows an increase of the radio range in severe environment conditions.
ZARC05	Connector plug female with cable 1.5 m (4.92 ft) for ZARB•H
ZARC12	Connector plug female with cable 3 m (9.84 ft) for ZARB•H
ZARC18	Connector plug female with cable 5 m (16.4 ft) for ZARB•H
ZARC06	Cable gland kit with wire grommets
ZARC09	Fixation kit with silent block: Use this accessory in case of applications with severe vibration constraints.
ZARC091	Fixation kit with magnet supports
ZARCFBA01	Added Features Card *(see page 261)*

Remote Device Accessories

Reference	Description
ZARC01	Charger
ZARC02	Shoulder belt
ZARC04	Remote Holder for Remote Device
ZARC07	Kit of adhesive labels in black and white for Remote Device
ZARC08	Kit of adhesive labels in color for Remote Device and hoisting system
ZARC20	Push button and trigger bellows set kit
ZARC21	Rubber protection

Chapter 2
Specifications

What Is in This Chapter?

This chapter contains the following sections:

Section 2.1
Base Station Specifications

What Is in This Section?

This section contains the following topics:

Base Station Specifications

Environment

The Base Station specifications are described in the table:

Specifications	Details	Value	
		ZARB•H•	ZARB•W•
Product certifications	-	CE, UL/cULus/CSA, EAC	
Environment	-	RoHS compliant	
Life time	-	10 years	
Degree of protection	-	IP65	
Degree of pollution	-	3	
Operating temperature	For 24…48 V ac/dc power supply	-25…70 °C (-13…158 °F)	
	For 48…120 V ac/dc power supply	-	-25…70 °C (-13…158 °F)
	For 120…240 V ac/dc power supply	-	-25…50 °C (-13…122 °F)
Storage temperature	-	-40…70 °C (-40…158 °F)	
Corrosive atmosphere withstands	IEC-60721-3-3	Level 3C2 on H_2S / SO_2 / NO_2 / Cl_2	
Fire withstands	Power on parts	960 °C 30s / 30s according to IEC 60695-2-10 and IEC-60695-2-11	
	Other parts	650 °C 30s / 30s according to IEC 60695-2-10 and IEC-60695-2-11	
Salt mist	IEC 60068-2-52	Severity 2	
Operating humidity range	-	0...97 %	
Storage humidity range	-	0...97 %	
Altitude	Operation Storage	0...2000 m (0...6561.7 ft) 0...3000 m (0...9842.5 ft)	
Vibration resistance According to IEC-60068-2-6	Without mounting accessories	5…100 Hz, Acceleration 39.2 m/s² (4 gn)	
	With silent block and aluminum frame ZARC09	2…100 Hz, Acceleration 39.2 m/s² (4 gn)	
	With magnet support and aluminum frame ZARC091	5…100 Hz, Acceleration 19.6 m/s² (2 gn)	
	With aluminum frame (from ZARC09 or ZARC091)	2…100 Hz, Acceleration 39.2 m/s² (4 gn)	

Specifications	Details	Value	
		ZARB•H•	ZARB•W•
Shock resistance According to IEC 60068-2-27	Without mounting accessories	147 m/s² (15 gn), for 11 ms	
	With silent block and aluminum frame ZARC09	147 m/s² (15 gn), for 11 ms	
	With magnet support and aluminum frame ZARC091	98.1 m/s² (10 gn), for 11 ms	
	Only with aluminum frame (from ZARC09 or ZARC091)	147 m/s² (15 gn), for 11 ms	
Power supply Over voltage category	-	OVC 2	OVC 3
Voltage dips	IEC-61000-4-11	20 ms at 24 Vac (IEC-61000-4-11) 140 ms at 48 Vac 2 s at 240 Vac	
Resistance to electrostatic discharges	IEC 61000-4-2	4 kV on contact 8 kV in air	
Resistance to radiated fields	IEC 61000-4-3	10 V/m	
Immunity to fast transient	IEC 61000-4-4	Power line: 4 kV (direct) Outputs: 4 kV (direct) Inputs: 2 kV (coupling)	
Surge immunity	IEC 61000-4-5 between the ground and power supply wires (Common mode)	2 kV	
	IEC 61000-4-5 between the power supply wires (Differential mode)	1 kV	
Immunity to conducted magnetic fields	Conforming to IEC-61000-4-6	10 V from 150 kHz to 80 MHz	
Emission disturbances	Conducted & radiated disturbances	Class B	
Weight	-	1.43 kg (3.152 lb.)	1.45 kg (3.197 lb.)

Safety Specifications

The main safety specifications are described in the table:

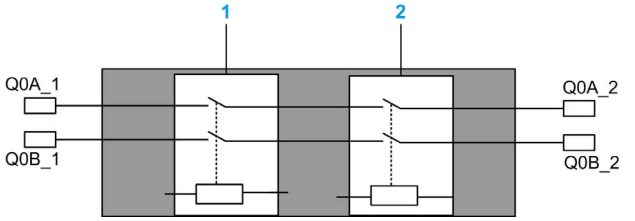
Specifications	Details	Value
Safety relays function Safety specifications	According to IEC 61508 Ed 2	Up to SIL3 capability
	According to IEC 62061 Ed 1	Up to SIL3 CL capability
	EN ISO 13849-1	Up to performance level “e” Up to category 4
Motion relays function Safety specifications	According to IEC 61508 Ed 2	SIL1 capability
	According to IEC 62061 Ed 1	SIL1 CL capability
	EN ISO 13849-1	Performance level “c” Category 2
IN7...IN18 safeguarding inputs	According to IEC 61508 Ed 2	SIL1 capability
	According to IEC 62061 Ed 1	SIL1 CL capability
	EN ISO 13849-1	Performance level “c” Category 2

Safety Relays

The safety relays specifications are described in the table:

Specifications	Details	Value	
		ZARB•H•	ZARB•W•
Number of contacts	The Base Station internally implements 2 safety relays in serial. Each safety relay has 2 contacts.	2	
Logical type	-	NO	
Insulation between Q0A and Q0B	-	SELV insulation between (Q0A1, Q0A2) and (Q0B1, Q0B2) for voltage up to 240 Vac	
Q0A voltages	-	Up to 48 Vac	24...240 Vac
Q0B voltages	-		
Q0A, Q0B Maximum Ie current 24...240 Vac	-	4 A	6 A
Relay type according to EN/IEC 60947-5-1	AC15	C300	B300
	DC13	-	R300
B10 with maximum load	-	200 000 cycles	
Minimum output current	-	10 mA / 24 Vdc	

Safety relays internal wiring:



1 Safety relay 1
2 Safety relay 2

Motion/Auxiliary Relays

The motion/auxiliary relay specifications are described in the table:

Specifications	Details	Value			
		ZARB12H•	ZARB12W•	ZARB18H•	ZARB18W•
Number of motion/auxiliary relays	-	12		18	
Normally open (N0) relays	-	12 (Q1…Q12)		16 (Q1…Q16)	
Normally open + normally closed (N0+NC) relays	-	0		2 (Q17, Q18)	
Nominal output voltage	-	24…48 V ac/dc ±20 %	24…240 V ac/dc ±20 %	24…48 V ac/dc ±20 %	24…240 V ac/dc ±20 %
Relay type according to EN/IEC 60947-5-1	AC15	B300			
	DC13	R300			
B10 with maximum load	Relays NO contact Up to 48 V	700 000 cycles			
	Relays NO contact Over than 48 V	-	500 000 cycles	-	500 000 cycles
	Relays NC contact	-		500 000 cycles	
Minimum output current	6.8 mA with 24 Vdc voltage	6.8 mA			
Maximum operating rate	-	0.5 Hz			
Weight	-	1.34 kg (2.954 lb.)	1.36 kg (2.998 lb.)	1.43 kg (3.152 lb.)	1.45 kg (3.197 lb.)

AC15: rated voltage/rated current

Rated operational voltage Ue (Vac)	Rated operational current Ie (A)	Make VA rating (VA)	Break VA rating (VA)
24	0.31	70	7.5
48	0.16		
120	0.06		
240	0.03		

It is recommended to use the following contactors:

AC voltage contactor coil (V)	TeSys D contactor reference
24	LC1D09B7, LC1D12B7, LC1D18B7, LC1D25B7, LC1D32B7, LC1D38B7
48	LC1D09E7, LC1D12E7, LC1D18E7, LC1D25E7, LC1D32E7, LC1D38E7
120	LC1D09FE7, LC1D12FE7, LC1D18FE7, LC1D25FE7, LC1D32FE7, LC1D38FE7
240	LC1D09U7, LC1D12U7, LC1D18U7, LC1D25U7, LC1D32U7, LC1D38U7

DC13: rated voltage/rated current

Rated operational voltage Ue (Vdc)	Rated operational current Ie (A)	Make VA rating (W)	Break VA rating (W)
24	0.10	2.4	2.4
48	0.05		
120	0.02		
240	0.01		

It is recommended to use the following contactors:

DC voltage contactor coil (V)	TeSys D contactor reference
24	LC1D09BL, LC1D12BL, LC1D18BL, LC1D25BL, LC1D32BL, LC1D38BL LC1DT09BL, LC1DT12BL, LC1DT18BL, LC1DT25BL, LC1DT32BL, LC1DT38BL
48	LC1D09EL, LC1D12EL, LC1D18EL, LC1D25EL, LC1D32EL, LC1D38EL LC1DT09EL, LC1DT12EL, LC1DT18EL, LC1DT25EL, LC1DT32EL, LC1DT38EL
110	LC1D09FL, LC1D12FL, LC1D18FL, LC1D25FL, LC1D32FL, LC1D38FL LC1DT09FL, LC1DT12FL, LC1DT18FL, LC1DT25FL, LC1DT32FL, LC1DT38FL
220	LC1D09ML, LC1D12ML, LC1D18ML, LC1D25ML, LC1D32ML, LC1D38ML LC1DT09ML, LC1DT12ML, LC1DT18ML, LC1DT25ML, LC1DT32ML, LC1DT38ML
250	LC1D09UL, LC1D12UL, LC1D18UL, LC1D25UL, LC1D32UL, LC1D38UL LC1DT09UL, LC1DT12UL, LC1DT18UL, LC1DT25UL, LC1DT32UL, LC1DT38UL

DC resistive (PLC (Programmable Logic Controller) DC 24 V inputs): rated voltage/rated current

Rated operational voltage Ue (Vdc)	Rated operational current Ie
24	5 mA minimum
	300 mA maximum

Power Supply

NOTICE

INOPERABLE EQUIPMENT

The ZARB•H• Base Station must be powered with a voltage:

- From 24 Vac -15 % to 48 Vac +10 % with frequency of 50 Hz -6 %/+4 % and frequency of 60 Hz -6 %/+4 %.
- From 24 Vdc -15 % to 48 Vdc +20 %.

The ZARB•W• Base Station must be powered with a voltage:

- From 24 Vac -15 % to 240 Vac +10 % with frequency of 50 Hz -6 %/+4 % and frequency of 60 Hz -6 %/+4 %.
- From 24 Vdc -15 % to 240 Vdc +20 %.

Failure to follow these instructions can result in equipment damage.

Protective Earth Ground

The protective earth ground must be connected to the machine to avoid maloperation due to earth faults (IEC 60204-1, Protection against maloperation due to earth faults).

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Connect the Base Station protective earth ground connection to the machine ground.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

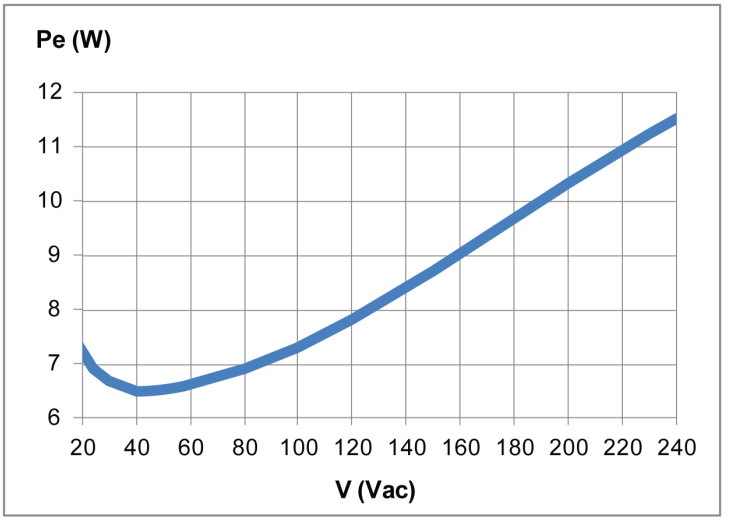
Connect the Base Station protective earth ground connection to the machine ground.

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

The PE must be connected to the machine ground (IEC 60204-1, protection against electric shock). If not then the Base Station inputs voltage (IN_COM, S2_S3, IN0…IN18) could increase to a dangerous voltage because of the possible static electricity induced by the machine motions.

ZARB18W Power Dissipation

This graphic shows the ZARB18W• dissipated power on an indicative basis:



IN0

The IN0 input specifications are:

- Static input type
- Current source logic
- Compatible only with 2 wiring:
  - ❍ Connection of IN0 to one side to the auxiliary contact of the main contactor and connection of S2_S3 output port to the other side of the auxiliary contact of the main contactor.
  - ❍ Direct connection to the S2_S3 output.
- 20 mA typical pulsed input current

IN1…IN18

The IN1 to IN18 input specifications are:

- Static input type
- Current source logic
- Compatible only with 2 wiring:
  - Connection of INi (i=1…18) in one side of a dry contact and connection of IN_COM output to the other side of the dry contact.
  - No INi (i=1…18) connection.
- 20 mA typical pulsed input current

Response Time

Input/Output	Maximum response time (ms)
E-STOP	500
STOP	500
Motion/Auxiliary	500
Selector	500
Input	500

RADIO Specification

RADIO Specification

Specification	Details	Value
Frequency of radio communication	International frequency range	2.4 GHz
Number of working systems in the same area	-	Up to 50 systems in a 100 x 100 meter area
Radio range	In free field	> 300 m (984 ft)
	In industrial environment	Up to 50 m (164 ft) typical
Antenna	(Possible ZARC03 external antenna use)	Internal
Working channel selection	No impact for the customer (during installation, use and maintenance)	Automatic
ID	-	MAC address reserved by Schneider Electric

FCC USA and IC Canada Compliance Statement

This device complies with part 15 of the FCC Rules and Industry Canada licence-exempt RSS standard(s). 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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1) *l'appareil ne doit pas produire de brouillage, et*
2) *l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential 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.

The base complies with FCC's radiation exposure limits set forth for an uncontrolled environment under the following conditions:

1) This equipment should be installed and operated such that a minimum separation distance of 20 cm is maintained between the radiator (antenna) and user's/nearby person's body at all times.
2) This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The remote device with it's antenna complies with FCC's radiation exposure limits set forth for an uncontrolled environment. To maintain compliance, follow the instructions below:

1) This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2) Avoid direct contact to the antenna, or keep contact to a minimum while using this equipment.

Under Industry Canada regulations, these radio transmitters may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. These radio transmitters (IC:7002CZARB and IC:7002CZART) have been approved by Industry Canada to operate with the antenna type ZARC03 with the maximum permissible gain and required antenna impedance. Any other antenna types having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Conformément à la réglementation d'Industrie Canada, les présents émetteurs radio peuvent fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Les présents émetteurs radio (identifier IC:7002CZARBo and IC:7002CZARTo) ont été approuvés par Industrie Canada pour fonctionner avec le type d'antenne ZARC03 ayant un gain admissible maximal et l'impédance requise. D'autres types d'antenne dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Product reference	Maximum gain of internal antenna (dB)	Maximum gain of external antenna (dB) (including cable)	Allowed impedance (Ω)
ZART8L•	4.5	–	–
ZATL8D•	5.5		
ZART12D•			
ZARB12H•	4.5	1	50
ZARB12W•			
ZARB18H•			
ZARB18W•			

Any changes or modifications not expressly approved by Schneider Electric could void the user's authority to operate the equipment.

Section 2.2
Remote Device Specifications

What Is in This Section?

This section contains the following topics:

Remote Device Specifications

Environment

Specification	Details	Value
Product certifications	-	CE, UL/CSA, EAC
Battery life time	Conforming to IEC 62133	> 2 years
Battery type	-	$LiFePO^4$
Battery voltage	-	3.3 Vdc
Mechanical life	Motion buttons	5 000 000 cycles
Mechanical life	Auxiliary buttons	1 000 000 cycles
Temperature	Storage	-20…45 °C (-4…113 °F)
	Operating	-20…60 °C (-4…140 °F)
Relative humidity	Operating/Storage	0 %...95 %, without condensation
Corrosive atmospheres resistance	IEC 60721-3-3	Level of 3C2 on H_2S / SO_2 / NO_2 / Cl_2
Degree of protection	-	IP65 and NEMA type 4
Altitude	Operation Storage	0...2000 m (0...6561.7 ft) 0...3000 m (0...9842.5 ft)
Vibration resistance	Conforming to IEC 60068-2-6	10…55 Hz, amplitude 0.75 mm, acceleration 15 gn
Shock resistance	Conforming to IEC 60068-2-27	100 gn
Mechanical protection	-	Bumper
Resistance to electrostatic discharges	Conforming to IEC 61000-4-2	4 kV on contact 8 kV in air
Resistance to radiated fields	Conforming to IEC 61000-4-3	10 V/m
Immunity to fast transient	Conforming to IEC 61000-4-4	1 kV, on power supply
Immunity to power frequency magnetic field	-	30 A/m minimum
Mechanical materials	-	Bumper in OnFlex™
Weight	-	594 g (21 oz)

Remote Device Charger Specification

Environment

Specification	Value
Location to be used	Residential, commercial, and light-industrial environment (IEC 61000-6-3)
Product certifications	CE, UL/CSA, EAC
Degree of protection	IP2x
Degree of pollution	2
Operating temperature	10…40 °C (50…104 °F)
Storage temperature	-20…60 °C (-4…140 °F)
Primary supply voltage	90…264 Vac
Primary supply voltage frequency	47…63 Hz
Secondary output voltage	12 Vdc, SELV voltage
Secondary output power	30 W minimum

Section 2.3
Dimensions

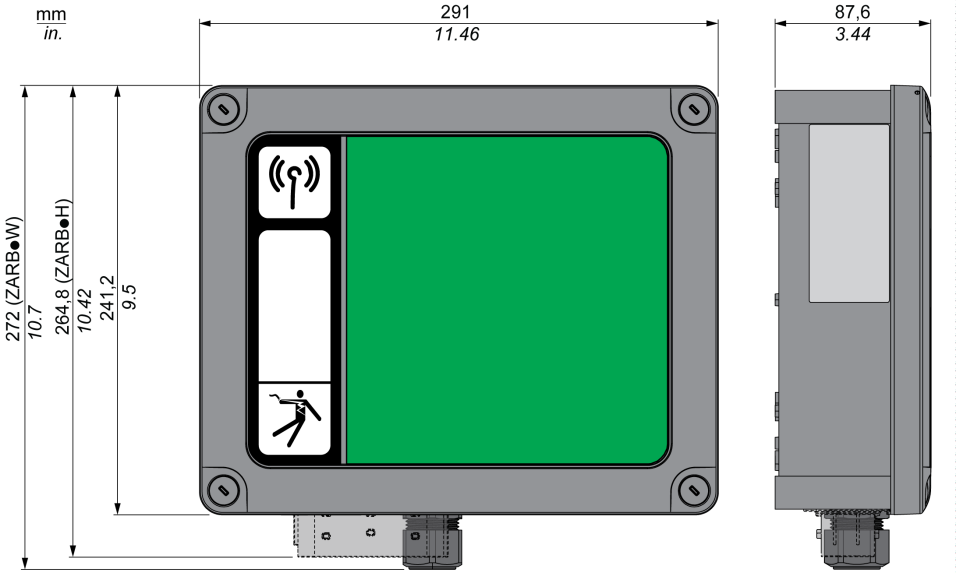
What Is in This Section?

This section contains the following topics:

Base Station Dimensions

Dimensions

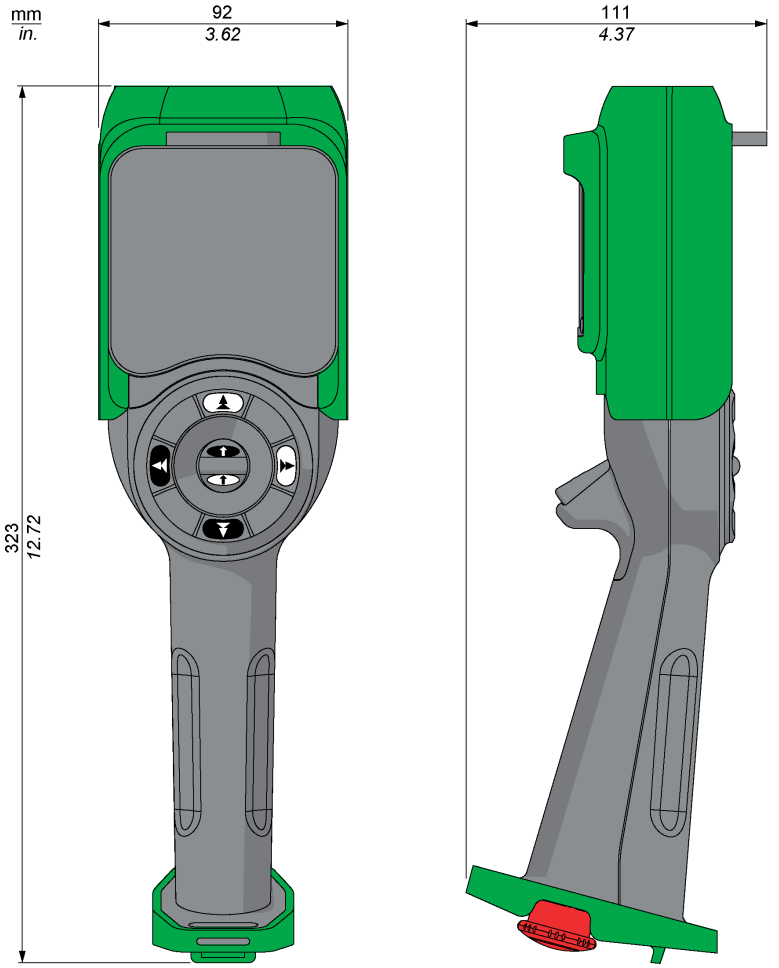
The following figure shows the Base Station dimensions:



Remote Device Dimensions

Dimensions

The following figure shows the Remote Device dimensions:



Chapter 3
Functional Safety

What Is in This Chapter?

This chapter contains the following sections:

Section 3.1
Generalities

What Is in This Section?

This section contains the following topics:

Introduction

Overview

The safety functions incorporated in eXLhoist allow you to develop applications oriented towards protection of people and machinery.

Some safety functions are configured with eXLhoist Configuration Software.

Integrated safety functions provide the following benefits:

- Additional standards-compliant safety functions
- No need for external safety devices
- Reduced wiring effort and space requirements
- Reduced costs

The eXLhoist is compliant with the requirements of the standards in terms of implementation of safety functions.

Standards and Terminology

Overview

The technical terms, terminology, and the corresponding descriptions in this manual normally use the terms or definitions in the relevant standards.

In the field of Wireless Remote Control System, this includes, but is not limited to, terms such as safety function, safe state, fault, fault reset, failure, error, error message, warning, warning message, and so on.

These standards include:

- IEC 61508 Ed.2 series: Functional safety of electrical/electronic/programmable electronic safety-related systems
- EN 62061 Ed.1.0: Safety of machinery - Functional safety of safety-related electrical, electronic, and programmable electronic control systems
- EN ISO 13849-1 & 2: Safety of machinery - Safety related parts of control systems

EC Declaration of Conformity

The EC declaration of conformity for the machine directive 2006/42/EC can be obtained on *www.schneider-electric.com*.

Functional Safety Conformity

The integrated safety functions are compliant with:

- EN 15011: 2014
- EN 14492-2: 2009
- EN 14439: 2009
- EN 13557: 2008
- IEC 60204-1: 2009
- IEC 60204-32: 2008

The listed standards set out safety-related considerations of Wireless Remote Control System safety related in terms of the framework of the ISO13849-1 and ISO13849-2 standards.

The defined safety functions are:

- SIL1, SIL2, and SIL3 capability in compliance with the IEC 61508 Ed.2 series.
- Performance Level c, d, and e in compliance with ISO 13849-1.
- Compliant with category 2, 3, and 4 of European standard ISO 13849-1.

Also refer to Safety Function Capability *(see page 72)*.

The safety demand operating mode is considered to be high demand or continuous mode of operation according to the IEC 61508-1 standard.

Basics

Functional Safety

Automation and safety engineering are 2 areas that were separate in the past but have recently become more and more integrated.

The engineering and installation of complex automation solutions are greatly simplified by integrated safety functions.

Usually, the safety engineering requirements depend on the application.

The level of requirement results from the risk and the hazard potential arising from the specific application.

IEC 61508 Standard

The standard IEC 61508 functional safety of electrical/electronic/programmable electronic safety-related systems covers the safety-related function.

Instead of a single component, an entire function chain (for example, from a sensor through the logical processing units to the actuator) is considered as a unit.

This function chain must meet the requirements of the specific safety integrity level as a whole.

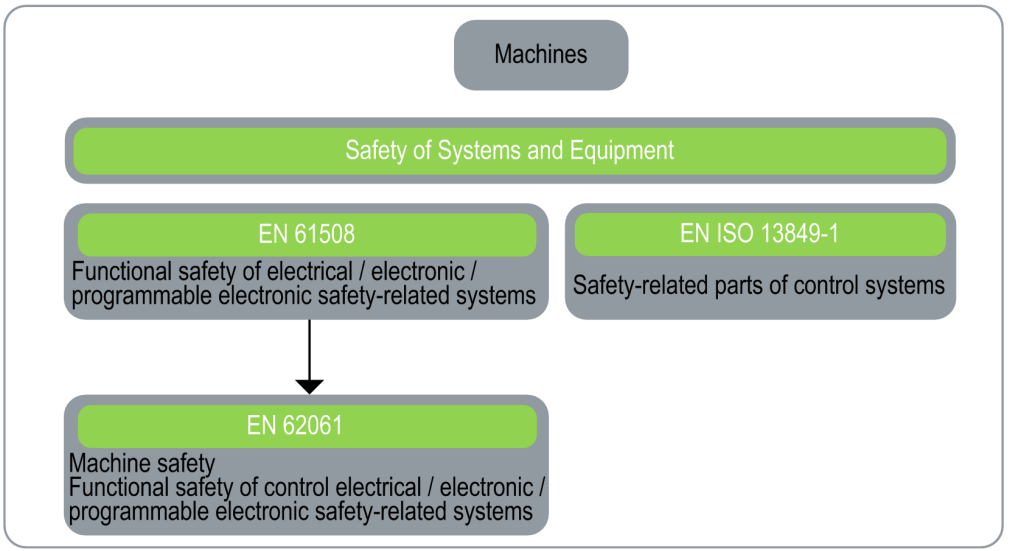
Systems and components that can be used in various applications for safety tasks with comparable risk levels can be developed on this basis.

EN ISO 13849 Standard or EN 62061 Standard

Designers can follow either EN ISO 13849-1 or EN 62061 to demonstrate conformity with the Directive 2006/42/EC on machinery. These 2 standards consider not only whether a fault will occur, but also how likely it is to occur.

This means that there is a quantifiable, probabilistic element in compliance: machine builders must be able to determine whether their safety circuit meets the required Safety Integrity Level (SIL) or Performance Level (PL). Panel builders and designers should be aware that manufacturers of the components used in safety circuits (such as safety detection components, safety logic solvers, and output devices like contactors) must provide detailed data on their products.

Safety standards:



SIL - Safety Integrity Level

The standard IEC 61508 defines 4 Safety Integrity Levels (SIL) for safety functions.

SIL1 is the lowest level and SIL4 is the highest level.

A hazard and risk analysis serves as a basis for determining the required SIL.

This is used to decide whether the relevant function chain is to be considered as a safety function and which hazard potential it must cover.

PF - Probability of Failure

The standard IEC 61508 defines SIL using requirements grouped into 2 broad categories: hardware safety integrity and systematic safety integrity. A device or system must meet the requirements for both categories to achieve a given SIL.

The SIL requirements for hardware safety integrity are based on a probabilistic analysis of the device. To achieve a given SIL, the device must meet targets for the maximum probability of dangerous failure and a minimum Safe Failure Fraction. The concept of “dangerous failure” must be rigorously defined for the system in question, normally in the form of requirement constraints whose integrity is verified throughout system development. The actual targets required vary depending on the likelihood of a demand, the complexity of the devices, and types of redundancy used.

The Probability of Failure on Demand (PFD) of low demand operation for different SILs are defined in IEC 61508 are as follows:

SIL	Average Probability of a Dangerous Failure on Demand of the safety function PFD
SIL4	$< 10^{-4}$
SIL3	$\geq 10^{-4}$ to $< 10^{-3}$
SIL2	$\geq 10^{-3}$ to $< 10^{-2}$
SIL1	$\geq 10^{-2}$ to $< 10^{-1}$

In continuous operation, these change to the following:

SIL	Average Frequency of a Dangerous Failure on Demand of the safety function (h^{-1}) PFH
SIL4	$\geq 10^{-9}$ to $< 10^{-8}$
SIL3	$\geq 10^{-8}$ to $< 10^{-7}$
SIL2	$\geq 10^{-7}$ to $< 10^{-6}$
SIL1	$\geq 10^{-6}$ to $< 10^{-5}$

A function is considered as "on demand" if the demand rate is lower than one activation per year. Otherwise, the function is considered as "High demand or continuous operation".

The hazards of a control system must be identified then analyzed in a risk analysis. These risks are gradually mitigated until their overall contribution to the hazard is deemed to be acceptable. The tolerable level of these risks is specified as a safety requirement in the form of a target probability of a dangerous failure over a given period, stated as a discrete SIL level.

PL - Performance Level

The standard EN ISO 13849-1 defines 5 Performance Levels (PL) for safety functions.

"a" is the lowest level and "e" is the highest level.

5 levels (a, b, c, d, and e) correspond to different values of average probability of dangerous failure per hour.

PL	Probability of a Dangerous Hardware Failure Per Hour
e	≥ 10^{-8} to < 10^{-7}
d	≥ 10^{-7} to < 10^{-6}
c	≥ 10^{-6} to < $3x10^{-6}$
b	≥ $3x10^{-6}$ to < 10^{-5}
a	≥ 10^{-5} to < 10^{-4}

HFT - Hardware Fault Tolerance and SFF - Safe Failure Fraction

Depending on the SIL for the safety system, the IEC 61508 standard requires a specific HFT in connection with a specific proportion of safe failures SFF.

The HFT is the ability of a system to execute the required safety function in spite of the presence of one or more hardware faults.

The SFF of a system is defined as the ratio of the rate of safe failures to the total failure rate of the system.

According to IEC 61508, the maximum achievable SIL of a system is partly determined by the HFT and the SFF of the system.

IEC 61508 distinguishes 2 types of subsystem (type A subsystem, type B subsystem).

These types are specified on the basis of criteria which the standard defines for the safety-relevant components.

SFF	HTF					
	Type A subsystem			Type B subsystem		
	0	1	2	0	1	2
< 60 %	SIL1	SIL2	SIL3	-	SIL1	SIL2
60 %…< 90 %	SIL2	SIL3	SIL4	SIL1	SIL2	SIL3
90 %…< 99 %	SIL3	SIL4	SIL4	SIL2	SIL3	SIL4
≥ 99 %	SIL3	SIL4	SIL4	SIL3	SIL4	SIL4

Systematic Safety Integrity & Detect Fault Avoidance Measures

Systematic errors in the specifications, in the hardware and the software, usage faults and maintenance faults in the safety system must be avoided to the maximum degree possible. To reach these requirements, IEC 61508 specifies a number of measures for fault avoidance that must be implemented depending on the required SIL. These measures for fault avoidance must cover the entire life cycle of the safety system, that is, from design to decommissioning of the system.

Section 3.2
Description and Safety Function Capability

What Is in This Section?

This section contains the following topics:

Wireless Remote Control System Safety Functions Are Part of an Overall System

Overview

The qualitative and quantitative safety objectives determined by the final application require some adjustments to ensure safe use of the safety functions. The integrator of the Wireless Remote Control System is responsible for these additional changes (for example, managing the mechanical brake on the motor).

Getting and Operating the Safety Function

Overview

The SISTEMA software allows machine developers and testers of safety-related machine controls to evaluate the safety standard or level of their machine in the context of EN ISO 13849-1. The tool allows you to model the structure of safety-related control components based on the designated architectures, allowing automated calculation of the reliability standards with various levels of detail, including that of the Performance Level (PL).

The eXLhoist SISTEMA libraries are available from *www.schneider-electric.com*.

E-STOP

Overview

For general descriptions, refer to E-STOP function *(see page 133)*.

The E-STOP is not configurable.

The undesired event of the E-STOP function is the non-execution of the E-STOP activation.

The safe state of the E-STOP function is to open safety relays.

Function	Installation	IEC 60204-32	IEC 61508	EN 62061	EN ISO 13849	
		STOP category	SIL	SIL CL	Safety category	PL
E-STOP	With auxiliary contact feedback loop between S2_S3 and IN0	Category 0	SIL3	SIL3 CL	Safety category 4	PL e
	Without auxiliary contact feedback loop between S2_S3 and IN0		SIL2	SIL2 CL	Safety category 3	PL d

For a SIL3 PLe E-STOP, auxiliary contact of contactors must be mechanically linked. Contactors shall be compliant with EN 60947-4-1:2010 Annex F (preferred) - Requirements for auxiliary contact linked to power contact (mirror contact).

In order to be compliant with the Common Cause of Failure (CCF), wiring of redundant contactors or drives must be by different path.

The standard E-STOP function of eXLhoist is limited to a stop category 0 according to IEC 60204-32. If some applications require an E-STOP function with a stop category 1, then a safety relay type Preventa XPSATE or XPSAV or similar must be used.

In order to justify of the safety category 4 according to EN ISO 13849-1, an automatic diagnostic is realized on IN0 terminal thanks to the S2_S3 terminal (Pulsed 12 V). An external supply of IN0 input cannot be used.

E-STOP function is a passive stop (function activated when an invalid frame is detected).

STOP Function

Overview

For general descriptions, refer to STOP function *(see page 135)*.

The undesired event of the STOP function is the non-execution of the STOP activation.

The safe state of the STOP function is to open safety relays.

Function	Installation	IEC 60204-32	IEC 61508	EN 62061	EN ISO 13849	
		STOP category	SIL	SIL CL	Safety category	PL
STOP	Without UOC	Category 0	SIL2	SIL2 CL	Safety category 3	PL d
	With UOC	Category 1				

STOP function is a passive stop (function activated when an invalid frame is detected).

Standard Motion & Auxiliary Functions

Overview

For general descriptions, refer to Standard Motion *(see page 147)* and Auxiliary functions *(see page 149)*.

A relay assignment can be done for the Remote Device motion buttons with the eXLhoist Configuration Software. An UOC relay *(see page 114)* can be associated to a motion axis (and its motion relays) thanks to the eXLhoist Configuration Software.

Auxiliary functions can be assigned to auxiliary buttons and relays thanks to the eXLhoist Configuration Software.

The undesired event of standard motion & auxiliary functions is the unintended standard motion or auxiliary function activation.

The safe state of the standard motion & auxiliary function is to open safety relays.

Function	Installation	IEC 60204-32	IEC 61508	EN 62061	EN ISO 13849	
		STOP category	SIL	SIL CL	Safety category	PL
Standard motion & auxiliary functions	No UOC	Category 2	SIL1	SIL1 CL	Category 2 for electronic parts Category 1 for electromechanical parts	PL c
	With UOC					

In order to justify of the safety category 2, an automatic diagnostic is realized on buttons of the Remote Device during a START of the machine. So during this phase, the operator must not push any motion or auxiliary buttons.

Standard motion & auxiliary functions are passive stop functions (functions activated when an input signal is detected).

Safeguarding

Overview

For general description, refer to Safeguarding function *(see page 116)*.

Safeguarding can be assigned to a motion direction thanks to the eXLhoist Configuration Software.

The undesired event of Safeguarding function is the no disabling of motion buttons.

Safeguarding limit switches contacts must be NC contacts.

The safe state of the Safeguarding function is to open safety relays.

Function	Installation	IEC 60204-32	IEC 61508	EN 62061	EN ISO 13849	
		STOP category	SIL	SIL CL	Safety category	PL
Safeguarding	NC	Category 2 on the motion direction	SIL1	SIL1 CL	Category 2 for electronic parts Category 1 for electromechanical parts	PL c

In order to justify of the safety category 2, an automatic diagnostic is realized on the Safeguarding inputs thanks to the IN_COM output port. An external power supply of Safeguarding inputs cannot be used.

Safeguarding is a passive STOP function (function activated when an input signal is detected).

Priority of Safety Functions

Overview

Priority of safety functions	Safety functions
1	E-STOP
2	STOP
3	Safeguarding
4	Standard motion & auxiliary functions

Safe State of the Wireless Remote Control System

Overview

Safe states of the Base Station are:

- SAFE-STOP failure: if a failure is detected by the Base Station, the Base Station opens safety relays with a stop category 0, stops the radio communication with the Remote Device, and restart.
- SAFE-STOP radio: if the Base Station looses the communication with the Remote Device, the Base Station opens the safety relays in stop category 0 or stop category 1 according to the commissioning.

The Safe state position of the Remote Device is no communication with the Base Station: if a failure is detected in the Remote Device, the Remote Device stops the radio communication. So the Base Station goes to SAFE-STOP radio mode and opens the safety relays in stop category 0 or stop category 1 according to the commissioning.

Legal RFU (Recommendation for Use)

Overview

According to the machinery directive 2006/42/EC and the amendment - RECOMMENDATION FOR USE n°CNB/M/11.050 rev02, functional test (automatic or manual) shall be performed within the following test intervals:

- At least every month for PL e with category 3 or category 4 (according to EN ISO 13849-1) or SIL3 with HFT = 1 (according to EN 62061);
- At least every 12 months for PL d with category 3 (according to EN ISO 13849-1) or SIL2 with HFT = 1 (according to EN 62061).

Summary of the Reliability Study

Synthesis of Reliability Study in Configuration 1 Remote Device & 1 Base Station

Standard	Safety features	E-STOP	STOP		Standard motion & auxiliary functions		Limit switch
		With auxiliary contact	Without UOC	UOC	Without UOC	UOC	NC contact
IEC 61508 Ed 2	SFF per channel	97.8 %	85 %	84.8 %	90.1 %		95 %
	PFH (10^{-9} h^{-1})	7.32	7.54	7.57	52.3	51.8	17.9
	Type	B					
	HFT	1			0		
	Diagnostic Coverage per channel	99.3 %	90.5 %	90.3 %	73.8 %		90 %
	SIL capability	3	2		1		
EN 62061 (1)	SIL CL capability	3	2		1		
EN ISO 13849-1 2008	PL	e	d		c		
	Safety category	4	3		2		
	MTTFd in years	15584	15130	15070	2183	2202	6380
Proof test interval (manual functional test)		Once per month	Once per year				
Maximum response time		500 ms					

(1) EN 62061 standard concerns integration. This standard distinguishes the overall safety function (classified SIL1, SIL2, or SIL3 according to diagrams in Appendix A) from components which constitute the safety function (classified SIL1 CL, SIL2 CL or SIL3 for eXLhoist).

NOTE: The table above is not sufficient to evaluate the PL of the hoisting system. The PL evaluation has to be done at the system level. The fitter of the integrator of the eXLhoist has to do the PL evaluation by including sensors and actuators data numbers from the table above. SISTEMA software can evaluate the PL of the system.

NOTE: The radio communication of the Wireless Remote Control System is compliant with IEC 61784-3 Ed2 2010.

Section 3.3
Functional Safety Function Commissioning

What Is in This Section?

This section contains the following topics:

Safety Parameters and Steps to Configure the Safety Functions

Commissioning of Safety Functions

The commissioning type of safety function is:

Functions	UOC delay time	Relay assignment	Remarks
E-STOP	-	-	No commissioning
STOP	Yes	-	Safety relays cannot be commissioned
Motion & auxiliary functions	Yes	Yes	-
Safeguarding	-	Yes	Delay and NO/NC contact assignment

Some passwords/codes can be configured on the eXLhoist Configuration Software:

- E-STOP RESET sequence on the Remote Device
- Start access sequence on the Remote Device
- Transfer password:
  - For the read of the Configuration File in a Remote Device
  - For the transfer of the Configuration File between a Remote Device and a Base Station.

Passwords/codes	Default value
E-STOP RESET sequence	-
Start access sequence	-
Configuration File transfer password	-

Wireless Remote Control System Safety Signature

Overview

The verification test for systems with safety integrated functions focuses on validating the functionality of safety integrated monitoring and stop functions configured in the Wireless Remote Control System.

The purpose of the test is to verify proper configuration of the defined safety functions and test mechanisms and to examine the response of dedicated monitoring functions to explicit input of values outside the tolerance limits.

The test must cover all Wireless Remote Control System-specific safety configured monitoring functions and global safety integrated functionality in eXLhoist.

Condition Prior to Verification Test

- The machine is wired up correctly.
- All safety devices such as limit switches, overload sensors, and emergency stop switches are connected and ready for operation.
- All commissioning parameters must be correctly set on the Wireless Remote Control System.

Section 3.4
Functional Safety Requirements for Maintenance

What Is in This Section?

This section contains the following topics:

Maintenance

E-STOP

By way of preventive maintenance and according to the Recommendation For Use *(see page 81)*, the E-STOP and the STOP function must be activated at least once a month. The Remote Device and the Base Station must be switched OFF and then ON (power cycle) before carrying out this preventive maintenance.

Others Safety Functions

By way of preventive maintenance and according to the Recommendation For Use *(see page 81)*, the STOP, motion, auxiliary, limit switch functions must be activated at least once a year. The Remote Device and the Base Station must be switched OFF and then ON (power cycle) before carrying out this preventive maintenance.

Base Station or Remote Device Replacement

Overview

You can replace the Base Station part and the Remote Device part.

If you replace the Base Station or the Remote Device configured, you will not lose your safety configuration thanks to the maintenance / device replacement procedure but you need to repeat the verification test to avoid incorrect wiring or incorrect behavior of the safety function.

NOTE: For more product information, see the Maintenance / Device Replacement *(see page 245)*.

Changing Machine Equipment

Overview

If you need to change any parts of the hoisting system (contactor, drive, …) you must repeat the verification test *(see page 85)*.

NOTE: For more product information, see the installation part *(see page 91)*.

Chapter 4
Installation and Wiring

What Is in This Chapter?

