

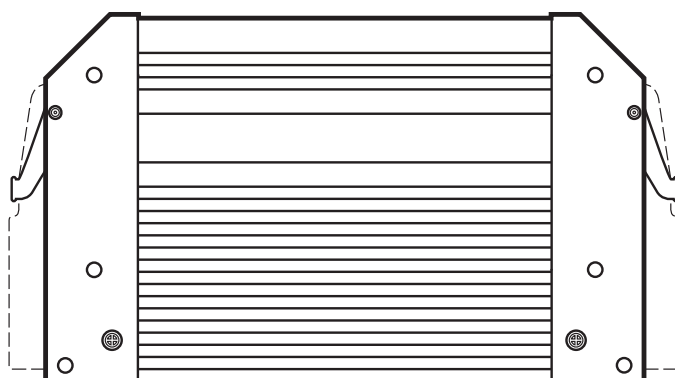


Original operating instructions SafetyController

CR7132

UK

80004329 / 01 04 / 2024



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1 Preliminary note

This document applies to devices of the type "SafetyController" (art. no.: CR7132). These instructions are part of the device.

This document is intended for specialists. These specialists are people who are qualified by their appropriate training and their experience to see risks and to avoid possible hazards that may be caused during operation or maintenance of the device. The document contains information about the correct handling of the device.

Read this document before use to familiarise yourself with operating conditions, installation and operation. Keep this document during the entire duration of use of the device.

Adhere to the safety instructions.

1.1 Symbols used

- ▶ Instructions
- > Reaction, result
- [...] Designation of keys, buttons or indications
- Cross-reference
-  Important note
Non-compliance can result in malfunction or interference.
-  Information
Supplementary note

1.2 Warning signs used

WARNING

Warning of serious personal injury.
Death or serious irreversible injuries may result.

CAUTION

Warning of personal injury.
Slight reversible injuries may result.

NOTE

Warning of damage to property.

2 Safety instructions

2.1 General

These instructions are part of the device. They contain information and illustrations about the correct handling of the device and must be read before installation or use.

Observe the operating instructions. Non-observance of the instructions, operation which is not in accordance with use as prescribed below, wrong installation or incorrect handling can seriously affect the safety of operators and machinery.

UK

2.2 Target group

These instructions are intended for authorised persons according to the EMC and low-voltage directives. The unit must be installed, connected and put into operation by a qualified electrician trained in safety technology.

2.3 Electrical connection

The device is designed for supply via a mobile on-board system (12/24 V DC battery operation).

Disconnect the unit externally before handling it. If necessary, also disconnect any independently supplied output load circuits.

The connection terminals may only be supplied with the signals indicated in the technical data and/or on the device label and only the approved accessories of ifm electronic may be connected.

2.4 Housing temperature

As described in the technical specifications below the device can be operated in a wide ambient temperature range. Because of the additional internal heating the housing walls can have high perceptible temperatures when touched in hot environments.

2.5 Tampering with the device

In case of malfunctions or uncertainties please contact the manufacturer. Any tampering with the device can seriously affect the safety of operators and machinery. This is not permitted and leads to the exclusion of any liability and warranty claims.

2.6 Electromagnetic compatibility

This is a class A product. It can cause radio interference in domestic areas. In this case the operator is requested to take appropriate measures.

2.7 Electrical welding on vehicles and plants

Welding work on the chassis frame must only be carried out by qualified persons.

Remove and cover the plus and minus terminals of the batteries.

Disconnect all contacts of the controller from the on-board system prior to welding on the vehicle or plant. Connect the earth terminal of the welding device directly to the part to be welded.

Do not touch the controller or electric cables with the welding electrode or the earth terminal of the welding device.

Protect the controller against weld slag.

3 Functions and features

The freely programmable controllers of the "SafetyController" series are rated for use under difficult conditions (e.g. extended temperature range, strong vibration, intensive EMC interference).

► Observe the operating conditions (Test standards and regulations).

WARNING

Observe the introduction (→ pages II ff)!

- Functions and features
- Programming and important additions to these instructions
- Set-up

4 Installation

4.1 Fixing

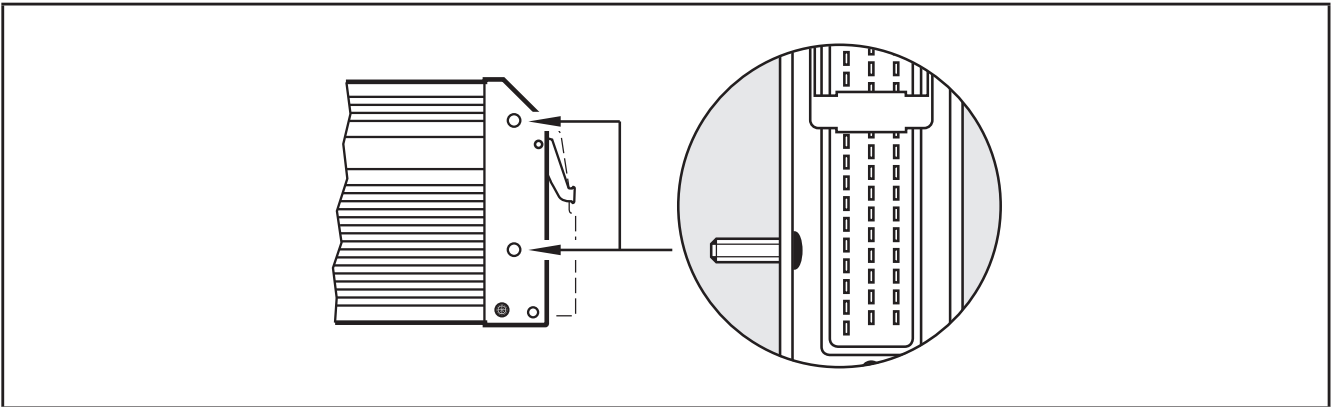
- Fix the controller to a flat surface using 4 M5 screws.
Screw material: steel or stainless steel
Tightening torque: 8 $\pm$ 2 Nm

NOTE

Use screws with a low head to avoid that the connector is damaged when placed and locked.