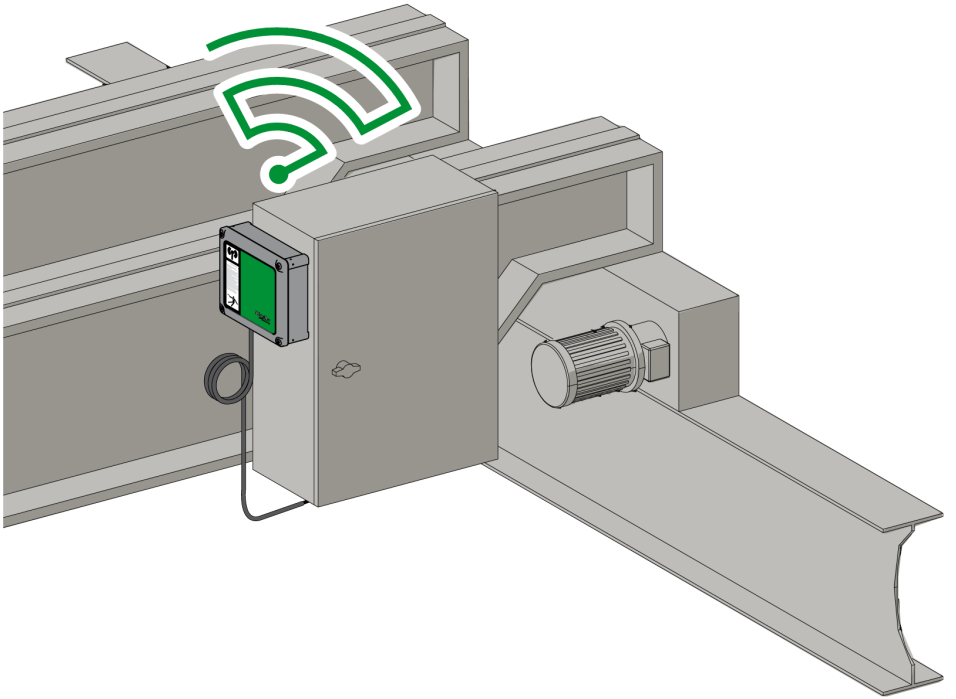
This chapter contains the following sections:

Section 4.1
Base Station Installation

Base Station Installation Precaution

Installation Precaution

Example of a recommended Base Station location:



Base Station location:

The Base Station must be installed vertically, on a flat and rigid surface, with the cable at the bottom.

Consider the wiring limitation and the radio communication limitation to choose the Base Station location.

Do not create obstacle between the Base Station and the Remote Device to optimize the radio communication level.

The Base Station must not be installed inside closed metal containers.

To prevent communication perturbation:
- Do not place cables or metallic parts in front of the Base Station cover.
- Do not place obstacles between the Base Station and the Remote Device.

According to IEC 61010-1, it is recommended to install the power switch of the Base Station close to the Base Station.

To be compliant with IEC 61508, EN 62061 and EN ISO 13849, cable ends must be used for the output wiring of the ZARB•W•.

⚠ DANGER

HEAVY LOAD MOVING HAZARD

The working range must be free of people when the hoisting system is operating.

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

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Install and operate this equipment according to the environmental conditions described in the operating limits.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

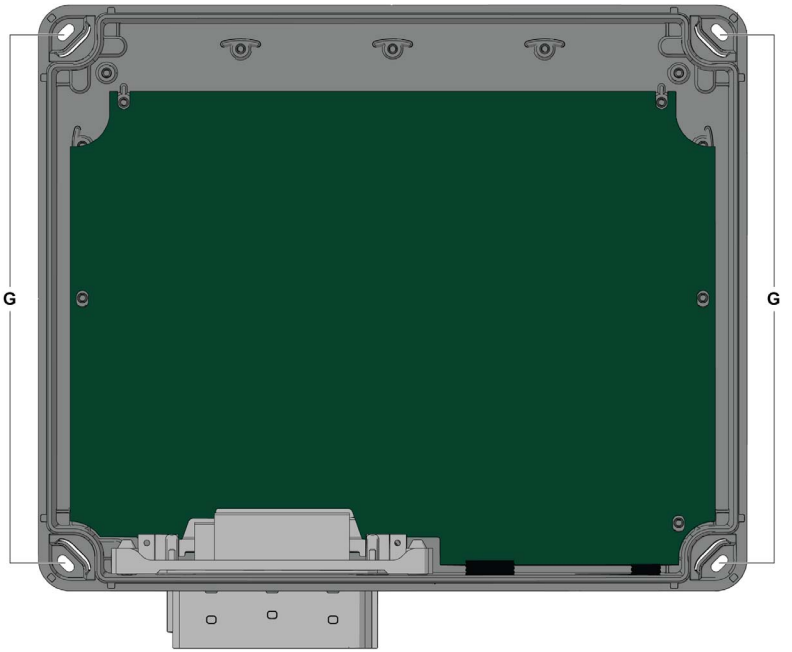
⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Use appropriate safety interlocks where personnel and/or equipment hazards exist.
- Use the sensor and actuator power supplies only for supplying power to the sensors or actuators connected to the device.
- Power line must be wired and protected with fuse or thermal magnetic switch (ex: Schneider-Electric GV2) in compliance with local and national regulatory requirements for the rated current and voltage of the particular equipment.
- Do not disassemble, repair, or modify this equipment.
- Do not drill hole in the Base Station.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Installation

Step	Action
1	Unscrew the 4 screws at the front of the Base Station.
2	Remove the cover.
3	Introduce the 4 screws in the dedicated holes (legend G): 
4	Screw the 4 mounting M04 screws. Engage at least 6 mm (0.23 in) of the thread in mounting plate.
5	Install the Base Station cover.
6	Screw the 4 screws to fasten the Base Station cover.
7	To help the Base Station identification, write its ID address on a dedicated adhesive label and stick it on an appropriate place. These labels are provided with the device or on the accessories ZARC07 and ZARC08. You can also stick the yellow label “Radio controlled device” on an appropriate place. This label is present on the accessory ZARC08.

Use the ZARC09 silent blocs in case of applications with severe vibration constraints.

Section 4.2
Base Station Wiring

What Is in This Section?

This section contains the following topics:

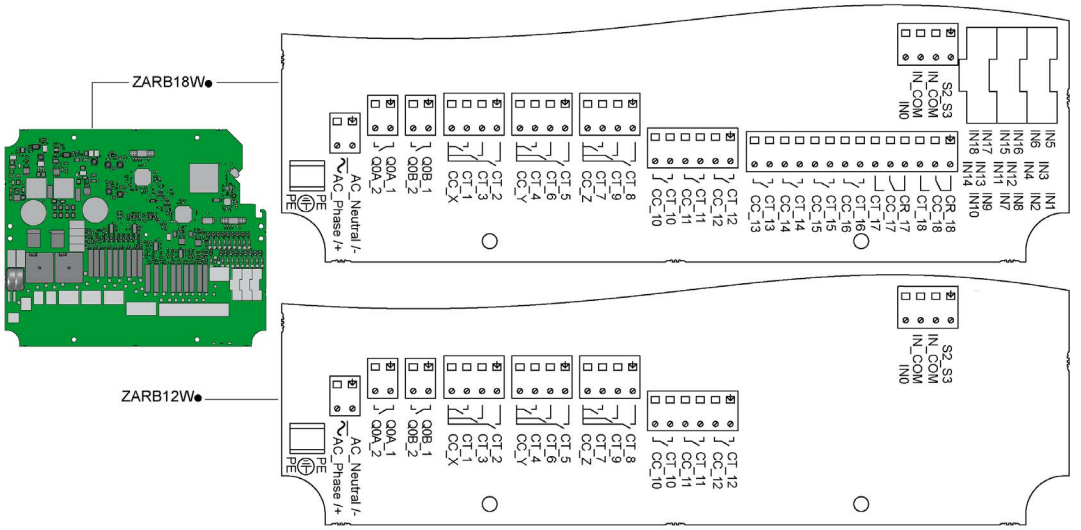
Base Station Wiring

ZARB•W•

Wiring procedure:

Step	Action
1	Unscrew the 4 screws at the front of the Base Station.
2	Remove the cover.
3	When necessary, remove the cap of the Base Station dedicated hole and install a cable gland from the kit ZARC06 *(see page 41)* (Tightening torque = 4±0.2 N.m (35.4±0.2 lb.-in)).
4	Introduce the cable through the dedicated cable gland.
5	Connect the wires in the dedicated terminals. Use, if necessary, cable ends.
6	Tight the cable gland.
7	Install the Base Station cover.
8	Screw the 4 screws to fasten the Base Station cover.

ZARB•W• terminals:



Insulation:

The group of relays (Q1…Q3), (Q4…Q6), (Q7…Q9), (Q10…Q12) and (Q13…Q18), as well as the group of inputs (IN0…IN18) and the group of power supply (AC_Phase/+, AC_Neutral/-) respect a SELV insulation between each other.

For more details on the relays/terminals, refer to Motion/Auxiliary relays wiring. *(see page 109)*.

A single 24 V insulation shall be respected inside the (IN0…IN18) group.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

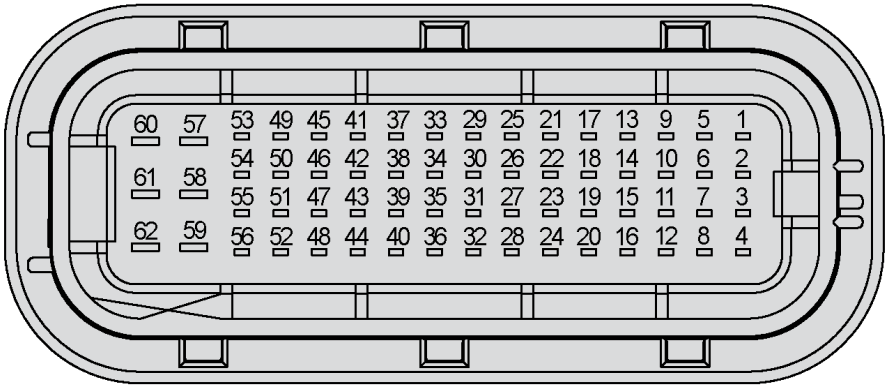
The devices connected to the Base Station IN0…IN18 inputs must respect a SELV insulation between their dry contact output and any external voltage.

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

ZARB•H•

The input/output are wired to the connector (except the safeguarding inputs).

To connect the Base Station, respect the connector description:



Pin nb.	ZARB-18H•	ZARB-12H•	Pin nb.	ZARB-18H•	ZARB-12H•	Pin nb.	ZARB-18H•	ZARB-12H•	Pin nb.	ZARB-18H•	ZARB-12H•
1	CR_18	-	17	CT_16	-	33	CT_7		49	-	
2	CC_18	-	18	CT_15	-	34	CC_Y		50	-	
3	CT_18	-	19	S2/S3		35	CT_2		51	-	
4	CT_13	-	20	IN3	-	36	IN1	-	52	-	
5	CR_17	-	21	CC_16	-	37	Q0A_1		53	-	

Pin nb.	ZARB-18H•	ZARB-12H•	Pin nb.	ZARB-18H•	ZARB-12H•	Pin nb.	ZARB-18H•	ZARB-12H•	Pin nb.	ZARB-18H•	ZARB-12H•
6	CC_17	-	22	CC_15	-	38	Q0A_2		54	-	
7	CT_17	-	23	-		39	CT_3		55	-	
8	CC_13	-	24	IN2	-	40	IN4	-	56	-	
9	CT_14	-	25	CT_9		41	Q0B_1		57	-	
10	CC_12		26	CT_8		42	Q0B_2		58	-	
11	CT_11		27	CT_5		43	CT_1		59	-	
12	CC_10		28	IN_COM	-	44	IN5	-	60	AC_Neutral	
13	CC_14	-	29	CC_Z		45	PE		61	-	
14	CT_12		30	CT_6		46	-		62	AC_Phase	
15	CC_11		31	CT_4		47	CC_X		-	-	
16	CT_10		32	IN0		48	IN6	-	-	-	

If the ZARC03 external antenna is used, refer to the dedicated Instruction Sheet *(see page 12)*.

Safeguarding Inputs

Safeguarding inputs wiring procedure:

Step	Action
1	Unscrew the 4 screws at the front of the Base Station.
2	Remove the cover.
3	Remove the cap of the Base Station dedicated hole and install a cable gland from the kit ZARC06 *(see page 41)* (Tightening torque = 3±0.2 N.m (26.5±0.2 lb.-in)).
4	Introduce the cable through the Base Station dedicated hole.
5	Connect the wires in the dedicated terminals.
6	Tight the cable gland.
7	Install the Base Station cover.
8	Screw the 4 screws to fasten the Base Station cover.

Input/Output Possible Uses

Input/Output	Possible uses (Depending on the configuration)
IN0	Feedback loop input *(see page 121)*
IN1…IN6	Detected Applicative Alarm *(see page 113)*
IN7…IN18	Safeguarding *(see page 116)*
S2_S3	Terminals for SIL2 / SIL3 E-STOP Configuration *(see page 121)*
Q0A, Q0B	Safety relay *(see page 121)*
Q1…Q9	Motion relays *(see page 109)*
Q10…Q16 (NO type) Q17, Q18 (NO+NC type)	Auxiliary relays *(see page 110)* Selector *(see page 111)* UOC *(see page 114)* Specific relays *(see page 119)*

Power Supply

NOTICE

INOPERABLE EQUIPMENT

The ZARB•H Base Station must be powered with a voltage:

- From 24 Vac -15 % to 48 Vac +10 % with frequency of 50 Hz -6 %/+4 % and frequency of 60 Hz -6 %/+4 %.
- From 24 Vdc -15 % to 48 Vdc +20 %.

The ZARB•W Base Station must be powered with a voltage:

- From 24 Vac -15 % to 240 Vac +10 % with frequency of 50 Hz -6 %/+4 % and frequency of 60 Hz -6 %/+4 %.
- From 24 Vdc -15 % to 240 Vdc +20 %.

Failure to follow these instructions can result in equipment damage.

Protective Earth Ground

The electrical isolation of the Base Station power supply from machine ground could cause static electricity damages. The limit switch could unexpectedly operates in case of ground fault.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Connect the Base Station protective earth ground connection to the machine ground.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The equipment could non-stop in case of ground fault on any control circuits.

⚠ WARNING
UNINTENDED EQUIPMENT OPERATION Insulate the products connected to inputs (applicative alarm, feedback loop, and safeguarding functions) from the electrical installation and the protective earth ground. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

NOTE: For EMC purpose, input (ex: IN1...IN6) and IN_COM signal wires must be wired in same cable.

Factory Setting

For details on factory setting (wiring and configuration), refer to factory setting description *(see page 104)*.

General Wiring Rules

The input and power supply cables should be cross-sectional conductor area = 0.75 mm^2 (AWG 18).

The output cables should be cross-sectional conductor area = 1.3 mm^2 (AWG 16).

The inputs and power supply cable lengths should not exceed 50 m (164 ft).

Follow the recommended cable diameter in the cable gland:

Cable gland	Recommended cable diameter
M20	10…14 mm (0.39…0.55 in)
M25	13…18 mm (0.51…0.71 in)

For more details, refer to Wiring Best Practices *(see page 101)*.

Added Features Card Wiring

For details, refer to Added Features Card wiring *(see page 268)*.

Wiring Best Practices

Overview

This section describes the wiring guidelines and associated best practices to be respected when using the system.

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm that the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the unit.
- Use only the specified voltage when operating this equipment and any associated products.

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

⚠ WARNING

LOSS OF CONTROL

- The designer of any control wiring diagram must consider the potential failure modes of control paths and, for certain critical control functions, provide a means to achieve a safe state during and after a path failure. Examples of critical control functions are emergency stop and overtravel stop, power outage and restart.
- Separate or redundant control paths must be provided for critical control functions.
- System control paths may include communication links. Consideration must be given to the implications of unanticipated transmission delays or failures of the link.
- Observe all accident prevention regulations and local safety guidelines.[1]
- Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] For additional information, refer to NEMA ICS 1.1 (latest edition), "Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control" and to NEMA ICS 7.1 (latest edition), "Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable-Speed Drive Systems" or their equivalent governing your particular location.

Protective Earth Ground (PE) on the Backplane

The protective earth ground (PE) is connected to the conductive backplane by a heavy-duty wire, usually a braided copper cable with the maximum allowable cable section.

⚠ WARNING

IMPROPER GROUNDING CAN CAUSE UNINTENDED EQUIPMENT OPERATION

- Use cables with insulated shielded jackets for I/O signals.
- Ground shielded cables for I/O signals at a single point [1].
- Always comply with local wiring requirements regarding grounding of cable shields.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1]Multipoint grounding is permissible if connections are made to an equipotential ground plane dimensioned to help avoid cable shield damage in the event of power system short-circuit currents

Wiring Guidelines

The following rules must be applied when wiring the system:

- I/O wiring must be kept separate from the power wiring. Route these 2 types of wiring in separate cable ducting.
- Verify that the operating conditions and environment are within the specification values.
- Use proper wire sizes to meet voltage and current requirements.
- Use copper conductors (highly recommended).
- Use twisted pair, shielded cables.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Use shielded cables wherever specified for inputs and outputs connections.
- Properly ground the cable shields as indicated in the related documentation.
- Route I/O cables separately from power cables.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Power line must be wired and protected with fuse or thermal magnetic switch (ex: Schneider Electric GV2) in compliance with local and national regulatory requirements for the rated current and voltage of the particular equipment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Rules for Screw Terminal Block

The following tables show the cable types and wire sizes for a 5.08 mm (0.19 in) pitch screw terminal block:

mm / in. 7 / 0.28								
mm^2	0.2…2.5	0.2…2.5	0.25…2.5	0.25…2.5	2 x 0.2…1	2 x 0.2…1.5	2 x 0.25…1	2 x 0.5...1.5
AWG	*24…14*	*24…14*	*23...14*	*23...14*	*2 x 24…17*	*2 x 24…16*	*2 x 23…17*	*2 x 20...16*

Ø 3,5 mm (*0.14 in.*)	C	N•m	0.5...0.6
		lb-in	*4.42...5.31*

The use of copper conductors is required.

The use of cable ends is required.

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

The devices connected to the Base Station IN0…IN18 inputs must respect a SELV insulation between their dry contact output and any external voltage.

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

⚠ DANGER

FIRE HAZARD

Use only the recommended wire sizes for I/O channels and power supplies.

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

NOTICE

INOPERABLE EQUIPMENT

Do not tighten screw terminals beyond the specified maximum torque (Nm / lb-in.).

Failure to follow these instructions can result in equipment damage.

Factory Setting Description

General Parameters

General	Label		Factory setting value
Parameter	Standby Time-out *(see page 224)*		Enabled 15 minutes
	Power saving Time-out *(see page 224)*		Enabled 15 minutes
	Horn duration *(see page 234)*		1 second
	Radio range *(see page 221)*	Primary Base radio range	Nominal
		Remote radio range	Nominal
		Primary Base Restricted pairing	Enabled
	Remote Fall and Shock detection *(see page 224)*		Disabled

Machine Protection Passwords

General	Label	Factory setting value
Protection	SART access sequence *(see page 223)*	Disabled
	E-STOP RESET sequence *(see page 223)*	Disabled
	SET UP access sequence *(see page 224)*	Disabled
	Configuration File Transfer Password *(see page 210)*	Disabled
	Data Storage Password *(see page 314)*	Disabled

Detected Applicative Alarms

Base Station wiring:

Label	Wiring description	Factory setting description	Factory setting Value
IN1	Sensor input	Overload pre-alarm	Active state = High
IN2	Sensor input	Overload alarm	
IN3	Sensor input	Over wind pre-alarm	
IN4	Sensor input	Over wind alarm	
IN5	Sensor input	Over speed alarm	
IN6	Sensor input	Generic alarm	
IN_COM	Common output port (to be connected to the other side of the dry contact connected to the IN1…IN6 inputs)	-	-

Safeguarding Function (Only for ZARB18•)

Base Station wiring:

Label	Wiring description	Factory setting description
IN7	Limit switch input (for button 1)	IN7…IN18 are not activated on the factory setting.
IN8	Limit switch input (for button 1H)	
IN9	Limit switch input (for button 2)	
IN10	Limit switch input (for button 2H)	
IN11	Limit switch input (for button 3)	
IN12	Limit switch input (for button 3H)	
IN13	Limit switch input (for button 4)	
IN14	Limit switch input (for button 4H)	
IN15	Limit switch input (for button 5)	
IN16	Limit switch input (for button 5 +7)	
IN17	Limit switch input (for button 6)	
IN18	Limit switch input (for button 6 +7)	
IN_COM	Common output port (to be connected to the other side of the dry contact connected to the IN7…IN18 inputs)	-

Motion Relays

Base Station wiring:

Label	Wiring description	Factory setting description
Motion relays (for axis X)		
CC_X	Common for relays 1…3	-
CT_1	Output of motion relay 1	Command for motion direction 1 Relay is ON when button 1 or 1H is pressed
CT_2	Output of motion relay 2	Command for motion direction 2 Relay is ON when button 2 or 2H is pressed
CT_3	Output of motion relay 3	Command for high speed Relay is ON when button 1H or 2H is pressed
Motion relays (for axis Y)		
CC_Y	Common for relays 4…6	-
CT_4	Output of motion relay 4	Command for motion direction 1 Relay is ON when button 3 or 3H is pressed
CT_5	Output of motion relay 5	Command for motion direction 2 Relay is ON when button 4 or 4H is pressed

Label	Wiring description	Factory setting description
CT_6	Output of motion relay 6	Command for high speed Relay is ON when button 3H or 4H is pressed
Motion relays (for axis Z)		
CC_Z	Common for relays 7…9	-
CT_7	Output of motion relay 7	Command for motion direction 1 Relay is ON when button 5 or 5+7 is pressed
CT_8	Output of motion relay 8	Command for motion direction 2 Relay is ON when button 6 or 6+7 is pressed
CT_9	Output of motion relay 9	Command for high speed Relay is ON when button 5+7 or 6+7 is pressed

Auxiliary Relays

Base Station wiring:

General	Label	Wiring description	Factory setting description
Auxiliary relay 10	CC_10	Common	Selector Relay 10 is ON when the Selector (button 10) is in position 1 or 1+2 Relay 11 is ON when the Selector (button 10) is in position 2 or 1+2
	CT_10	Output (NO type)	
Auxiliary relay 11	CC_11	Common	
	CT_11	Output (NO type)	
Auxiliary relay 12	CC_12	Common	“Horn” relay Relay is ON during the start procedure, and for a configurable duration. In START mode, the relay is ON as long as the ON/START/Horn button is pressed.
	CT_12	Output (NO type)	
Auxiliary relay 13	CC_13	Common	“Radio link” relay Relay 13 is ON as long as the radio communication is achieved between the Base Station and its Remote Device.
	CT_13	Output (NO type)	
Auxiliary relay 14	CC_14	Common	Relay 14 is ON when button 11 is pressed
	CT_14	Output (NO type)	
Auxiliary relay 15	CC_15	Common	Relay 15 is ON when button 12 is pressed
	CT_15	Output (NO type)	
Auxiliary relay 16	CC_16	Common	Relay 16 is ON when button 13 is pressed
	CT_16	Output (NO type)	

General	Label	Wiring description	Factory setting description
Auxiliary relay 17	CC_17	Common	Relay 17 is ON when button 14 is pressed
	CT_17	Output (NO type)	
	CR_17	Output (NC type)	
Auxiliary relay 18	CC_18	Common	Relay 18 is ON when button 15 is pressed
	CT_18	Output (NO type)	
	CR_18	Output (NC type)	

The description of the relays 13 to 18 depends on the Base Station and Remote Device;

Base Station:

References	ZARB12••	ZARB18••
Motion & auxiliary standard relays	12 (Q1…Q12)	18 (Q1…Q18)

Remote Device:

References	ZART8L•	ZART8D•	ZARB12D•
Number of buttons	11 (8 configurable)	11 (8 configurable)	15 (12 configurable)

Power Supply and PE

Base Station wiring:

Label	Wiring description	Factory setting description
PE	Protected earth ground	-
AC_Neutral /-	Base Station power supply	-
AC_Phase /+		

Safety

Base Station wiring:

Label	Wiring description	Factory setting description
Q0A_1	Safety relay 1	-
Q0A_2		
Q0B_1	Safety relay 2	
Q0B_2		
IN0	Feedback loop	-
S2_S3		

Section 4.3
Functionalities Description

What Is in This Section?

This section contains the following topics:

Motion/Auxiliary Relays

Description

The motion/auxiliary relays are switched ON as long as the associated button is pressed.

Only up to 6 motion/auxiliary relays activation occurs at the same time.

If more than 2 motion/auxiliary relays switching are requested at the same time, then they are actuated in successive switching every 20 ms (except for UOC relays).

You can configure the motion/auxiliary relays with the eXLhoist Configuration Software.

For more details, refer to Relay Assignment *(see page 230)*.

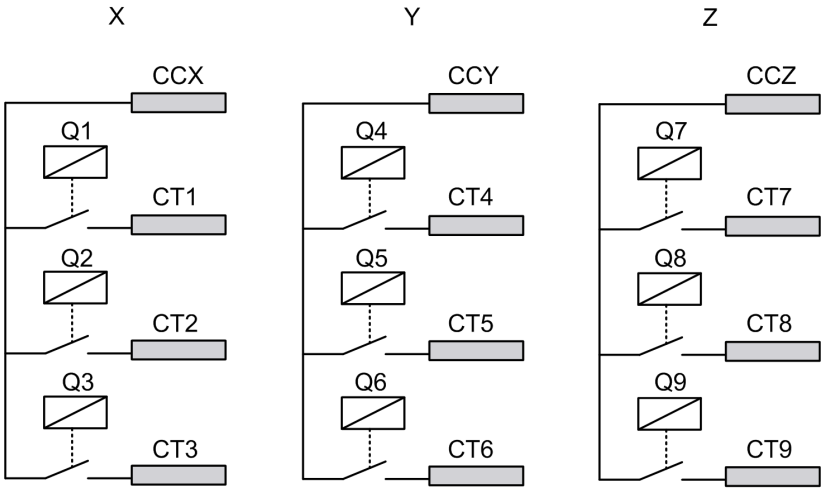
General Wiring Rules

The cables should be cross-sectional conductor area = 1.3 mm^2 (AWG 16).

For more details, refer to Wiring Best Practices *(see page 101)*.

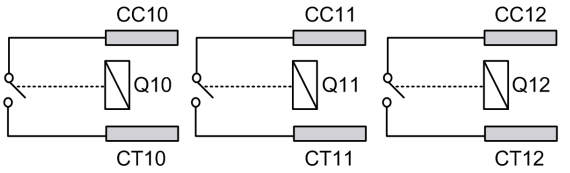
Wiring

Q1…Q9 motion relay internal wiring (NO type):

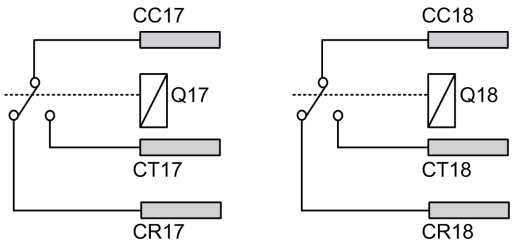


Q10…Q16 motion/auxiliary relay wiring (NO type only):

Example for Q10…Q12:



Q17, Q18 auxiliary relay wiring (NO+NC type):



⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Power line must be wired and protected with fuse or thermal magnetic switch (ex: Schneider Electric GV2) in compliance with local and national regulatory requirements for the rated current and voltage of the particular equipment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Motion Wiring

For wiring examples, refer to the Architecture examples *(see page 328)*.

Auxiliary Wiring

The auxiliary buttons can be used, for example, to manage a:

- Vacuum/magnetic function *(see page 334)*
- Auxiliary Selector switch function *(see page 111)*
- Supplementary motion

Factory Setting

For details on factory setting (wiring and configuration), refer to factory setting description *(see page 104)*.

Auxiliary Selector

Description

The auxiliary selector button (2 or 3 positions) can be associated to relays.

With an adapted wiring, these relays enable/disable the motions of the selected device (hook/trolleys).

In single and slave mode, you can configure 1 auxiliary selector.

In Master mode, you can configure up to 2 auxiliary selectors.

You can configure the auxiliary selectors with the eXLhoist Configuration Software.

For more details, refer to Relay Assignment *(see page 230)*.

General Wiring Rules

The cables should be cross-sectional conductor area = 1.3 mm^2 (AWG 16).

For more details, refer to Wiring Best Practices *(see page 101)*.

Multi Base Control Base Selector

Description

In MBC configuration, the master Remote Device have an MBC Base selector.

The MBC Base selector button is used to select which Base Stations are controlled (Base A, Base A+B, or Base B).

You can associate relays to the MBC Base selector button.

States for the MBC Base selector:

State	Description
Base A	Activated when you press the Base selector button to select the primary Base Station.
Base A+B	Activated when you press the Base selector button to select the 2 Base Stations.
Base B	Activated when you press the Base selector button to select the secondary Base Station.
Base pairing A+B	Activated as long as the Base selector is in Base A+B state.

With an adapted wiring, the Base pairing A+B state can be used, for example, to inhibit Anticollision Safeguarding inputs and be able to move 2 bridges side by side.

You can configure the Base selector with the eXLhoist Configuration Software.

For more details, refer to Relay Assignment *(see page 230)*.

General Wiring Rules

The cables should be cross-sectional conductor area = 1.3 mm^2 (AWG 16).

For more details, refer to Wiring Best Practices *(see page 101)*.

Detected Applicative Alarm

Overview

The ZARB18•• Base Station implements 6 inputs: IN1…IN6.

Different sensors can be connected to these inputs.

These inputs are dedicated for applicative alarms.

Description

The detected applicative alarms are only displayed on the ZART•D• Remote Device.

Factory settings:

Input	Description
IN1	Overload pre-alarm
IN2	Overload alarm
IN3	Over wind pre-alarm
IN4	Over wind alarm
IN5	Over speed alarm
IN6	Generic alarm

You can configure the detected applicative alarm inputs with the eXLhoist Configuration Software.

For more details, refer to Alarm Assignment *(see page 238)*.

General Wiring Rules

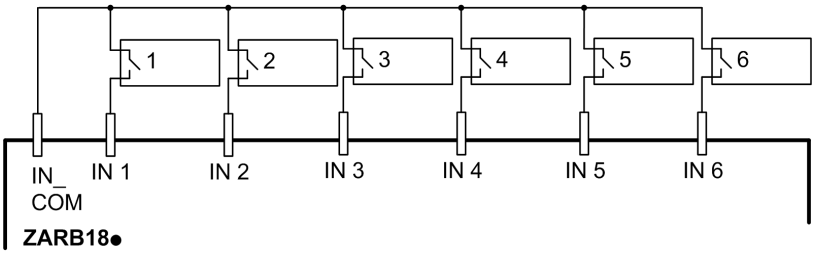
The cables should be cross-sectional conductor area = 0.75 mm^2 (AWG 18).

The cable lengths should not exceed 50 m (164 ft).

For more details, refer to Wiring Best Practices *(see page 101)*.

Wiring

Wiring diagram for the detected applicative alarm devices:



1-6 Detected applicative alarm sensors

Unintended Operating Control (UOC) Function

Overview

The Base Station can manage 3 UOC functions.

These relays have temporization that shall correspond to the decelerating time ramp of the drive. After this time, the UOC relay will switch OFF to enable the Safe Torque Off (STO according to EN IEC 61800-5-2) input on the drive.

The UOC function allows the Wireless Remote Control System to get a STOP category 1 according to EN 60204.

Description

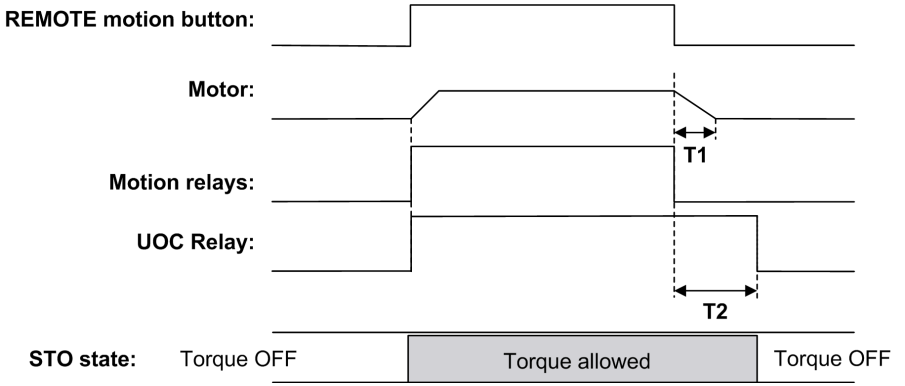
A UOC relay is associated to one motion axis (4 motion buttons).

Once a motion button is pressed, the associated UOC relay is switched ON.

When all motion buttons are released, the UOC delay time starts.

The UOC relay is switched OFF after the UOC pre-defined delay.

UOC function diagram with a drive (the UOC relay is normally open (NO)):



T1 Drive deceleration time.
T2 UOC delay time.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

The UOC delay time must be longer than the drive deceleration time.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

You can configure the UOC with the eXLhoist Configuration Software.

For more details, refer to Relay Assignment *(see page 230)*.

General Wiring Rules

The cables should be cross-sectional conductor area = 1.3 mm^2 (AWG 16).

For more details, refer to Wiring Best Practices *(see page 101)*.

Wiring

Depending on the DRIVE functionality and its application schematic, the UOC relay can be directly connected to the DRIVE Safe Torque Off (STO according to EN/IEC 61800-5-2) input or in serial with a contactor coil.

For wiring examples, refer to the Architecture examples *(see page 328)*.

Safeguarding Function

Overview

The ZARB18•• Base Station implement 12 inputs IN7…IN18.

These inputs are dedicated for limit switches/Motion Feedback to provide a protection to the hoist system.

eXLhoist can manage 2 types of safeguarding protection:
- Limit Switch: drive control of the motion.
- Motion Feedback: contactor solution for the motion.

Limit Switches Description

There are 4 inputs per axis that allow to:
- Stop the motion at minimum mechanical position.
- Disable the high speed of the direction when the hoist system is near the minimum position.
- Stop the motion at maximum mechanical position.
- Disable the high speed of the direction when the hoist system is near the maximum position.

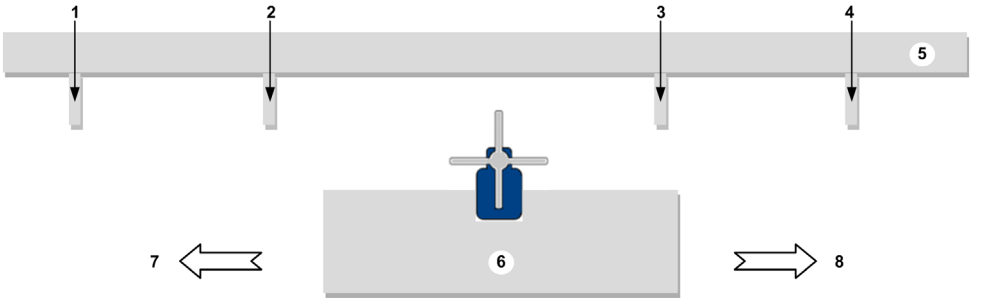
These inputs are associated to motion buttons.

Once a limit switch is opened, the associated motion relay(s) is(are) switched OFF.

You can configure the limit switches with the eXLhoist Configuration Software.

For more details, refer to Limit Switch/Motion Feedback *(see page 236)*.

Principle of Limit switches function installation for 1 axis:



1 Mechanical target for limit switch triggering for **stopping** the motion direction (example: input IN7)
2 Mechanical target for limit switch triggering for **slowing** the motion direction (example: input IN8)
3 Mechanical target for limit switch triggering for **slowing** the motion direction (example: input IN10)
4 Mechanical target for limit switch triggering for **stopping** the motion direction (example: input IN9)
5 Stationary part
6 Mobil part
7 Motion (example: button 1 or 1H)
8 Motion (example: button 2 or 2H)

Motion Feedback Description

Instead of wiring NC limit switches, you can wire to safeguarding input contactor. This allows to detect contactor failure.

If the motion feedback function is configured in an axis, then the corresponding inputs can be configured according to the activation state; activation low (NC contact) or activation high (NO contact).

A delay time can be assigned for each axis. This delay time can be between 0.1 s…10 s by step of 0.1 second.

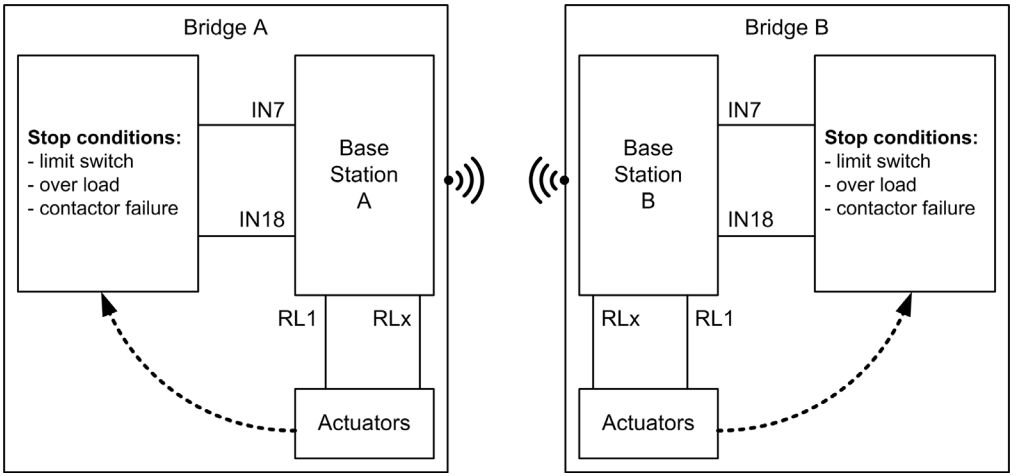
In Motion feedback, the number of inputs per axis can be:

- 3 inputs in case of 3 contactors per axis
- 4 inputs in case of 4 contactors per axis

MBC Specificity

When a Master Remote Device controls 2 Base Stations (Base selector = A+B), the Safeguarding inputs are shared by the 2 Base Stations. For example, when a stop condition is detected by the Base Station A, the Base Station B stops the same movements.

Safeguarding inputs are shared in MBC mode when a Master Remote Device controls 2 Base Stations:



General Wiring Rules

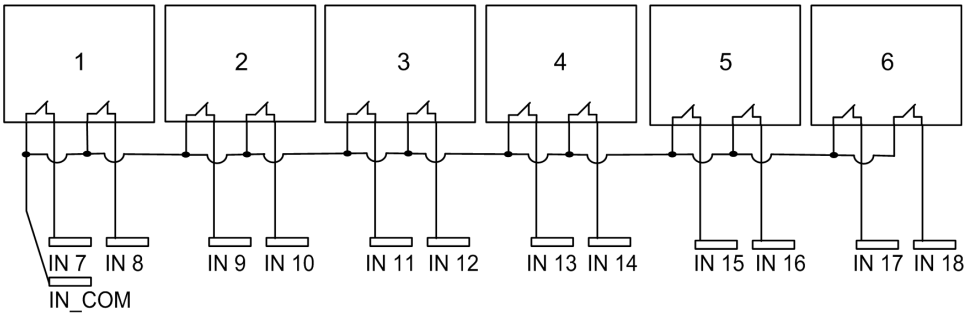
The cables should be cross-sectional conductor area = 0.75 mm^2 (AWG 18).

The cable lengths should not exceed 50 m (164 ft).

For more details, refer to Wiring Best Practices *(see page 101)*.

Wiring

Wiring diagram for the detected safeguarding devices:



1-6 Limit switches

For wiring examples, refer to the Safeguarding wiring examples *(see page 336)*.

Factory Setting

For details on factory setting (wiring and configuration), refer to factory setting description *(see page 104)*.

Special Functions

Description

The Wireless Remote Control System manages 6 specific relays:

Relay	Description
Horn	This relay is switched ON during the start procedure, and for a configurable duration. This relay is also switched ON, in START mode, as long as the ON/START/Horn is pressed.
Radio link	This relay is switched ON as long as a RADIO communication is achieved between the Base Station and its Remote Device.
Unpairing Relay	This relay is switched OFF when the Base Station is paired with a Remote Device. This relay is switched ON when the Base Station is not paired with a Remote Device. This relay is blinking, during the pairing selection, when the Base Station is selected but not confirmed by the Remote Device.
Start relay	This relay is switched ON as long as the 2 safety relays are ON. It occurs only in START mode and if all the safety conditions are fulfilled. It can indicate when the motions are enabled.
Impulse Start relay	This relay is switched ON for 1 second when the Wireless Remote Control System enters in Start mode. It occurs only in START mode and if all the safety conditions are fulfilled. It can indicate when the motions become enabled.
Maintenance relay	This relay is used by Data Storage functionality *(see page 309)*. As soon as a Settable data value exceeds its threshold value, the maintenance relay becomes permanently activated. The maintenance relay is deactivated only after a reset of the corresponding Settable data is performed through the eXLhoist Data Storage Recovery Software *(see page 313)*. The maintenance relay can be connected to a beacon on the machine or to a centralized maintenance HMI or monitoring. The maintenance relay can be connected to the generic input alarm of the Base Station in order to inform the operator through the Remote Device ZART•D••.

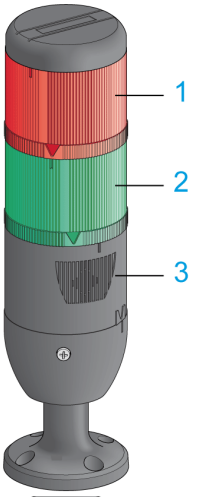
You can configure the specific relays with the eXLhoist Configuration Software.

For more details, refer to Relay Assignment *(see page 230)*.

Application Example

A “Radio link” indication shall inform operator about the system communication status according to EN 15011:2011 standard.

It is recommended to use a Schneider Electric beacon:



1 Light wired to the “Radio link” relay
2 Light wired to the “Start relay” relay
3 Buzzer wired to the “Horn” relay (an additional flash light can be wired to this relay)

The beacon operating is described in the START mode description *(see page 137)*.

General Wiring Rules

The cables should be cross-sectional conductor area = 1.3 mm^2 (AWG 16).

For more details, refer to Wiring Best Practices *(see page 101)*.

Factory Setting

For details on factory setting (wiring and configuration), refer to factory setting description *(see page 104)*.

Safety Relay

IN0 Feedback Loop Input

The IN0 input is dedicated to check the correct actuator functionality with the auxiliary contact state.

The E-STOP function can reach up to SIL 3 level only if all the relevant auxiliary contacts are connected between the IN0 input and the S2_S3 port terminal.

Q0A/Q0B Safety Relays

The safety relays are switched ON when ON/START/Horn button is activated and all the safety conditions are fulfilled.

General Wiring Rules

The input cables should be cross-sectional conductor area = 0.75 mm^2 (AWG 18).

The input cable lengths should not exceed 50 m (164 ft).

For more details, refer to Wiring Best Practices *(see page 101)*.

Wiring

For wiring examples, refer to the Architecture examples *(see page 328)*.

Safety Details

For more details about safety, refer to Safety chapter *(see page 63)*.

Section 4.4
Remote Device Installation

What Is in This Section?

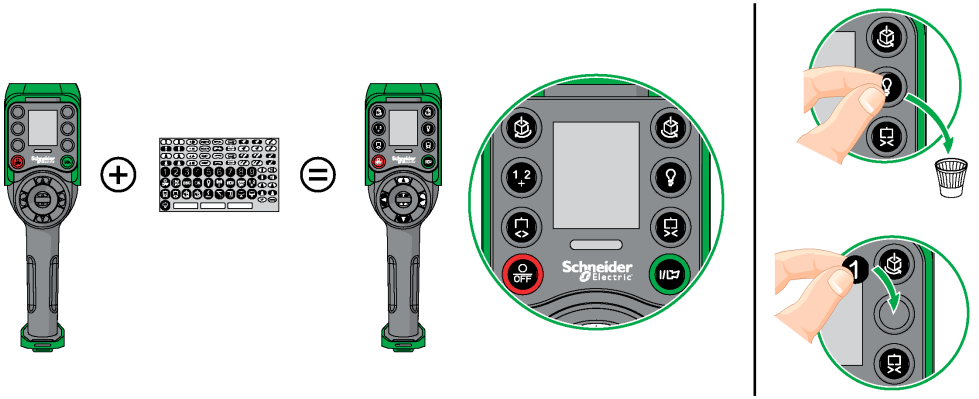
This section contains the following topics:

Customize The Remote Device

Overview

The Wireless Remote Control System is delivered with a factory configuration.

Use the label set to customize the remote buttons in accordance with the motion/auxiliary configuration.



For details on factory setting (wiring and configuration), refer to factory setting description *(see page 104)*.

You can also stick an empty label above the top side of the Remote Device, and write on it the label of the hoisting system driven by it.

First Commissioning

Overview

The following procedures describe the first commissioning of a Wireless Remote Control System from a pack (Base Station + Remote Device).

The installation must be in accordance with the factory setting *(see page 104)*.

For commissioning an MBC configuration, refer to How to modify an MBC configuration *(see page 165)*.

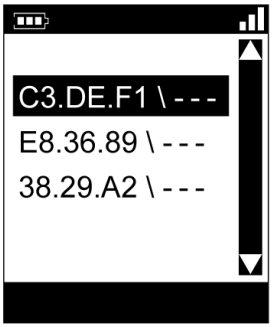
In other case, refer to eXLhoist Configuration Software *(see page 187)* and the Discovery procedure description *(see page 157)*.

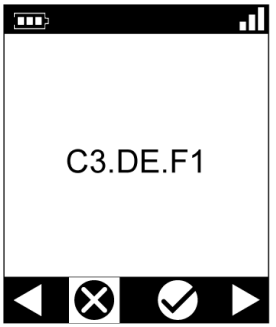
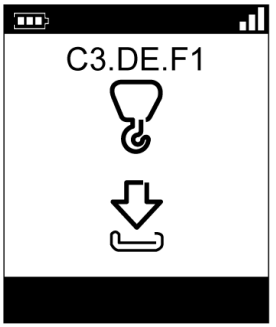
First Commissioning with 1 Base Station and the ZART8L

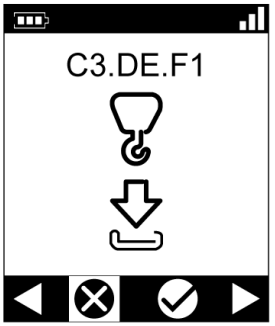
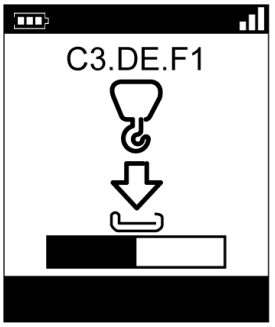
Step	Action
1	Charge the Remote Device for more than 4 hours. *(see page 167)*
2	Install the Base Station *(see page 92)*.
3	Power ON the Base Station. **NOTE:** Following steps of the procedure must end in 5 minutes maximum.
4	Place yourself to an appropriate distance from the Base Station (around 10 m (32.8 ft)).
5	Press only the ON/START/Horn button more than 1 s.
6	Wait for the E-STOP LED to be permanently ON. **Result:** The Wireless Remote Control System is in STOP mode *(see page 135)*.

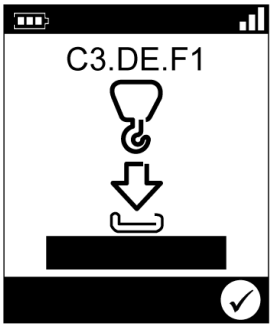
It is recommended to perform the verification test of the system *(see page 85)*.

First Commissioning with 1 Base Station and the ZART•D

Step	Action
1	Charge the Remote Device for more than 4 hours. *(see page 167)*
2	Install the Base Station *(see page 92)*. **NOTE:** Save the Base Station ID. It is required during the Remote Device pairing procedure.
3	Power ON the Base Station. **NOTE:** Following steps of the procedure must end in 5 minutes maximum.
4	Place yourself to an appropriate distance from the Base Station (around 10 m (32.8 ft)).
5	Press only the ON/START/Horn button more than 1 s. **Result:** The Remote Device displays the ID list of detected Base Station: 
6	Selects the ID of the new Base Station with buttons 5 and 6.

Step	Action
7	Press the button 7 (trigger) to validate. **Result:**  The STATUS LED and the COM LED of the selected Base Station are blinking synchronously. If configured, the Unpairing relay is blinking.
8	Select the validation icon (check symbol) with buttons 1 and 2.
9	Press the button 7 (trigger) to validate. **Result:** The Remote Device proposes to load the Configuration File from the Base Station to the Remote Device. 

Step	Action
10	Press the button 7 (trigger) to validate. **Result:** The Remote Device proposes to confirm the load of the Configuration File from the Base Station to the Remote Device. 
11	Select the validation icon (check symbol) with buttons 1 and 2.
12	Press the button 7 (trigger) to validate. **Result:** The Remote Device loads the Configuration File from the Base Station to the Remote Device. 

Step	Action
13	Wait for the end of the Configuration File load: **Result:**  The Remote Device automatically powers OFF.

It is recommended to perform the verification test of the system *(see page 85)*.

Chapter 5
Using The Wireless Remote Control System

What Is in This Chapter?

This chapter contains the following sections:

Section 5.1
Basic Uses

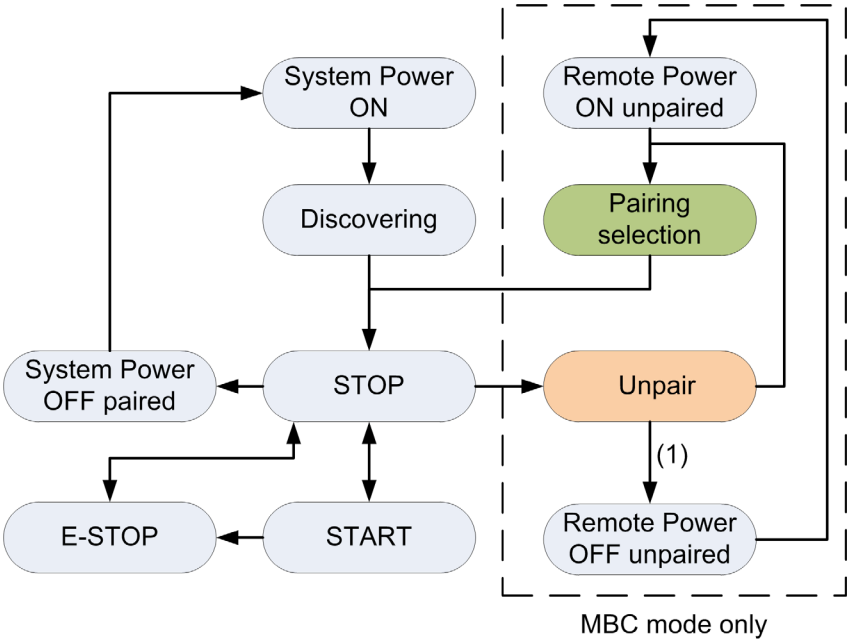
What Is in This Section?

This section contains the following topics:

Main Modes Diagram

Main Modes Diagram

The following diagram presents the main modes of the Wireless Remote Control System:



(1) Only for ZART8LM.

Power ON

Overview

The aim is to describe how to power ON the Wireless Remote Control System.

Triggering Procedure

Step	Action
1	Check that the Remote Device is powered OFF.
2	Power ON the Base Station.
3	Press only the ON/START/Horn button more than 1 s.

Result: The Remote Device is powered ON.

The discovery procedure is automatically launched. If the Wireless Remote Control System has been installed correctly, the Wireless Remote Control System goes automatically in STOP mode *(see page 135)*.

In other case, refer to the discovery description *(see page 157)*.

NOTE: If the button 7 (trigger) and the ON/START/Horn button are pressed simultaneously more or equal than 1 s, the Remote Device goes in diagnostic mode *(see page 174)*.

Release

The Remote Device is powered OFF:

- By the Power OFF procedure *(see page 140)*.
- Automatically when the Remote Device battery level is too low.
- Automatically after the Power-saving timeout. You can configure the Power-saving timeout in the eXLhoist Configuration Software. For more details, refer to Parameters *(see page 223)*.

E-STOP

Overview

The E-STOP function leads to go to the safe position of the Wireless Remote Control System when the operator presses the E-STOP red mushroom button.

In E-STOP mode, the motion/auxiliary relays and the safety relays are OFF.

NOTE: The E-STOP function of the Remote Device is available only when the E-STOP LED is ON.

Triggering Procedure

Step	Action
1	Press the E-STOP button.

Wireless Remote Control System in E-STOP Mode

Remote Device:

Reference	Description
ZART8L•	• The START LED is OFF. • The E-STOP LED is blinking.
ZART•D•	• The STOP mode symbol is displayed:  • The E-STOP symbol is permanently displayed:  • The E-STOP LED is blinking.

Base Station:

Element	Description
Relays	• The safety relays are switched OFF. • The motion/auxiliary relays are switched OFF. • The “Start relay” is switched OFF.
LEDs	• The **STATUS** LED is ON. • The **POWER** LED is ON. • The **COM** LED is blinking.

Release

Release procedure:

Step	Action
1	Verify that there is no more risk conditions.
2	Release the E-STOP button.
3	If an E-STOP RESET sequence is configured, type it with the motion buttons 1…6.
3	Press the button 7 (trigger).

Result: The Wireless Remote Control System is in STOP mode *(see page 135)*.

Specifics Information

You can configure the E-STOP RESET sequence in the eXLhoist Configuration Software.

For more details, refer to Parameters *(see page 223)*.

STOP

Overview

In STOP mode, the motion/auxiliary relays are disabled and the safety relays are OFF.

Triggering Procedure

The STOP mode is reached in the following cases:

- The OFF/STOP button is pressed (the Wireless Remote Control System was previously in START mode).
- No button pressed for more than the configured Standby timeout *(see page 224)*.
- Wireless connection lost (out of range for example).
- Discovery after a Power ON.

Triggering procedure when the Wireless Remote Control System is in START mode:

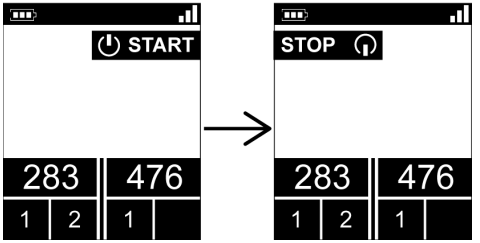
Step	Action
1	Check that the Wireless Remote Control System is in START mode.
2	Press the OFF/STOP button.

Wireless Remote Control System in STOP Mode

Remote Device:

Reference	Description
ZART8L•	• The START LED is: ❍ OFF if no START Access Sequence is configured ❍ Reverse flashing *(see page 182)* if a START Access Sequence is configured • The E-STOP LED is ON.
ZART•D•	• The STOP mode symbol is displayed:  • The E-STOP LED is ON.

ZART•D• display from START mode to STOP mode:



The Base Station executes the following steps:

1 The motion/auxiliary relays are switched OFF.
2 If configured, the UOC relays are switched OFF after a pre-configured time delay.
3 The safety relays are switched OFF.

Base Station:

Element	Description
Relays	• The safety relays are switched OFF. • The motion/auxiliary relays are switched OFF. • The “Radio link” relay is switched ON. • The “Start relay” is switched OFF.
LEDs	• The **STATUS** LED is ON. • The **POWER** LED is ON. • The **COM** LED is blinking.

Release

From this mode, you can:

- Charge the Remote Device battery *(see page 167)*.
- Power OFF the Remote Device *(see page 140)*.
- Go to START mode *(see page 137)*.

Specifics Information

You can configure the Standby timeout duration in the eXLhoist Configuration Software.

For more details, refer to Parameters *(see page 223)*.

START

Overview

The START mode is the only mode in which:

- You can command the motions *(see page 147)*.
- You can command the auxiliary function *(see page 149)*.
- You can command the horn *(see page 156)*.
- The safety relays are switched ON.

Triggering Procedure

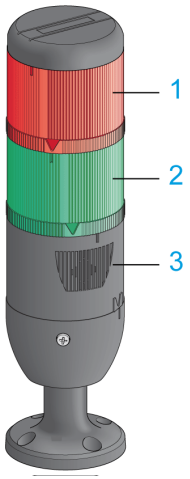
Required conditions: The Wireless Remote Control System must be in STOP mode.

Triggering procedure:

Step	Action
1	If a START Access Sequence is configured, type it with the motion buttons 1…6.
2	Press only the ON/START/Horn button more than 1 s.
3	Wait during the START warning time (ZART•D• vibrations, “Horn” relay is switched ON).

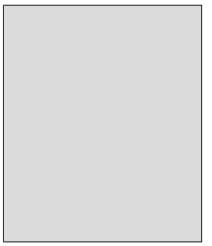
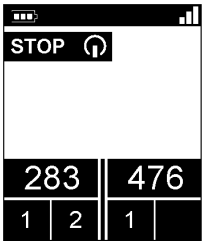
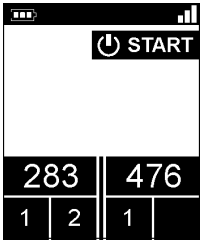
START Details

It is recommended to use a Schneider Electric beacon:



1 Light wired to the “Radio link” relay
2 Light wired to the “Start relay”
3 Buzzer wired to the “Horn” relay (an additional flash light can be wired to this relay)

Beacon description in the operating modes: (example with ZART•D•)

Step	Hoisting system signaling	ZART•D•
Before Power ON the Remote Device		
STOP mode The motions are not enabled yet.		
Between STOP mode and START mode: ● The ZART•D• vibrate facility is activated. ● The Horn sounds for the configured time. ● The motions are not enabled yet.		
START mode The motions are enabled. The Impulse start relay is on for 1 s.		

Wireless Remote Control System in START Mode

Remote Device:

Reference	Description
ZART8L•	• The START LED is ON. • The E-STOP LED is ON.
ZART•D•	• The START mode symbol is displayed: START • The E-STOP LED is ON.

Base Station:

Element	Description
Relays	• The safety relays are switched ON. • The motion/auxiliary relays are enabled. • The “Radio link” relay is switched ON. • The “Start relay” is switched ON. • The “Impulse start relay” is switched ON for 1 s.
LEDs	• The **STATUS** LED is ON. • The **POWER** LED is ON. • The **COM** LED is blinking.

Release

To leave the START mode:

- You can go to STOP mode *(see page 135)*.
- You can go to E-STOP mode *(see page 133)*.
- The Wireless Remote Control System goes automatically to STOP mode when no button is pressed for more than the configured Standby timeout *(see page 224)*.

Specifics Information

You can configure the START access, the Standby timeout, and the Horn duration in the eXLhoist Configuration Software.

For more details about the START access, the Standby timeout, refer to Parameters *(see page 223)*.

For more details about the Horn duration, refer to Relay Assignment *(see page 230)*.

Power OFF

Overview

This function switches OFF the Remote Device.

Triggering Procedure

Required conditions: The Wireless Remote Control System must be in STOP mode.

The "Power OFF function" is triggered in the following cases:

- The OFF/STOP button is pressed.
- No button pressed for more than the configured timeout: Standby timeout + Power Saving timeout.
- The Remote Device battery level is low.
- Fall of the Remote Device.

Triggering procedure when the Wireless Remote Control System is in STOP mode:

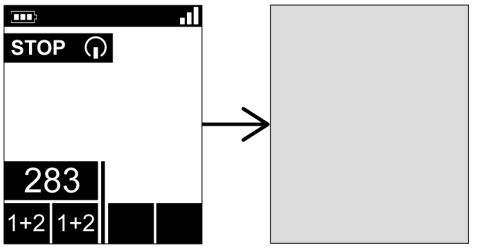
Step	Action
1	Check that the Wireless Remote Control System is in STOP mode
2	Press only the OFF/STOP button more than 2 s

Wireless Remote Control System in Power OFF Mode

Remote Device:

Reference	Description
ZART8L•	• All the LEDs are OFF.
ZART•D•	• The display is inactive. • The E-STOP LED is OFF.

ZART•D• display from STOP mode to Power OFF:



Base Station:

Element	Description
Relays	● The safety relays are switched OFF. ● The motion/auxiliary relays are switched OFF. ● The “Radio link” relay is switched OFF. ● The “Start relay” is switched OFF.
LEDs	● The **STATUS** LED is ON. ● The **POWER** LED is ON. ● The **COM** LED is OFF.

Release

From this mode, you can:

- Power ON the Remote Device *(see page 132)*.
- Charge the Remote Device battery *(see page 167)*.

Specifics Information

You can configure the Standby timeout and the Power Saving timeout in the eXLhoist Configuration Software.

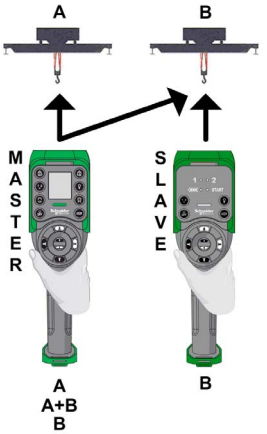
For more details, refer to Parameters *(see page 223)*.

Multi Base Control System Pairing

Overview

In Multi Base Control (MBC), two Single Systems work together. For example:

- System A: a Master Remote Device with its primary Base Station
- System B: another Remote Device (master or slave) with its primary Base Station.



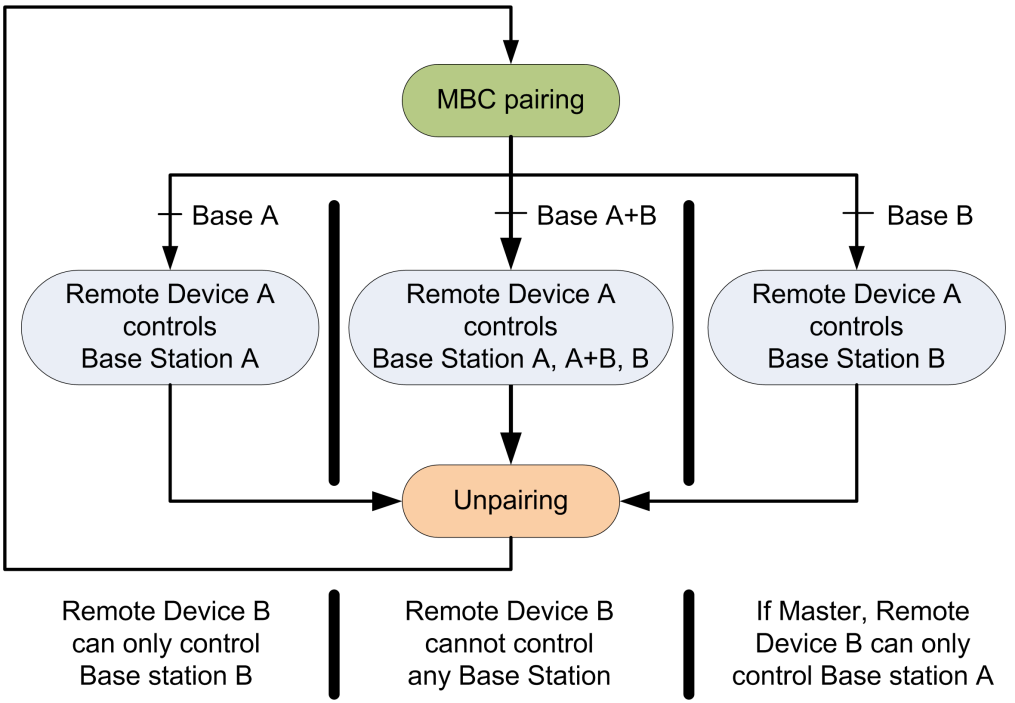
MBC Pairing Principle

A Base Station can only be paired and controlled by one Remote Device.

By default, or after a configuration modification, the Remote Device A is only paired with the Base Station A and the Remote Device B is paired with the Base Station B.

When a Remote Device is Powered OFF, the Base Station is still considered as “paired” and cannot be paired with another Remote Device until it gets “unpaired” following the unpairing procedure.

MBC pairing of a Master Remote Device A:



Pairing/Unpairing of the MBC Pairing

To allow the Remote Device A to control Base Station B or 2 Base Stations simultaneously, you must:

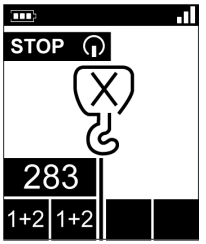
Step	Action
1	Unpair the Remote Device B (master or slave) with Base Station B.
2	Unpair the Master Remote Device A with Base Station A.
3	Pair the Master Remote Device A with desired Base Stations.

To return in the original configuration: Master Remote Device A controls Base Station A and Remote Device B (Master or slave) controls Base Station B, you must:

Step	Action
1	Unpair the Master Remote Device A with Base Station B.
2	Pair the Master Remote Device A with Base Station A.
3	Pair the Remote Device B (Master or slave) with Base Station B.

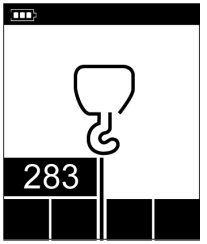
MBC Unpairing Procedure

To allow a Base Station get “unpaired” from a Remote Device, you must:

Step	Action
1	Go to diagnostic mode *(see page 174)*.
2	**ZART•DM result:** The unpairing screen displays the label of the paired Base Station:  The unpairing logo blinks. **NOTE:** If the Remote Device is paired with 2 Base Stations, the label of the 2 Base Stations are displayed. **ZART8LM result:** “1” and “2” LED are flashing.
3	Press button 7 (trigger) to confirm the unpairing request. **Result:** ● The ZART8LM Remote Device automatically powers OFF. ● The ZART•DM Remote Device goes to pairing screen *(see page 145)*.

MBC Pairing Procedure

To allow a Base Station get “paired” to a Remote Device you must:

Step	Action
1	Power ON the unpaired Remote Device. **ZART8LM result:** The ZART8LM automatically pairs with its primary Base Station and goes to STOP mode. **ZART•DM result:** The ZART•DM Remote Device goes to pairing screen: 
2	For Master Remote Device, press the Base selector button to select the label of the Base Station to pair (the primary, the secondary, or both Base Stations). **NOTE:** Only pairable Base Stations are displayed.
3	Press button 7 (trigger) to confirm the pairing request. **Result:** The Remote Device pairs with the selected Base Stations and goes to STOP mode.

Section 5.2
Functionalities

What Is in This Section?

This section contains the following topics:

Standard Motion

Overview

In START mode, the motion buttons activate the associated motion relays that command the hoisting system movements.

Triggering Procedure

Required conditions: The Wireless Remote Control System must be in START mode *(see page 137)*.

Triggering procedure:

Step	Action
1	Check that the Wireless Remote Control System is in START mode.
2	Press a motion button 1, 1H, 2, 2H, 3, 3H, 4, 4H, 5, 5+7, 6, 6+7 *(see page 30)*.

Result: The associated relays are switched ON as long as the motion button is pressed.

The Remote Device has no specific result.

Release

Release procedure:

Step	Action
1	Release the motion button.

Result: The associated relays are switched OFF.

Restrictions for Motion/Auxiliary Use

Type	Description
Number of simultaneous motions	Only up to 6 motion/auxiliary relays can be activated at the same time (excluding the UOC relays). If more than 6 motion/auxiliary relays are requested (excluding the UOC relays), then the last motion relay request is not taken into account.
Interlocking	If 2 buttons dedicated to the same motion axis are pressed in opposite sense (interlocking), then the motion is stopped in these both directions.

Specifics Information

In the eXLhoist Configuration Software, you can configure:

- Motion/auxiliary buttons associated to relays *(see page 230)*.
- Motion/auxiliary buttons interlocking *(see page 225)*.

Auxiliary Function

Overview

In START mode, the auxiliary buttons activate the associated relays to command auxiliary action (for example to command open and close grab).

Triggering Procedure

Required conditions: The Wireless Remote Control System must be in START mode *(see page 137)*.

Triggering procedure:

Step	Action
1	Check that the Wireless Remote Control System is in START mode.
2	Press an auxiliary button (10, 10+7, 11, 11+7, 12, 12+7, 13, 13+7, 14, 14+7, 15, 15+7) *(see page 30)*.

Result: The associated relays are switched ON as long as the auxiliary button is pressed.

The Remote Device has no specific result.

Release

Release procedure:

Step	Action
1	Release the auxiliary button.

Result: The associated relays are switched OFF.

Specifics Information

In the eXLhoist Configuration Software, you can configure:

- Motion/auxiliary buttons associated to relays *(see page 230)*.
- Motion/auxiliary buttons interlocking *(see page 225)*.

Multi Base Control Base Selector

Description

Multi Base Control (MBC) = one Remote Device commands one or two Base Stations. For more details, refer to MBC Mode *(see page 21)* and to MBC Pairing *(see page 142)*.

Once the Master Remote Device is paired with 2 Base Stations, the MBC Base selector button allows to switch between the primary, the secondary, and both Base Stations.

The MBC Base selector button is only available with the ZART•DM Remote Device configured as Master.

Triggering Procedure

Required conditions: The Wireless Remote Control System must be in STOP mode *(see page 135)* or in START mode *(see page 137)*.

Triggering procedure:

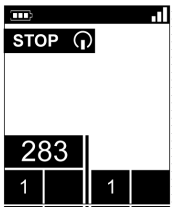
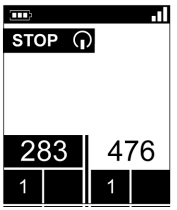
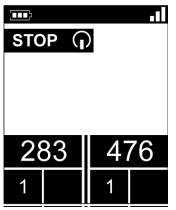
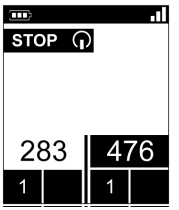
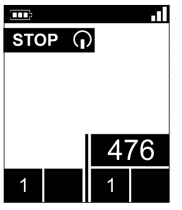
Step	Action
1	Check that the Wireless Remote Control System is in STOP mode or in START mode.
2	Press the MBC Base Selector button to loop between the several positions.

Wireless Remote Control System Result

Remote Device:

For the ZART8L•: not supported.

For the ZART•DM display: the Base Station label indicates which bridge(s) is(are) paired / selected:

<table>
<tr><th colspan="5">ZART•DM display</th></tr>
<tr>
<td> 
</td>
<td> 
</td>
<td> 
</td>
<td> 
</td>
<td> 
</td>
</tr>
<tr>
<td rowspan="2">Primary Base Station (283) paired</td>
<td colspan="3">The 2 Base Stations (283 and 476) are paired.
Press the MBC Base selector button to select the Base Station to control.</td>
<td rowspan="2">Secondary Base Station (476) paired.</td>
</tr>
<tr>
<td>Primary Base Station (283) selected.</td>
<td>The 2 Base Stations (283 and 476) are selected.</td>
<td>Secondary Base Station (476) selected.</td>
</tr>
</table>

For more details, refer to ZART•D• Display Parts Identification *(see page 33)*.

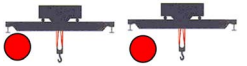
Base Station result:

The associated relays are switched ON.

For more details, refer to relay assignment *(see page 233)*.

In MBC configuration, when both Base Stations are selected, the motions asked with the Remote Device are realized simultaneously by the 2 Base Stations.

In MBC configuration, the “Radio link” relay of the connected Base Station switches ON:

Relay	Selector position A		Selector position A+B		Selector position B	
RADIO link	Base A	Base B	Base A	Base B	Base A	Base B
						

Specifics Information

At the first Power ON or after a new configuration, the MBC Base Selector position is 1. For further Power ON, the Selector position is the last known Selector position.

You can configure the Selector in the eXLhoist Configuration Software.

For more details, refer to Relay Assignment *(see page 230)*.

Auxiliary Selectors

Description

There are 2 different configurations to use the auxiliary selector button:

- Trolley selector (2 or 3 positions): to manage 2 trolleys with one Base Station.
- Hook selector (2 positions): to manage 2 hooks with one Base Station.

Triggering Procedure

Required conditions: The Wireless Remote Control System must be in STOP mode *(see page 135)* or in START mode *(see page 137)* depending on the Auxiliary selector configuration *(see page 223)*.

Triggering procedure:

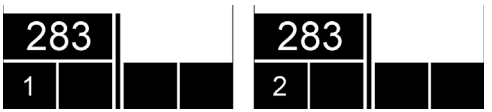
Step	Action
1	Check that the Wireless Remote Control System is in STOP mode or in START mode depending on the Auxiliary selector configuration.
2	Press the Auxiliary Selector button more than 1 s to loop between the several positions.

Wireless Remote Control System Result

Remote Device result:

For the ZART8L•: the Selector LEDs are activated depending on the selection done.

For the ZART•D• display: the Auxiliary Selector symbol indicates which trolley(s)/hook(s) is(are) selected:

Nb of position	Description
2	
3	

For more details, refer to ZART•D• Display Parts Identification *(see page 33)*.

Base Station result:

The associated relays are switched ON.

For more details, refer to relay assignment *(see page 233)*.

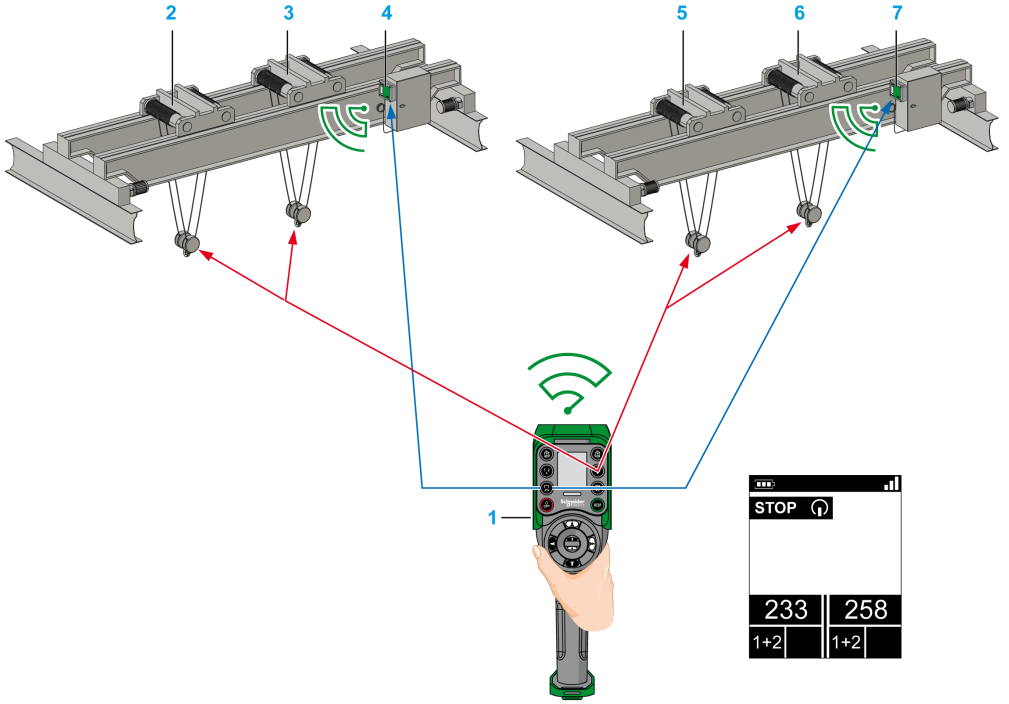
MBC Specifications

You can configure up to 2 Auxiliary selector buttons to the ZART•DM Remote Device when it is configured as a Master.

Auxiliary selector button of the Remote Device can be assigned to:

- 1 Base Station,
  or
- 2 Base Stations (same action to the 2 Base Stations in the same time).

Example with one Auxiliary selector button assigned to two Base Stations:

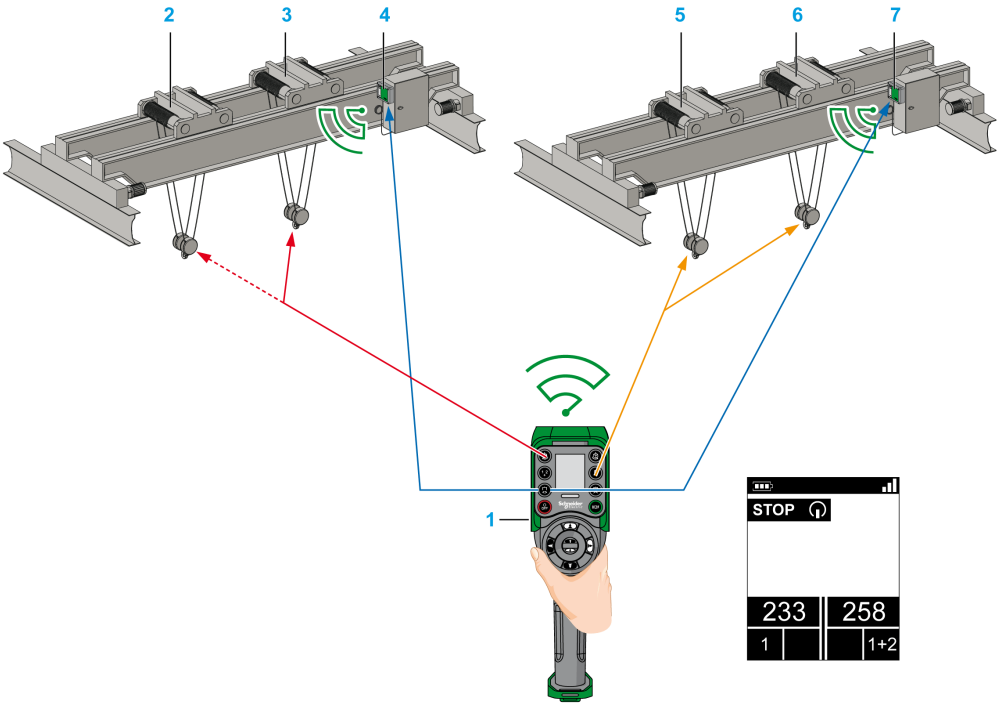


Auxiliary selector: Trolleys 1+2 operative on bridge A

MBC Base selector: Primary and secondary Base Stations selected

1 Remote Device
2 Bridge A: Trolley 1
3 Bridge A: Trolley 2
4 Bridge A: Primary Base Station
5 Bridge B: Trolley 1
6 Bridge B: Trolley 2
7 Bridge B: Secondary Base Station

Example with two Auxiliary selector buttons respectively assigned to one Base Station:



Auxiliary selector: Trolley 1 operative on bridge A

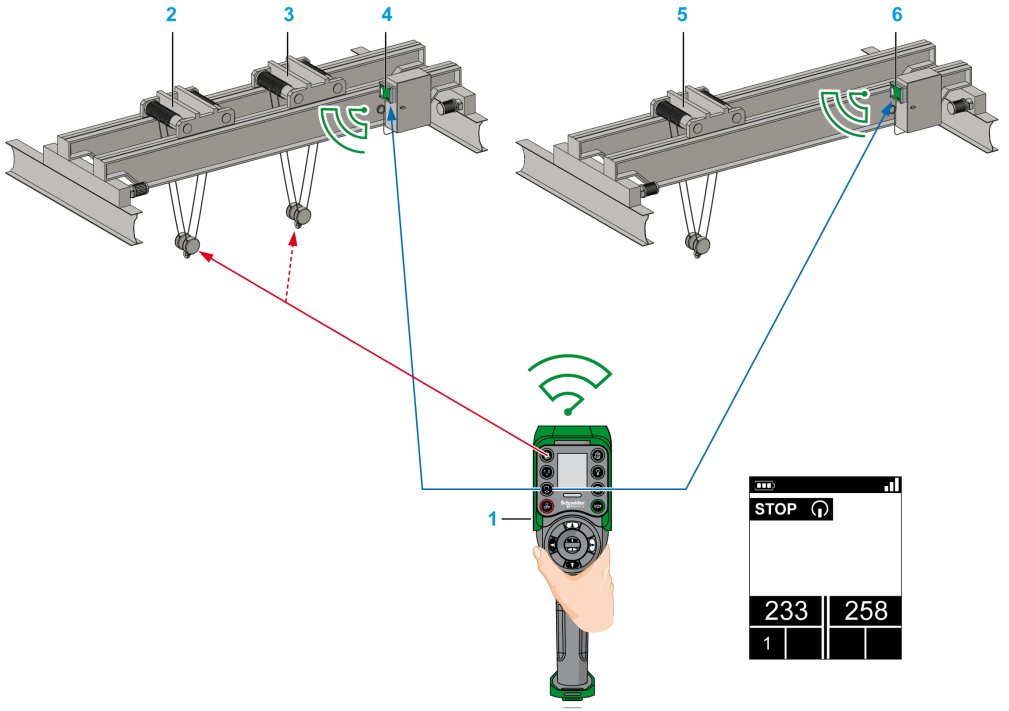
Auxiliary selector: Trolley 2 non-operative on bridge A

Auxiliary selector: Trolleys 1+2 operative on bridge B

MBC Base selector: Primary and secondary Base Stations selected

1 Remote Device
2 Bridge A: Trolley 1
3 Bridge A: Trolley 2
4 Bridge A: Primary Base Station
5 Bridge B: Trolley 1
6 Bridge B: Trolley 2
7 Bridge B: Secondary Base Station

Example with one Auxiliary selector button assigned to only one Base Station:



Auxiliary selector: Trolley 1 operative on bridge A

Auxiliary selector: Trolley 2 non-operative on bridge A

MBC Base selector: Primary and secondary Base Stations selected

1 Remote Device
2 Bridge A: Trolley 1
3 Bridge A: Trolley 2
4 Bridge A: Primary Base Station
5 Bridge B: Trolley
6 Bridge B: Secondary Base Station

Specifics Information

At the first Power ON or after a new configuration, the Selector position is 1. For further Power ON, the Selector position is the last known Selector position.

You can configure the auxiliary Selectors in the eXLhoist Configuration Software.

For more details, refer to Relay Assignment *(see page 230)*.

Horn

Overview

From STOP mode to START mode, the “Horn” relay is switched ON for a predefined duration time.

In START mode, as long as you press the ON/START/Horn button, the “Horn” relay is switched ON.

Triggering Procedure

Triggering procedure:

Step	Action
1	Check that the Wireless Remote Control System is in START mode.
2	Press the ON/START/Horn button.

Result: The “Horn” relay is switched ON as long as the ON/START/Horn button is pressed.

The Remote Device has no specific result.

Release

Release procedure:

Step	Action
1	Release the ON/START/Horn button.

Result: The “Horn” relay is switched OFF.

Specifics Information

The Horn duration during start can be configured in the eXLhoist Configuration Software.

For more details, refer to Relay Assignment *(see page 230)*.

Section 5.3
Discovering

Discovering

Overview

The discovering function is developed to be as automatic as possible.

This function manages 2 different tasks:

- The pairing of the system: association between a Remote Device and a Base Station
- The Configuration File Upload/Download: this file contains the Wireless Remote Control System configuration information.

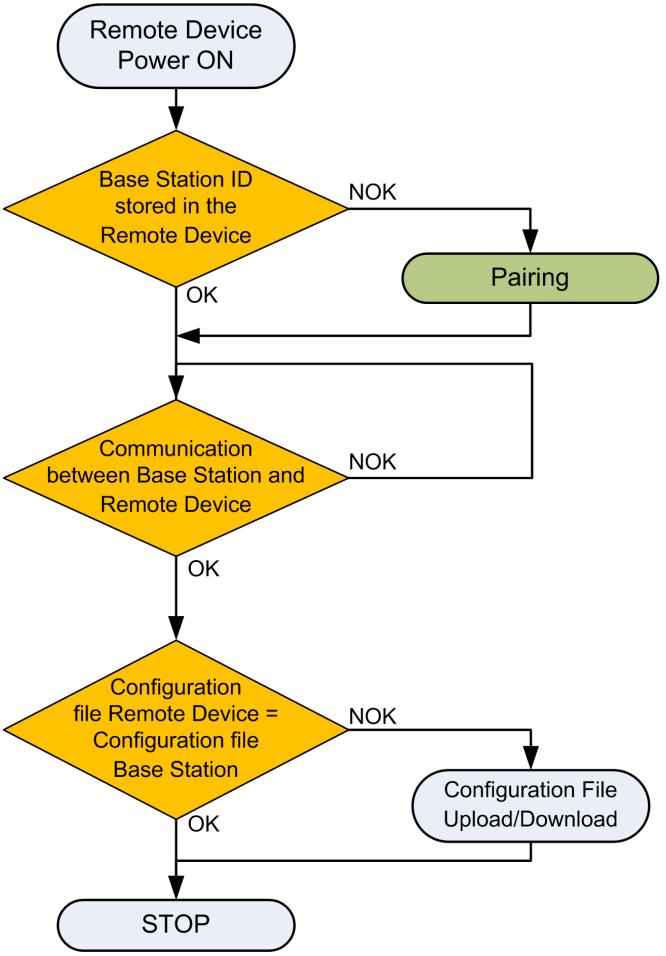
This function is launched at each Remote Device Power ON. In normal use, this function is automatic. You have to realize intermediate operations during:

- A device replacement *(see page 247)*
- The first commissioning *(see page 124)*
- A configuration modification *(see page 160)*.

NOTE: This function is only applicable to ZART•D Remote Device.

Discovering Diagram

The following diagram presents the detailed Discovering function:



Pairing

The pairing is the action to associate a Base Station with a Remote Device.

Each Base Station have a unique ID.

The pairing test is launched at each Remote Device power ON.

As long as the pairing test is OK, the validation procedure is not requested to the operator.

Configuration File

The Configuration File is stored in the Remote Device and in the Base Station.