UK

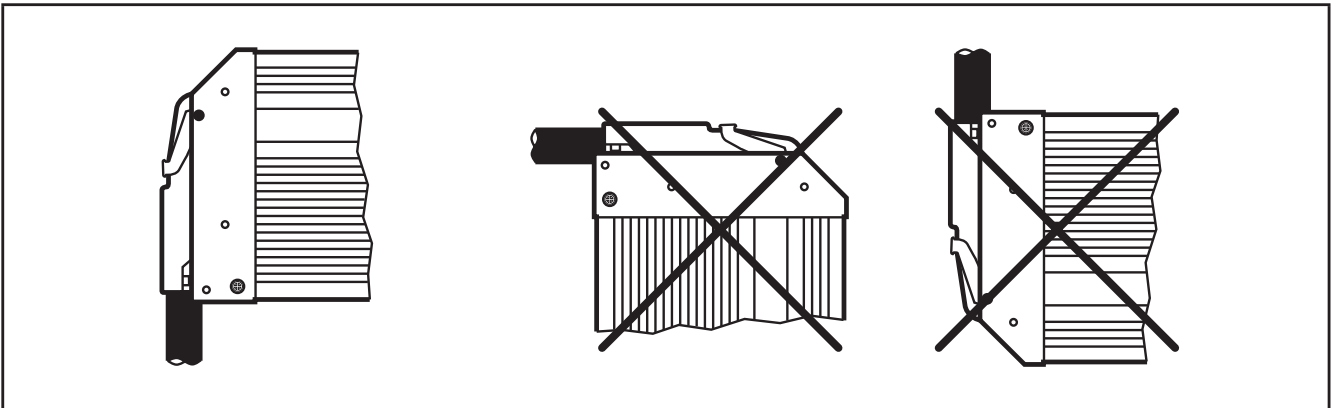
Screws to be used (examples)	Standard
Button head hexagon socket screws (M5 x L)	ISO 7380
Cylinder screws with hexagon socket and low head (M5 x L)	DIN 7984
Cutting screws for metric ISO thread with low head	DIN 7500



Example button head hexagon socket screw

4.2 Installation position

- Align the controller so that the cable entries of the connectors face downwards.



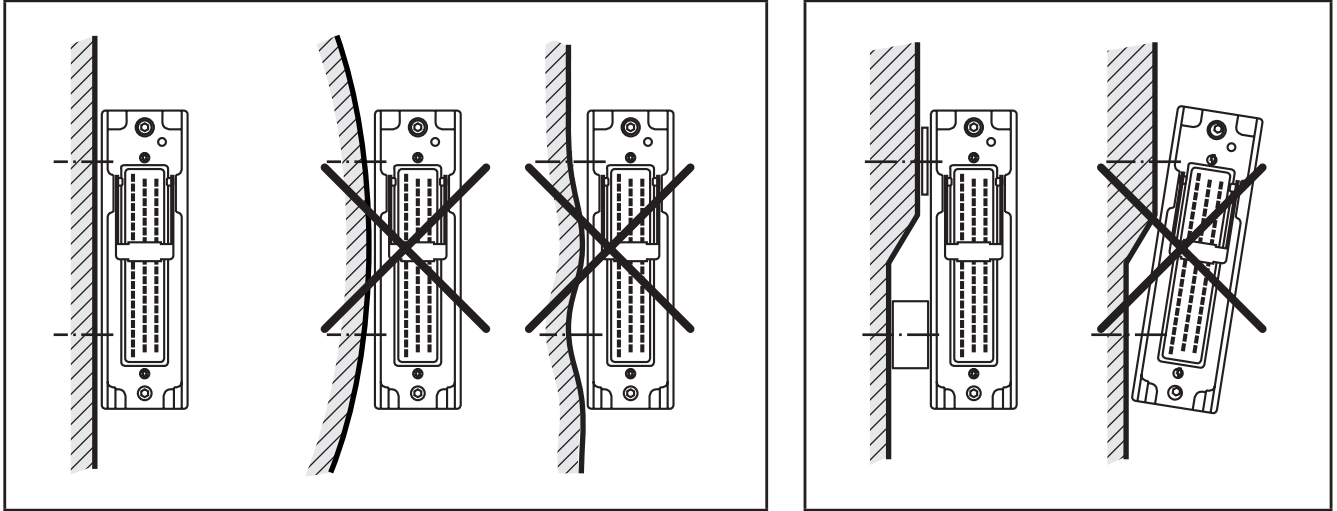
Preferred installation position

4.3 Mounting surface

NOTE

The housing must not be exposed to any torsional forces or mechanical stress.

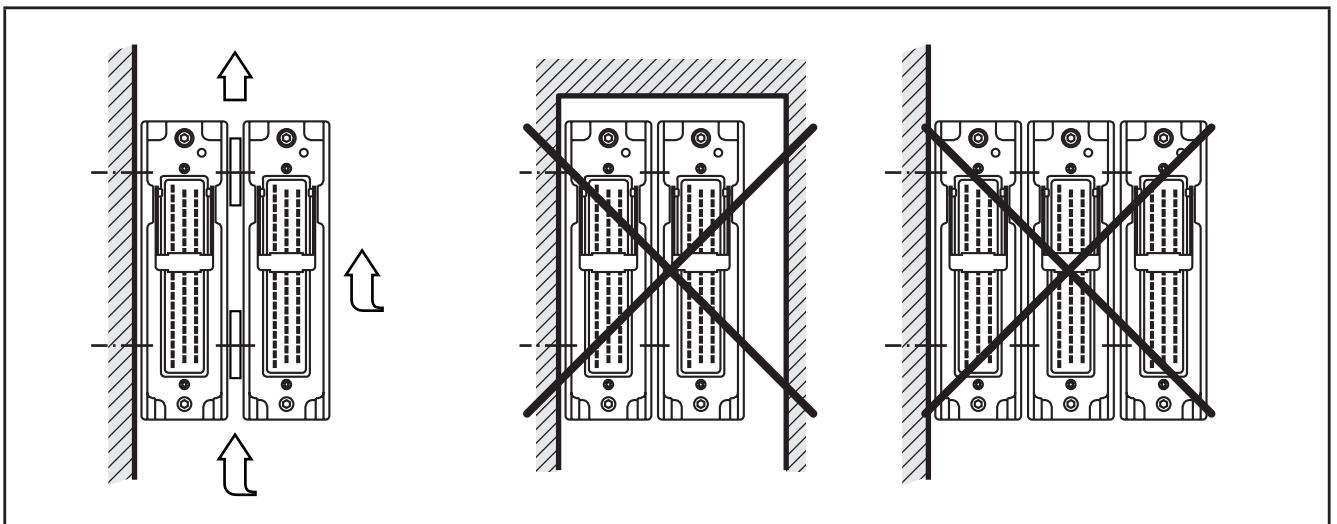
- Use compensating elements if there is no flat mounting surface available.