The Configuration File can be created or modified in the eXLhoist Configuration Software *(see page 187)*.

Section 5.4
How to Modify the Configuration

What Is in This Section?

This section contains the following topics:

How to Modify a Single Configuration

Configuration Modification

The following procedure describes how to modify the system configuration:

Step	Action
1	Connect the Remote Device to a PC *(see page 192)*.
2	Start the eXLhoist Configuration Software *(see page 204)*.
3	Create or open a project *(see page 205)*.
4	Modify the configuration of the project *(see page 215)*.
5	Save the project *(see page 213)*.
6	Select **Communication → Store to Device**.
7	If enabled, enter the transfer password of the Configuration File already stored in the Remote Device.
8	Wait for the end of the Configuration File load in the Remote Device.
9	Disconnect the Remote Device to the PC.
10	Power ON the Base Station. **NOTE:** Following steps of the procedure must end in 5 minutes maximum.
11	The Configuration File must be loaded from the Remote Device to the Base Station. Refer to: ● Configuration File load With a ZART8L• *(see page 162)*. ● Configuration File load With a ZART•D• *(see page 163)*.

It is recommended to perform the verification test of the system *(see page 85)*.

Configuration File Load with a ZART8L•

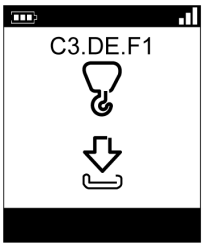
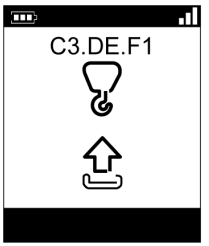
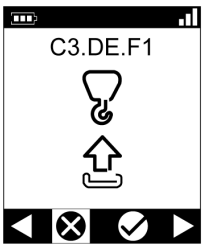
After the modification of the configuration with the eXLhoist Configuration Software:

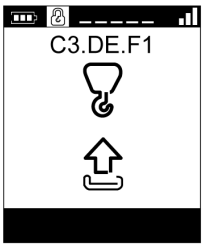
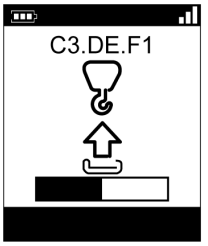
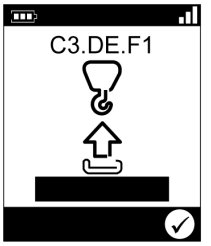
Step	Action
1	Power ON the Remote Device. **Result:** The **STATUS** LED and the **COM** LED of the selected Base Station are blinking synchronously. If configured, the Unpairing relay is ON. The START, “1”, and “2” LED of the Remote Device are flashing.
2	Press the button 7 (trigger) to validate.
3	If the Configuration File in the Base Station is protected by a Configuration File transfer password, enter it.
4	Wait for the end of the Configuration File load (around 20 seconds). The Configuration File is automatically loaded from the Remote Device to the Base Station. During the load, the START LED and “2” LED are flashing *(see page 182)*.
5	The Remote Device automatically powers OFF.

It is recommended to perform the verification test of the system *(see page 85)*.

Configuration File Load with a ZART•D•

After the modification of the configuration with the eXLhoist Configuration Software:

Step	Action	Result
1	Power ON the Remote Device.	The **STATUS** LED and the **COM** LED of the selected Base Station are blinking synchronously. If configured, the Unpairing relay is ON.
2	Press the button 7 (trigger) to validate.	The Remote Device proposes to load the Configuration File from the Base Station to the Remote Device. 
3	Change the direction of the Configuration File load with buttons 5 and 6.	
4	Press the button 7 (trigger) to validate.	The Remote Device proposes to confirm the load of the Configuration File from the Remote Device to the Base Station. 

Step	Action	Result
5	Select the validation icon (check symbol) with buttons 1 and 2.	-
6	Press the button 7 (trigger) to validate.	-
7	If the Configuration File (stored in the Base Station) has a transfer password, a padlock is displayed:  Enter this Configuration File transfer password with the buttons 1 to 6.	-
8	The Remote Device loads the Configuration File from the Remote Device to the Base Station.  Wait for the end of the Configuration File load.	 The Remote Device automatically powers OFF.

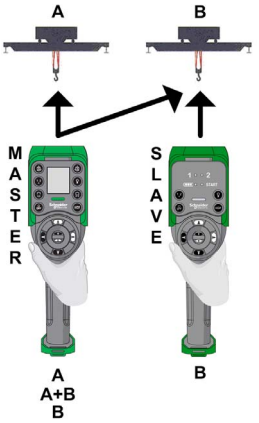
It is recommended to perform the verification test of the system *(see page 85)*.

How to Modify a MBC Configuration

Overview

In MBC, two Single Systems work together. For example:

- System A: a Master Remote Device with its primary Base Station
- System B: another Remote Device (master or slave) with its primary Base Station.



NOTE: Each system have a unique Configuration File. To configure an MBC System, you have to manage 2 Configuration Files (one per Base Station).

MBC Configuration Modification

The following procedure describes how to modify the MBC system configuration:

Step	Action
1	Connect the Remote Device A to a PC *(see page 192)*.
2	Start the eXLhoist Configuration Software *(see page 204)*.
3	Click **Connect** button to Create a project for the system A (with the Configuration File of the connected Remote Device.
4	Modify the configuration of the project *(see page 215)*. Main parameters: ● Remote Device as a Master ● Enter Base Station A ID as the Primary Base Station ID ● Enter Base Station B ID as the Secondary Base Station ID
5	Save the project *(see page 213)* of the System A.
1 In Tandem, use the same Remote Device with two Master configurations. **2** In Tandem, it is recommended to save as the configuration A into configuration B and exchange the Base Stations IDs.	

Step	Action
6	Select **Communication → Store to Device**.
7	Wait for the end of the Configuration File load in the Remote Device A.
8	Disconnect the Remote Device A to the PC.
9	Power ON the Base Station A. **NOTE:** Following steps of the procedure must end in 5 minutes maximum.
10	The Configuration File must be loaded from the Remote Device A to the Base Station A. Refer to Configuration File load with a ZART•D• *(see page 163)*.
11	Connect the Remote Device B to the PC *(see page 192)*(1).
12	Click **Connect** button to Create a project for the system B(2) (with the Configuration File of the connected Remote Device.
13	Modify the configuration of the project *(see page 215)*. Main parameters: ● Remote Device as a Master or a slave ● Enter Base Station B ID as the Primary Base Station ID ● Enter Base Station A ID as the Secondary Base Station ID
14	Save the project *(see page 213)* of the System B.
15	Select **Communication → Store to Device**.
16	Wait for the end of the Configuration File load in the Remote Device B.
17	Disconnect the Remote Device B to the PC.
18	Power ON the Base Station B. **NOTE:** Following steps of the procedure must end in 5 minutes maximum.
19	The Configuration File must be loaded from the Remote Device B to the Base Station B. If Slave, refer to Configuration File load with a ZART8L• *(see page 162)*. If Slave or Master, refer to Configuration File load with a ZART•D• *(see page 163)*.
1 In Tandem, use the same Remote Device with two Master configurations. **2** In Tandem, it is recommended to save as the configuration A into configuration B and exchange the Base Stations IDs.	

It is recommended to perform the verification test of the system *(see page 85)*.

Section 5.5
Remote Device Charge

Remote Device Charge

Required Conditions

- The Remote Device must only be charged indoor with the ZARC01 charger.
- The Remote Device temperature range must be 10…60 °C (50…140 °F).

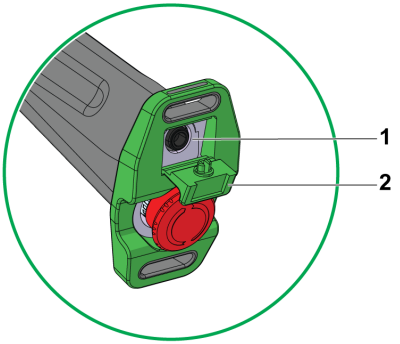
NOTE: At the first commissioning, you must charge the Remote Device for 4 hours.

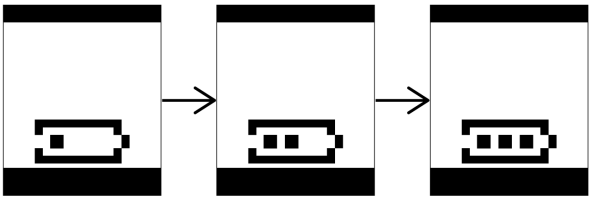
NOTE: The Remote Device charge time is around 15 minutes long at the maximum if the temperature range is 10…35 °C (50…95 °F), and is longer if the temperature is higher than 35 °C (95 °F).

NOTICE
UNOPERATIVE REMOTE DEVICE Do not charge the Remote Device at a temperature under 10 °C (50 °F). **Failure to follow these instructions can result in equipment damage.**

⚠ WARNING
BATTERY LIFESPAN, RISK OF EXPLOSION AND FIRE Do not dispose of electric tools together with household waste material. In observance of european directive 2002/96/EC on wasted electrical and electronic equipment and its implementation in accordance with national law, electric tools that have reached the end of their life must be collected separately and returned to an environmentally compatible recycling facility. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Procedure

Step	Action
1	Power OFF the Remote Device.
2	On the bottom of the Remote Device, remove the protective cap.  **1** Remote Device battery charge connector **2** Protective cap
3	Connect the charger ZARC01 to the Remote Device battery charge connector.
4	Plug the charger ZARC01 to the dedicated power source.

Step	Action
5	Wait for around 15 minutes at 25 °C (77 °F). During the charge: ● ZART8L•: the battery LED is flashing. ● ZART•D•: the blinking battery symbol indicates the battery level:  The battery is fully charged when: ● ZART8L•: the battery LED is permanently ON. ● ZART•D•: the battery symbol is permanently displayed. For more details, refer to Diagnostic *(see page 177)*. **NOTE:** The time duration for charge of the Remote Device depends on the ambient temperature.
6	Unplug the charger to the dedicated power source.
7	Unconnect the charger to the Remote Device battery charge connector.
8	On the bottom of the Remote Device, place back the protective cap.

NOTE: As soon as the Remote Device Charge starts, the communications between the Remote Device and the Base Station are stopped.

Chapter 6
Diagnostic

What Is in This Chapter?

This chapter contains the following sections:

Section 6.1
Base Station Diagnostic

Diagnostic

Description

The Base Station have 3 LED indicators:

LED	Color	State	Description
STATUS	Green	ON	The Wireless Remote Control System is working properly.
		Blinking	Refer to the chapter Troubleshooting *(see page 319)*.
		OFF	Base Station Power OFF or internal fault detected.
COM	Yellow	ON	Call Schneider Electric support.
		Blinking	The communication is established between the Base Station and the Remote Device.
		OFF	No communication between the Base Station and the Remote Device.
POWER	White	OFF	Base Station powered OFF.
		ON	Base Station powered ON.

Special case:

STATUS and COM LEDs are synchronized reverse flashing: pairing confirmation request.

Section 6.2
ZART•D Diagnostic

What Is in This Section?

This section contains the following topics:

Diagnostic Mode

Overview

The ZART•D• has a specific diagnostic mode display:

- To test the Wireless Remote Control System configuration.
- To pair/unpair Remote Device.

Procedures to Activate the Diagnostic Mode

The diagnostic mode on the ZART•D• indicates the inputs and relays states of the Base Station.

From STOP mode:

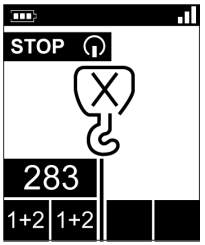
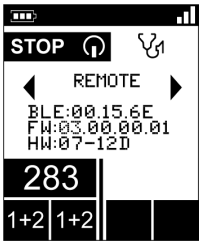
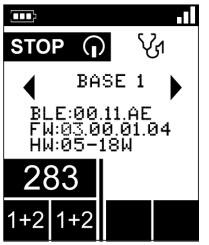
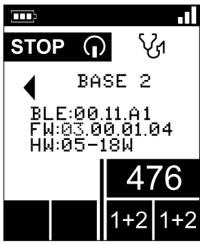
Step	Action
1	Go to STOP mode *(see page 135)*.
2	Simultaneously press the buttons 1H and 2H, and release immediately.
3	Less than 5 seconds later, simultaneously press the buttons 3H and 4H.
4	Release the buttons 3H and 4H. Result: The Remote Device displays the Diagnostic mode in STOP mode.

From Power OFF mode:

Step	Action
1	Simultaneously press the button 7 (trigger) and the ON/START/Horn button more or equal than 1 second. **NOTE:** Only the Remote Device information are accessible.

Diagnostic Mode in STOP Mode

In STOP mode, use the buttons 1 and 2 to alternate between the screens:

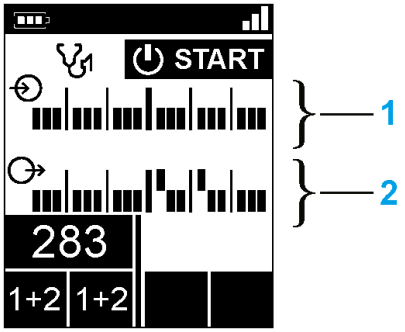
Unpairing	Remote Device information	Primary Base Station information	Secondary Base Station information
			
Only in MBC mode	Single and MBC modes	Single and MBC modes	Only in MBC mode for Master Remote Device

The Unpairing screen allows Unpairing the Remote Device with its paired Base Station. For more information, refer to MBC pairing description *(see page 142)*.

Press ON/START/Horn button more or equal than 1 second to display the Diagnostic mode in START mode.

Diagnostic Mode in START Mode

If the Remote Device is paired with one Base Station, the Remote Device displays dynamically the I/O status of the Base Station:



1 IN1...IN18 states: up for input = 1, down for input = 0
2 Relays 1...18 states: up for output = 1, down for output = 0

If the Remote Device is paired with 2 Base Stations, the Remote Device leaves the diagnostic mode and goes in START mode.

Procedure to Leave the Diagnostic Mode

From START mode:

Step	Action
1	Press STOP button to go to STOP mode

From STOP mode:

Step	Action
1	Press STOP button to leave the Diagnostic mode.

From any diagnostic screen:

Step	Action
1	Press only the OFF/STOP button more than 2 seconds to Power OFF the Remote Device.

Battery Level of the Remote Device

ZART•D

Display	Description
	Battery charge level is high
	Battery charge level is medium
	Battery charge level is low
	This display occurs at least 10 minutes before the Remote Device powers OFF. In addition, the Remote Device vibrator function is activated for 1 second.

Radio Communication Indicator

ZART•D•

Display	ZART•D• radio communication level with the Base Station
	High
	Medium
	Low
	Very low
	No radio communication

NOTE: In MBC mode, when the 2 Bases Stations are paired, the Remote Device displays the primary Radio Communication level.

E-STOP LED

Description

E-STOP LED	Description
Permanently ON	E-STOP is operational and not triggered.
Blinking	E-STOP is operational and triggered.
Permanently OFF	E-STOP is not operational.

For more details, refer to E-STOP LED description *(see page 133)*.

Applicative Alarms Signals

Overview

Some devices can be connected to the ZARB18• Base Station to provide detected applicative alarms signals that can be displayed on the ZART•D.

ZART•D

When applicative alarms signals come from ZARB18• Base Station, the ZART•D Remote Device involves a symbol display and 3 seconds of vibration every 10 minutes as long as the alarm signal is active.

The Remote Device displays the following symbols:

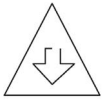
Display	Status	Description
	Permanently ON	Overload pre-alarm
	Blinking	Overload alarm
	Permanently ON	Over wind pre-alarm
	Blinking	Over wind alarm
	Blinking	Over speed alarm
	Blinking	Generic alarm

NOTE: The applicative alarms are only information, the Wireless Remote Control System does not change its functional mode.

Detected Failure Displays

ZART•D

The ZART•D Remote Device can display the following symbols:

Display	Status	Description
	Blinking	Configuration File download failure detected
	Blinking	Configuration File upload failure detected
	Blinking	Remote Device battery charge failure detected
	Blinking	Main contactor feedback loop IN0 / S2_S3 failure detected or motion contactor failure detected when the motion feedback function is used.
	Blinking	The "Restricting pairing" happens 5 minutes after the power ON and forbid the pairing with a new Base Station. For more details, refer to troubleshooting *(see page 319)*.

Section 6.3
ZART8L Diagnostic

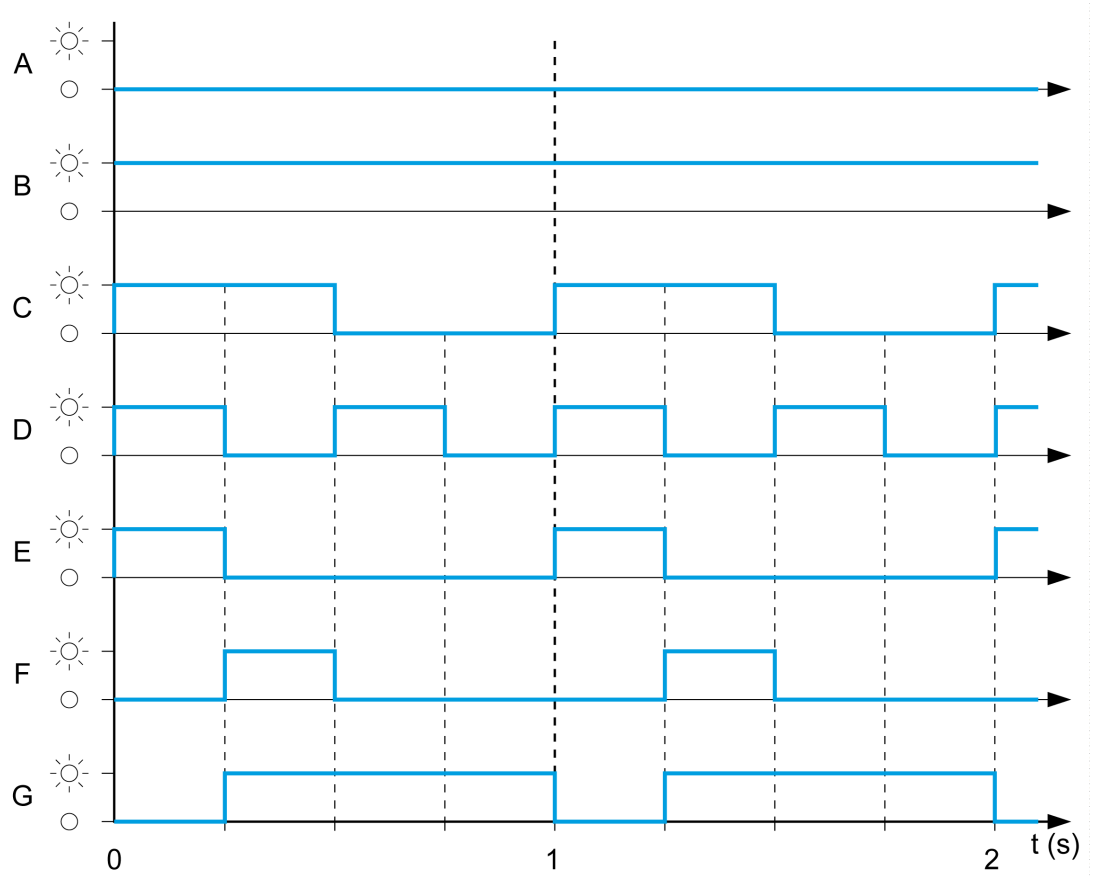
ZART8L• LED Diagnostic

Overview

This section describes the ZART8L• Display LEDs *(see page 35)*.

LED Status Chronogram

The following diagram presents the different status of the ZART8L• LEDs:



Label	Status
A	OFF
B	ON
C	Normal blink
D	Fast blink
E	Flash step 1
F	Flash step 2
G	Reverse flash step 1

Start LED

Label	Status	Description
B	ON	The system is in START mode with radio operational
C	Normal blink	Radio not established or START mode not yet confirmed
F	Reverse flash step 1	A password has not yet been provided & validated (either for before START sequence, or after unlocking the E-STOP before START)
D	Fast blink	Wrong Configuration File
E	Flash step 1	The Remote Device is connected to a PC.
A	OFF	To represent other states than the previous ones

Battery LED

Charger ZARC01 not connected:

Label	Status	Description
B	ON	Battery charge level is high Battery charge level is medium
C	Normal blink	Battery charge level is low
D	Fast blink	Battery charge level is very low The battery capacity just allows 10 minutes of normal operation.
A	OFF	The battery is fully discharged or the Remote Device is Power OFF.

Charger ZARC01 connected:

Once the Remote Device is connected to the battery charger, the battery LED flashes 3 times (status E = Flash step 1). After the 3 flashes, the battery LED status changes to the following ones:

Label	Status	Description
B	ON	Battery charge level is full (No need to charge or end of charge)
E	Flash step 1	Battery charge in progress
C	Normal blink	Impossible to charge (charger failure detected) or temperature out of the allowed boundaries
A	OFF	Impossible to charge (battery too low to be charged)

Auxiliary Selector LEDs

The “1” LED:

Label	Status	Description
B	ON	The “1” or the “1+2” auxiliary selector position is selected and confirmed
C	Normal blink	The “1” or the “1+2” auxiliary selector position is required but not yet confirmed
A	OFF	The auxiliary selector position “1” is NOT selected

The “2” LED:

Label	Status	Description
B	ON	The “1+2” or the “2” auxiliary selector position is selected and confirmed
C	Normal blink	The “1+2” or the “2” auxiliary selector position is required but not yet confirmed
A	OFF	The auxiliary selector position “2” is NOT selected

Set of LEDs

Power ON - Check LEDs:

At Remote Device Power ON, the 4 LEDs (START, Battery, 1, and 2) flash one time (status E = Flash step 1).

Remote Device failure detected:

If a Remote Device internal failure is detected, the 4 LEDs go in the following status:

- The START LED is in status E = Flash step 1
- The BATTERY LED is in status E = Flash step 1
- The “1” LED is in status E = Flash step 1
- The “2” LED is in status E = Flash step 1

Configuration file download:

During the transfer of a Configuration File (from the Remote Device to the Base Station):

- The START LED is in status E = Flash step 1
- The “2” LED is in status F = Flash step 2

Remote Device reset:

When you press the reset button: until the “1” and “2” LED come in the following status:

- The “1” LED is in status E = Flash step 1
- The “2” LED is in status A = OFF

E-STOP LED

Label	Status	Description
B	ON	E-STOP is operational and not triggered.
C	Normal blink	E-STOP is operational and triggered.
A	OFF	E-STOP is not operational.

Chapter 7
eXLhoist Configuration Software

What Is in This Chapter?

This chapter contains the following sections:

Section 7.1
Introduction to eXLhoist Configuration Software

What Is in This Section?

This section contains the following topics:

What is eXLhoist Configuration Software?

Introduction

eXLhoist Configuration Software is a graphic user interface allowing you to manage the configuration of the Wireless Remote Control System.

Software Features

Main software features of eXLhoist Configuration Software:

- Standard Windows® interface
- Application browser and multiple window views
- Programming and configuration support
- Communication with controller

Standard Windows® Interface

Key standard Windows® features:

- Easy use of keyboard or mouse
- Dockable windows
- Standard menu organization
- Tooltips, status bar, and shortcut menus
- Online help including context-sensitive help

Controller Communication and Control

Main eXLhoist Configuration Software features for remote support:

- Connecting and disconnecting a remote
- Downloading and uploading remote configuration files

Additional Information

Refer to the following for additional information:

- For information on standard Windows® interface features, refer to Microsoft Windows® documentation and help files.
- For context-sensitive help, first click in the main window and then press **F1** or click the **help** buttons in dialog boxes.

Conventions

The following typographic conventions are used in this operation guide.

Format	Represents
Bold	For user input, enter words or phrases shown in **bold** as they appear. Menu names and options, commands and toolbar names, and dialog box names and options are also shown in **bold** type.
UPPER CASE	Keyboard names, combinations, and sequences are shown in all uppercase letters. For example, the keyboard shortcut for creating a new application is CTRL+N. To perform this shortcut, press and hold the CTRL key and then press the N key.
File → Open	The arrow indicates a menu selection. In this instance, go to the **File** menu to select the **Open** command.

Installation

Introduction

The software can be downloaded from *www.schneider-electric.com*.

It must be installed via an administrator account.

Prerequisites

eXLhoist Configuration Software supports the following Windows® platforms:

- Windows® 7 32/64 bits
- Windows® 8.1 32/64 bits
- Windows® 10 32/64 bits only for eXLhoist Configuration Software version ≥ v4.0

eXLhoist Configuration Software requires the following minimal configuration:

- Dual core processor
- RAM: 2 GB
- Required disk space: 2 GB
- Windows® 7 32 bits

Installation Process

To install eXLhoist Configuration Software, follow the steps below:

Step	Action
1	Double-click the program file (setup.exe).
2	If the .NET® framework 3.5 SP1 is not already installed, the installer automatically installs it. **NOTE:** An Internet connection is required.
3	Follow all the steps. **NOTE:** It is recommended to follow the steps concerning the driver installation of the TCSMCNAM3M002P USB to RS-485 converter (with RJ45 plug) to avoid inoperable communication with the connected Remote Device.

Connect a Remote Device to the PC

Introduction

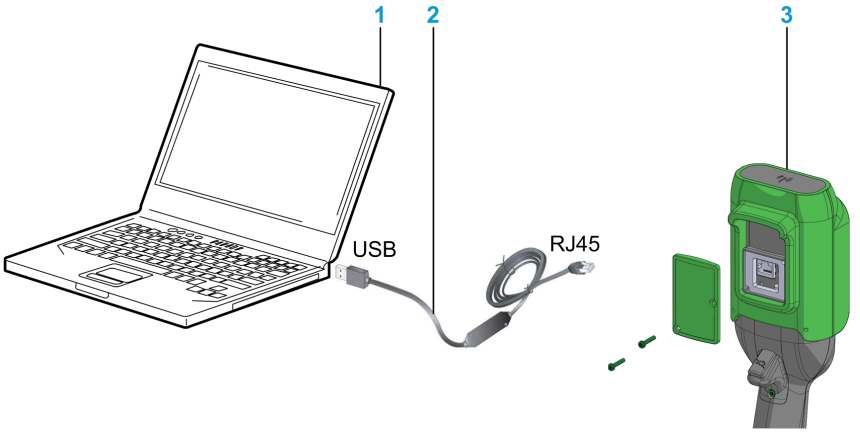
The connection is made using the USB to RS-485 converter (with RJ45 plug).

Before connecting the Remote Device to the PC:

- It is recommended to Power OFF the Remote Device.
- The eXLhoist Configuration Software must be installed.

Description

The figure illustrates the connection to a personal computer:



1 Personal computer
2 USB to RS-485 converter (with RJ45 plug): TCSMCNAM3M002P
3 Remote Device

NOTICE
INOPERABLE EQUIPMENT ● Always connect the communication cable to the PC before connecting it to the device. ● Only use the Schneider Electric cable TCSMCNAM3M002P. **Failure to follow these instructions can result in equipment damage.**

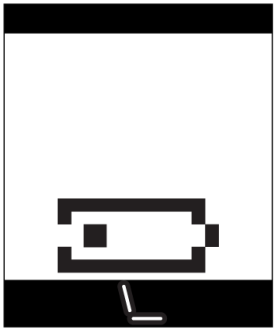
The PC does not supply the Remote Device. As long as the Remote Device is connected to the PC, it is recommended to charge the remote *(see page 167)* during the process.

Remote Device Display

As long as the Remote Device is connected to the PC:

ZART8L•: The Start LED is flashing.

ZART•D•: a dedicated screen is displayed



Section 7.2
User Interface

What Is in This Section?

This section contains the following topics:

Starting Screen

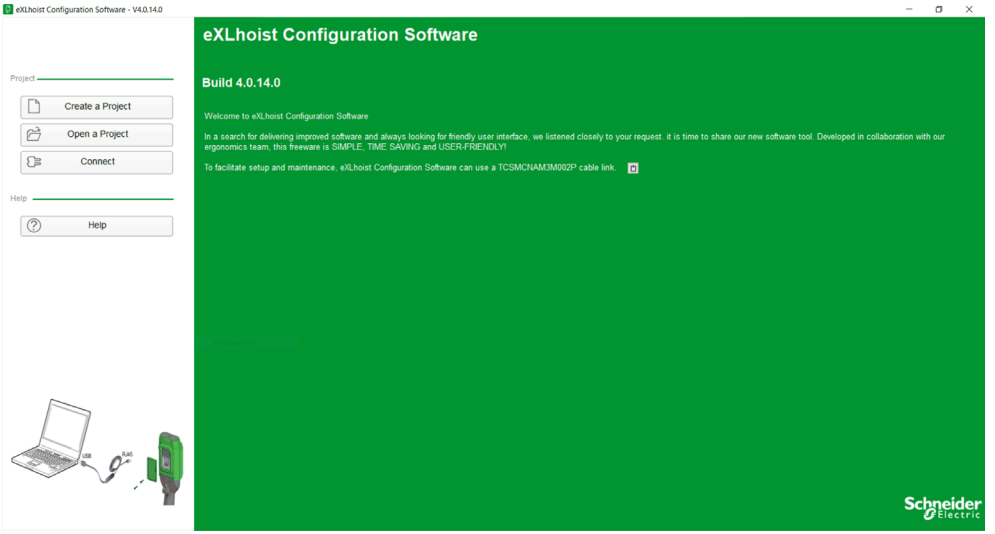
Introduction

The eXLhoist Configuration Software starting window is displayed at software launch. It provides easy access to the main functions:

- Create a new project.
- Open an existing project.
- Connect to a Remote Device.

Description

The illustration shows the eXLhoist Configuration Software starting screen:



Button	Description
Create a Project	Allows you to create a new project with default values.
Open a Project	Allows you to open an existing project. Project files have the “xpf” extension.
Connect	Allows you to create a project with the data stored in a Remote Device. The data are loaded from the Remote Device to the PC.

For more details, refer to Create a project *(see page 205)*.

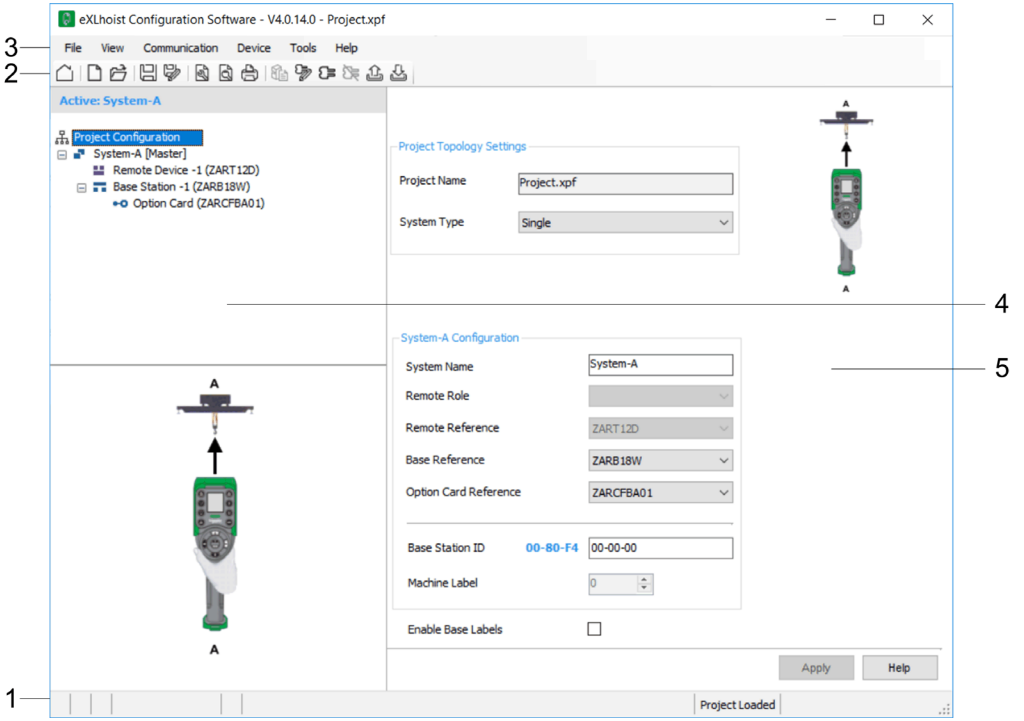
Main Window

Introduction

The eXLhoist Configuration Software main window provides access to menus and commands, windows, and toolbars.

Description

The illustration shows the eXLhoist Configuration Software main window:



Area	Description
1	Status bar *(see page 197)*
2	Toolbar *(see page 198)*
3	Menu bar *(see page 199)*
4	Tree view *(see page 200)*
5	Project configuration *(see page 216)*

Status Bar

Introduction

The status bar is a panel at the bottom of the main window that displays information about the application and the connected device. The status bar can be turned on or off by selecting **View → Status Bar** from the menu bar.

Description

The status bar displays:

- Status messages and prompts
- Project status

Toolbar

Introduction

The toolbar is a panel at the top of the main window which provides access to the main commands using icons.

The toolbar can be turned on or off by selecting **View → Toolbar** from the menu bar.

Description

The illustration shows the eXLhoist Configuration Software toolbar:

Element	Description
1	**Go to Start Page**: Displays the start page, any opened project must be closed. If the project is not saved, a dialog box asks to save the project.
2	**New Project**: Creates new project, any opened project must be closed. If the project is not saved, a dialog box asks to save the project.
3	**Open Project**: Opens a project saved on your computer.
4	**Save**: Saves modifications to an existing project.
5	**Save As**: Saves an open project under a name and/or in a new location.
6	**Page Setup**: Ables to configure the printing page setup.
7	**Print Preview**: Displays the print preview.
8	**Print**: Prints the project.
9	**Identify Device**: Displays information related to the connected Remote Device.
10	**Edit Connection** *(see page 209)*.
11	**Connect to Device**: Establishes the connection between the Remote Device and the PC.
12	**Disconnect from Device**: Disconnects the connection between the Remote Device and the PC.
13	**Load Values From Device**: Loads the parameters from the connected Remote Device to the project file. If no project is opened, this command loads the Remote Device information to the project file. If a project is opened, this command loads the Remote Device configuration to the project. Project data are overwritten.
14	**Store Values to Device**: Transfer configuration from project to the Remote Device. If no project is opened, this command downloads the existing project file information to the Remote Device. If a project is opened, this command transfers the project information to the Remote Device.

Menu Bar

Introduction

The menu bar is a panel at the top of the main window which provides access to the command menus.

Description

The illustration shows the eXLhoist Configuration Software menu bar:

Menu	Description
File	Available to launch file related operations (**New**, **Open**, **Export**, **Print**, **Save**, **Close**, and so on).
View	Available to toggle the toolbar and status bar visibility.
Communication	Available to manage the communication-related operation.
Device	Available to manage: ● The Transfer Configuration File Password *(see page 210)*. ● The Data Storage *(see page 309)*.
Tools	Available to switch the language of the eXLhoist Configuration Software. **NOTE:** Application restart needed.
Help	Available to display the **Help** and **About** of the eXLhoist Configuration Software.

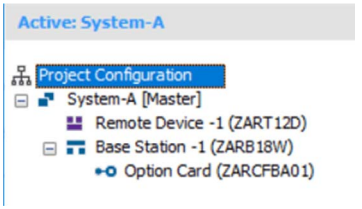
Tree View

Introduction

The eXLhoist Configuration Software tree view provides access to the connected Remote Device parameters.

Description

The illustration shows the eXLhoist Configuration Software tree view:



The following tabs are available from Remote Device tree view:

- Parameters *(see page 223)*
- Interlocking *(see page 225)*
- Device Identity *(see page 227)*

The following tabs are available from Base Station tree view:

- Relays Assignment *(see page 230)*
- Limit Switch/Motion Feedback *(see page 236)*
- Alarm Assignment *(see page 238)*
- Data storage Assignment *(see page 240)*
- Device Identity *(see page 244)*

The following tabs are available from Option Card tree view (if present):

- I/O *(see page 278)*
- Serial Link *(see page 279)*
- Display *(see page 280)*
- Overload *(see page 282)*
- Device Identity *(see page 283)*

Section 7.3
Project Management

What Is in This Section?

This section contains the following topics:

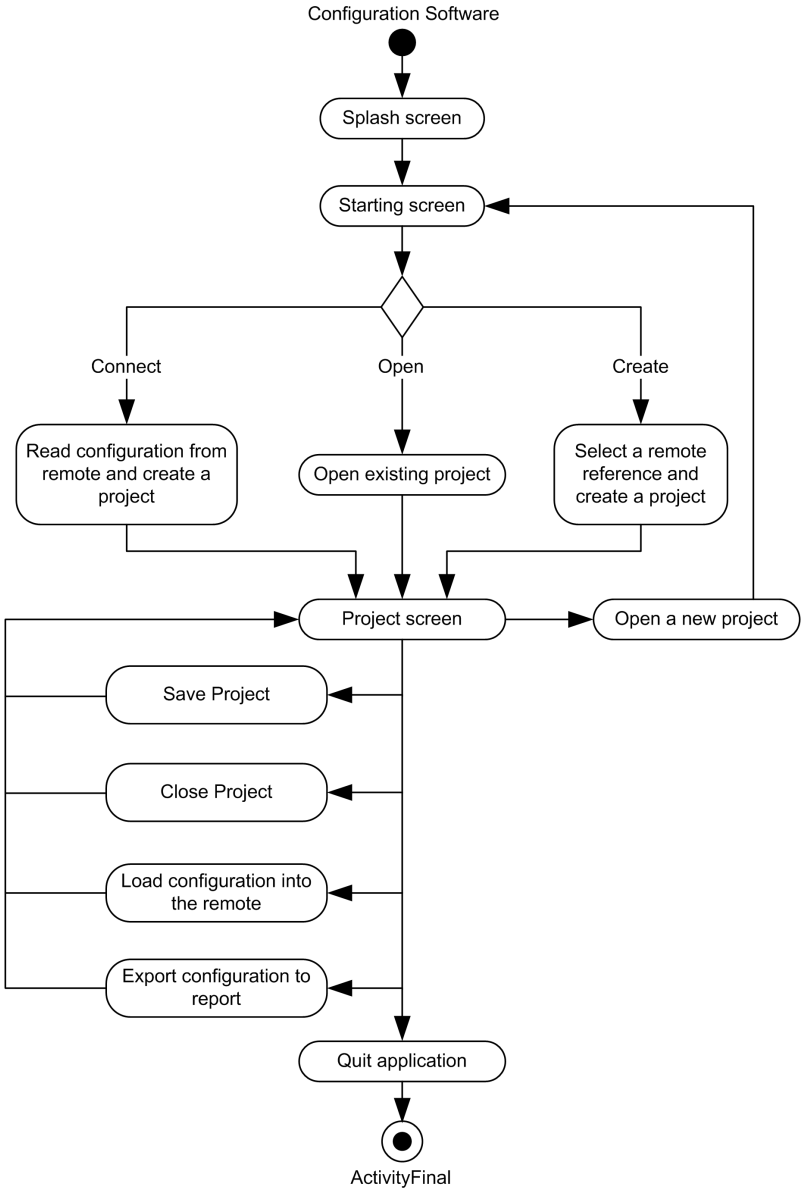
Diagram

Uses Cases

The main use cases of the eXLhoist Configuration Software are:

- Create a project.
- Open an existing project.
- Open a new project using data from Remote Device connected.
- Save project.
- Close project.
- Generate the configuration documentation and the Base wiring diagram to export in “.pdf” files.
- Transfer configuration from PC to Remote Device.

The diagram illustrates the use cases:



Start and Exit eXLhoist Configuration Software

Start eXLhoist Configuration Software

The installation procedure for eXLhoist Configuration Software creates one or more of the following options for starting the software, depending on selections made during installation.

Select one of the following options to start eXLhoist Configuration Software:

- Double-click the eXLhoist Configuration Software icon on the Windows® desktop.
- Select the eXLhoist Configuration Software entry from the Windows® programs menu.
- Select **Run** from the Windows® start menu and browse for the eXLhoist Configuration Software program.

eXLhoist Configuration Software starts and the starting screen is displayed.

Exit eXLhoist Configuration Software

To exit eXLhoist Configuration Software:

Step	Action
1	Select **File → Exit** from the main menu. If there is no change, the application closes and eXLhoist Configuration Software exits to the Windows® desktop. If there are changes, an exit dialog box is displayed prompting you to save changes.
2	Select **Yes** to save changes and exit eXLhoist Configuration Software. Select **No** to discard changes and exit. Select **Cancel** to return to eXLhoist Configuration Software with changes intact.

Creating a Project

Overview

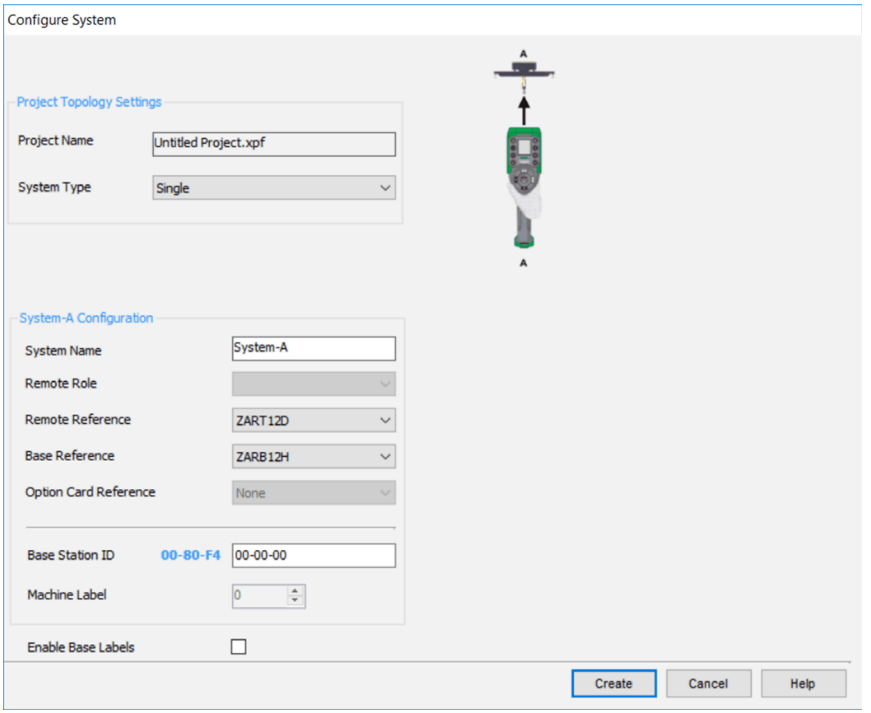
As shown in the eXLhoist Configuration Software diagram, there are 3 ways to start a project:

- Create a new project with default values *(see page 206)*.
- Open an existing project *(see page 207)*.
- Create a new project with the configuration stored in a connected Remote Device *(see page 207)*.

These 3 ways can be realized form the starting screen but also from the main menu.

Create a New Project with Default Values

Follow the procedure to create a new project with default values.

Step	Action
1	From the starting screen, click **Create a project** button. Note: From the main menu, select **File** → **New**.
2	A device system configuration window is displayed:  Select the appropriate devices.
3	Click **Create** button. Result: The project window is activated.

Open an Existing Project

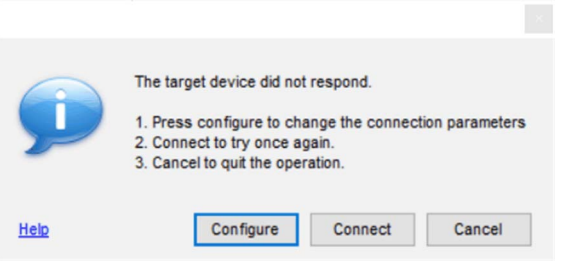
Follow the procedure to open an existing project from your PC:

Step	Action
1	From the starting screen, click **Open a project** button. Note: From the main menu, select **File** → **Open**.
2	A browser window is displayed. Select the project file (".xpf").
3	Click **Open**.
4	If the project file is locked, a window is displayed. Enter the project password *(see page 211)*. Click **Enter**. The project window is activated.

Note: If you do not enter the correct project password, the project is nevertheless opened but in "Locked" mode. In this mode, only the **Device Identity** tab content is displayed.

Create a New Project with the Configuration Stored in a Remote Device

Follow the procedure to create a new project with the configuration stored in a connected Remote Device:

Step	Action
1	Connect a Remote Device to the PC *(see page 192)*.
2	From the starting screen, click **Connect** button.
3	If the communication between the PC and the Remote Device is not established, a window is displayed:  Click **Configure** to display the Edit Connection windows *(see page 209)*. Click **Connect** to retry the connection. Click **Cancel** to cancel the connect procedure.

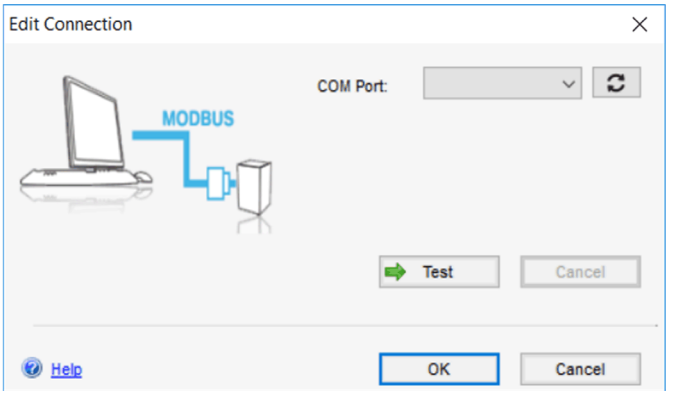
Step	Action
4	If the configuration in the Remote Device has a transfer Configuration File password, a window is displayed. Enter the Transfer Password *(see page 210)* with the keyboard of the PC. Click **Enter**.
5	Wait during the transfer. Note: A progress bar is displayed during the transfer.
6	If the project file is locked, a window is displayed. Enter the project password *(see page 211)*. Click **Enter**. The project window is activated.

NOTE: If you do not enter the correct project password, the project is nevertheless opened in “Locked” mode. In this mode, only the **Device Identity** tab content is displayed.

Edit a Connection

Overview

Follow the procedure to modify the communication settings for the connected device:

Step	Action
1	Connect a Remote Device to the PC *(see page 192)*.
2	From the main menu, select **Communication** → **Edit Connection**.
3	A window is displayed:  Select the **COM Port**.
4	Click **Test**.
5	Click **OK** to validate and close the window. Click **Cancel** to close the window.

Project Passwords Management

Overview

You can configure 2 passwords to the project:
- The transfer password of the Configuration File
- The project password

Transfer Password

The transfer password ables to protect the Configuration File stored in the Base Station against:
- Overwriting
- Wrong pairing
- Download by inappropriate person

The transfer password is asked before each Configuration File transfer:
- After a modification of the system configuration *(see page 161)*
- During a remote replacement *(see page 253)*

To improve the machine configuration protection, it is recommended to configure a Configuration File transfer password.

Follow the procedure to create or modified the transfer password:

Step	Action
1	From the main menu, select **Device → Transfer Password → Create Password**. Result: A window is displayed.
2	To modify an existing password, enter the previous password in the **Old Password** field.
3	Enter the new transfer Configuration File password in the **New Password** and in the **Confirm Password** fields. **NOTE:** Password must be 2 digits up to 6 digits. Digits allowed are 1, 2, 3, 4, 5 and 6.
4	Click **OK**.

The transfer password is stored in the project and in the Configuration File.

During configuration, use the keyboard of the PC to enter the transfer password.

In normal use (not connected to a PC), use the motion buttons 1...6 of the Remote Device to enter the transfer password.

Project Password

The project password is asked before opening a “Locked” project.

If you do not enter the correct project password, the project is nevertheless opened but in “Locked” mode. In this mode, only the Device Identity tab content is displayed.

Follow the procedure to create or modified the project password:

Step	Action
1	From the main menu, select **File → Password → Project Password**. Result: A window is displayed.
2	To modify an existing password, enter the previous password in the **Old Password** field.
3	Enter the new project password in the **New Password** and in the **Confirm Password** fields. **NOTE:** Password can contain from 1 to 20 characters. Characters allowed are a…z, A…Z, and 0…9. All other characters are non-allowed (+ ° _ - % ’ .).
4	Click **OK**.

Follow the procedure to unlock a project (opened without the correct project password):

Step	Action
1	From the main menu, select **File → Password → Unlock Project**. Result: A window is displayed.
2	Enter the project password.
3	Click **OK**.

Load the Configuration into the Remote Device

How To ...

Follow the procedure to load the configuration from the PC to the Remote Device:

Step	Action
1	Connect a Remote Device to the PC *(see page 192)*.
2	Create or open a project *(see page 205)*.
3	From the main menu, select **Communication → Store to device**.
4	If enabled, enter the transfer password of the Configuration File already stored in the Remote Device.
5	Wait during the transfer.

Save a Project

How To ...

Follow the procedure to save the project file on the PC:

Step	Action
1	From the main menu, select **File → Save**. Result: A browser window is displayed.
2	Choose the directory.
3	Click **Save**.

It is possible to duplicate and change the name of the project file by selecting **File → Save as**.

Export to PDF

How To ...

Follow the procedure to export the configuration to a PDF file:

Step	Action
1	From the main menu, select **File → Export → Export to PDF**. Result: A browser window is displayed.
2	Choose the directory and the name of the export file.
3	Click **Export**. Result: The export file is created.
4	A question window asks you to open or not the export file. Click **Yes** to open the export file. Click **No** to go back to the project workspace.

Follow the procedure to export the Base wiring diagram to a PDF file:

Step	Action
1	From the main menu, select **File → Export → Base Wiring Diagram**. Result: A browser window is displayed.
2	Choose the directory and the name of the export file.
3	Click **Export**. Result: The export file is created.

Section 7.4
Project and System Configuration

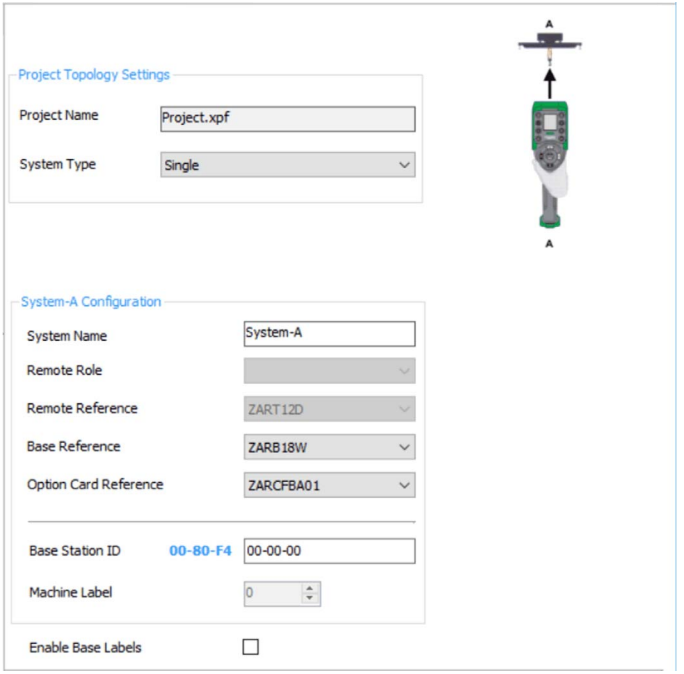
What Is in This Section?

This section contains the following topics:

Project Configuration

Overview

In this tab, you can configure the Wireless Remote Control System main features.

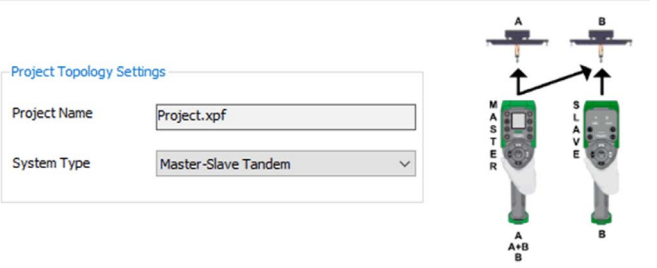


Project Topology Settings

The **Project Topology Settings** area allows you to select the topology of your system:

- **Single**
- **Standalone Tandem**
- **Master-Master Tandem**
- **Master-Slave Tandem**
- **Large Crane**

Project Topology Settings area:



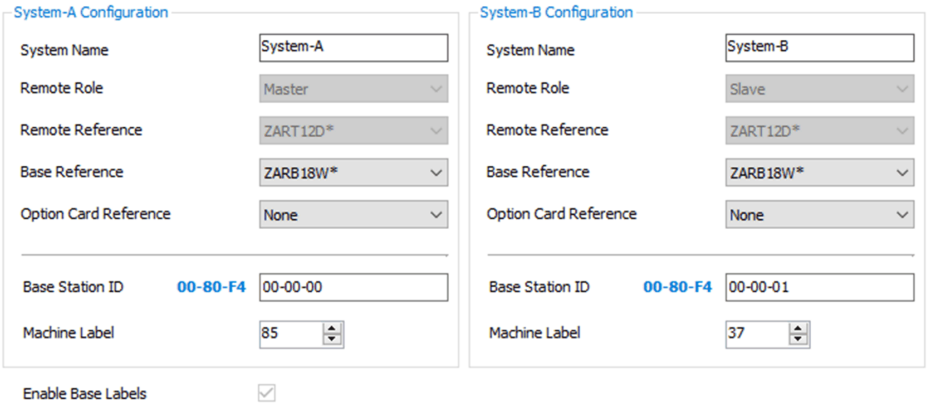
For more information, refer to Main applications *(see page 17)*.

System Configuration

The **System Configuration** area allows you to select the main features of each system:

- **System Name**
- **Base Reference**
- **Option Card Reference**

System Configuration area:



You must enter the parameters of the **System-A** Base Station (Primary Base):

Step	Action
1	Enter the ID of the Base Station. Format: `00 80 F4 0X XX XX` (`0X XX XX` is an hexadecimal value from `0 00 00` to `3 FF FF`). This ID can be read on the Label of theBase Station.
2	Select in the list a **Machine Label** number (0…999). This label number is displayed on the ZART•D• to identify the selected Base Station/Bridge.

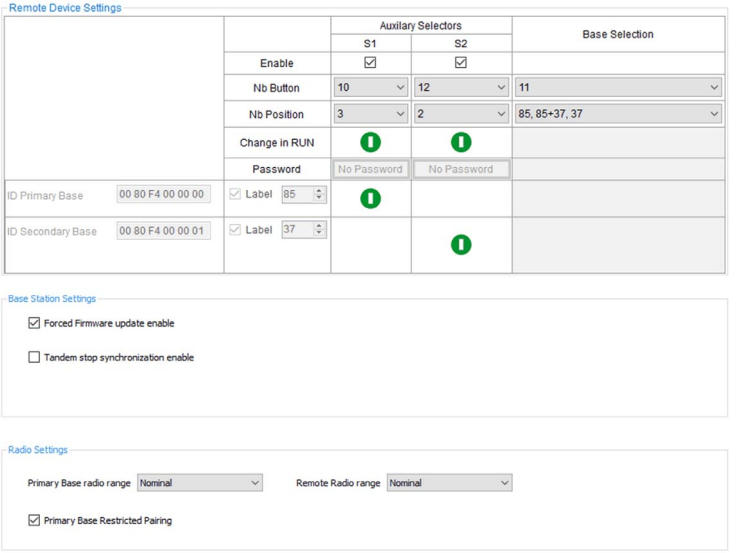
If the Remote Device is configured as a Master, you must enter the parameters of the **System-B** Base Station (Secondary Base):

Step	Action
1	Enter the ID of the Base Station.
2	Select in the list a **Machine Label** number (0…999).

System Configuration

Overview

In this tab, you can configure the Wireless Remote Control System parameters.

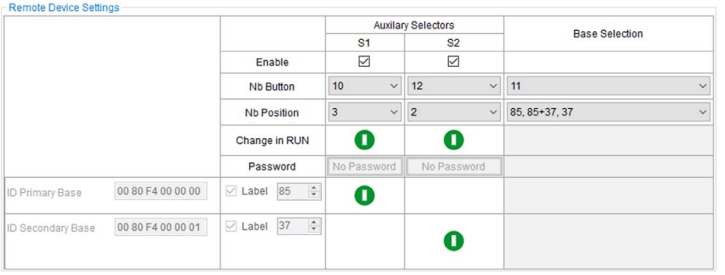


Remote Device Settings

The **Remote Device Settings** area allows you to configure the main features of your system:

- The Remote Device main parameters
- The Base Station Selection.
- The **Auxiliary Selectors**.

Remote Device Settings area:



Select in the list the **Nb Button** of the Base selector that will be used to select Base Station. For more details, refer to MBC Base selector description *(see page 150)*.

With an adapted wiring, the **Auxiliary Selectors** enable/disable the motions of the selected device (hook/trolleys):

Step	Action
1	Select the Auxiliary Selector **Enable** checkbox. If the Remote Device is configured as a Single or a Slave, only the Auxiliary Selector 1 can be configured.
2	Select in the **Nb Button** list the button to be used as auxiliary selector. For ZART8••: it is possible to assign button 10...11. For ZART12••: it is possible to assign button 10...15.
3	Select 2 or 3 in the **Nb Position** list.
4	Click in the **Change in RUN** area to enable/disable the Auxiliary selector use in START mode. If disabled, the Auxiliary Selector is only usable in STOP mode.
5	Click in the Base Station area to make enabled/disabled the use of the Auxiliary selector with the corresponding Base Station.

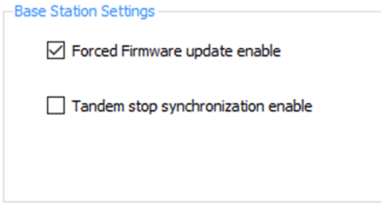
For more details, refer to Auxiliary selector description *(see page 152)*.

Base Station Settings

The **Base Station Settings** area allows you to configure following features of the Base Station:

- Enable the Base Station firmware update.
- In case of a tandem topology, enable the tandem stop synchronization.

Base Station Settings area:

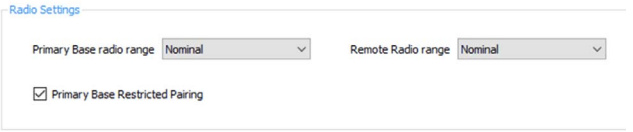


Radio Settings

The **Radio Settings** area allows you to configure the radio main features:

- The Base Station radio range.
- The Remote Device radio range
- Enable the primary Base Station restricted pairing.

Radio Settings area:



You can limit the radio level of your system.

You can select for the Base Station and for the Remote Device:

- **Nominal**: standard radio level
- **Reduced**: reduced radio level

The factory setting value is **Nominal**.

The **Primary Base Restricted pairing** function manages the Base Station pairing restriction:

- If the Restricted pairing is enabled, then the Base Station will accept the connection only with the Remote Device paired with the Base Station. The pairing can only be done:
  - During 5 minutes after a Power OFF/Power ON cycle of the Base Station
    or
  - after an unpairing request in MBC mode *(see page 142)*.
- If the restricted pairing is disabled, then the Base Station will accept the connection with all Remote devices configured with the ID of the Base Station.

The factory setting value is **Enable**.

Section 7.5
Remote Device Configuration

What Is in This Section?

This section contains the following topics:

Parameters

Overview

In this tab, you can configure the Wireless Remote Control System parameters.

Start Access Sequence

When START access sequence is enabled, the operator must enter this sequence to go in START mode.

Click **Enable** checkbox to enable/disable it.

The allowed buttons for this sequence are 1, 2, 3, 4, 5, 6.

The sequence can have 1 to 6 steps.

The sequence can use same button several times.

E-STOP RESET Sequence

E-STOP RESET sequence is asked to the operator to reset the Remote Device after an E-STOP. If reset sequence is empty or disable, the operator has to press the button 7 (trigger).

Click **Enable** checkbox to enable/disable it.

The user must press button 7 (trigger) to validate the end of sequence.

The allowed buttons for this sequence are 1, 2, 3, 4, 5, 6.

The sequence can have 1 to 6 steps.

The sequence can use same button several times.

Set Up Sequence

When SET UP access sequence is enabled, the operator must enter this sequence to go in SET UP mode.

Click **Enable** checkbox to enable/disable it.

The allowed buttons for this sequence are 1, 2, 3, 4, 5, 6.

The sequence can have 1 to 6 steps.

The sequence can use same button several times.

Standby Timeout

The Remote Device goes automatically from START mode to STOP mode if no buttons are pressed during the Standby Timeout delay.

Click **Enable** checkbox to enable/disable it.

You can modify the duration: 1…60 minutes.

The factory setting value is 15 minutes.

Power Saving Timeout

When the Wireless Remote Control System is in STOP mode due to Standby Timeout, if no button is pressed during this Power saving Timeout, the Remote Device automatically powers OFF.

Click **Enable** checkbox to enable/disable it.

You can modify the duration: 1…300 minutes.

The factory setting value is 15 minutes.

Remote Fall and Shock Detection

When the function is enabled, if a Remote Device fall or shock is detected, the Remote Device powers OFF and the Base Station waits for a Remote Device connection.

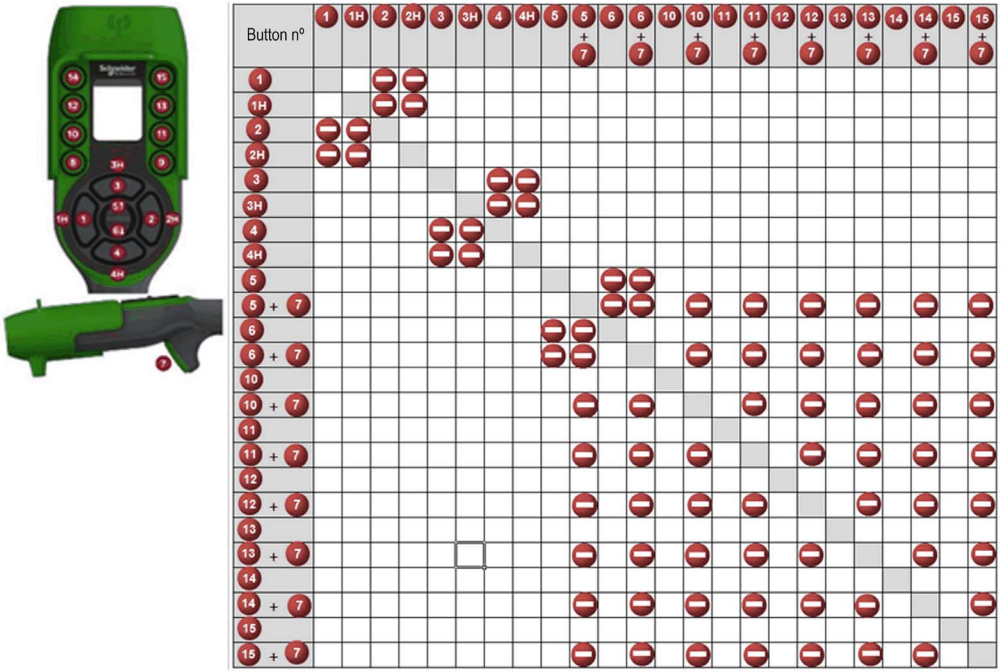
Click **Enable** checkbox to enable/disable it.

The factory setting value is **Disable**.

Interlocking

Overview

In this tab, you can configure the buttons combinations that cannot operate simultaneously.



Configuration

Step	Action
1	Click a cell to interlock (or not) 2 buttons (or buttons combinations). **Result:** When the buttons are interlocked, the empty cell has now an associated symbol: .

Example of the factory setting:

The button 1 and 2 are associated to the same axis, for the opposites directions.

The button 1 must not operate while the button 2 is pressed.

The button 2 must not operate while the button 1 is pressed.

If the buttons are pressed simultaneously, the movement is stopped.

Restriction Due To Remote Device

This tab is automatically modified according to the selected/connected Remote Device:

Reference	Disable buttons
ZART8L•	12…15+7
ZART8D•	12…15+7
ZART12D•	-

Configuration in MBC

When the Remote Device is configured as Master, 2 interlocking tables are displayed:

- One interlocking table when the Remote Device commands the primary Base Station.
- Another interlocking table when the Remote Device commands the primary Base Station and the secondary Base Station.

Step	Action
1	Click a cell to interlock (or not) 2 buttons (or buttons combinations). **Result:** When the buttons are interlocked, the empty cell has now an associated symbol:  .

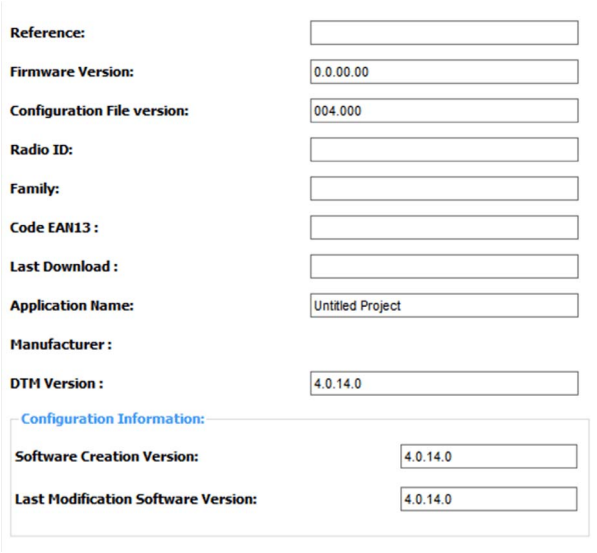
Modifications on the primary table are automatically done on the second table.

Modifications on the second table are not automatically done on the primary table.

Device Identity

Overview

From this tab, you can read generic information from the Remote Device:



Description

At the activation, the fields are clear.

Click **Read** to display generic information coming from the connected Remote Device. If there is no Remote Device connected, you are informed by a popup and all fields are cleared.

Remote Device general information:

Field	Description
Reference	Remote Device reference.
Firmware Version	Firmware version of the Remote Device. Format xx.yy.zzzz.tttt (where xx is major version, yy is minor version, zzzz is the quality evolution index, and tttt is internal revision index)
Configuration File version	Version of the Configuration File stored in the Remote Device. Format xxx.yyy (where xxx is major version and yyy is minor version).
Radio ID	Radio ID of the Remote Device
Family	eXLhoist
Code EAN13	Code EAN13 of the Remote Device. ZART8L: 3606480610356 ZART8D: 3606480610363 ZART12D: 3606480610370 ZART8LM: 3606481138309 ZART8DM: 3606481138293 ZART12DM: 3606481138286
Last Download	Date of the last load of a Configuration File in the Remote Device.
Application name	Name of the project file (Last 30 characters).
Manufacturer	Schneider Electric
DTM Version	Version of the DTM.
Configuration Information Software Creation Version	Version of the eXLhoist Configuration Software used at the project creation time (Never change after).
Configuration Information Last Modification Software Version	Version of the eXLhoist Configuration Software used at the last project modification time.

Information is updated and stored in the Remote Device after a download Configuration File from PC.

The Remote Device and the Base Station have additional information in the areas **Reserved for Schneider Electric use**.

If the Remote Device is configured as a Master, another Base Station information area is displayed for the second Base Station.

Section 7.6
Base Station Configuration

What Is in This Section?

This section contains the following topics:

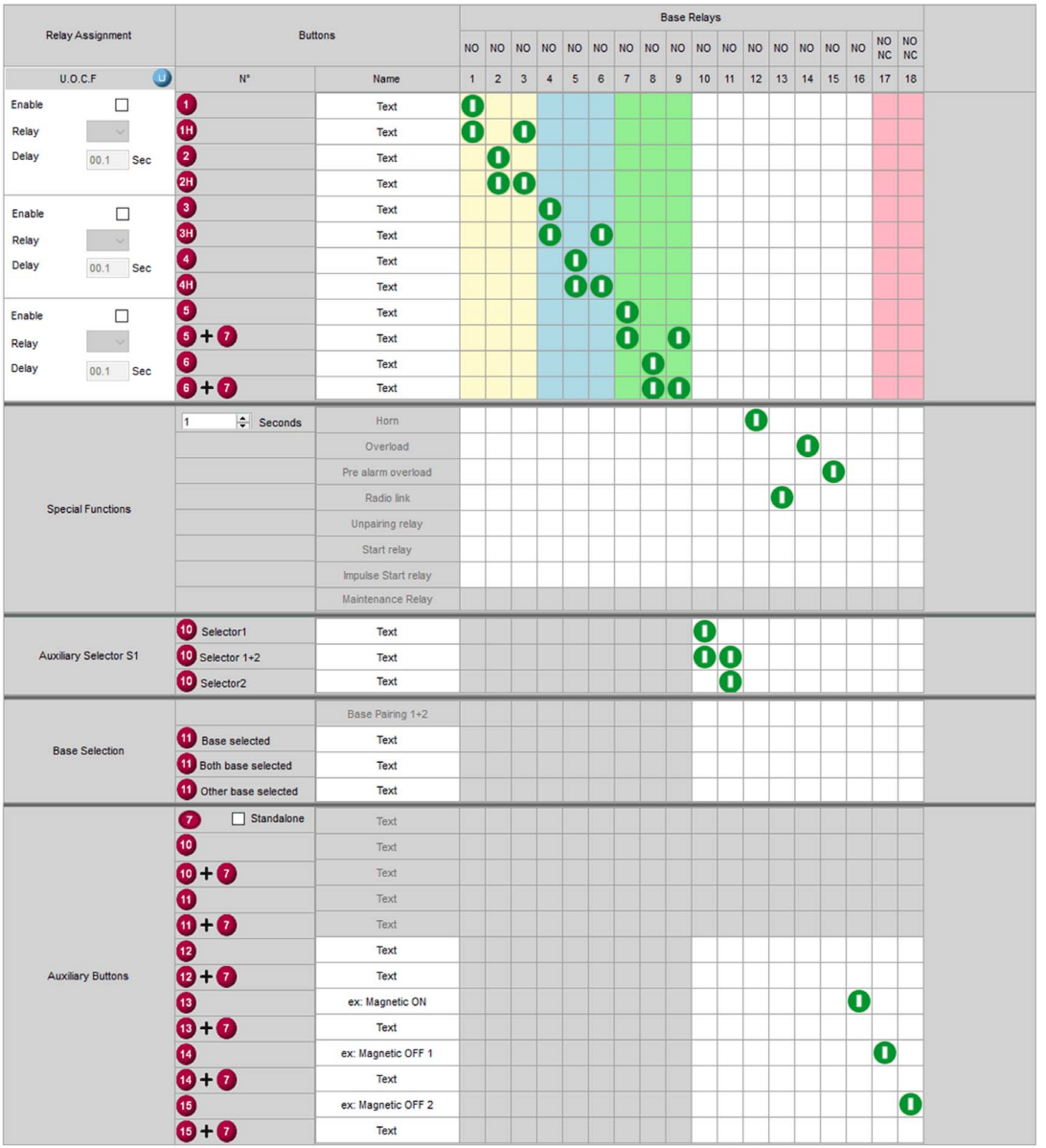
Relay Assignment

Overview

In this tab, you can:

- Associate one or more relays to:
  - The motion buttons.
  - The auxiliary buttons.
  - The auxiliary selectors.
  - The Base selector.
  - The special functions.

- Configure the UOC function.



Restriction Due To Remote Device

This tab is automatically modified according to the selected/connected Remote Device:

Reference	Disable relay column	Disable buttons rows
ZART8L	13...18	12…15+7
ZART8LM	-	12…15+7
ZART8D•	-	12…15+7
ZART12D•	-	-

Generic Description

The main use of this tab is to configure the association between the buttons and the relays.

To associate a button to a relay:

Step	Action
1	Click a cell to associate a button to a relay. **Result:** The empty cell has now an associated symbol 
2	To be more explicit, you can click in the **Name** text zone of a button to modify it (24 characters maximum).

As long as the button is pressed, the associated relays are activated.

The cells in gray cannot be assigned.

4 relays maximum can be associated with the motion buttons (1…6+7).

Button 7 Standalone

Click the button 7 **Standalone** checkbox to enable/disable the function:

- **Button 7 standalone:**
  In this configuration, the buttons 5+7, 6+7, 10+7, 11+7, 12+7, 13+7, 14+7 and 15+7 are disabled.
  For example, button 7 standalone can be used as a validation button. Refer to button 7 validation button wiring example *(see page 340)*.
- **Button 7 coupled with other button:**
  In this configuration, the buttons 5+7, 6+7, 10+7, 11+7, 12+7, 13+7, 14+7 and 15+7 are enabled.
  For example, button 7 coupled with other button can be used as a second speed with buttons 5, 6, 10, 11, 12, 13, 14, and 15.

Auxiliary Selector

The Auxiliary Selector is only visible if it is configured in Remote Device Settings *(see page 219)*.

With an adapted wiring, the **Auxiliary Selectors** enable/disable the motions of the selected device (hook/trolleys)

Step	Action
1	Click a cell to associate a relay to a selector position. **Result:** The empty cell has now an associated symbol 
2	To be more explicit, you can click in the **Name** text zone of a button to modify it (24 characters maximum).

For example:

Relays Assignment	Buttons		Base Relays																	
			NO 1	NO 2	NO 3	NO 4	NO 5	NO 6	NO 7	NO 8	NO 9	NO 10	NO 11	NO 12	NO 13	NO 14	NO 15	NO 16	NO NC 17	NO NC 18
	N°	Name																		
Auxiliary Selector S1	10 Selector 1	Text										I								
	10 Selector 1+2	Text											I							
	10 Selector 2	Text										I	I							

For more information, refer to auxiliary selectors description *(see page 152)*.

Base Selector

The Base Selector is only usable if the Remote Device is configured as a Master in Remote Device Settings *(see page 219)*.

The Base selector is used to select the Base Station to be controlled.

You can associate a relay to the Base selector position:

Step	Action
1	Click a cell to associate a relay to a selector position or the Base pairing 1+2. **Result:** The empty cell has now an associated symbol 

The **Base Pairing 1+2** relay is activated when the Remote Device is connected to the 2 Base Stations. This relay can be used if a PLC is managing the Tandem functionality *(see page 21)*.

For example:

Relays Assignment	Buttons		Base Relays																	
			NO 1	NO 2	NO 3	NO 4	NO 5	NO 6	NO 7	NO 8	NO 9	NO 10	NO 11	NO 12	NO 13	NO 14	NO 15	NO 16	NO NC 17	NO NC 18
	N°	Name																		
Base Selector		Base Pairing 1+2													●					
	11 Base selected	Text														●				
	11 Both Base selected	Text															●			
	11 Other Base selected	Text																●		

Special Functions Configuration

The special functions configuration consists in associate a special function to a relay:

Step	Action
1	For each of the 6 special functions, click a cell to associate a relay.

The 6 special functions are:

- Horn
  - Horn duration
    This value is the Horn duration activation during the Start procedure.
    You can modify the duration: 0…60 s.
    The factory setting value is 1 second.
- Radio link
- Unpairing relay
- Start relay
- Impulse Start relay
- Maintenance relay

For more information, refer to special functions description *(see page 119)*.

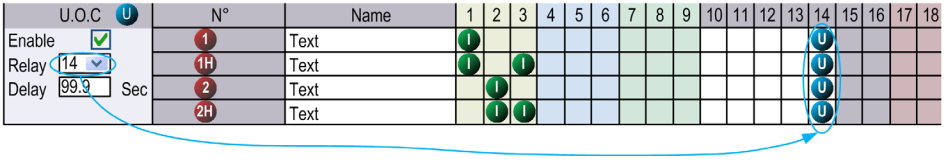
UOC Configuration

The UOC configuration consists in associate a motion axis to a relay.

This relay can be wired to the DRIVE Safe Torque Off (STO) or in serial with a contactor coil.

Step	Action
1	Click the **UOC Enable** checkbox. **NOTE:** There is a UOC function for the 3 axis.
2	Select the associated relay in the **Relay** list. **Result:** Corresponding cells are automatically filled by the symbol U.
3	Enter the UOC delay (0.1…99.9 seconds).

For example:



The relay 14 is ON when one or more of relays 1, 2, 3 is ON.

When relays 1, 2 and 3 are OFF, the UOC delay starts.

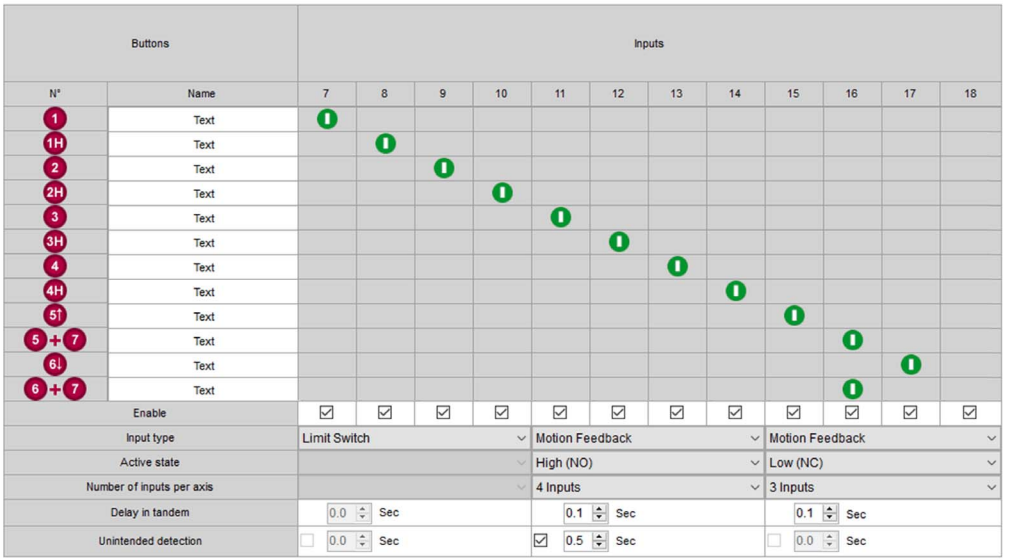
The relay 14 goes OFF when the UOC delay is expired.

For more details, refer to UOC description *(see page 114)*.

Limit Switch/Motion Feedback

Overview

In this tab, you can configure the Safeguarding inputs:



Safeguarding Function Configuration

The Safeguarding function configuration consists in enable/disable the Safeguarding inputs.

When the Safeguarding input is activated, the associated motion button is considered as unpressed and the associated relays are switched OFF.

The association between motion buttons and Safeguarding inputs are unmodifiable:

Motion button	1	1H	2	2H	3	3H	4	4H	5	5+7	6	6+7
Safeguarding input	IN7	IN8	IN9	IN10	IN11	IN12	IN13	IN14	IN15	IN16	IN17	IN18

Follow the procedure to configure safeguarding inputs:

Step	Action
1	Select the **Enable** checkbox of an input Nb (**Input 7**...**Input 18**).
2	For each axis, select the **input type**: **Limit Switch** or **Motion Feedback**.
3	For each axis, if **Motion Feedback** is selected: ● Select in **Activate state** list: ❍ **High (NO)** ❍ **Low (NC)** ● Select the **Number of inputs per axis**: ❍ **3 Inputs** ❍ **4 Inputs** ● Enter the **Delay** (0.1…10 s) ● Select the **Unintended detection** and enter the corresponding delay (0.1…10 s)

For more details, refer to limit switches/Motion Feedback description *(see page 116)*.

Alarm Assignment

Overview

In this tab, you can configure the Applicative Alarm states.

Alarm Assignment			Base inputs					
			1	2	3	4	5	6
Pre-Alarm overload			●					
Pre-Alarm overwind				●				
Alarm Overloaded					●			
Alarm Overwind						●		
Alarm over-speed							●	
Custom								●
Active State		High	⊙	⊙	⊙	⊙	⊙	⊙
		Low	○	○	○	○	○	○
Threshold Assignment	Activation	Count						
		Time (hours)						
	Pulsating	Time (second)						
		Count						

The Base Station can provide detected alarms information to the ZART•D•.

Voltage free sensors can be connected to Base Station.

Step	Action
1	Click **High** or **Low** to select the active state of each alarm. With a NO type switch, select **High**.

For more information, refer to Detected applicative alarms wiring *(see page 113)*.

The bottom of the table allows configuring the Data Storage of the Detected applicative alarms. For more details, see next page.

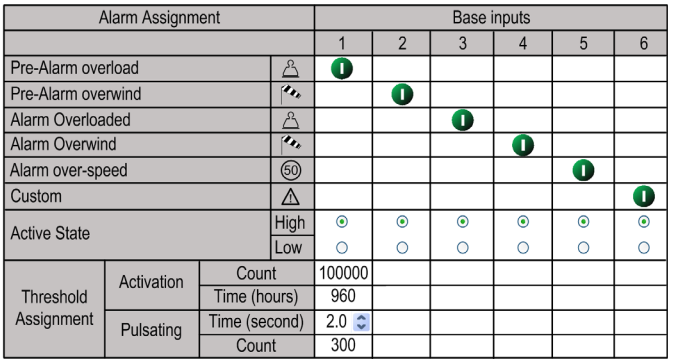
Configure Data Storage Alarm Input Assignments

When you used a ZARB18•• Base Station, you can configure threshold for each of 6 inputs associate to the ZARB18•• Base Station.

For each input, you can configure:

- Activation count threshold
- Activation time threshold in hour
- Pulsating time configuration
- Pulsating count threshold

The following procedure describes how to configure input threshold:

Step	Action
1	Click **Alarm Assignment** Tab: 
2	Unlock Data Storage parameters *(see page 314)*
3	For input to be configured, configure threshold assignments: ● Activation count threshold (0…1000000) ● Activation time threshold in hour (0...87658 hour) ● Pulsating time in second (0…10 s with step 0.1 s) ● Pulsating count threshold (0…10000)

For more details, refer to Data Storage principle *(see page 310)*.

Data Storage Assignment

Overview

Data Storage function allows to store in the Base Station cumulative operation hours and number of operations of the:

- Motions and auxiliary buttons
- Special functions
- Alarm inputs

For more details, refer to Data Storage overview *(see page 310)*.

Configure Data Storage Axis Parameters

You can configure up to 8 axis associate to Data Storage.

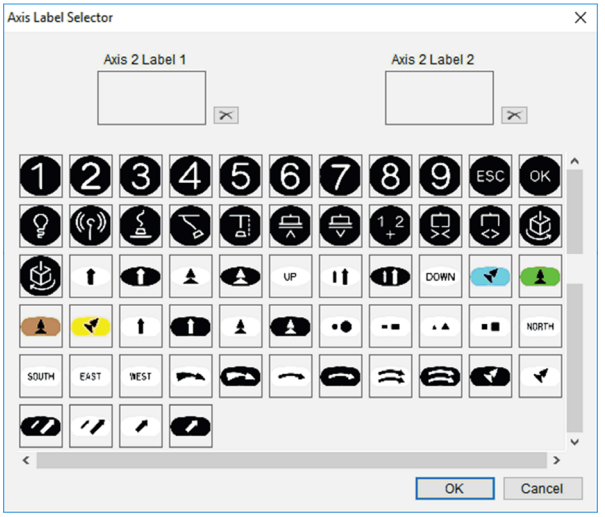
For each axis, you can configure:

- Associated buttons of the Remote Device
- Associated label of the bridge movement
- Auxiliary selector position
- Activation count threshold
- Activation time threshold
- Pulsating time configuration
- Pulsating count threshold
- Backtracking time configuration (depend on axis configuration)
- Backtracking count threshold (depend on axis configuration)

The following procedure describes how to configure axis parameters:

Step	Action
1	Unlock Data Storage parameters *(see page 314)*
2	Click **Data Storage Assignment** tab:
3	For axis to be configured, click **Axis Label** area. **Result:** The Axis Label Selector window opens:
(1) For axis configured with only one direction, it is not possible to measure backtracking.	

				Axis								Special functions			
		Button N°	Button Name	1	2	3	4	5	6	7	8	Horn	Radio link	Pairing relay	Star relay
Buttons	Motion Auxiliary	1	Text												
		2	Text												
		3	Text												
		4	Text												
		5	Text												
		6	Text												
		10	Text												
		11	Text												
		12	Text												
		13	Ex: Magnetic ON												
		14	Ex: Magnetic OF...												
		15	Ex: Magnetic OF...												
	Auxiliary Selector S1	10	Selector 1												
		10	Selector 1+2												
		10	Selector 2												
Threshold assignment	Activation		Count	1000000	0	0	0	0	0	0	0	0	0	0	0
			Time (hours)	87658	0	0	0	0	0	0	0	0	0	0	0
	Pulsating		Time (second)	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Count	1000000	0	0	0	0	0	0	0				
	Backtracking		Time (second)	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0				
			Count	1000000	0	0	0	0	0	0	0				



Step	Action
4	Drag and drop corresponding label. One or two labels can be assigned on each axis. The list of labels is identical to the kit of adhesive labels for Remote Device. So you have the same labels on Remote Device buttons and the axis assignment. Click **OK** to close the Axis Label Selector window.
5	Click a cell to select Remote Device button corresponding to axis movement. **Result:** The empty cell has now an associated symbol 
6	If used, click a cell to select auxiliary selector position associate to axis.
7	Configure threshold assignments: • Activation count threshold (0…1000000) • Activation time threshold in hour (0...87658 hours) • Pulsating time in second (0…10 s with step 0.1 s) • Pulsating count threshold (0…1000000) • Backtracking time(1) in second (0…10 s with step 0.1 s) • Backtracking count threshold (1000000)
(1) For axis configured with only one direction, it is not possible to measure backtracking.	

For more details, refer to Data Storage principle *(see page 310)*.