Mounting surface

4.4 Heat dissipation

- Ensure sufficient heat dissipation as the internal heating of the electronics is conducted away via the housing.
- In case of sandwich mounting of controllers use spacers.



Heat dissipation and sandwich mounting

5 Electrical connection

5.1 Wiring

Wiring (→ 7 Technical data)

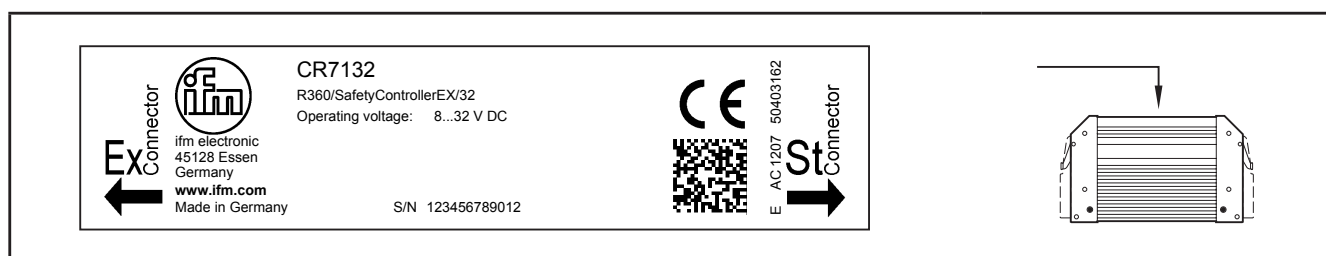


Only connect the connector pins as shown in the pin layout.
Unspecified connector pins remain unconnected.

- Connect all indicated supply cables and GND terminals (St and Ex connection side).

5.1.1 Assignment of the connectors

- Note the device label.



Assignment of the connectors on the device label

⚠ WARNING

Inversion of the connectors can lead to unstable start-up of the machine.

NOTE

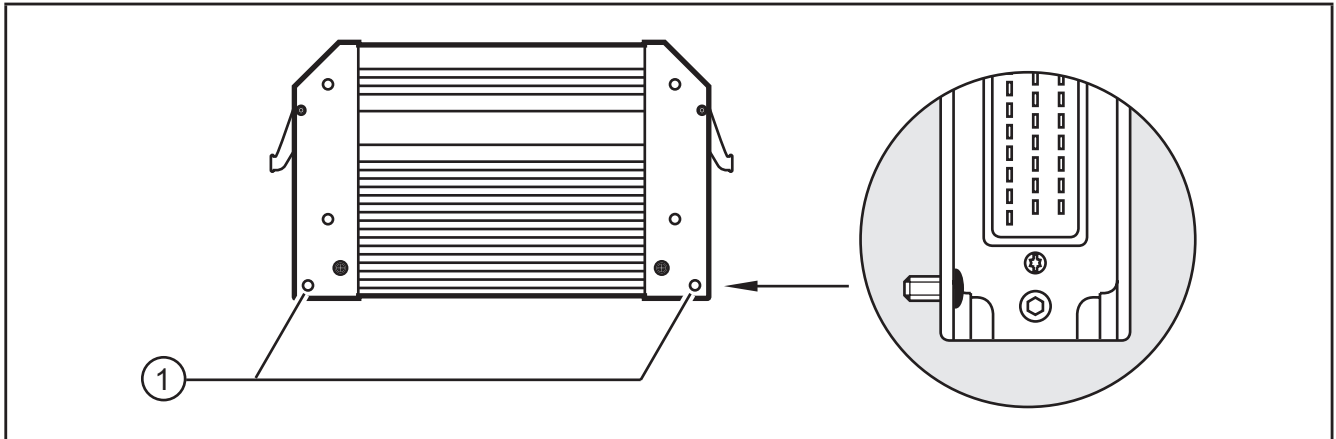
Inversion of the connectors can lead to damage to the reference voltage output (pin 51, controller side).

NOTE

Inversion of the connectors can lead to damage to a connected PC or notebook.

UK

5.2 Ground connection



1: Drill holes for ground connection



To ensure the protection of the device against electrical interference and the safe function of the device, the housing must be connected to the ground of the vehicle.

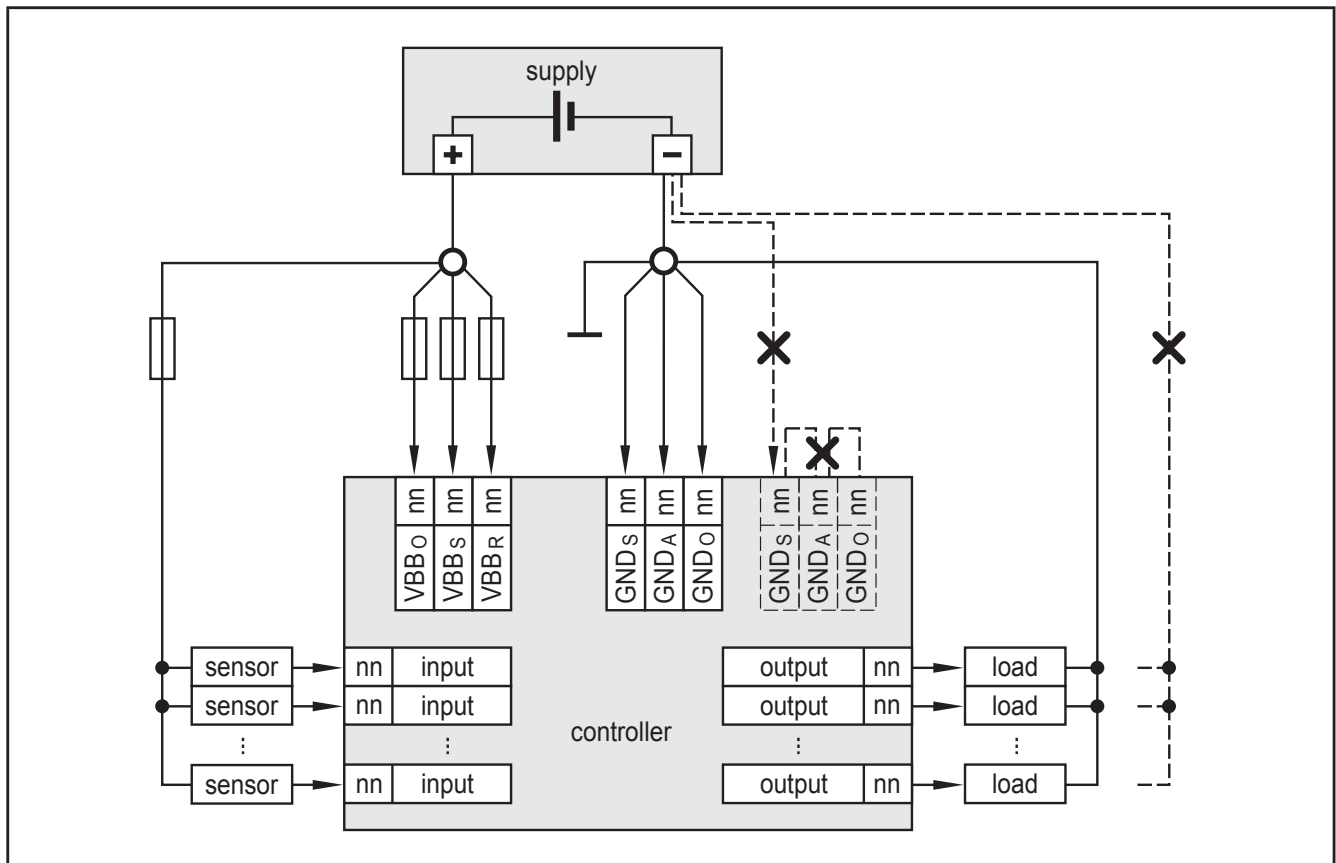
- Establish a connection between the device and the ground of the vehicle using M5 screws.
Screws to be used (→ 4.1 Fixing)

5.3 Fuses

- The individual electric circuits must be protected in order to protect the whole system.

Connection side	Description	Potential	Pin no.	Fuse
Standard (St) Safety	Supply voltage sensors/module	VBB_s	St-10	≤ 2 A time-lag
	Supply voltage outputs	VBB_o	St-19	≤ 15 A
	Supply voltage via relay	VBB_R	St-01	≤ 15 A
Extended (Ex) Non Safety	Supply voltage relay	VBB_{Rel}	Ex-51	≤ 2 A time-lag
	Supply voltage output group 1	VBB_1	Ex-19	≤ 15 A
	Supply voltage output group 2	VBB_2	Ex-01	≤ 15 A
	Supply voltage output group 3	VBB_3	Ex-32	≤ 15 A
	Supply voltage output group 4	VBB_4	Ex-10	≤ 15 A

5.4 Laying the supply and signal cables



Example St connection side (X = not permissible)

⚠ WARNING

The linking of connections in the plug is not permitted and can affect the safety of operators and machinery.

- ▶ Basically all supply and signal cables must be laid separately.
- ▶ Connect supply and ground cables to the controller and to the sensors/actuators via the respective common star point.



If a prewired connection cable is used, remove the cores with unused signal inputs and outputs.

Unused cores, in particular core loops, lead to interference coupling that can influence the connected controller.