Data Storage Application Example

Example of a System with 2 trolleys:

				Axis								
				1	2	3	4	5	6	7	8
		Button N°	Button Name				UP DOWN	UP DOWN			
Buttons	Motion Auxiliary	1	Travel Fwd	I							
		2	Travel Rev	I							
		3	Transverse Fwd		I	I					
		4	Transverse Rev		I	I					
		5	Hoist Up				I	I			
		6	Hoist Down				I	I			
		10	Text								
		11	Text								
		12	Text								
		13	Ex: Magnetic ON								
		14	Ex: Magnetic OF...								
		15	Ex: Magnetic OF...								
	Auxiliary Selector S1	10	Selector 1	Text	I		I		I		
		10	Selector 1+2	Text	I	I	I	I	I	I	
		10	Selector 2	Text		I		I		I	
Threshold assignment		Activation	Count	1000	1000	2000	2000	2000	200	200	0
			Time (hours)	500	500	500	400	400	100	100	0
		Pulsating	Time (second)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
			Count	100	100	100	150	150	75	75	0
		Backtracking	Time (second)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
			Count	50	50	50	50	50	10	10	0

Axis Description:

Axis Nb	Description
1	Travel
2	Transverse trolley 1
3	Transverse trolley 2
4	Hoist trolley 1
5	Hoist trolley 2
6	Rotation hook 1
7	Rotation hook 2
8	-

Configure Data Storage Special Function Threshold

You can configure activation threshold for each of 4 Special functions:

- Horn.
- Radio Link.
- Base Pairing 1+2.
- Start Relay.

Each of 4 special functions is defined in Relays Assignment tab *(see page 230)*.

For each Special function, you can configure:

- Activation count threshold
- Activation time threshold

The following procedure describes how to configure Special Function threshold:

Step	Action
1	Click **Data Storage Assignment** tab.
2	For Special Function to be configured, configure threshold assignments: ● Activation count threshold (0…1000000) ● Activation time threshold in hour (0…87658 hours)

Device Identity

Overview

From this tab, you can read generic information from the Base Station:

Description

At the activation, the fields are clear.

Click **Read** to display generic information coming from the connected Remote Device. If there is no Remote Device connected, you are informed by a popup and all fields are cleared.

Base Station general information:

Field	Description
Base Station Type	Base Station type.
Firmware Version	Firmware version of the Base Station. Format xx.yy.zzzz.tttt (where xx is major version, yy is minor version, zzzz is the quality evolution index, and tttt is internal revision index)
Radio ID	Radio ID of the Base Station

Information is updated and stored in the Remote Device after a download Configuration File from PC.

The Remote Device and the Base Station have additional information in the areas **Reserved for Schneider Electric use**.

If the Remote Device is configured as a Master, another Base Station information area is displayed for the second Base Station.

Chapter 8
Maintenance / Device Replacement

What Is in This Chapter?

This chapter contains the following sections:

Section 8.1
Maintenance

Maintenance

Remote Device Cleaning

When the surface or the frame of the display gets dirty, soak a soft cloth in water with a neutral detergent, wring the cloth tightly, and wipe the display.

NOTICE
EQUIPMENT DAMAGE Do not use paint thinner, organic solvents, or a strong acid compound to clean the equipment. **Failure to follow these instructions can result in equipment damage.**

Periodic Check Points

Monthly check point for the ZARB•W Base Station: check the good terminal block tightening.

For more information, refer to the Safety chapter *(see page 63)*.

Section 8.2
Device Replacement

Overview

The Configuration File management allows some device replacement.

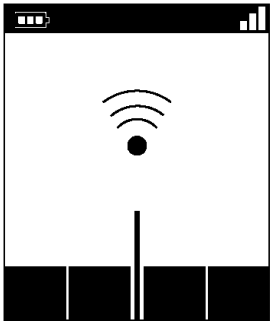
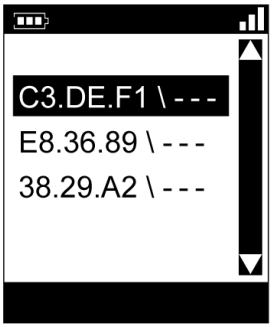
What Is in This Section?

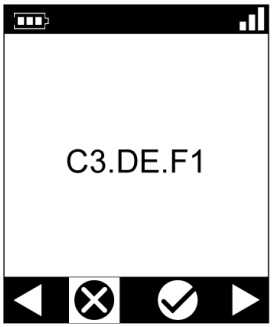
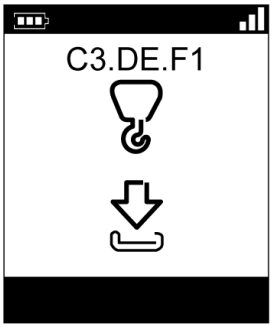
This section contains the following topics:

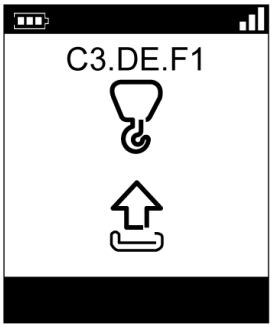
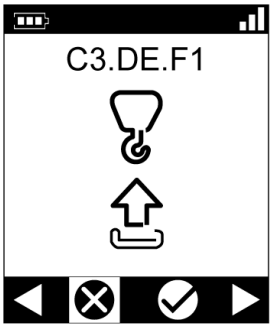
Base Station Replacement

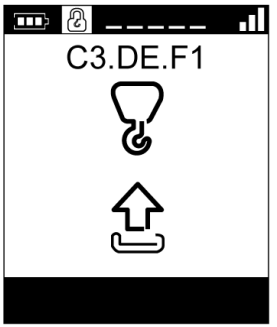
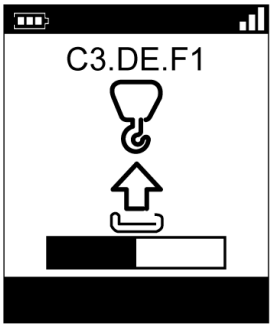
New Base Station Replacement

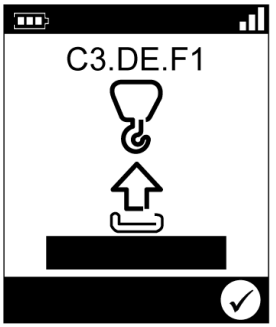
Follow the procedure to replace a Base Station by a new one:

Step	Action
1	Execute a Remote Pairing Reset *(see page 258)*.
2	Install the new Base Station.
3	Power ON the new Base Station. **NOTE:** The following steps of the procedure must end in 5 minutes maximum.
4	Place yourself with the Remote Device to an appropriate distance from the Base Station (around 10 m (32.8 ft)).
5	Press only the ON/START/Horn button on the Remote Device more than 1 s. **Result:** The Remote Device looks for Base Stations: 
6	Wait until the scan of Base Station ends. **Result:** The Remote Device displays the ID list of detected Base Stations: 

Step	Action
7	Selects the ID of the new Base Station with buttons 5 and 6. This ID can be read on the label of the Base Station.
8	Press the button 7 (trigger) to validate. **Result:**  The STATUS LED and the COM LED of the selected Base Station are blinking synchronously. If configured, the Unpairing relay is blinking.
9	Select the validation icon (check symbol) with buttons 1 and 2.
10	Press the button 7 (trigger) to validate. **Result:** The Remote Device proposes to load the Configuration File from the Base Station to the Remote Device. 

Step	Action
11	Change the direction of the Configuration File load with buttons 5 and 6. **Result:** 
12	Press the button 7 (trigger) to validate. **Result:** The Remote Device proposes to confirm the load of the Configuration File from the Remote Device to the Base Station. 
13	Select the validation icon (check symbol) with buttons 1 and 2.
14	Press the button 7 (trigger) to validate.

Step	Action
15	If the Configuration File (stored in the Base Station) has a transfer password, a padlock is displayed:  Enter this Configuration File transfer password with the buttons 1 to 6.
16	The Remote Device loads the Configuration File from the Remote Device to the Base Station. 

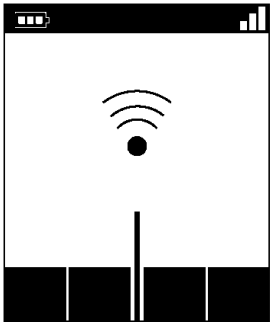
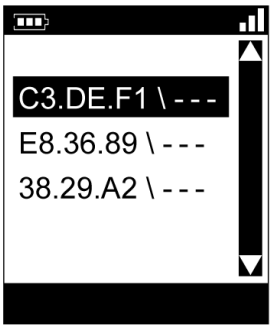
Step	Action
17	Wait for the end of the Configuration File load. **Result:** 
18	Power OFF the Remote Device.

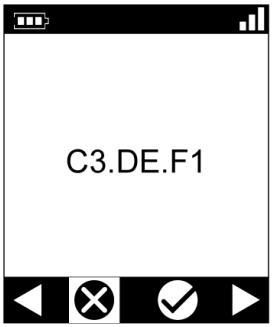
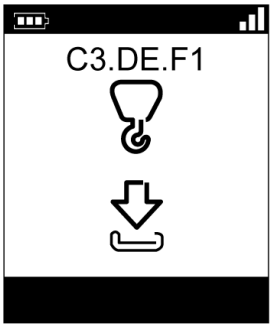
It is recommended to perform the verification test of the system *(see page 85)*.

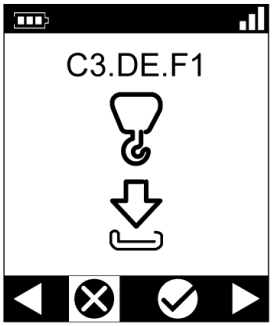
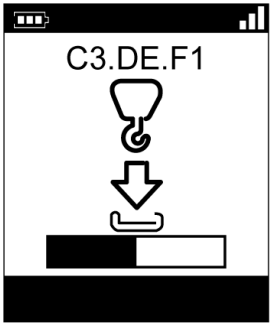
ZART•D• Replacement

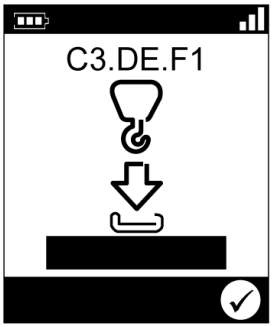
Replacement of a ZART•D• by an out-of-the-box One

Procedure to replace an out of order ZART•D• by an out-of-the-box one:

Step	Action
1	Power ON the Base Station. **NOTE:** The following steps of the procedure must end in 5 minutes maximum.
2	Place yourself with the Remote Device to an appropriate distance from the Base Station (around 10 m (32.8 ft)).
3	Press only the ON/START/Horn button on the Remote Device more than 1 s. **Result:** The Remote Device looks for Base Stations: 
4	Wait until the scan of Base Station ends. **Result:** The Remote Device displays the ID list of detected Base Stations: 
5	Selects the ID of the appropriate Base Station with buttons 5 and 6. This ID can be read on the label of the Base Station.

Step	Action
6	Press the button 7 (trigger) to validate. **Result:**  The STATUS LED and the COM LED of the selected Base Station are blinking synchronously. If configured, the Unpairing relay is blinking.
7	Select the validation icon (check symbol) with buttons 1 and 2.
8	Press the button 7 (trigger) to validate. **Result:** The Remote Device proposes to load the Configuration File from the Base Station to the Remote Device. 

Step	Action
9	Press the button 7 (trigger) to validate. **Result:** The Remote Device proposes to load the Configuration File from the Base Station to the Remote Device. 
10	Select the validation icon (check symbol) with buttons 1 and 2.
11	Press the button 7 (trigger) to validate.
12	If the Configuration File (stored in the Base Station) has a transfer password, a padlock is displayed. Enter this Configuration File transfer password with the buttons 1 to 6.
13	The Remote Device loads the Configuration File from the Base Station to the Remote Device. 

Step	Action
14	Wait for the end of the Configuration File load: **Result:** 
15	Power OFF the Remote Device.

It is recommended to perform the verification test of the system *(see page 85)*.

Replacement of a ZART•D by an Already Configured One

Replacement of an out of order ZART•D by an already configured one:

Step	Action
1	Do a Remote Factory Reset *(see page 258)*.
2	Execute the procedure Replacement of an out of order ZART•D by a new one *(see page 253)*.

ZART8L Replacement

Replacement of an ZART8L

Procedure to replace a ZART8L:

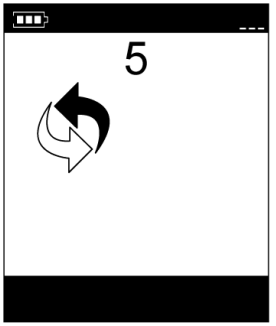
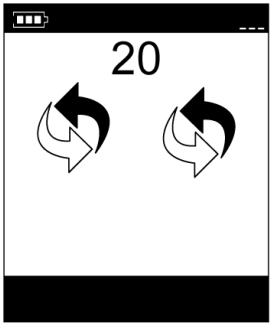
Step	Action
1	Connect the Remote Device to a PC *(see page 192)*.
2	Start the eXLhoist Configuration Software *(see page 204)*.
3	Open the existing project of the Remote Device to replace *(see page 207)*.
4	Select **Communication → Store to Device**.
5	Wait for the end of the Configuration File load in the Remote Device.
6	Disconnect the Remote Device to the PC.
7	Power ON the Base Station. **NOTE:** The following steps of the procedure must end in 5 minutes maximum.
8	Power ON the Remote Device. **Result:** The **STATUS** LED and the **COM** LED of the Base Station are blinking synchronously. If configured, the Unpairing relay is ON. The “1” and “2” LED of the Remote Device are flashing.
9	Press the button 7 (trigger) to validate. **Result:** The Configuration File is automatically loaded from the Remote Device to the Base Station.
10	Wait for the end of the Configuration File load (around 20 seconds). During the load, the START LED and “2” LED are flashing *(see page 182)*.
11	The Remote Device automatically powers OFF.

It is recommended to perform the verification test of the system *(see page 85)*.

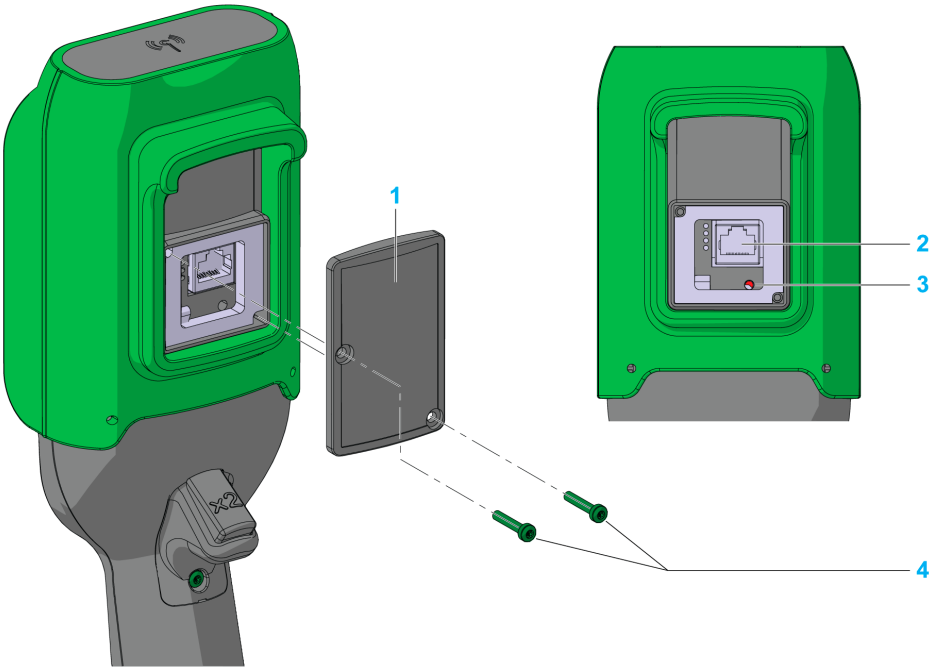
Section 8.3
Remote Device Resets

Remote Device Resets

Procedure

Step	Action	
1	Power ON the Remote Device.	
2	On the rear of the Remote Device, unscrew the 2 Torx screws, diameter 3.5 mm (0.14 in).	
3	Remove the cover.	
4	Press and maintain the reset button for the appropriate duration *(see page 259)*. For the ZAR•D:	
	When the first delay is reached (for Pairing reset), the remote displays: 	When the second delay is reached (for Factory reset), the remote displays: 
5	Release the reset button.	
5	Place back the cover.	
6	Screw the 2 screws to mount the cover.	

Remote Device rear view:



1 Cover
2 RJ45 socket
3 Reset button
4 2 Torx screws, diameter 3.5 mm (0.14 in)

Reset Information

Title	t = Reset button duration press	Remote Device reaction
Simple reset	t < 5 s	• Remote Device reboot.
Pairing reset	5 s ≤ t < 20 s	• Remote Device reboot. • Erase in the remote memory the stored Base Station ID. The remote is no more paired with Base Station.
Factory reset	t > 20 s	• Remote Device reboot. • Erase in the remote memory the stored Base Station ID. The remote is no more paired with Base Station. • Delete the Configuration File. The Remote Device goes back to factory settings.

Chapter 9
Added Features Card

What Is in This Chapter?

This chapter contains the following sections:

Section 9.1
Overview

What Is in This Section?

This section contains the following topics:

Added Features Card Overview

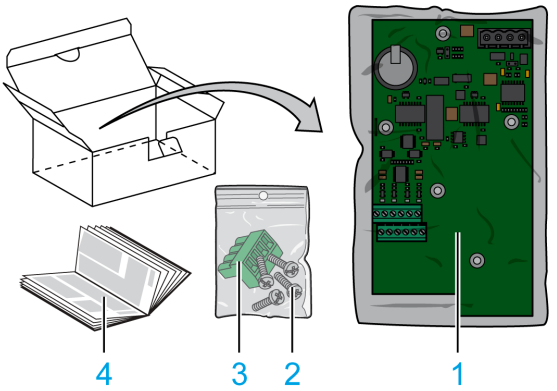
Overview

The ZARCFBA01 Added Features Card is an optional card designed to extend the functionalities of the Base Station ZARB18W• by adding:

- 4 analog inputs (current or voltage)
- Modbus SL slave RTU (Remote Terminal Unit) features for the communication between the Base Station and a Modbus master (typically a PLC).

Package Content

Applicable items that could be included in the Added Features Card package:



1 Added Features Card
2 4 M3 screws
3 Modbus removable terminal
4 Instruction Sheet

Added Features Card Characteristics

Environment

The Added Features Card specifications are described in the table:

Specification	Details	Value
Product certifications	-	CE
Environment	-	RoHS Compliant
Option card life time	-	10 years
Degree of pollution	-	3
Operating temperature	-	-25…70 °C (-13…158 °F)
Storage temperature	-	-40…70 °C (-40…158 °F)
Operating humidity range	-	0…97 %
Storage humidity range	-	0…97 %
Altitude	Operation Storage	0…2000 m (0…6561.7 ft) 0…3000 m (0…9842.5 ft)
Vibration	Standards IEC 60947-1 Annex Q IEC 61131-2, Pr NF EN 60255-1 IEC 60068-2-6, Test Fc	For each axis: 2 Hz…13.2 Hz: ±1 mm (±0.039 in) 13.2 Hz…100 Hz: ±6.86 m/s² (0.7 gn)
	DNV / BV / LROS / GL / RINA	2 Hz…8.14 Hz: ±7.5 mm (±0.295 in) 8.14 Hz…150 Hz: 19.6 m/s² (2 gn)
Shock	IEC 60947-1 Annex Q IEC 61131-2 IEC 60068-2-27, Test Ea	Peak acceleration: 147 m/s² (15 gn) for 11 ms
24V dc Power supply	-	OCV1 (24 Vdc SELV)
Voltage dips for 24V dc	-	5 ms
Resistance to radiated fields	IEC 61000-4-3, criteria A	10 V/m (80 MHz < f < 1 GHz) 3 V/m (1.4 GHz < f < 2.0 GHz) 1 V/m (2 GHz < f < 2.7 GHz)
Immunity to fast transient	IEC 61000-4-4, 24 Vdc power supply	2 kV (direct), and 4 kV with safety criteria according to IEC 62061
	IEC 61000-4-4, analog inputs and shield, Modbus serial line shield, CM	2 kV in direct on the shield of analog inputs 2 kV with coupling clamp for the dc input and dc output
Surge immunity	IEC 61000-4-5, analog inputs shield, Modbus serial line shield	CM (line to ground): 1 kV
	IEC 61000-4-5, between the power supply wires (Differential mode)	1 kV, direct coupling with a load in serial with the relay contact, criteria A

Specification	Details	Value
Immunity to conducted magnetic fields	IEC-61000-4-6, Modbus shield, analog inputs shield	150 kHz…80 MHz: 10 V
Emission disturbances	Conducted & radiated disturbances	Class A

Added Features Card Installation

Installation

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, connectors or wires except under the specific conditions specified in this user guide.
- Always use a properly rated voltage sensing device to confirm that the power is off.
- Unplug the power cable from both the equipment and the power supply.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the equipment.
- Use only the specified voltage when operating this equipment and any associated products.

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

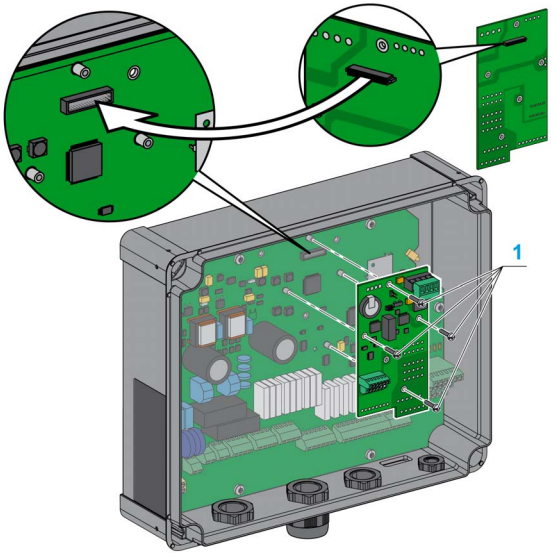
NOTICE

RISK OF DAMAGE TO THE CONNECTOR

Ensure good positioning of the Added Features Card onto the spacers to avoid damage to the connector.

Failure to follow these instructions can result in equipment damage.

Procedure to install the Added Features Card:

Step	Action
1	Power off the Base Station ZARB18W•.
2	Wait until the POWER LED becomes OFF (around 20 seconds).
3	Unscrew the 4 screws at the front of the Base Station.
4	Remove the cover.
5	Place the Added Features Card onto the spacers.
6	Screw the 4 M3 mounting screws (Tightening torque = 0.8 Nm (7.08 lb.-in)).  **1** Mounting screws
7	Install the Base Station cover.
8	Screw the 4 screws to fasten the Base Station cover.

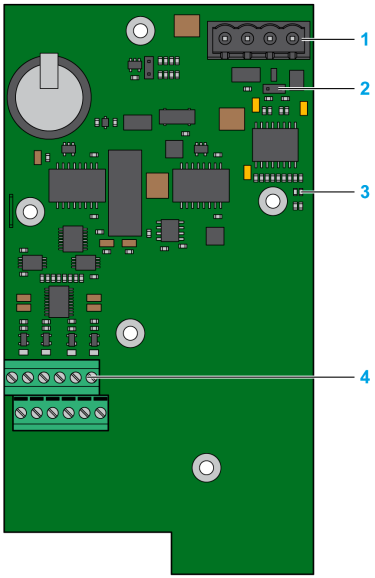
Section 9.2
Wiring

What Is in This Section?

This section contains the following topics:

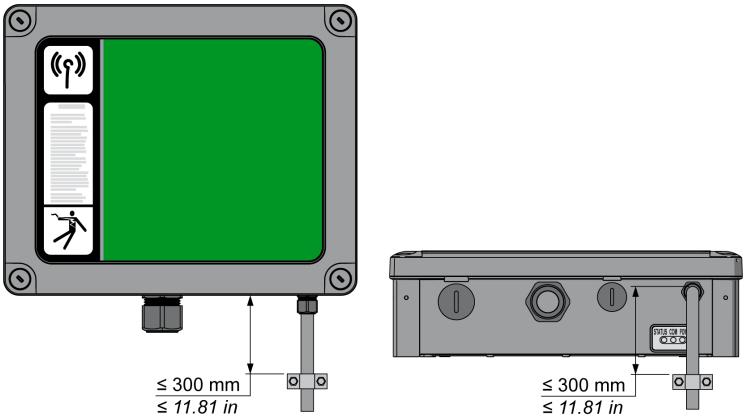
Added Features Card Wiring

Added Features Card Terminals



1 Modbus SL connector
2 Line termination resistance jumper
3 Modbus activity LEDs
4 Analog inputs terminals

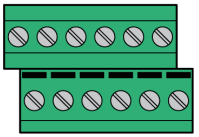
Wiring Procedure

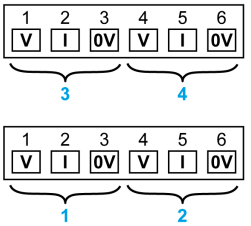
Step	Action
1	Power off the Base Station.
2	Wait until the POWER LED becomes OFF (around 20 seconds).
3	Unscrew the 4 screws at the front of the Base Station ZARB18W•.
4	Remove the cover.
5	When necessary, remove the cap of the Base Station dedicated hole and install a cable gland from the kit ZARC06 *(see page 41)* (Tightening torque = 4±0.2 N.m (35.4±0.2 lb.-in)). 
6	Introduce the cable through a cable gland. For the analog inputs wires, use a twisted-pair shielded cable with a ground connection at a maximum distance from the Base Station of 0.3 m (0.984 ft).
7	Connect the wires in the dedicated terminals. Use, if necessary, cable ends. For more details, refer to Wiring Best Practices *(see page 101)*.
8	Tight the cable gland.
9	Install the Base Station cover.
10	Screw the 4 screws to fasten the Base Station cover.

Added Features Card Analog inputs

Analog Inputs Connector Overview

The Added Features Card embeds 4 analog inputs on a screw terminal.

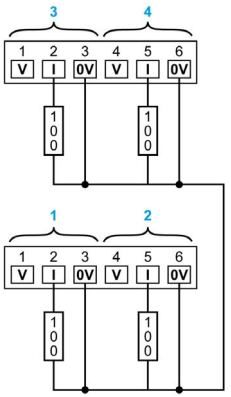




1 Physical analog input 1
2 Physical analog input 2
3 Physical analog input 3
4 Physical analog input 4

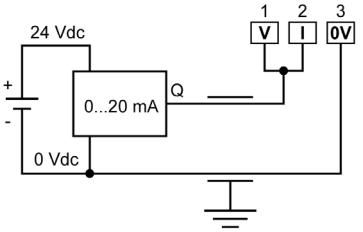
Analog Inputs Wiring

Each of the 4 analog inputs can be used as voltage or current analog input depending on the wiring:

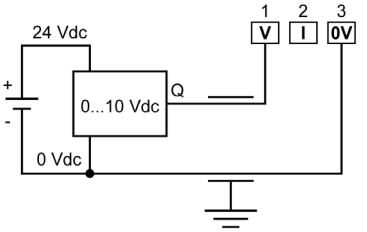


1 Physical analog input 1
2 Physical analog input 2
3 Physical analog input 3
4 Physical analog input 4

Current sensor wiring example:



Voltage sensor wiring example:



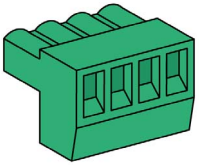
Electrical characteristics

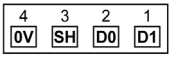
Characteristic	Description
Voltage analog input range	0…10 Vdc -10…+10 Vdc
Current analog input range	0…20 mA 4…20 mA -20…+20 mA
Cable type	Twisted-pair shielded
Maximum cable length	30 m (98.42 ft)
Permissible continuous overload on inputs.	Voltage 0…10 Vdc: 15 Vdc Voltage -10…+10 Vdc: -15 Vdc…+15 Vdc Current 0…20 mA: 30 mA Current 4…20 mA: 30 mA Current -20…+20 mA: -30 mA…+30 mA
Input conversion resistor for current inputs.	100 Ω 0.1 % 25 ppm 0.1 W
Analog input resolution	12 bits of value + 1 bit of sign
Absolute accuracy error	-25 °C…+70 °C: +/- 1 % of full scale At 25 °C: +/- 0.2 % of full scale
Absolute accuracy error in EMC perturbation	+/- 2.5 % of full scale with 1000-4-3 EMC perturbations (with software filter deactivated): ● 80 MHz…1 GHz:10 V/m ● 1.4 GHz…6 GHz: 3 V/m conforming to EN/IEC 61000-4-3
Conversion time	10 ms
Type of filters	● Hardware first order embedded filter ● Software filter accessible through the eXLhoist configuration software: n*10 ms ❍ Minimum filtering time: 10 ms (n = 1) ❍ Maximum filtering time: 10 s (n = 1000)
Input impedance	Current input: ≤ 50 Ω Voltage input: ≥ 1 MΩ
Digital value format	ZART8D•, ZART12D• Remote Devices screen: 3 digit in decimal. Analog values are available in Word and Float16 format through modbus *(see page 286)*.

Added Features Card Modbus SL Connector

Modbus SL Connector Overview

The Added Features Card embeds a Modbus serial line removable screw terminal:





1 Data 1
2 Data 0
3 Shield
4 0 V / GND Modbus

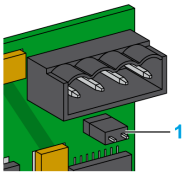
Modbus SL Wiring

Daisy chain architecture is possible by connecting 2 wires in each connection point of the terminal, using a double cable end.

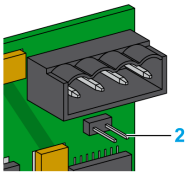
A built-in line termination resistance can be connected by the mean of a jumper:

By default, the jumper provided is placed onto the 2 upper pins, which activates the line termination resistance.

Disconnect the jumper if the Added Features Card is not at the end of the network.

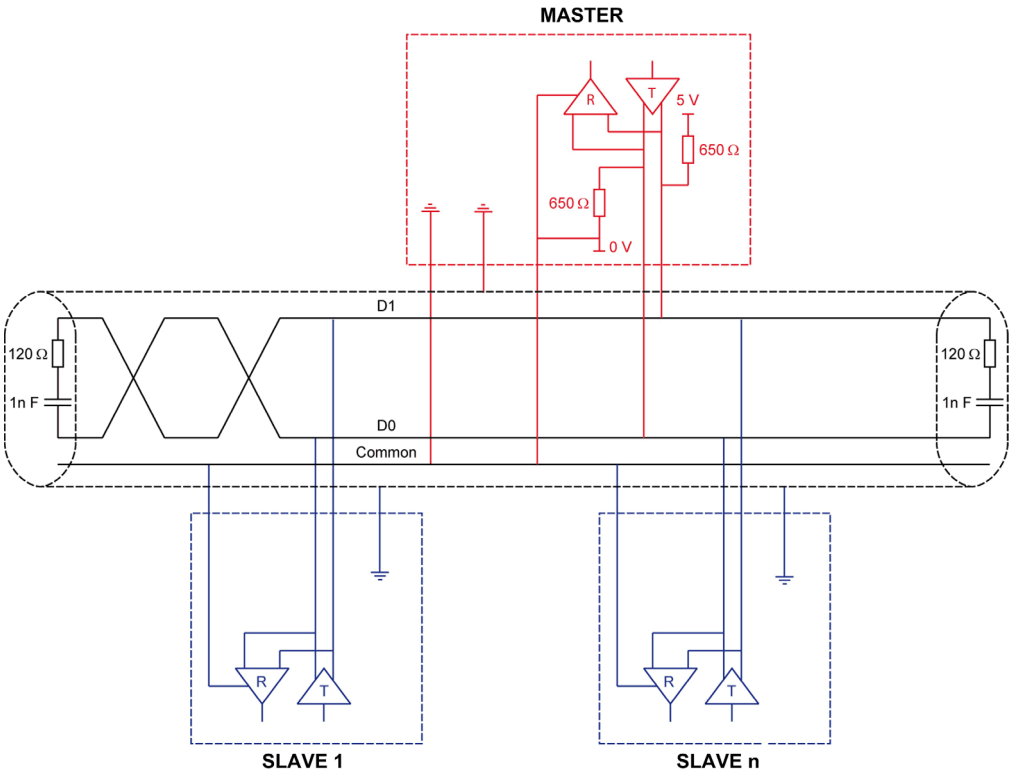


1 Line termination resistance connected.



2 Line termination resistance disconnected.

Schematic diagram



Protection against interferences:

- Use the Schneider Electric cable with 2 pairs of shielded twisted conductors (reference: TSXCSA100, TSXCSA200, and TSXCSA500).
- Keep the Modbus cable separated from the power cables (0.3 m (0.98 ft) minimum).

Section 9.3
Software Configuration

What Is in This Section?

This section contains the following topics:

Added Features Card Software Configuration Overview

Overview

The Added Features Card tabs are accessible if the Added Features Card has been selected in the Configure System window while creating a new project.

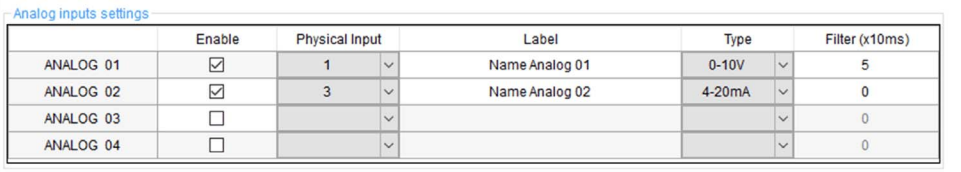
The system Configuration can be modified in the Project Configuration window *(see page 216)*.

In the Project Configuration tree view, the Added Features Card ZARCFBA01 is down to the Base Station of each System.

Added Features Card Analog Inputs Configuration

Overview

In the **I/O** tab, you can configure the analog inputs of the Added Features Card:



Configuration

For each ANALOG 0x, the following is available:

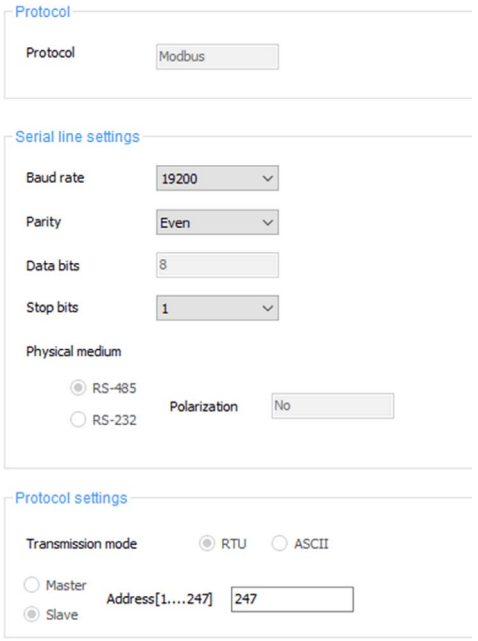
- Enable/Disable the analog input in the **Enable** column.
- Select one of the 4 physical inputs for the desired analog input.
  It is not possible to use the same physical input twice.
- Set a customized **Label** for the analog input (up to 20 digits).
- Select the **Type** of physical input:
  - 0-10 V
  - 0-20 mA
  - 4-20 mA
  - +/-10 V
  - +/-20 mA
- A **Filter** value (x10 ms) can be applied on the physical input value.

NOTE: Physical inputs configured in this tab must be used in the display tab.

Added Features Card Modbus SL Configuration

Overview

In the **Serial Link** tab, you can configure the Modbus SL communication channel of the Added Features Card:



Configuration

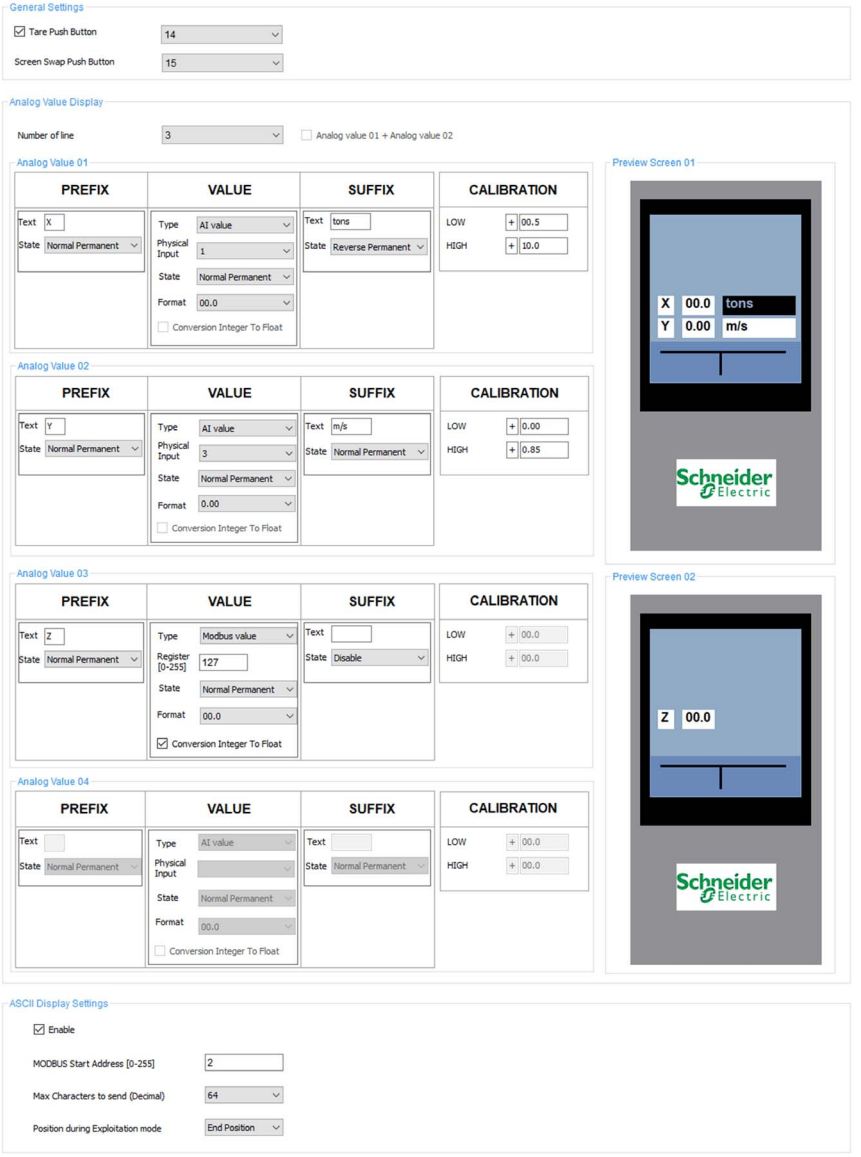
The Modbus Serial Link can be set using the following:

- Baud rate from 1200 to 38400 bps.
- Parity:
  - none
  - even
  - odd
- Stop bits:
  - 1
  - 2
- The Modbus address from 1 to 247.

Added Features Card Display Configuration

Overview

In the **Display** tab, you can configure the display for the functions related to the Added Features Card:



Configuration

For each of the 2 screens, up to 2 lines can be configured. The following is available:

- Set an alphanumerical **prefix** (1 digit) and select its display state.
- Select the value to display and select its display state:
  - One of the 4 physical inputs value and/or
  - a Modbus register value.
    An automatic Integer to Float conversion can be selected.
- Set an alphanumerical **suffix** for the displayed value (up to 4 digits) and select its display state.
- Preset the calibration value *(see page 305)*.

If at least 2 screens are involved in the settings *(see page 303)*:

- The Screen Swap Push Button can be selected.

If at least 1 physical analog input is involved in the settings:

- The Tare function can be activated *(see page 308)* and the related button can be selected.

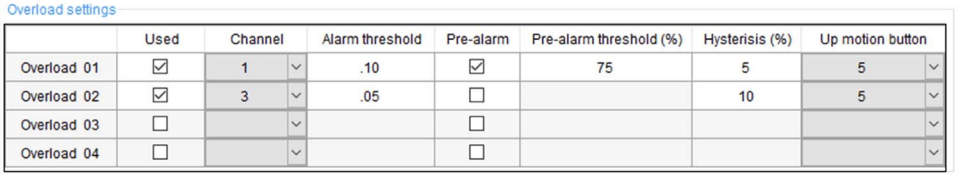
The ASCII Display function can be activated *(see page 304)*, and the following settings are available:

- the Modbus address from 0 to 255.
- The maximum string length (up to 64 ASCII characters).
- The position of the ASCII display screen during START mode:
  - End position.
  - First position.

Added Features Card Overload Configuration

Overview

In the **Overload** tab, you can configure the overload function for the analog inputs of the Added Features Card:



Configuration

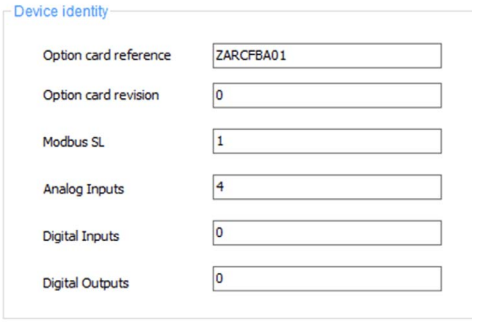
For each of the 4 Overload 0x function, the following is available:

- Enable/Disable the overload function in the **Used** column.
- Select one of the 4 physical inputs for the desired function.
  It is not possible to use the same physical input twice.
- Set the **Alarm threshold** value.
- Enable/Disable the pre-alarm function in the **Pre-alarm** column.
- Set the **Pre-alarm threshold** value in percent.
- Set an **Hysteresis** value in percent.
- Select the **Up motion button** for the related function.

Added Features Card Device Identity

Overview

From the **Device Identity** tab, you can read generic information from the Added Features Card:



Section 9.4
Modbus SL Communication

What Is in This Section?

This section contains the following topics:

Added Features Card Modbus SL Communication

Added Features Card Modbus SL Characteristics

Characteristic	Description
Insulation	500 Vac
Line termination resistance	Built-in, 150 Ω (0.5 W) / 1 nF Factory setting: connected
Modbus device type	Slave
Physical layer	RS-485
Transmission type	Modbus RTU capable
Address range	1…247
Baud rate	4800 bps 9600 bps 19200 bps (factory setting) 38400 bps
LED indicators	Yellow LEDs to display the Modbus activity(1)
Connector type	4 points removable screw terminal Pitch: 5.08 mm (0.19 in.)
(1) Both LEDs are blinking in a proper send/receive communication.	

Read / Write Modbus Mapping Table

Device	Address	Description	Data type	Read / Write
Remote Device	$0000_{(h)}$	Analog Display Modbus ASCII Display Modbus Vibrator for ASCII Display (Register + 1)	Word	R/W
	…		Word	R/W
	$00FF_{(h)}$		Word	R/W
Remote Device and Base Station	$0F00_{(h)}$	Button states 1 *(see page 288)*	Word	R
	$0F01_{(h)}$	Button states 2 *(see page 288)*	Word	R
	$0F02_{(h)}$	Base Station states (MSB) & selector state (LSB) *(see page 289)*	Word	R
	$0F03_{(h)}$	Base Station error code (MSB) & Base Station role (LSB) *(see page 289)*	Word	R
	$0F04_{(h)}$	DI 1 Base Station (IN0 to IN15) *(see page 293)*	Word	R
	$0F05_{(h)}$	DI 2 Base Station (IN16 to IN18) *(see page 294)*	Word	R
	$0F06_{(h)}$	DO 1 (Safety Relays to Relay 14) *(see page 294)*	Word	R
	$0F07_{(h)}$	DO 2 (Relay 15 to Relay 18) *(see page 294)*	Word	R
	$0F08_{(h)}$	Reserved	Word	R
	$0F09_{(h)}$	Reserved	Word	R
	$0F0A_{(h)}$	Reserved	Word	R
	…	-	-	R

Device	Address	Description	Data type	Read / Write
Added Features Card	$0F30_{(h)}$	Analog Value 1	Word	R
	$0F31_{(h)}$	Analog Value 1	Float 16	R
	$0F32_{(h)}$	Analog Value 2	Word	R
	$0F33_{(h)}$	Analog Value 2	Float 16	R
	$0F34_{(h)}$	Analog Value 3	Word	R
	$0F35_{(h)}$	Analog Value 3	Float 16	R
	$0F36_{(h)}$	Analog Value 4	Word	R
	$0F37_{(h)}$	Analog Value 4	Float 16	R
	$0F38_{(h)}$	Reserved	-	-
	$0F39_{(h)}$	Reserved	-	-
	$0F3A_{(h)}$	Analog Input 1 Low	Float 16	R
	$0F3B_{(h)}$	Analog Number 1 Low	Float 16	R
	$0F3C_{(h)}$	Analog Input 1 High	Float 16	R
	$0F3D_{(h)}$	Analog Number 1 High	Float 16	R
	$0F3E_{(h)}$	Analog Input 2 Low	Float 16	R
	$0F3F_{(h)}$	Analog Number 2 Low	Float 16	R
	$0F40_{(h)}$	Analog Input 2 High	Float 16	R
	$0F41_{(h)}$	Analog Number 2 High	Float 16	R
	$0F42_{(h)}$	Analog Input 3 Low	Float 16	R
	$0F43_{(h)}$	Analog Number 3 Low	Float 16	R
	$0F44_{(h)}$	Analog Input 3 High	Float 16	R
	$0F45_{(h)}$	Analog Number 3 High	Float 16	R
	$0F46_{(h)}$	Analog Input 4 Low	Float 16	R
	$0F47_{(h)}$	Analog Number 4 Low	Float 16	R
	$0F48_{(h)}$	Analog Input 4 High	Float 16	R
	$0F49_{(h)}$	Analog Number 4 High	Float 16	R
	$0F4A_{(h)}$	Analog inputs error	Word	R
Reserved	$0F4B_{(h)}$	Reserved	-	-
	…		-	-
	$FFFF_{(h)}$		-	-

Button states 1 Register 0F00$_{(h)}$

Bit	Description	
Bit 0	Button 1 state	Value 0: The button is released. Value 1: The button is pressed.
Bit 1	Button 1H state	
Bit 2	Button 2 state	
Bit 3	Button 2H state	
Bit 4	Button 3 state	
Bit 5	Button 3H state	
Bit 6	Button 4 state	
Bit 7	Button 4H state	
Bit 8	Button 5 state	
Bit 9	Button 6 state	
Bit 10	Button 7 state	
Bit 11	Reserved	
Bit 12	Reserved	
Bit 13	Button 8 state	
Bit 14	Button 8 state	
Bit 15	Button 9 state	

Button states 2 Register 0F01$_{(h)}$

Bit	Description	
Bit 0	Button 10 state	Value 0: The button is released. Value 1: The button is pressed.
Bit 1	Button 11 state	
Bit 2	Button 12 state	
Bit 3	Button 13 state	
Bit 4	Button 14 state	
Bit 5	Button 15 state	
Bit 6…Bit 15	Reserved	-

Base Station states & selector state Register 0F02$_{(h)}$

Bit	Description	
Bit 0	Trolley / Hook 1 Selector.	Value 0: No configuration. Value 1: Trolley / Hook 1 state. Value 2: Trolley / Hook 2 state. Value 3: Trolley / Hook 1+2 state.
Bit 1		
Bit 2		
Bit 3	Bridge Selector.	Value 0: No configuration. Value 1: Bridge 1 state. Value 2: Bridge 2 state. Value 3: Bridge 1+2 state.
Bit 4		
Bit 5	Unpairing acknowledge.	Value 0: No unpairing acknowledgment. Value 1: Unpairing acknowledgment.
Bit 6	Trolley / Hook 2 Selector.	Value 0: No configuration. Value 1: Trolley / Hook 1 state. Value 2: Trolley / Hook 2 state. Value 3: Trolley / Hook 1+2 state.
Bit 7		
Bit 8	Base Station state	Value 0: Not Used Value 1: Base Station is in STOP state Value 2: Base Station is in RUN state Value 3: Not Used Value 4: Base Station is in E-STOP state (E-Stop engaged) Value 5: Base Station is in E-STOP state (E-Stop disengaged) Value 6: Base Station is in INx test failure state Value 7: Base Station is in SAFE-STOP Failure state
Bit 9		
Bit 10		
Bit 8…Bit 15	Reserved	-

Base Station error code & Base Station role Register 0F03$_{(h)}$

Base Station role (LSB)

Value$_{(h)}$	Description
0(h)	Single
1(h)	Primary
2(h)	Secondary

Error code (MSB)

Value$_{(h)}$	Function	Description
1(h)	-	Detected error during the configuration phase of the CC2541, create advertising phase
2(h)	E-STOP	E-Stop counters detected error
3(h)	RAD COM	The bit motion diag in the payload from REMOTE is the same with previous frame
4(h)	STOP	I1 inactive, I2 inactive, stop word null
5(h)		I1 inactive, I2 inactive, other values than 0 or stop word not in accordance with (m1_m2) index
6(h)		i1 inactive, I2 active, other values than 0 or stop word not in accordance with (m1_m2) index
7(h)		I1 active, I2 inactive, other values than 0 or stop word not in accordance with (m1_m2) index
8(h)		i1 active, i2 active, other values than 0 or stop word not in accordance with (m1_m2) index
9(h)	-	No response from UC2 (for verifiy UC1 UC2 task)
0A…0F(h)	Reserved	-
10(h)	UC COM	The frame received from the another UC contains a length detected error
11(h)		The frame received from the another UC contains a CRC8 detected error
12(h)	RAD COM	The server handle in the HCI event is different with the server handle in the payload from REMOTE
13(h)		The server handle is different than 0x10, 0x20 or 0x30
14(h)		The telegram id received from the another UC is the same between 2 frames
15(h)	UC COM	The states between UC1 and UC2 are different
16(h)		The state received from UC1 is not valid
17(h)	EEPROM	An error has been detected when reading the configuration file in the EEPROM
18(h)		An error has been detected when reading default configuration file primary in the EEPROM just written
19(h)		An error has been detected when writing the configuration file received from Remote
1A(h)		An error has been detected when reading the DS file in the EEPROM
1B(h)		An error has been detected when reading the default configuration file secondary in the EEPROM just written
1C…1F(h)	Reserved	-
20(h)	CHECK	The state of the contact is different with the state of the command of the safety relays
21(h)	Reserved	-
22(h)	CHECK	An error has been detected between the UC number read of input and the UC number received from another UC
23(h)		An error has been detected when testing the power supply
24(h)		An error has been detected when testing the output loop-back
25(h)	EEPROM	The UC state read in the EEPROM is not STOP_STATE or E_STOP_STATE_DISENGAGED

Value$_{(h)}$	Function	Description
26(h)	CHECK	An error has been detected when testing the limit switches
27(h)		Base ID address detected error between UC1 and UC2
28(h)		RAM detected error in the configuration file structure
29(h)	-	UC2 counter input task detected error
2A(h)	-	Firmware version detected error
2B(h)	-	The Base ID is not from 0x0080F4000000 to 0x80F403FFFF
2C(h)	-	The Vendor ID value is not from 0x0001 to 0xEEEE
2D(h)	-	The Vendor ID value is not the same between UC1 and UC2
2E…2F(h)	Reserved	-
30(h)	RAD COM	An error has been detected in the state button received from REMOTE
31(h)		The single CRC computed by UC1 is different from the single CRC received from REMOTE
32(h)		The COMM_ID_CRC computed by UC1 is different from the COMM_ID_CRC received from REMOTE
33(h)		The type HCI event received from CC2541 in the event frame is not 0x04
34(h)		The event code received from CC2541 in the event frame is not 0xFF
35(h)		The opcode of the event received from CC2541 in the event frame is unknown
36(h)	UC COM	The number of bytes received from UC2 is not correct
37(h)	INPUT	An error has been detected when reading the PCB version
38(h)		An error has been detected when reading the PCB version
39(h)	RAD COM	The MBC_CRC computed by UC1 is different from the MBC_CRC received from the other BASE
3A(h)	-	A detected error from UC1 is received
3B(h)	-	A detected error from UC2 is received
3C…3F(h)	Reserved	-
40(h)	SAFETY	ESM detected error
41(h)		CRC flash detected error
42(h)		Parameter flash detected error CRC
43…4F(h)	Reserved	-

Value$_{(h)}$	Function	Description
50(h)	SAFETY	Counter task error: task UC1 communication with UC2
51(h)		Counter task error: task UC1 check
52(h)		Counter task error: task UC1 RAD receive
53(h)		Counter task error: task UC1 safety
54(h)		Counter task error: task UC1 RAD send
55(h)		Counter task error: task UC1 output
56(h)		Counter task error: task UC2 input
57(h)		Counter task error: task UC2 receive from UC2
58(h)		Counter task error: task UC2 send to UC1
59(h)		Counter task error: task UC2 check
5A(h)		Counter task error: task UC2 safety
5B(h)		Counter task error: task UC2 RAD sniff
5C(h)		Counter task error: task UC1 data storage
5D(h)		Counter task error: task UC1 input
5E(h)		Counter task error: task UC1 Modbus
5F(h)		Counter task error: task UC1 page display
60(h)	-	UC number detected error
61(h)	-	Hardware detected error
62…69(h)	Reserved	-
6A(h)	SAFETY	Counter task error: task UC1 send IOT data
6B…6F(h)	Reserved	-
70(h)	-	SRDY line detected error
71(h)	-	Send_Byte_SPI1: error of flag spiREG1.BUF (wait for the end of sending SPI1)
72(h)	-	Send_Frame_To_CC2541: error of flag spiREG1.FLG (wait for the end of sending SPI1)
73(h)	-	Read_Byte_SPI1: error of flag spiREG1.FLG (wait for the end of receiving SPI1)
74…7F(h)	Reserved	-
80(h)	MBC	Lifesign detected error
81…CF(h)	Reserved	-

Value$_{(h)}$	Function	Description
D0(h)	SAFERTOS	Detected error safertos for UC1: RAD receive task
D1(h)		Detected error safertos for UC1: RAD send task
D2(h)		Detected error safertos for UC1: communication with UC2 task
D3(h)		Detected error safertos for UC1: initialization task
D4(h)		Detected error safertos for UC1: link establish task
D5(h)		Detected error safertos for UC1: output task
D6(h)		Detected error safertos for UC1: verify UC2 task
D7(h)		Detected error safertos for UC2: RAD sniff task
D8(h)		Detected error safertos for UC2: input task
D9(h)		Detected error safertos for UC2: receive from UC1 task
DA(h)		Detected error safertos for UC2: send to UC1 task
DB(h)		Detected error safertos for check task
DC(h)		Detected error safertos for safety task
DD(h)		Detected error safertos for safe stop failure task
DE(h)		Detected error safertos for IT SPI2
DF(h)		Detected error safertos for IT SRDY line
E0(h)		Detected error safertos for UC1: data storage task
E1(h)		Detected error safertos for UC1: Modbus task (option card)
E2(h)		Detected error safertos for UC1: input task (option card)
E3(h)		Detected error safertos for UC1: page display task
E4(h)		Detected error safertos for UC1: send data IOT task
E5…FF(h)	Reserved	-

DI 1 Base Station (IN0 to IN15) Register 0F04$_{(h)}$

Bit	Description	
Bit 0	Digital input 1	Value 0: The digital input is at inactive state. Value 1: The digital input is at active state.
…	…	
Bit 15	Digital input 16	

DI 2 Base Station (IN16 to IN18) Register 0F05(h)

Bit	Description	
Bit 0	Digital input 17	Value 0: The digital input is at inactive state. Value 1: The digital input is at active state.
Bit 1	Digital input 18	
Bit 2…Bit 15	Reserved	-

DO 1 (Safety relays to Relay 14) Register 0F06(h)

Bit	Description	
Bit 0	Safety relay 19	Value 0: The digital output is at inactive state. Value 1: The digital output is at active state.
Bit 1	Safety relay 20	
Bit 2	Digital output 1	
…	…	
Bit 15	Digital output 14	

DO 2 (Relay 15 to Relay 18) Register 0F07(h)

Bit	Description	
Bit 0	Digital output 15	Value 0: The digital output is at inactive state. Value 1: The digital output is at active state.
Bit 1	Digital output 16	
Bit 2	Digital output 17	
Bit 3	Digital output 18	
Bit 4…Bit 15	Reserved	-

Analog Inputs Error Register 0F4A(h)

Bit	Description	
Bit 0	Analog input 1	Value 0: No error detected. Value 1: An error has been detected. The input data is considered as not reliable.
Bit 1	Analog input 2	
Bit 2	Analog input 3	
Bit 3	Analog input 4	
Bit 4…Bit 15	Reserved	-

Modbus Protocol

Introduction

The transmission mode used is RTU. The frame does not contain message header and end of message bytes.

Slave address	Request code	Data	CRC16

The data is transmitted in binary code.

CRC16: cyclical redundancy check.

The end of the frame is detected on a silence greater than or equal to three characters.

Principle

Only one device can transmit on the line at any time.

The master manages the exchanges and only it can take the initiative.

It interrogates each of the slaves in succession

No slave can send a message unless it is invited to do so.

The master repeats the question when there is an incorrect exchange, and declares the interrogated slave unavailable if no response is received within a given time period.

If a slave does not understand a message, it sends an exception response to the master. The master may or may not repeat the request.

Direct slave-to-slave communications are not possible.

For slave-to-slave communication, the application software must therefore be designed to interrogate a slave and send back data received to the other slave.

The 2 types of dialogue are possible between master and slaves:
- The master sends a request to a slave and waits for its response
- The master sends a request to all slaves without waiting for a response (broadcasting principle)

Addresses

Address specification:
- The device Modbus address can be configured from 1 to 247.
- Address 0 coded in a request sent by the master is reserved for broadcasting. Slave devices take account of the request, but do not respond to it.

Supported Modbus Functions

Introduction

The device supports the following Modbus functions:

Function Name	Code		Description	Remarks
	Dec.	Hex		
`Read Holding Registers`	03	03_h	Read N output words	Maximum PDU length: 63 words
`Write Multiple Registers`	16	10_h	Write N output word	Maximum PDU length: 61 words
(Subfunction) `Read Device Identification`	43/14	$2B_h/0E_h$	Encapsulated interface transport/Read device identification	–

Read Holding Registers

This function can be used to read all words of the device, both input words and output words.

Request

Function code	1 byte	03_h
Starting address	2 bytes	$0000_h...FFFF_h$
Quantity of registers	2 bytes	1...63 ($3F_h$)

Response

Function code	1 byte	03_h
Byte count	1 byte	2 x N(1)
Register value	N(1) x 2 bytes	–
(1) N: Quantity of registers		

Request frame

Slave no.	03_h	No. of first word		No. of words		CRC16	
		Hi	Lo	Hi	Lo	Lo	Hi
1 byte	1 byte	2 bytes		2 bytes		2 bytes	
Hi = high-order byte, Lo = low-order byte.							

Response frame

Slave no.	03_h	Number of bytes read	First word value		Last word value		CRC16	
			Hi	Lo	Hi	Lo	Lo	Hi
1 byte	1 byte	1 byte	2 bytes		2 bytes		2 bytes	
Hi = high-order byte, Lo = low-order byte.								

Detected error

Detected error code	1 byte	83_h
Exception code	1 byte	02_h...03_h

Exception code values meaning:
- 02_h: Starting address is not correct.
- 03_h: Quantity of registers ≥$7D_h$.

Write Multiple Register

This function can be used to write all input words of the device.

Request

Function code	1 byte	10_h
Starting address	2 bytes	0000_h...$00FF_h$
Quantity of registers	2 bytes	1...63 ($3F_h$)

Response

Function code	1 byte	10_h
Byte count	1 byte	2 x N(1)
Register value	N(1) x 2 bytes	–
(1) N: Quantity of registers		

Request frame

Slave no.	10_h	No. of first word		Number of words		Number of bytes	Value of first word		CRC16	
		Hi	Lo	Hi	Lo		Hi	Lo	Lo	Hi
1 byte	1 byte	2 bytes		2 bytes		1 byte	2 bytes		2 bytes	

Response frame

Slave no.	10_h	No. of first word		No. of words		CRC16	
		Hi	Lo	Hi	Lo	Lo	Hi
1 byte	1 byte	2 bytes		2 bytes		2 bytes	

Detected error

Detected error code	1 byte	83_h
Exception code	1 byte	$02...03_h$

Exception code values meaning:

- 02_h: Starting address is not correct.
- 03_h:
  - Quantity of registers ≥$7B_h$.
  - Byte count ≠ Register value (2 x Quantity of registers).

Read Device Identification

The table provides the device identification details:

Category	ID	Name / Description	Type	Length
Basic Read Device Id $01_h...03_h$	00_h	VendorName	ASCII String	$1D_h$
	01_h	ProductCode	ASCII String	01_h
	02_h	MajorMinorRevision	ASCII String	07_h
Regular Read Device Id $02_h...03_h$	03_h	Vendor URL	ASCII String	021_h
	04_h	Product Name	ASCII String	08_h
	05_h	Model Name	ASCII String	07_h
Extended Read Device Id 03_h	80_h	Base BLE ID	ASCII String	$0C_h$
	84_h	Detail Base Firmware Version	Byte	06_h
	87_h	Vendor ID of Base Device	Byte	02_h
	88_h	SupportedActivationKeybyBaseDevice	Byte	02_h

Example transaction for a basic read device identification:

Request frame

Slave no.	$2B_h$	Type of MEI $0E_h$	Read Device Id 01_h	Object Id 00_h	CRC16	
					Lo	Hi
1 byte	1 byte	1 byte	1 byte	1 byte	2 bytes	

Response frame

Slave no.	$2B_h$	Type of MEI $0E_h$	Read Device Id 01_h	Degree of conformity 02_h
1 byte	1 byte	1 byte	1 byte	1 byte

Number of additional frames 00_h	Next object Id 00_h	Number of objects 03_h
1 byte	1 byte	1 byte

Content of the objects:

Vendor name

Id of object 00_h	Length of object 12_h	Value of object "**Schneider Electric**"
1 byte	1 byte	18 bytes

Product Code

Id of object 01_h	Length of object $1D_h$	Value of object ZARB18W: "**3606480610370**"
1 byte	1 byte	29 bytes

MajorMinorRevision

Id of object 02_h	Length of object 07_h	Value of object "**xxx.yyy**"
1 byte	1 byte	7 bytes

Vendor URL

Id of object 03_h	Length of object 21_h	Value of object “**http://www.schneider-electric.com**”
1 byte	1 byte	33 bytes

Product Name

Id of object 04_h	Length of object 08_h	Value of object “**eXLhoist**”
1 byte	1 byte	8 bytes

Model Name

Id of object 05_h	Length of object 07_h	Value of object “**ZARB18W**”
1 byte	1 byte	7 bytes

Base BLE ID

Id of object 80_h	Length of object $0C_h$	Value of object **xxxxxxxxxxx**
1 byte	1 byte	12 bytes

Detail Base Firmware version

Id of object 84_h	Length of object 06_h	Value of object $\mathbf{XX_h.YY_h.ZZZZ_h.TTTT_h}$
1 byte	1 byte	6 bytes

Vendor ID of Base Device

Id of object 87_h	Length of object 02_h	Value of object $\mathbf{LSB_h.MSB_h}$
1 byte	1 byte	2 bytes

Supported Activation Key by Base Device

Id of object 88_h	Length of object 02_h	Value of object $\mathbf{Byte2_h.Byte1_h}$
1 byte	1 byte	2 bytes

Detected error

Detected error code	1 byte	83_h
Exception code	1 byte	$01...03_h$

Exception code values meaning:

- 01_h:
  - **Function code** not supported.
  - **Type of MEI** not supported.
- 02_h: **Object Id** not supported.
- 03_h: **Read Device Id** Id not supported.

Section 9.5
Added Features Card Operation

What Is in This Section?

This section contains the following topics:

Added Features Card Page Management

Page Management

The Remote Device can display up to 3 pages:

- 2 pages with 2 Analog values display
- 1 page with ASCII Display

Page swap push button is needed to change the page displayed in START mode. For more information on the **Page swap** configuration, refer to Display configuration *(see page 280)*.

This allows the operator to have a feedback from the machine through:

- Analog inputs data.
- Plain text messages dynamically updated by the PLC.

Added Features Card ASCII Display

Overview

This screen displays information read from the PLC as ASCII characters.

This screen is present in diagnostic mode or in START mode, depending on the configuration on eXLhoist Configuration Software.

In START mode, this screen can be set as first or end position.

This screen contains 4 line of 16 ASCII characters.

The Modbus frame must contain the following:
- Start byte: 02_h
- 32 words for 64 ASCII characters in hexadecimal
- Stop byte: 03_h

In eXLhoist Configuration Software, it is necessary to configure:
- The start address Modbus implemented on the PLC
- The maximum number of characters (40_h for 64 characters)

For more information, refer to Display configuration *(see page 280)*.

ASCII Display

This plain text area allows to use the screen of the Remote Device as a remote display for the operator.

Added Features Card Calibration

Calibration

The calibration of the analog inputs must be realized during commissioning phase.

Procedure example to calibrate Analog 01 input for weight measurement:

Step	Action
1	Fill calibration parameters on eXLhoist Configuration Software in order to pre-set the values. For more information, refer to Display configuration *(see page 280)*.
2	Place a light weight (0.5 tons for example).
3	Press buttons 1H+2H then 3H+4H. **Result**: The Remote Device enter the diagnostic mode *(see page 174)*.
4	Press button 7 (trigger). **Result**: The **Calibration** menu is selected.
5	Enter the password if required.
6	Press button 7 (trigger). **Result**: Analog 01 is the first analog input.
7	Select MIN and press button 7 (trigger). **Result**: MIN is selected.
8	Increase or decrease value from the pre-set value with buttons 5 and 6 to get close to the correct weight.
9	Press button 7 (trigger). **Result**: Remote Device powers off.
10	Power on the Remote Device. **Result**: Automatic Configuration File transfer is displayed.
11	Power cycle the Remote Device.
12	Place a heavy weight (10 tons for example).
13	Press buttons 1H+2H then 3H+4H. **Result**: The Remote Device enter the diagnostic mode *(see page 174)*.
14	Press button 7 (trigger). **Result**: The **Calibration** menu is selected.
15	Enter the password if required.
16	Press button 7 (trigger). **Result**: Analog 01 is the first analog input.
17	Select MAX and press button 7 (trigger). **Result**: MAX is selected.

Step	Action
18	Increase or decrease value from the pre-set value with buttons 5 and 6 to get close to the correct weight.
19	Press button 7 (trigger). **Result**: Remote Device powers off.
20	Power on the Remote Device. **Result**: Automatic Configuration File transfer is displayed.
21	Power cycle the Remote Device. **Result**: Analog 01 is calibrated.

Repeat the procedure for the other analog inputs.

Added Features Card Overload

Overload

The overload function is configured with eXLhoist Configuration Software *(see page 282)*.

Up to 4 overloads can be configured (1 for each analog input).

The following parameters must be configured:

- Alarm threshold
- Pre-alarm enable/disable
- % of the alarm threshold for the Pre-alarm
- Hysteresis (%)
- Button motion up (Motion up is not allowed during the overload)

There are 2 Overload relays:

- 1 Alarm
- 1 Pre-alarm

NOTE: There are 2 signalizations on the Remote Device for Alarm and Pre-alarm working in the same way as Overload with Base Station input.In Single mode, **Overload** function and Overload with Base Station input are complementary.

Added Features Card Tare

Tare

Tare push button must be configured to set a tare on 1 analog input value. To configure the button associated to the function in eXLhoist Configuration Software, refer to Display configuration *(see page 280)*.

Procedure to execute the **tare** function:

Step	Action
1	Press the **Tare** push button. **Result**: The Remote Device enter the **tare** mode
2	Press the button corresponding to the analog input to select. **Result:** The selected analog input line is blinking.
3	Press the **Tare** push button more than 1 s. **Result:** The **tare** function is validated.
4	Press **return** button to finish the **tare** process.

Chapter 10
Data Storage

What Is in This Chapter?

This chapter contains the following topics:

Data Storage Overview

Overview

Data Storage function allows to store in the Base Station cumulative operation hours and number of operations of the:

- Motions and auxiliary buttons
- Alarm inputs

The Data Storage function generates 2 kinds of data:

- Non-settable and non-resettable data,
- Settable and resettable data. Thresholds can be assign to theses settable and resettable data. If stored data overpasses the threshold value, the maintenance relay is permanently activated.

Principle

Depending on the Base Station type, up to 8 axis and 6 inputs can be assigned for the data storage.

Each axis can be assign to 1 or 2 buttons and 1 auxiliary selector.

If 2 buttons are assigned to an axis (for example forward and reverse), the Base Station stores for this axis:

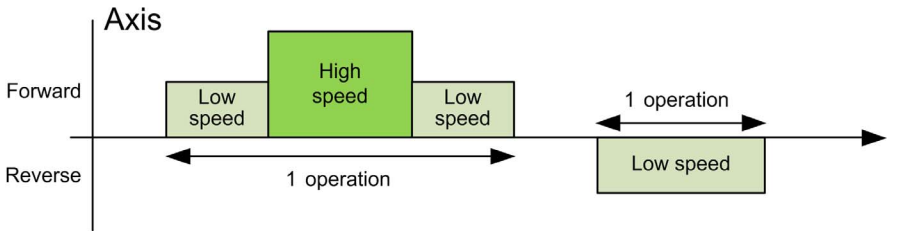
- Cumulative operation hours
- Number of operations(1)
- Number of pulsating(2) operations
- Number of backtracking(3) operations

If one button is assigned to an axis, the Base Station stores for this axis:

- Cumulative operation hours
- Number of operations(1)
- Number of pulsating(2) operations

(1) **Number of operations:**

The number of operations is the number of an axis direction command (for example, the number of hoist operations of up and down movement activated). Each forward and each reverse command increases the count by one.

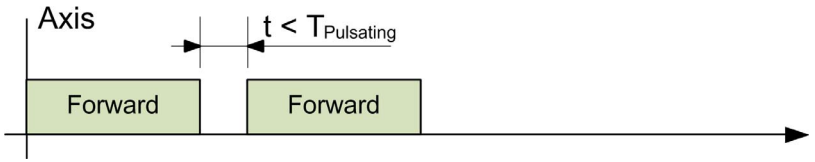


(2) **Pulsating:**

If the same direction movement command (forward or reverse) is given within a period $T_{Pulsating}$ in seconds, a pulsating event is recorded and a count is incremented by one.

A pulsating incident is defined as followed:

- A falling edge on a forward command followed by a rising edge of a forward command within a configurable time in seconds ($T_{Pulsating}$).
- A falling edge on a reverse command followed by a rising edge of a reverse command within a configurable time in seconds ($T_{Pulsating}$).



Schneider Electric recommends using $T_{Pulsating}$ = 2 s but $T_{Pulsating}$ is configurable from 0.1 s to 5 s with a step = 0.1 s.

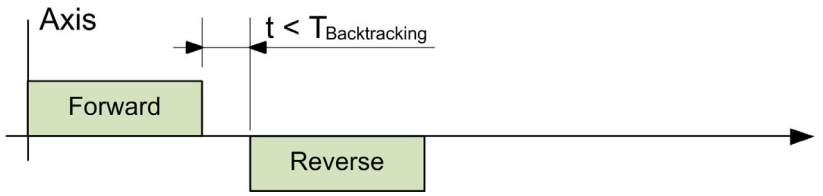
(3) **Backtracking:**

If different direction movement commands (forward and reverse) are given within a period $T_{Backtracking}$ in seconds, a backtracking event is recorded and a count is incremented by one. If both forward and reverse movement commands are received simultaneously, no backtracking operation is recorded.

A backtracking incident is defined as followed:

- A falling edge on a forward command followed by a rising edge of a reverse command within a configurable time in second ($T_{Backtracking}$).
- A falling edge on a reverse command followed by a rising edge of a forward command a configurable time in second ($T_{Backtracking}$).

Schneider Electric recommends using $T_{Backtracking}$ = 2 s but $T_{Backtracking}$ can be configurable between 0.1 s and 5 s with a step of 0.1 s.



Maintenance Relay

A Maintenance relay can be configured on the Base Station among the existing relays.

If Settable and resettable data overpasses the threshold value, the maintenance relay is permanently activated.

The maintenance relay is deactivated only after a reset of the corresponding Settable and resettable data is performed through the eXLhoist Data Storage Recovery Software.

The maintenance relay can be connected to a beacon on the machine or to a centralized maintenance HMI or monitoring.

The maintenance relay can be connected to the generic input alarm of the Base Station in order to inform the operator through the Remote Device ZART•D•.

System Component

With eXLhoist Configuration Software, you can configure Axis assignments, thresholds, and maintenance relay assignment.

With eXLhoist Data Storage Recovery Software, the maintenance operator can:

- Download the data stored in the Base Station. The Remote Device is the gateway between the Base Station and eXLhoist Data Storage Recovery Software.
- Set / Reset counters in the Base Station.
- Save in a CSV file the data stored in the Base Station.

The Data storage access is protected by a password. This password allows reading, setting, downloading, and resetting Data Storage data.

The Data Storage functionality requires the eXLhoist Data Storage Recovery Software use. For further details, consult your Regional Schneider Electric Sales Office.

Data Storage Configuration

Configuration Modification

The following procedure describes how to create and modify the system configuration

Step	Action
1	Connect the Remote Device to a PC *(see page 192)*.
2	Start the eXLhoist Configuration Software *(see page 204)*.
3	Create or open a project *(see page 205)*.
4	Unlock Data Storage Parameters *(see page 314)*.
5	Modify the configuration of the data storage parameters: ● Configure a maintenance Relay *(see page 230)* ● Configure Data Storage Axis Parameters *(see page 240)* ● Configure Data Storage Special Functions Threshold *(see page 243)* ● Configure Data Storage Alarm Input Assignments *(see page 239)*
6	Save the project *(see page 213)*.
7	Select **Communication → Store to device**(1).
8	If enabled, enter the transfer password of the Configuration File already stored in the Remote Device.
9	Wait for the end of the Configuration File load in the Remote Device.
10	Disconnect the Remote Device to the PC.
11	Power ON the Base Station. **NOTE:** The following steps of the procedure must end in 5 minutes maximum.
12	The Configuration File must be loaded from the Remote Device to the Base Station. Refer to: ● Configuration File load With a ZART8L• *(see page 162)*. ● Configuration File load With a ZART•D• *(see page 163)*.

Unlock Data Storage Parameters

When you create a new project, all Data Storage parameters are locked by a Data Storage Password.

The Data Storage Password is asked:

- By eXLhoist Configuration Software when you create or modify a configuration with Data Storage parameters.
- By eXLhoist Data Storage Recovery Software when you load data stored in Base Station.

The following procedure describes how to create the Data Storage password:

Step	Action
1	Click **Device → Data Storage Password → Create Password** to create a Data Storage password.
2	Enter and confirm a Data Storage password.
3	Click **OK**.

When a Data Storage password is configured, you can unlock Data Storage access:

Step	Action
1	Click **Device → Data Storage Access**.
2	Enter the Data Storage password.
3	Click **OK**. **Result:** you have access to: ● The threshold assignment of the Detected applicative alarm *(see page 238)* ● The Data Storage tab *(see page 240)*

Configure a Maintenance Relay

In **Relay assignment** tab *(see page 230)*, you can configure the **Maintenance Relay** associate to Data Storage Functions.

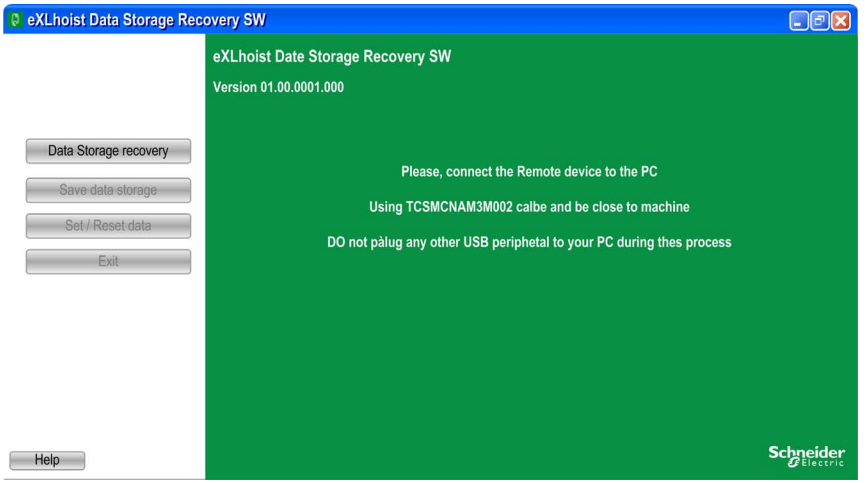
When one or more Data monitored exceed corresponding threshold configured by eXLhoist Configuration Software, **Maintenance Relay** is ON.

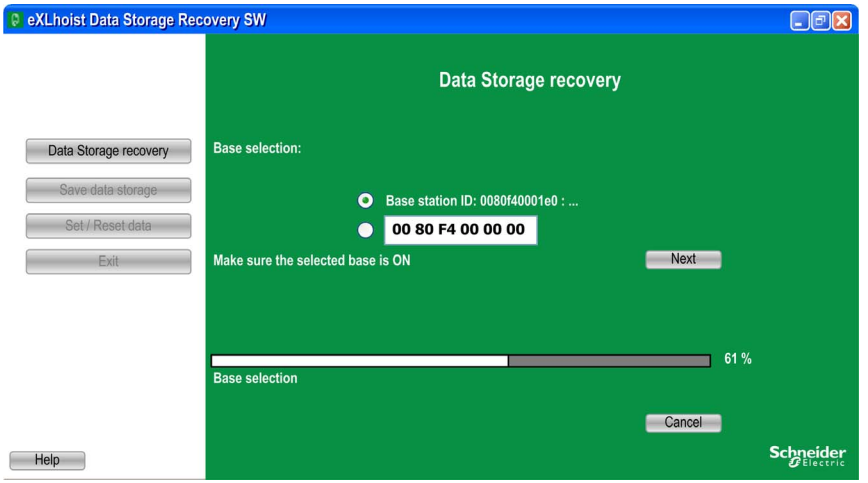
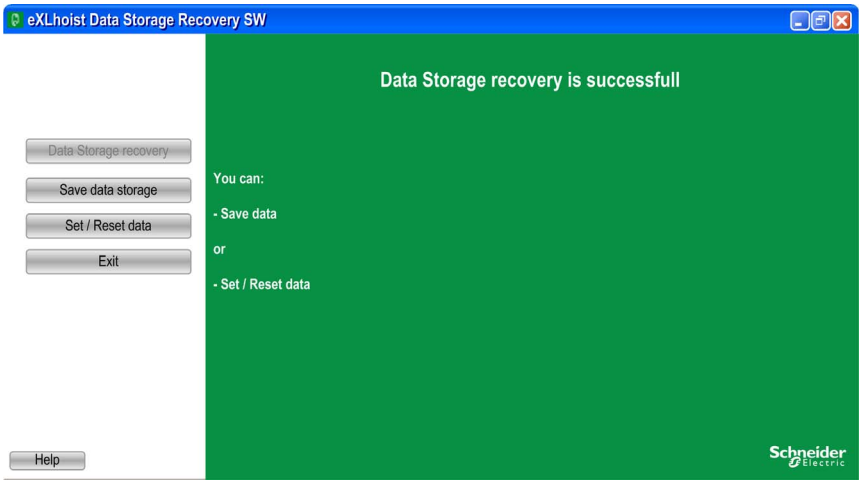
When the user resets data monitored or changes corresponding threshold to a value upper than measured value, **Maintenance Relay** is OFF.

Data Storage Recovery

General Recovery Procedure

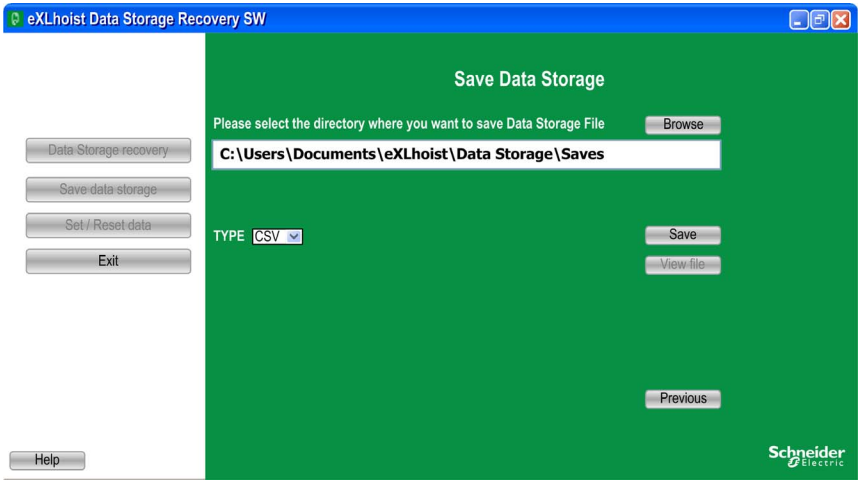
The following procedure describes how to recovery and/or modify the data stored in the Base Station:

Step	Action
1	Power ON Base Station.
2	Connect the Remote Device to a PC *(see page 192)*.
3	Start the eXLhoist Data Storage Recovery Software.
4	Click **Data Storage recovery**: 

Step	Action
5	Select Base Station to recover data and click **Next** button:  This operation can take several minutes.
6	If asked, enter the **Data Storage Password** then click **Next** button. If you loose your Data Storage Password, contact Schneider Electric customer service.
7	Then you can: ● Click **Save Data Storage** to save the data stored *(see page 317)* ● Click **Set / Reset data** to modify the data stored *(see page 318)* 

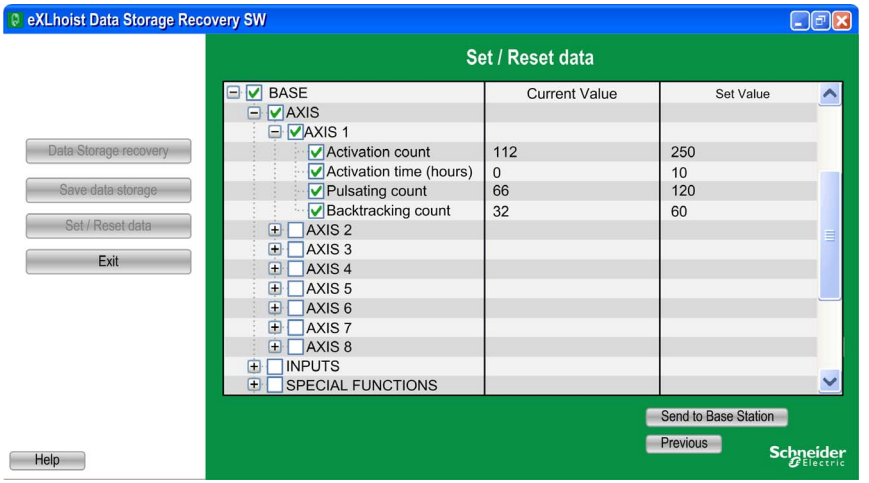
Save Data Stored in the Base Station

The following procedure describes how to save data stored in the Base Station:

Step	Action
1	Unroll steps 1…7 of the general recovery procedure *(see page 315)*.
2	Click **Save data Storage**.
3	Click **Browse** to select the directory where you want to save Data Storage File in CSV format: 
4	Click **Save** to save file.
5	When data are stored, a popup appears. Click **OK**.
6	Click **View File** to open file in a spreadsheet application (for example: Microsoft® Excel).

Set or Reset Data Stored in the Base Station

The following procedure describes how to change data stored in the Base Station:

Step	Action
1	Unroll steps 1…7 of the general recovery procedure *(see page 315)*. Or Click **Previous** in last step of Save data stored in the Base Station procedure.
2	Click **Set / Reset data** to update value in Base Station.
3	A popup informs you. Click **OK** if you agree.
4	A window appears where you can show data read and change data in Base Station: 
5	Select checkbox to reset the selected value. Select grouped checkboxes to reset many values at same time.
6	Enter desired value on corresponding **Set Value** columns.
7	Click **Send to Base Station** button to update data stored in Base Station.