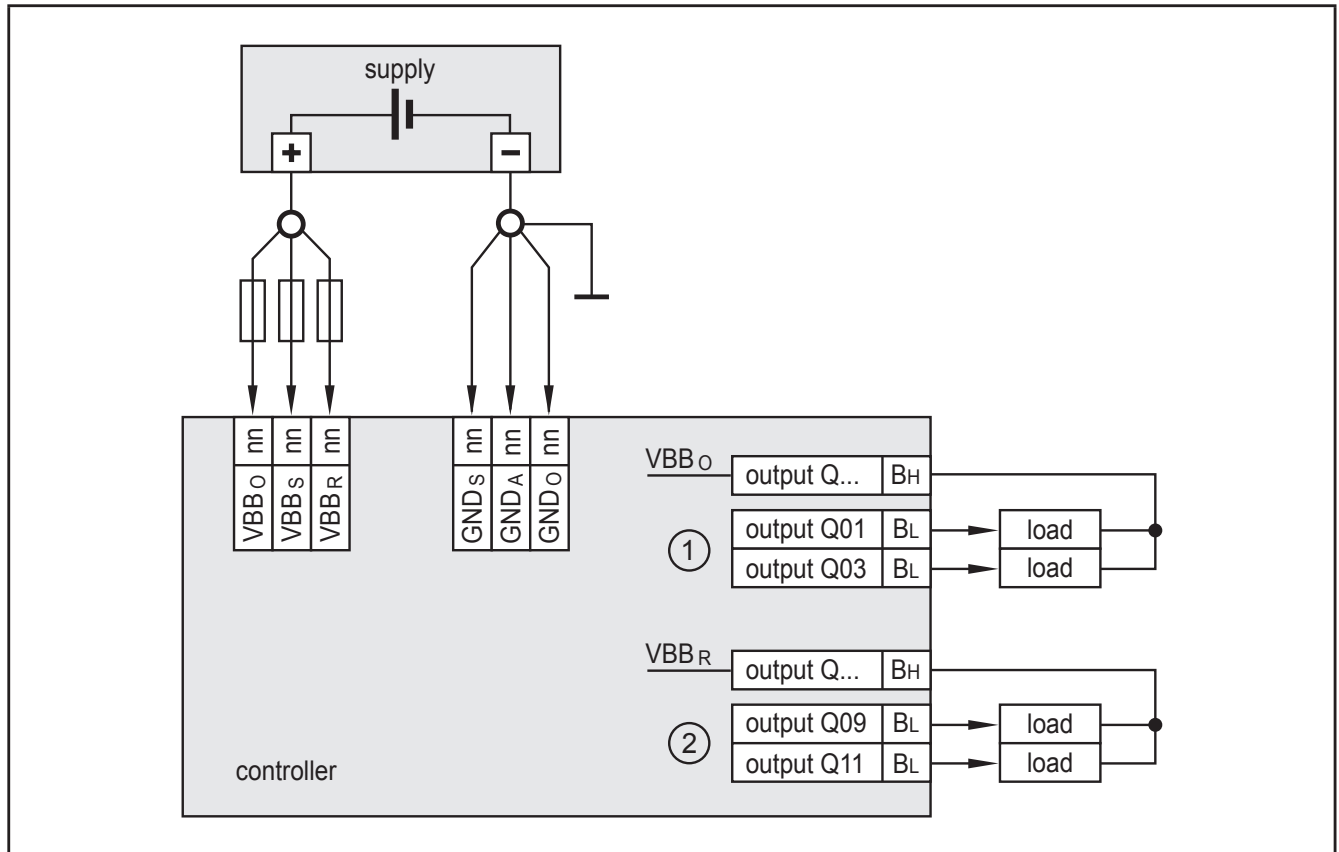
5.4.1 GND connections of the Ex connection side

- ▶ Connect all GND connections of the Ex connection side to the common GND star point.

5.5 Frequency and analogue inputs

- ▶ Operate frequency inputs with screened cables, so that useful signals are not affected by external interference.
- ▶ Connect screens to ground on one side.

5.6 Supply low-side digital outputs (B_L)



Supply low-side digital outputs (B_L)

- 1: Outputs of the output group VBB_O
- 2: Outputs of the output group VBB_R

- Supply low-side outputs (B_L) via a high-side output (B_H) of the same output group.

5.7 Connection technology

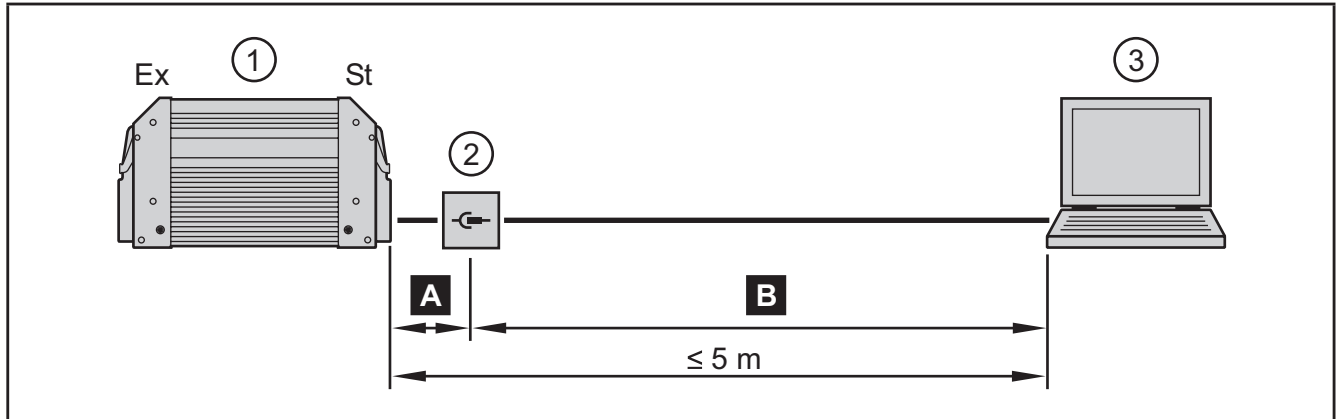
NOTE

Only connect the 55-pole connectors when the supply voltage is disconnected. No "hot plugging" is permitted.

5.8 USB interface

5.8.1 Hardware requirement

The USB controller used is USB 2.0 compatible. The USB interface is provided as a virtual COM port under Windows (→ 6.2 Programming via USB interface).



1. Controller (2 x 55-pin connector; USB connection on St side)
2. USB connector for programming and service purposes
3. Notebook/PC

- A** Connection controller to USB connector, permanent (≤ 3 m).
- Position the USB connector in immediate vicinity to the controller. The cable length "A" considerably influences the quality of the USB data transmission.
- B** Connection USB connector to notebook / PC, temporary
- Use a connection cable with the designation "Full Speed/High Speed" (= USB connection cable with twisted and screened cores).
 - Do not make a connection using several USB connection cables.
 - Remove the connection cable after the programming or service works.

5.8.2 Short-circuit protection

NOTE

The USB interface is not protected against short circuits with a live wire outside the following voltage ranges:

USB_P: -0.5...3.8 V DC

USB_N: -0.5...3.8 V DC

USB_5V: -0.5...10.0 V DC

A short circuit will destruct the USB interface.

6 Set-up

WARNING

Observe the introduction (→ pages II ff)!

- Functions and features
- Programming and important additions to these instructions
- Set-up

6.1 Interfaces and system requirements

The user can easily create the application program by means of the IEC 61131-3 compliant CODESYS programming system.

The "Downloader" software tool is used for the download to the controller. This tool ensures error-free data transfer via redundancy check (CRC).



System requirements for RS-232 and CAN1-4:
Microsoft Windows XP, SP1/2 or higher

System requirements for USB (virtual COM port):
Windows XP, SP2 or higher

For usable CODESYS and Downloader versions see CR7132
SafetyController system manual.

6.2 Programming via USB interface



Note in general:

- The controller can be connected to any USB interface. The number of the COM port does not change.
- Only connect one controller for programming to the PC.
- Special USB and COM port drivers are required.

6.2.1 Install the USB drivers

These drivers provide a "virtual COM port", i.e. another artificial serial interface, on the PC.

The drivers can be found on the ifm ecomat mobile CD.



Changes to the system settings of the PC require extended user rights.
Contact your system administrator.

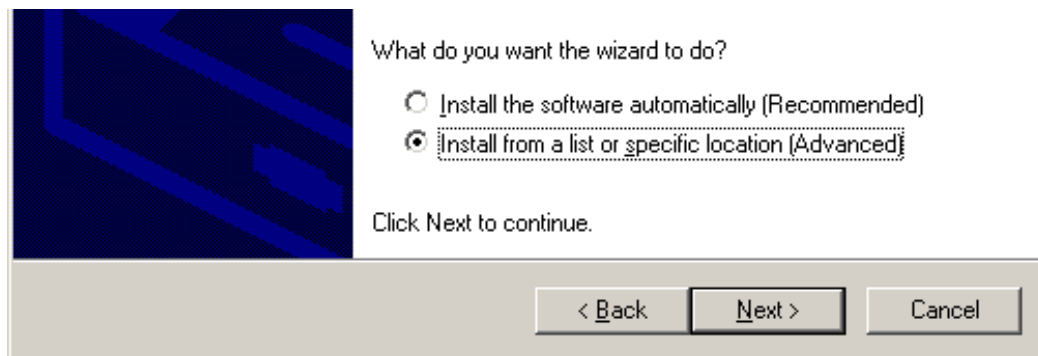


The following descriptions point out the installation under Windows XP. In other Windows versions there may be different menu names or structures.

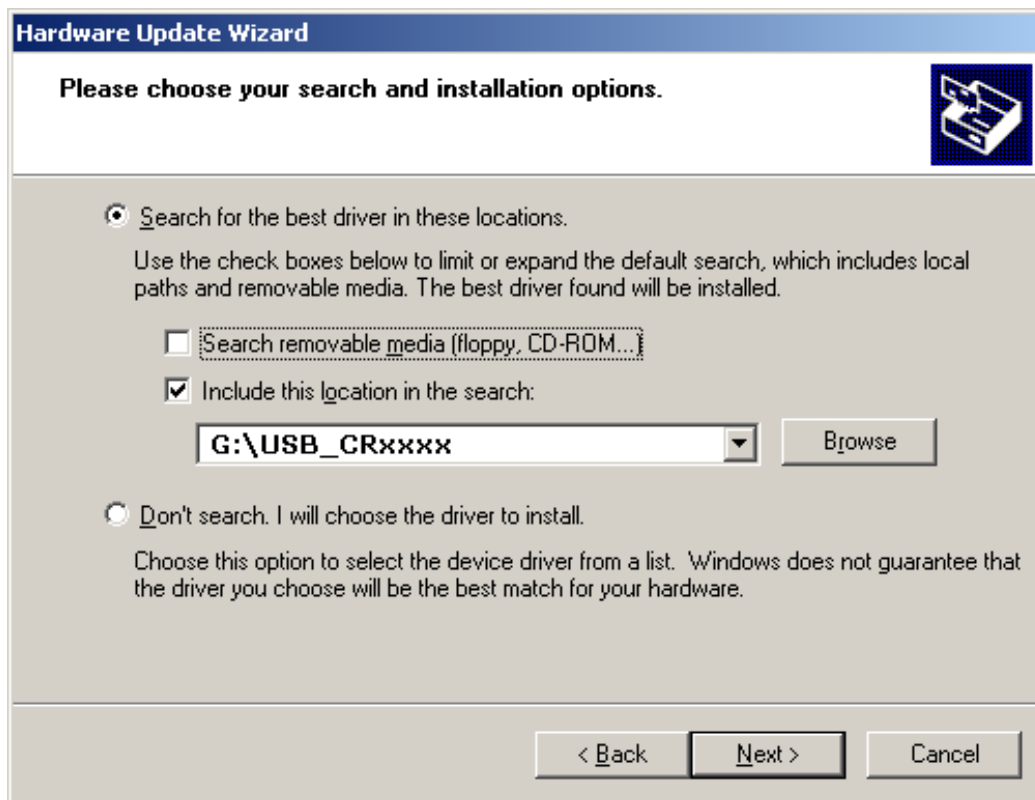
- ▶ Connect the controller to the PC via the USB interface.
- > When started for the first time, the Windows dialogue box "Found New Hardware Wizard" automatically appears.



- ▶ Select [No, not this time].
(Prevents the automatic search for a new Windows update)
- ▶ Click on [Next] to continue.