Chapter 11
Troubleshooting

Troubleshooting

Troubleshooting

<table>
<tr><th>Diagnostic</th><th>Possible cause</th><th>Solution</th></tr>
<tr><td rowspan="2">Configuration File download issue
When you want to download the Configuration File from/into the Remote Device, a dialog box displays the following message:
Configuration File version not supported by Configuration software.</td><td>The Configuration File of a Remote Device which firmware version ≥ v4.0 cannot be downloaded with a eXLhoist Configuration Software version≤ v3.0.</td><td>Use a eXLhoist Configuration Software which version ≥ v4.0.</td></tr>
<tr><td>The Configuration File of a Remote Device which firmware version = v3.0 cannot be downloaded with a eXLhoist Configuration Software version≤ v2.0.</td><td>Either use a eXLhoist Configuration Software which version = v3.0
or update the Remote Device firmware to version v4.0 and use a eXLhoist Configuration Software which version ≥ v4.0.</td></tr>
<tr><td colspan="2">The Remote Device cannot be paired to the Base Station.</td><td rowspan="8">The pairing can be blocked by the “restricting pairing” function.
The “restricting pairing” happens 5 minutes after the Base Station power ON and forbid the pairing with a new Remote Device.</td><td rowspan="8">Power OFF the Remote Device.
Power OFF the Base Station until the POWER LED is OFF.
Power ON the Base Station.
Power ON the Remote Device: the Remote Device shall be paired to the Base Station before 5 minutes.</td></tr>
<tr><td colspan="2">Base Station</td></tr>
<tr><td>POWER LED</td><td>COM LED</td><td>STATUS LED</td></tr>
<tr><td>ON</td><td>Blinking</td><td>ON</td></tr>
<tr><td colspan="2">Remote Device</td></tr>
<tr><td>ZART•</td><td>E-STOP LED</td><td>Blinking</td></tr>
<tr><td>ZART8L</td><td>Start LED</td><td>OFF</td></tr>
<tr><td>ZART•D•</td><td colspan="2">  </td></tr>
</table>

<table>
<tr><th colspan="3">Diagnostic</th><th>Possible cause</th><th>Solution</th></tr>
<tr><td colspan="3">The E-STOP is not available.
It is not possible to go to START mode.</td><td rowspan="10">IN0 feedback loop wiring issue</td><td rowspan="10">Check that the IN0 input is correctly:
● Connected to S2_S3 for E-STOP SIL2.
● Connected to S2_3 through the main contactor auxiliary contact for SIL3.</td></tr>
<tr><td colspan="3">Base Station</td></tr>
<tr><td>POWER LED</td><td>COM LED</td><td>STATUS LED</td></tr>
<tr><td>ON</td><td>Blinking</td><td>ON</td></tr>
<tr><td colspan="3">Remote Device</td></tr>
<tr><td>ZART•</td><td>E-STOP LED</td><td>OFF</td></tr>
<tr><td>ZART8L</td><td>Start LED</td><td>OFF</td></tr>
<tr><td>ZART•D•</td><td colspan="2">  </td></tr>
<tr><td colspan="3">Unintended Motion detection issue
Pre-requisite:
● Base Station firmware version V3.x.
● Unintended motion detection activated in the configuration.</td><td rowspan="10">Incorrect wiring</td><td rowspan="10">Check the electrical contacts of each relay and contactors.</td></tr>
<tr><td colspan="3">Base Station</td></tr>
<tr><td>POWER LED</td><td>COM LED</td><td>STATUS LED</td></tr>
<tr><td>ON</td><td>Blinking</td><td>ON</td></tr>
<tr><td colspan="3">Remote Device</td></tr>
<tr><td>ZART•</td><td>E-STOP LED</td><td>OFF</td></tr>
<tr><td>ZART8L</td><td>Start LED</td><td>OFF</td></tr>
<tr><td>ZART•D•</td><td colspan="2">  </td></tr>
<tr><td colspan="3">The main contactor does not switch OFF in case of E-STOP triggering</td><td rowspan="10">Incorrect safety relay wiring</td><td rowspan="10">Perform a correct wiring between the Base Station safety relays contacts and the main contactor coil.</td></tr>
<tr><td colspan="3">Base Station</td></tr>
<tr><td>POWER LED</td><td>COM LED</td><td>STATUS LED</td></tr>
<tr><td>ON</td><td>Blinking</td><td>OFF</td></tr>
<tr><td colspan="3">Remote Device</td></tr>
<tr><td>ZART•</td><td>E-STOP LED</td><td>ON</td></tr>
<tr><td>ZART8L</td><td>Start LED</td><td>ON</td></tr>
<tr><td>ZART•D•</td><td colspan="2">Not Applicable</td></tr>
</table>

<table>
<tr><th colspan="3">Diagnostic</th><th>Possible cause</th><th>Solution</th></tr>
<tr><td colspan="3">eXLhoist STOP or fallback
Sometimes the Remote Device switches to STOP mode.
Or
Sometimes the eXLhoist system stop working and restarts.</td><td rowspan="5">Wrong alarm inputs biasing involving eXLhoist STOP or fallback</td><td rowspan="5">Use a relay or an optocoupler to isolate the signal.</td></tr>
<tr><td colspan="3">Base Station</td></tr>
<tr><td>POWER LED</td><td>COM LED</td><td>STATUS LED</td></tr>
<tr><td>ON</td><td>OFF</td><td>OFF</td></tr>
<tr><td colspan="3">Remote Device</td></tr>
<tr><td>ZART•</td><td>E-STOP LED</td><td>OFF</td><td rowspan="4">Voltage dips involving eXLhoist STOP or fallback</td><td rowspan="4">Check the electrical network wiring, especially the main contactor wiring.
If no mistakes are detected, then connect the Base Station power supply to 230 Vac.
If power supply voltage cannot be changed, contact your Schneider Electric customer support.</td></tr>
<tr><td>ZART8L</td><td>Start LED</td><td>OFF</td></tr>
<tr><td>ZART•D•</td><td colspan="2">Not Applicable</td></tr>
<tr><td colspan="3">Remote Device powers OFF often
The ZART8L• powers OFF often (ex: once per hour).
Or
If the START button is pressed, then the ZART•D• powers OFF.</td><td rowspan="10">Remote Device battery gauge calibration issue</td><td rowspan="10">Connect the Remote Device to the ZARC01 power supply and charge the Remote Device battery for 10 hours 10…40 °C (50…104 °F).
NOTE: The Remote Device should be charged for 10 hours every month. It allows getting the right battery gauge calibration.</td></tr>
<tr><td colspan="3">Base Station</td></tr>
<tr><td>POWER LED</td><td>COM LED</td><td>STATUS LED</td></tr>
<tr><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td colspan="3">Remote Device</td></tr>
<tr><td>ZART•</td><td>E-STOP LED</td><td>OFF</td></tr>
<tr><td>ZART8L</td><td>Start LED</td><td>OFF</td></tr>
<tr><td>ZART•D•</td><td colspan="2">OFF</td></tr>
</table>

<table>
<tr><th colspan="3">Diagnostic</th><th>Possible cause</th><th>Solution</th></tr>
<tr><td colspan="3">Remote Device battery does not charge</td><td rowspan="9">The Remote Device battery is or has been charged under 10 °C (50 °F).</td><td rowspan="9">Charge the Remote Device battery at a temperature 10…40 °C (50…104 °F).
If it does not work, contact your Schneider Electric customer support.</td></tr>
<tr><td colspan="3">Base Station</td></tr>
<tr><td>POWER LED</td><td>COM LED</td><td>STATUS LED</td></tr>
<tr><td>-</td><td>-</td><td>-</td></tr>
<tr><td colspan="3">Remote Device</td></tr>
<tr><td>ZART•</td><td>E-STOP LED</td><td>OFF</td></tr>
<tr><td>ZART8L</td><td>Batt LED</td><td>Blinking</td></tr>
<tr><td>ZART•D•</td><td colspan="2">  </td></tr>
<tr><td colspan="3">It is no more possible to use the Base Station which is non-operational</td><td rowspan="9">Base Station firmware issue</td><td rowspan="9">If an OEM or maintenance person has updated the firmware
Then:
Power ON/Power OFF the Base Station five times in less of 1 minute until the STATUS LED is fixed.
NOTE: Wait the POWER LED switching OFF.
If it does not work, then use the eXLhoist Configuration Software to launch the Base Station firmware update one more time.
If it does not work, contact the Schneider Electric customer support.</td></tr>
<tr><td colspan="3">Base Station</td></tr>
<tr><td>POWER LED</td><td>COM LED</td><td>STATUS LED</td></tr>
<tr><td>ON</td><td>OFF</td><td>Blinking</td></tr>
<tr><td colspan="3">Remote Device</td></tr>
<tr><td>ZART•</td><td>E-STOP LED</td><td>OFF after 3 blinking</td></tr>
<tr><td>ZART8L</td><td>Start LED</td><td>OFF</td></tr>
<tr><td>ZART•D•</td><td colspan="2">OFF</td></tr>
<tr><td colspan="3">The Remote Device Powers OFF often
(from once a week to several times a day)</td><td rowspan="9">Accelerometer issue</td><td rowspan="9">Use a Remote Device which firmware version ≥ v3.0, then use the eXLhoist Configuration Software and configure the Remote Fall and Shock detection as disabled.</td></tr>
<tr><td colspan="3">Base Station</td></tr>
<tr><td>POWER LED</td><td>COM LED</td><td>STATUS LED</td></tr>
<tr><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td colspan="3">Remote Device</td></tr>
<tr><td>ZART•</td><td>E-STOP LED</td><td>OFF</td></tr>
<tr><td>ZART8L</td><td>Start LED</td><td>OFF</td></tr>
<tr><td>ZART•D•</td><td colspan="2">OFF</td></tr>
</table>

<table>
<tr><th colspan="3">Diagnostic</th><th>Possible cause</th><th>Solution</th></tr>
<tr><td colspan="3">The eXLhoist radio range is too high</td><td rowspan="8">-</td><td rowspan="8">Use a Base Station which firmware version ≥ v3.0, then use the eXLhoist Configuration Software and configure the Primary Base radio level and/or the Remote radio level to Reduced.</td></tr>
<tr><td colspan="3">Base Station</td></tr>
<tr><td>POWER LED</td><td>COM LED</td><td>STATUS LED</td></tr>
<tr><td>ON</td><td>Blinking</td><td>ON</td></tr>
<tr><td colspan="3">Remote Device</td></tr>
<tr><td>ZART•</td><td>E-STOP LED</td><td>ON</td></tr>
<tr><td>ZART8L</td><td>Start LED</td><td>ON</td></tr>
<tr><td>ZART•D•</td><td colspan="2">ON</td></tr>
<tr><td colspan="3">The Horn duration time of 1 second is too long</td><td rowspan="8">-</td><td rowspan="8">Reduce the Horn duration between 0.1 s and 1 s through an external modular relay RE17RMMW.
If you use a Base Station which firmware version ≥ v3.0, you can use the eXLhoist Configuration Software (version ≥ v3.0) and configure the Horn duration to 0 s.</td></tr>
<tr><td colspan="3">Base Station</td></tr>
<tr><td>POWER LED</td><td>COM LED</td><td>STATUS LED</td></tr>
<tr><td>ON</td><td>Blinking</td><td>ON</td></tr>
<tr><td colspan="3">Remote Device</td></tr>
<tr><td>ZART•</td><td>E-STOP LED</td><td>ON</td></tr>
<tr><td>ZART8L</td><td>Start LED</td><td>ON</td></tr>
<tr><td>ZART•D•</td><td colspan="2">ON</td></tr>
</table>

Appendices

Appendix A
Architecture Examples

What Is in This Chapter?

This chapter contains the following topics:

Tested Architectures

Overview

Schneider Electric provides the basis of tested architecture. You can adapt these architectures to your individual requirements. The specified architectures have been tested under actual service conditions. Your specific application requirements may be different from those assumed for these projects. In that case, you have to adapt the architecture to your particular needs. To do so, you need to consult the specific product documentation that you may find necessary to modify or adapt. Pay particular attention and conform to any safety information, different electrical requirements, and normative standards that would apply to your modifications and/or adaptations. Some or all of the architectures may contain recommendations of products that are not available in your country or location, or may imply or recommend wiring, products, procedures, or controller logic and/or functions that are in conflict with your local, regional, or national electrical or safety codes and/or normative standards.

⚠ WARNING

REGULATORY INCOMPATIBILITY

Be sure that all equipment applied and systems designed comply with and conform to all applicable local, regional, and national regulations and standards.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

The use and application of the architectures require expertise in the design of control systems. Only you, the designer or integrator, can be aware of all the conditions and factors present during installation and setup, operation, and maintenance of the machine or process, and can therefore determine the associated equipment, the functions, the related safety provisions and interlocks which can be effectively and properly used. When selecting control equipment, and any other related equipment or software for a particular application, you must also consider any applicable local, regional, or national standards and/or regulations.

Description

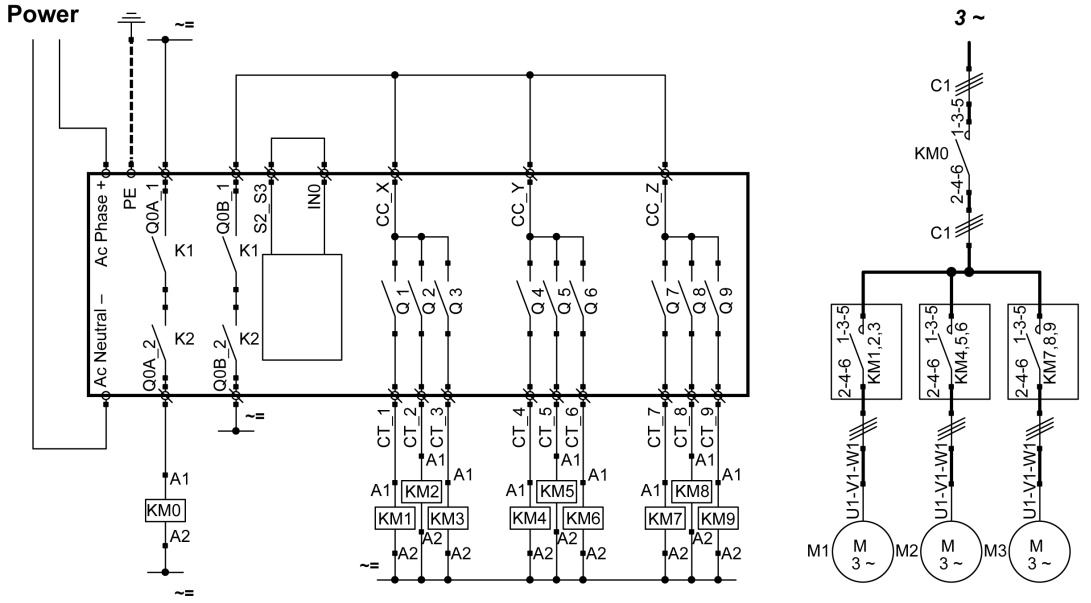
Schneider Electric has tested some possible architectures:

Architectures	Hoisting	Trolley	Translation	E-STOP STOP	Motion	Stop category
				According To		
				EN 61508 EN 13849	EN 61508 EN 13849	EN 60204
Safety case 1 *(see page 329)*	Contactor	Contactor	Contactor	SIL2/Cat 3	SIL1/Cat 2	Cat 0
Safety case 2 *(see page 330)*						
Safety case 3 *(see page 331)*		ATV32	ATV32	SIL3/Cat 4		
Safety case 4 *(see page 332)*	ATV71			SIL3/Cat 4		Cat 1
Safety case 5 *(see page 333)*				SIL3/Cat 4		

Stop category depends on the UOC function/wiring *(see page 114)*.

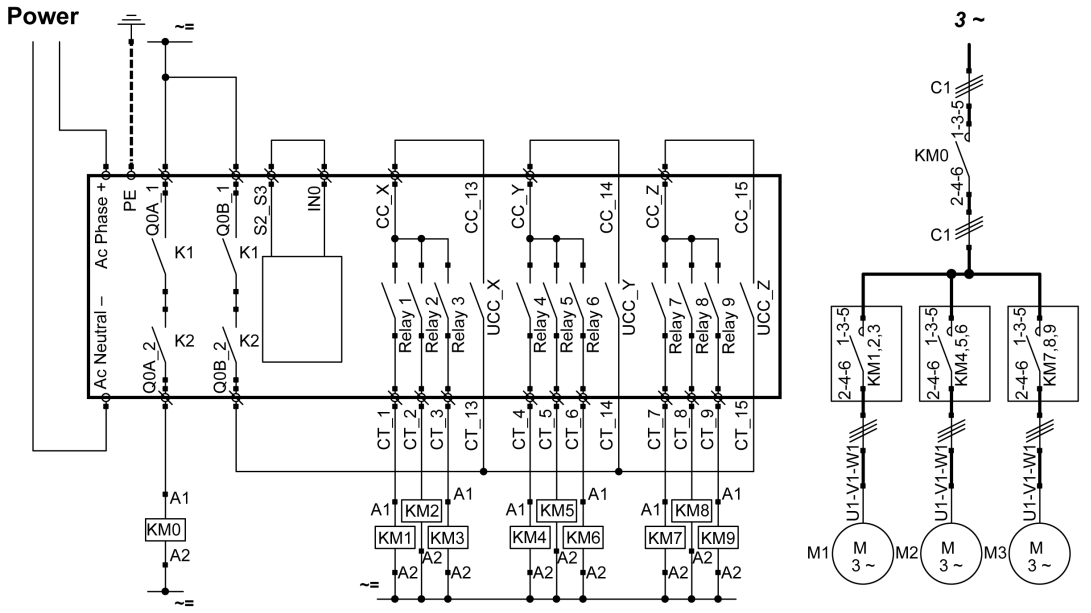
E-STOP and STOP SIL level depends on the IN0 and S2_S3 wiring *(see page 121)*.

Safety Case 1



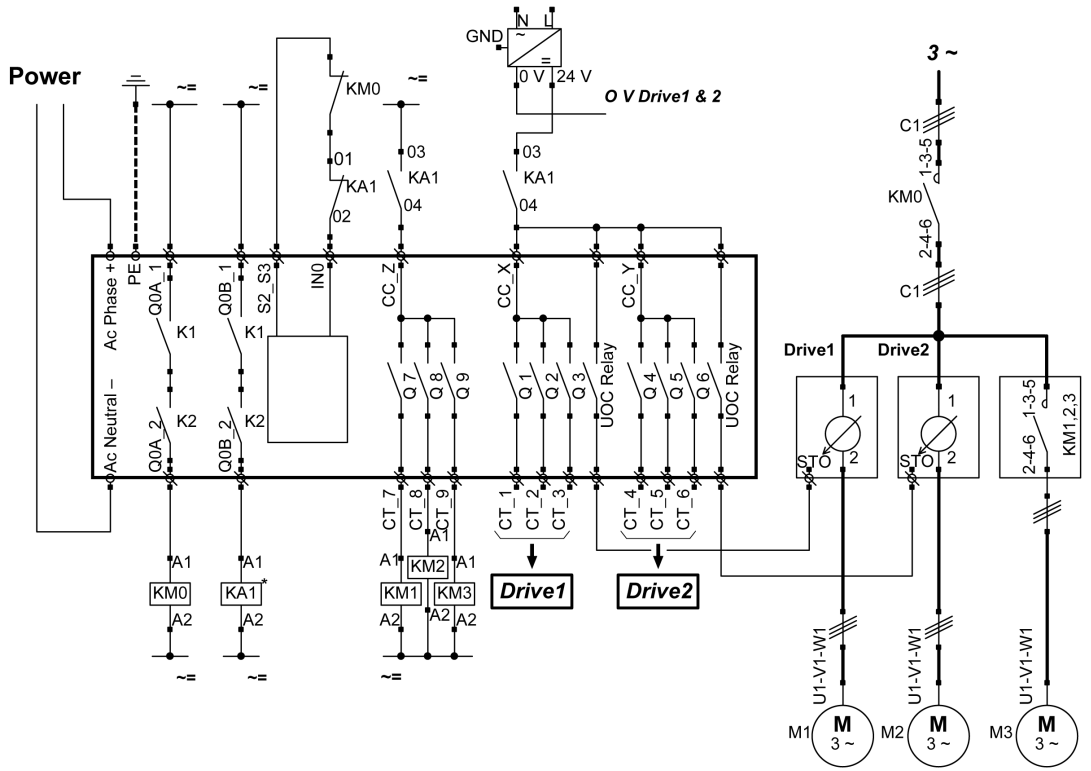
The E-STOP function of the Remote Device is SIL2.

Safety Case 2



The E-STOP function of the Remote Device is SIL2.

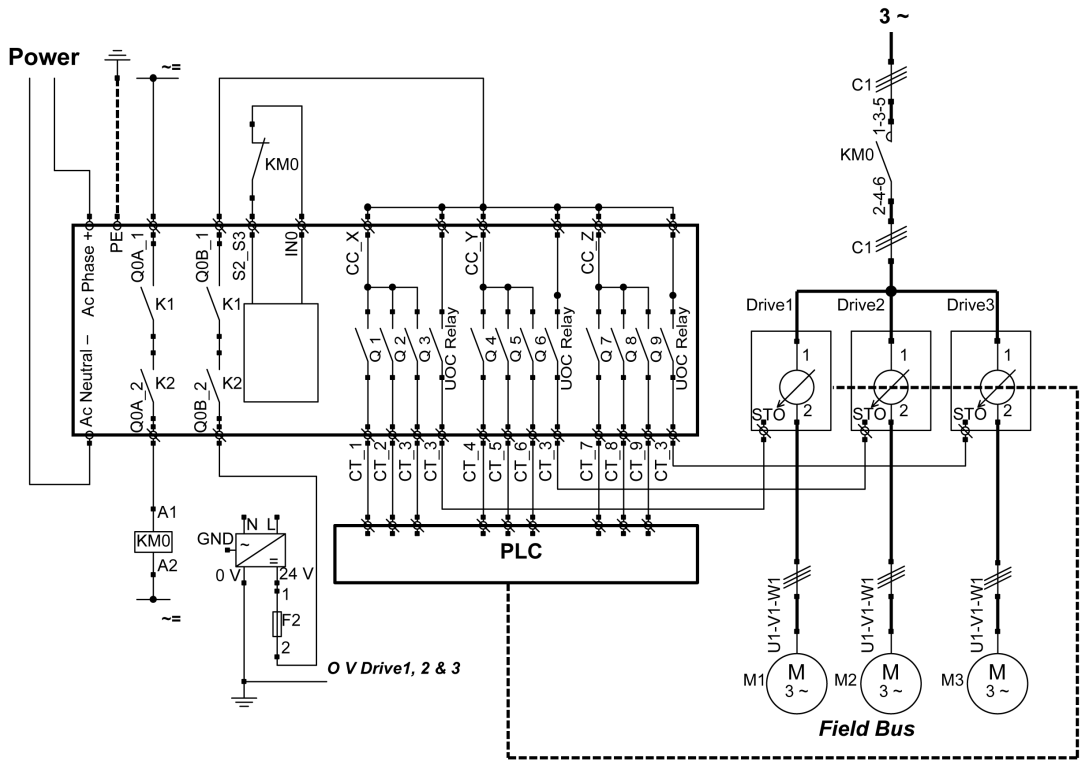
Safety Case 3



The E-STOP function of the Remote Device is SIL3.

Drive1 and Drive2 are motor drives.

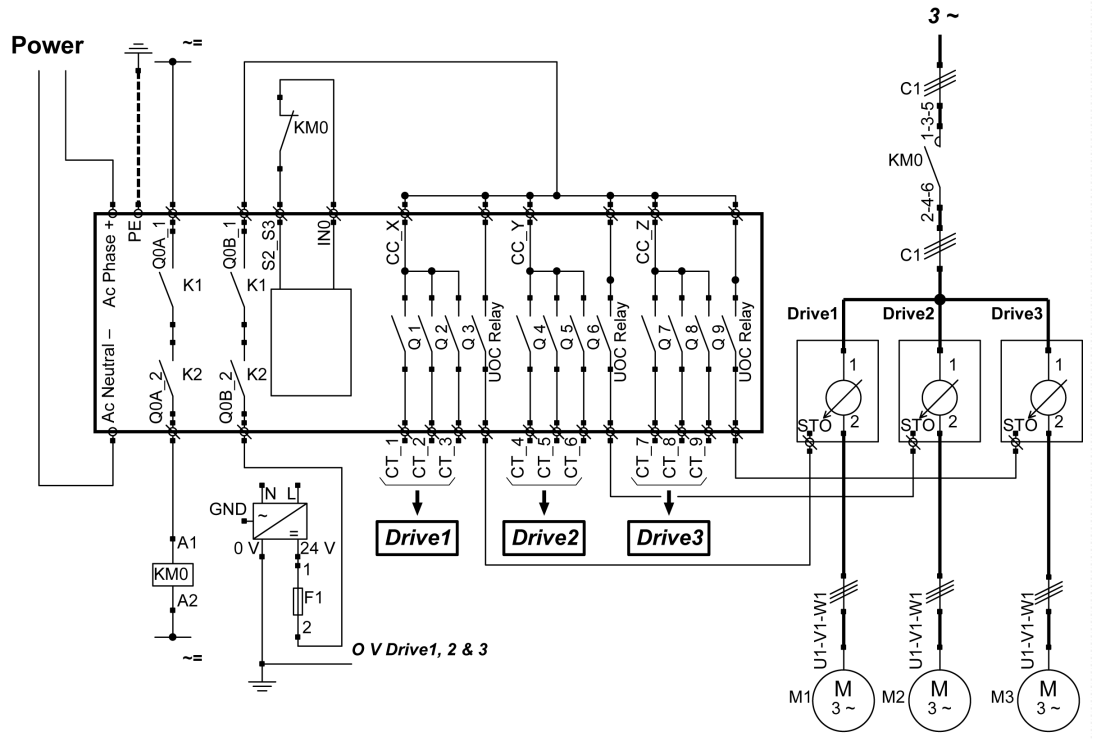
Safety Case 4



The E-STOP function of the Remote Device is SIL3.

Drive1, Drive2, and Drive3 are motor drives.

Safety Case 5



The E-STOP function of the Remote Device is SIL3.

Drive1, Drive2, and Drive3 are motor drives.

Vacuum/Magnetic Application Example

Description

A possible use of auxiliary buttons is a Vacuum/Magnetic function.

Vacuum/Magnetic	Description
Triggering	“Vacuum/Magnetic ON“ button is assigned to 1 relay. When the operator presses the “Vacuum/Magnetic ON” button, the magnetic is activated through the associated relay.
Releasing	To release the load, simultaneously press ”Vacuum/Magnetic OFF 1” and “Vacuum/Magnetic OFF 2” buttons. “Vacuum/Magnetic OFF 1” button should be assigned to 1 NO+NC relay. “Vacuum/Magnetic OFF 2” button should be assigned to 1 different NO+NC relay.

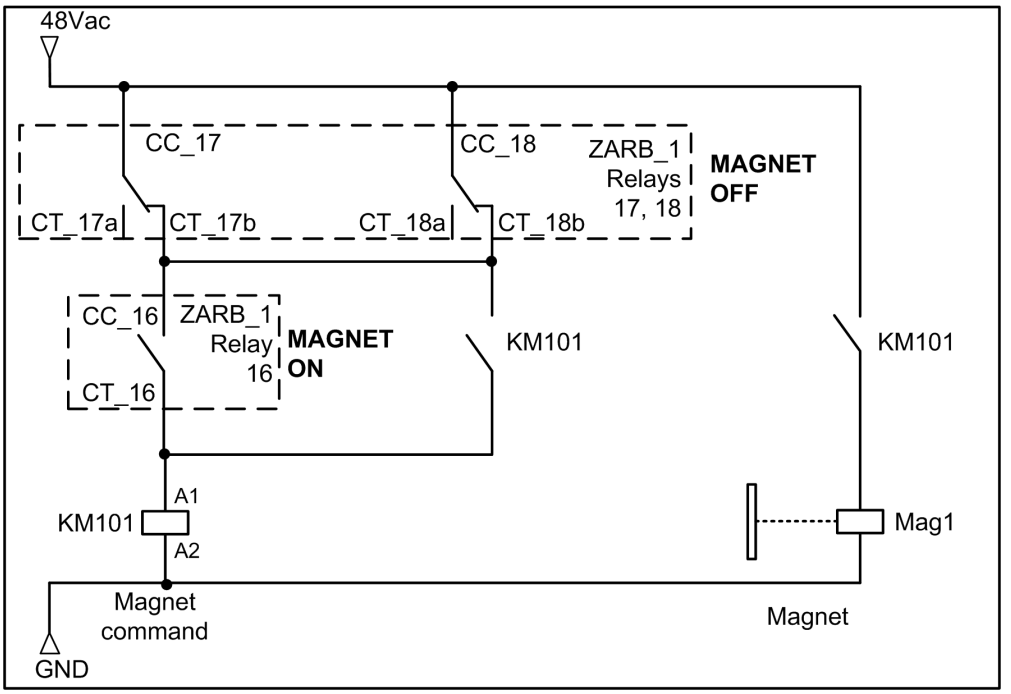
Configuration

Example of system configuration

Topic	Configured button	Associated relay
Vacuum/Magnetic ON	13	Q16
Vacuum/Magnetic OFF 1	14	Q17
Vacuum/Magnetic OFF 1	15	Q18

As already done in the factory setting, it is recommended to use buttons at different sides of Remote Device for load release function (operator uses both hands).

Wiring Example



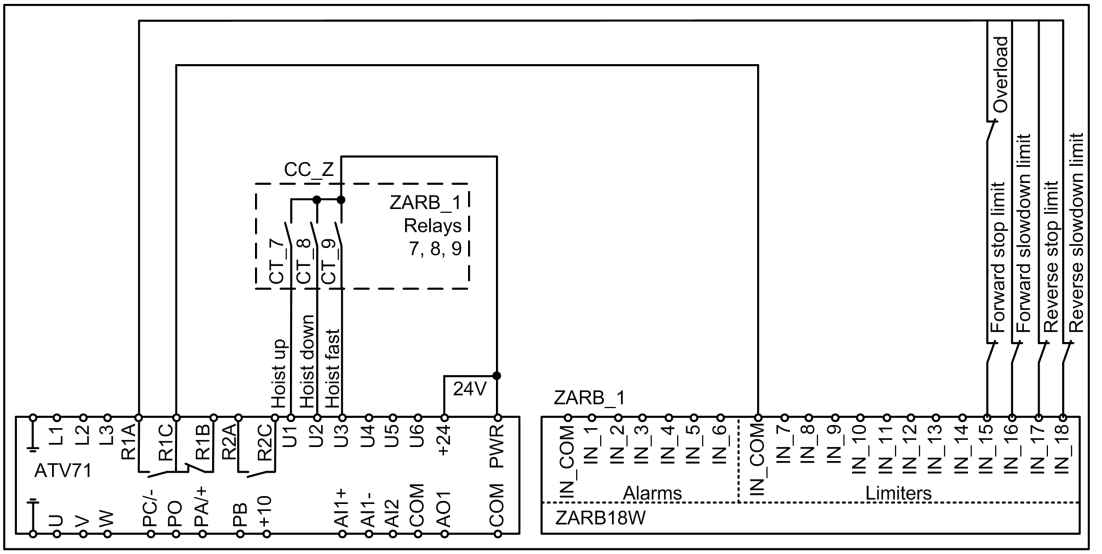
Safeguarding Wiring Examples

Overview

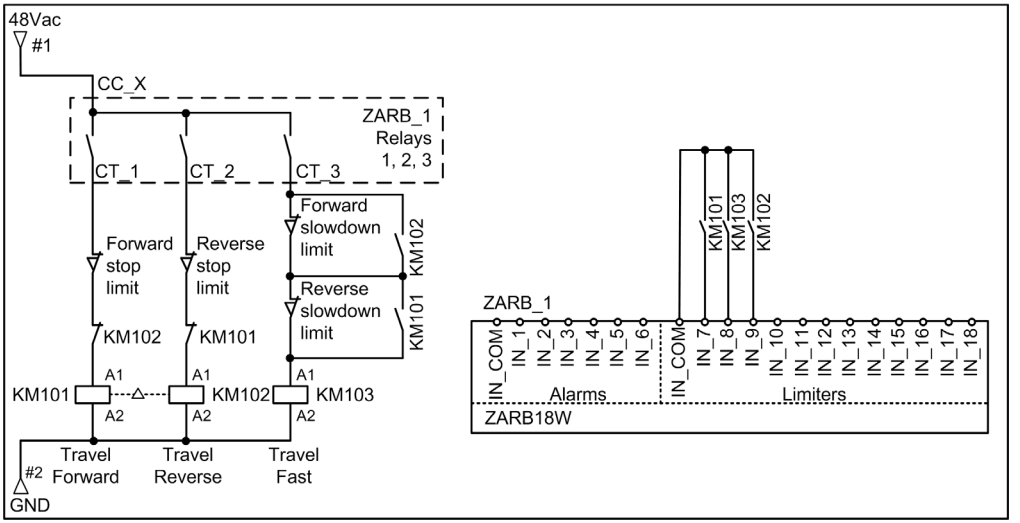
eXLhoist can manage 2 types of safeguarding protection:

- Limit Switch: drive control of the motion.
- Motion Feedback: contactor solution for the motion.

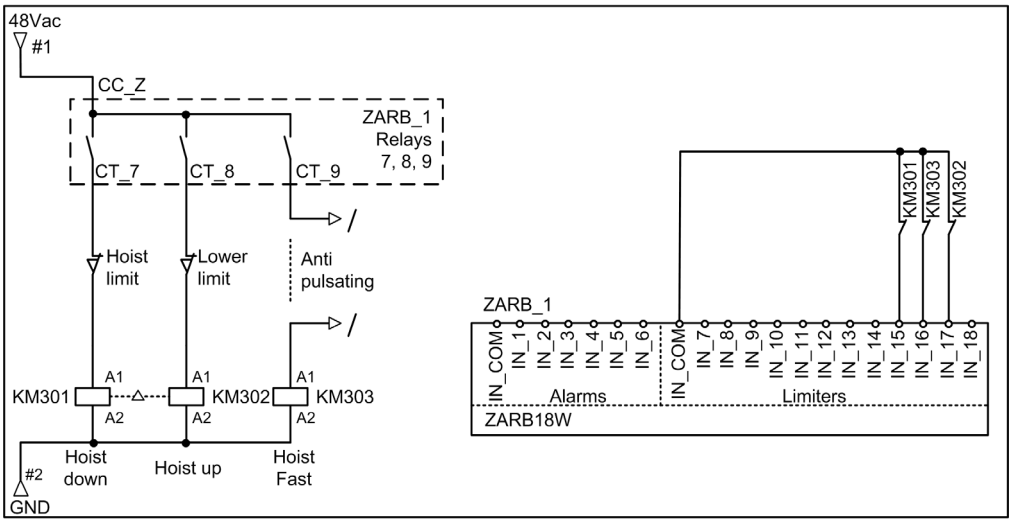
Limit Switch Example with an ATV71



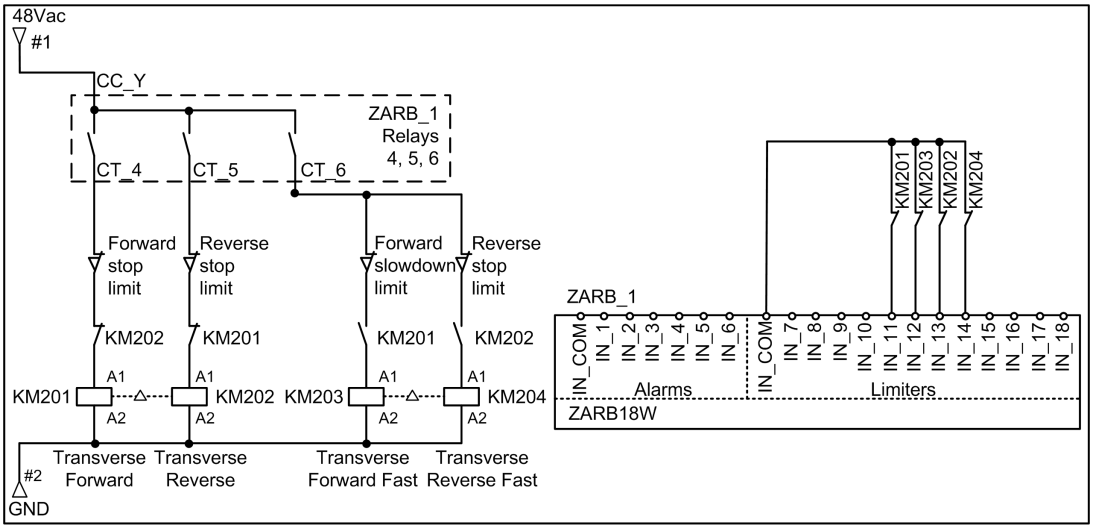
Motion Feedback Example with NO Auxiliary Contact with 3 Wires Command



Motion Feedback Example with NC Auxiliary Contact with 3 Wires Command



Motion Feedback Example with NC Auxiliary Contact with 4 Wires Command



Room Lighting Application Example

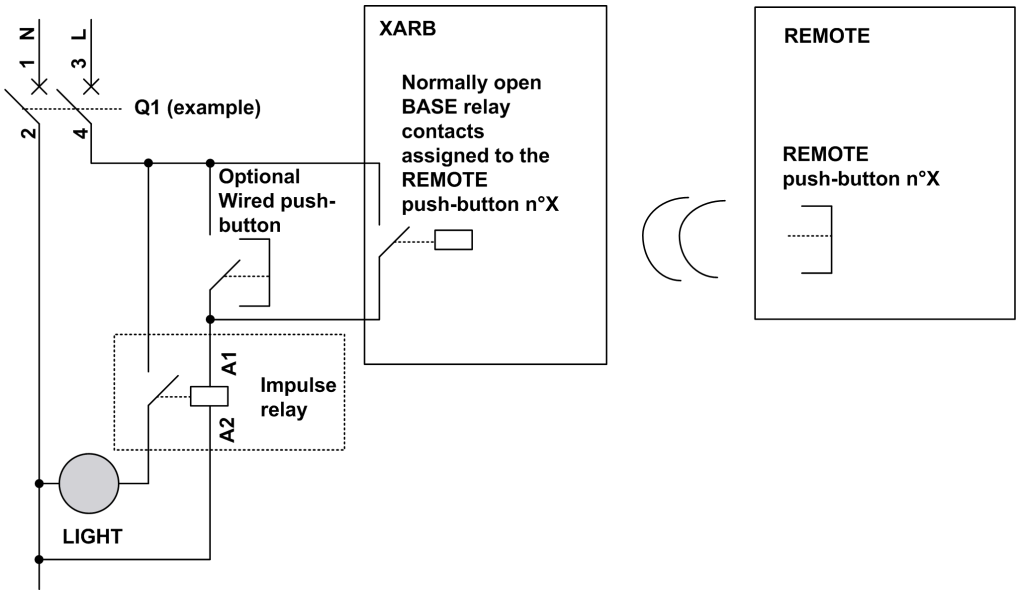
Description

It is possible to manage room lighting applications. An auxiliary button commands an impulse relay on the room lighting circuit.

Configuration

There is no specific configuration needed. You have to associate an auxiliary button to a relay.

Wiring Example



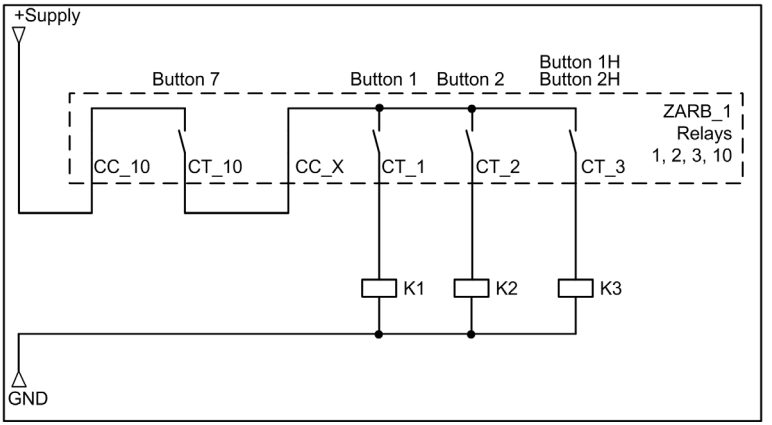
NOTE: Schneider Electric offers modular impulse relays which are bistable switches designed to control load power mainly for lighting applications.

Validation Button Wiring Examples

Overview

The button 7 can be configured as standalone. In this configuration, you can use it as a validation button.

Button 7 Standalone as Validation Button Example



Glossary

A

AWG

(American wire gauge) The standard that specifies wire section sizes in North America

C

CCF

(Common Cause of Failure)

CSA

(Canadian standards association) The Canadian standard for industrial electronic equipment in hazardous environments.

CSV

(comma-separated values) A CSV file stores tabular data (numbers and text) in plain text. Each line of the file is a data record. Each record consists of one or more fields, separated by commas.

D

DTM

(*Device Type Manager*) Classified into 2 categories:

- Device DTMs connect to the field device configuration components.
- CommDTMs connect to the software communication components.

The DTM provides a unified structure for accessing device parameters and configuring, operating, and diagnosing the devices. DTMs can range from a simple graphical user interface for setting device parameters to a highly sophisticated application capable of performing complex real-time calculations for diagnosis and maintenance purposes.

E

E-STOP

Emergency stop (according to EN ISO13850:2008) function that is intended to:

- Avert arising, or reduce existing, hazards to persons, damage to machinery or to work in progress,
- Be initiated by a single human action.

EMC

ElectroMagnetic Compatibility

EN

EN identifies 1 of many European standards maintained by CEN *(European Committee for Standardization)*, CENELEC *(European Committee for Electrotechnical Standardization)*, or ETSI *(European Telecommunications Standards Institute)*.

F

Firmware

The operating system (OS) of a device

H

HFT

(Hardware Fault Tolerance)

I

ID

IDentification.

IEC

(International Electrotechnical Commission) A non-profit and non-governmental international standards organization that prepares and publishes international standards for electrical, electronic, and related technologies.

IP

(Ingress Protection) The protection classification according to IEC 60529.

L

LED

(Light Emitting Diode) An indicator that illuminates under a low-level electrical charge.

M

MAC address

(Media Access Control address) A unique 48-bit number associated with a specific piece of hardware. The MAC address is programmed into each network card or device when it is manufactured.

MBC

(Multi Base Control) A Remote device can control up to 2 Base Stations.

MTTF

(Mean Time To Failure)

N

NC

(Normally Closed) A contact pair that closes when the actuator is de-energized (no power is applied) and opens when the actuator is energized (power is applied).

NEMA

(National Electrical Manufacturers Association) The standard for the performance of various classes of electrical enclosures. The NEMA standards cover corrosion resistance, ability to help protect from rain, submersion, and so on. For IEC member countries, the IEC 60529 standard classifies the ingress protection rating for enclosures.

NO

(Normally Open) A contact pair that opens when the actuator is de-energized (no power is applied) and closes when the actuator is energized (power is applied).

P

PC

(Personal Computer)

PE

(*Protective Earth*) A common grounding connection to help avoid the hazard of electric shock by keeping any exposed conductive surface of a device at earth potential. To avoid possible voltage drop, no current is allowed to flow in this conductor (also referred to as *Protective ground* in North America or as an equipment grounding conductor in the US national electrical code).

PFD

(Probability of Failure on Demand)

PFH

(Probability of Failure per Hour)

PL

(Performance Level)

R

RJ45

A standard type of 8-pin connector for network cables.

S

SELV

(Safety Extra Low Voltage) A system that follows IEC 61140 guidelines for power supplies is protected in such a way that voltage between any 2 accessible parts (or between 1 accessible part and the PE terminal for class 1 equipment) does not exceed a specified value under normal conditions or under inoperable conditions.

SFF

(Safe Failure Fraction)

SIL

(Safety Integrity Level) (according to IEC 61508)

START warning time

Time between the STOP mode and START mode. During this time, the Horn is activated, the motion and auxiliary function are not enabled.

STO

(Safe Torque Off).

U

UL

(Underwriters Laboratories) A US organization for product testing and safety certification.

UOC

(Unintended Operating Control) The UOC function allows control of a drive STO input.