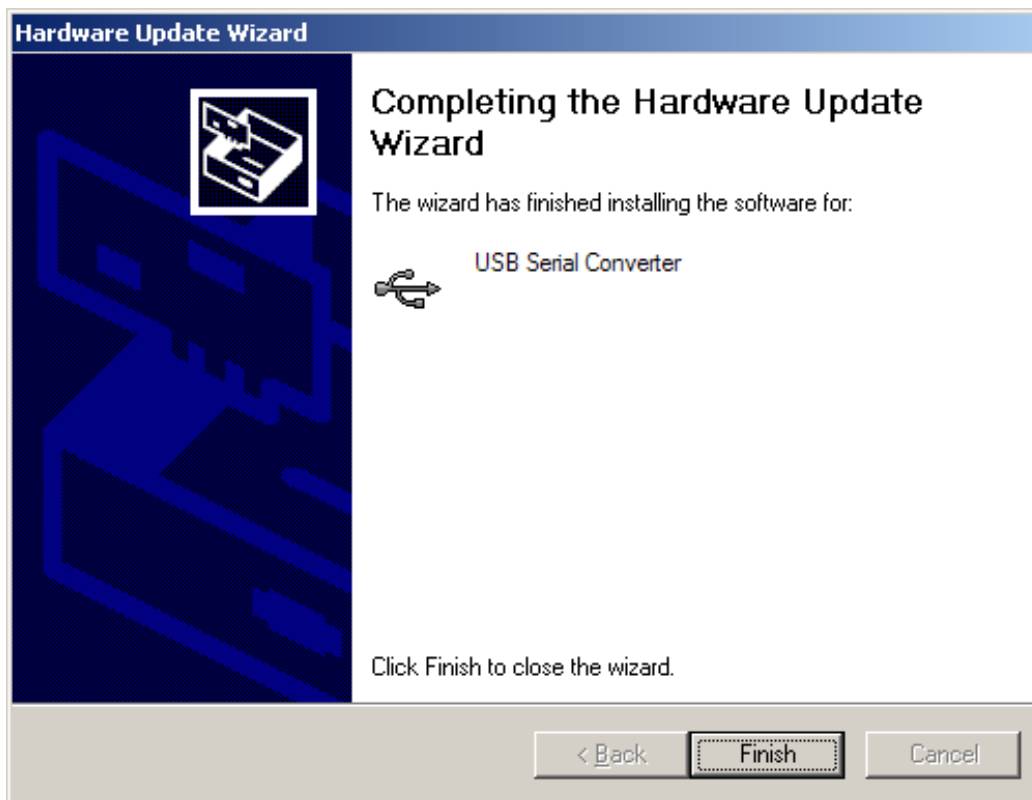
- ▶ Select [Install from a list or specific location].
(Enables the targeted search and selection of the required driver)
- ▶ Click on [Next] to continue.



- ▶ In case of installation using the ecomat mobile CD, select "Include this location in the search" → Drive letter:\USB_CRxxxx.
- ▶ If the USB driver is located in a hard disk directory (e.g. after an internet download), select the directory using the browser function in the dialogue window. Alternatively, enter the storage location directly.

-  Only if the Windows installation wizard has found a valid driver file can you change to the next dialogue box with [Next].
-  Windows carries out a "Windows logo test". The result of the system-internal test does not have any effect on the function of the software.
 - ▶ Acknowledge the possible message "Windows logo test not passed" with [Continue].

- > The selected driver is displayed.
- > A message appears that installation was carried out correctly.



- Complete the installation with [Finish].

6.2.2 Install and define the virtual COM port

The installation is only necessary when started for the first time. The installation procedure is identical to the previous USB driver installation (→ 6.2.1).

The installation program automatically selects the next free COM port (e.g. COM3) for the driver.

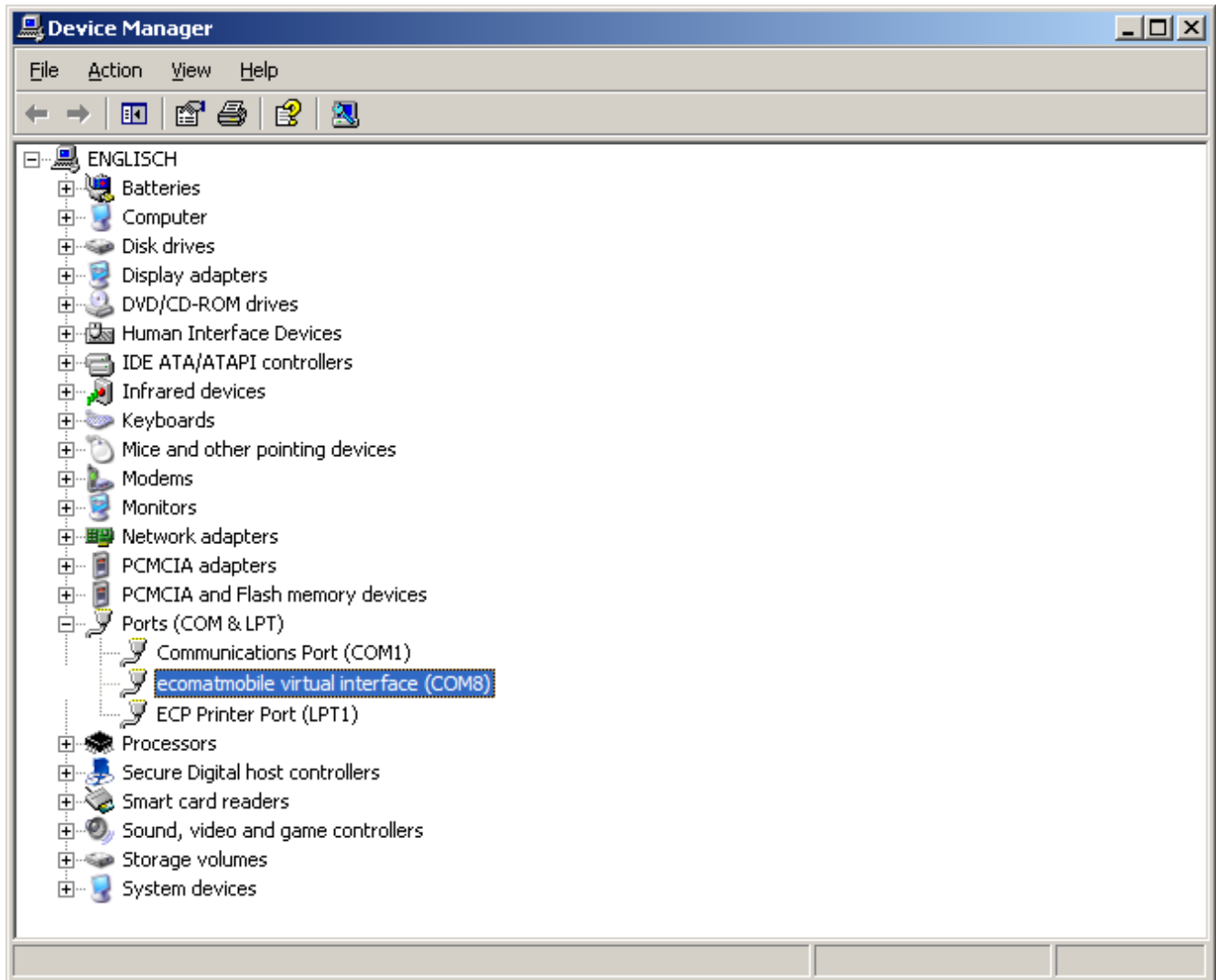
- In case of conflicts with other programs, change the setting for the COM port in the Windows device manager.
 1. Open the device manager.
The service program device manager can for example be accessed via Start → Control Panel → Device Manager.
 2. Select the entry with a double click in the directory "Ports (COM & LPT)".
As an alternative: Right mouse click → Properties.
 3. Click on [Port settings] in the following dialogue box.
 4. Select [Advanced...] and redefine the COM port in the "Advanced Settings" menu (e.g. COM8), if necessary.



Do not use a COM port which is already used by another device. In most computers COM1 and COM2 are already assigned by the hardware interfaces.

- Confirm the setting with [OK].

- > The new COM port is indicated in the device manager following the driver name.



6.3 Uninstall the drivers



If a driver is to be updated, the installed drivers have to be deinstalled first of all.

- ▶ Disconnect the USB connection between the controller and the PC.
- ▶ Open the service program "Software" via the start menu → Control Panel.
- ▶ Uninstall the drivers successively with [Change/Remove].

7 Technical data

CR7132

SafetyController

IEC 61508:2010 SIL 2

if used as safety controller

Suited for requirements up to:

IEC 62061:2021 SIL 2

ISO 13849:2023 PL d

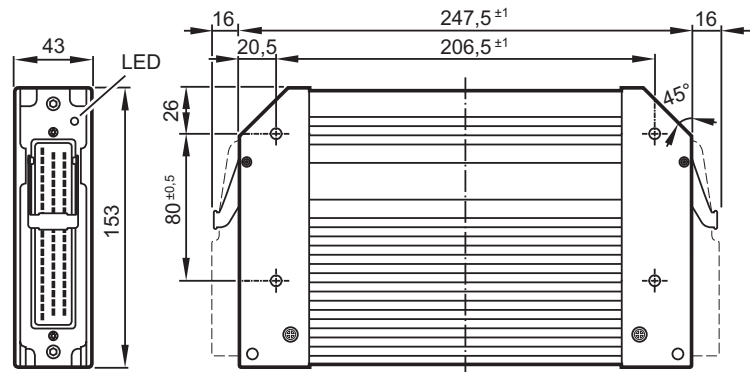
32-bit processor

32 inputs / 48 outputs

2 CANsafety interfaces

CoDeSys 2.3

8...32 V DC



UK

Technical data	
Mechanical data	
Housing	
Dimensions (H x W x D)	
Installation	
Connection	
Weight	
Housing/storage temperature	
Protection rating	
Electrical data	
Input/output channels (total)	
Inputs	
Outputs	
Operating voltage	
Overvoltage	
Input voltage gradient	
Reverse polarity protection	
Current consumption	
CAN interfaces 1...4	
Baud rate	
Communication profile	
Serial interface	
Baud rate	
Topology	
Protocol	

Controller as black-box system to implement a central or decentralised system design	
Closed, screened metal housing with flange fastening	
153 x 247.5 x 43 mm	
Screw connection by means of 4 M5 x L screws to DIN 7500 or DIN 7984 Mounting position horizontal or vertical to the mounting wall	
2 55-pin connectors, latched, protected against reverse polarity, type AMP or Framatome AMP junior timer contacts, crimp connection 0.5/2.5 mm ²	
1.6 kg	
– 40...75 °C (depending on the load) / – 40...85 °C	
IP 67 (for inserted connector with individually sealed cores, e.g. EC2084)	
80 (32 inputs / 48 outputs)	
Configurable Digital for positive/negative sensor signals, positive with diagnostic capabilities Analogue (0...10/32 V, 0...20 mA, ratiometric) Frequency (≤ 30 kHz) 16 of the inputs safety-related inputs	
Configurable Digital positive/negative switching (high/low side) Digital, positive switching (high side, 16 x max. 2 A) PWM output (20...250 Hz, 16 x max. 4 A, 16 x max. 2 A) Current-controlled (16 x 0.01...2 A, 16 x 0.02...4 A) 16 of the outputs are safety-related outputs (8 x 0.01...2 A, 8 x 0.02...4 A)	
8...32 V DC 36 V for t ≤ 10 s > 1.3 V/s	
Yes	
≤ 320 mA (without external load at 24 V DC)	
CAN interface 2.0 A/B, ISO 11898 50 Kbits/s...1 Mbit/s (default 125 Kbits/s) CANopen, CiA DS 301 V4.01, CiA DS 306 V1.3 or SAE J 1939 or free protocol or 2 x CANsafety for safe data transmission	
RS-232 C 9.6...115.2 Kbit/s (default 115.2 Kbits/s) Point-to-point (max. 2 participants); master-slave connection Predefined ifm protocol (INTELHEX)	

CR7132	Technical data																					
Virtual COM port	USB, max. 1 MBaud																					
Processor	32-bit CPU Infineon TriCore 1796																					
Device monitoring	Undervoltage/overvoltage monitoring Watchdog function Checksum test for program and system Excess temperature monitoring																					
Process monitoring concept	Second switch-off mode for 8 outputs each via a relay																					
Physical memory	Flash: 4 Mbytes RAM: 2 Mbytes Remanent memory: 128 Kbytes																					
Memory allocation	See system manual www.ifm.com → Data sheet search → CR7132 → More information																					
Software/programming																						
Programming system	CODESYS version 2.3 (IEC 61131-3)																					
Display elements																						
Status indication	Three-colour LED (R/G/B)																					
Operating states	<table><tr><th>LED colour</th><th>Status</th><th>Description</th></tr><tr><td>–</td><td>Off</td><td>No operating voltage</td></tr><tr><td>Yellow</td><td>1 x on</td><td>Initialisation or reset checks</td></tr><tr><td rowspan="3">Green</td><td>5 Hz</td><td>No operating system loaded</td></tr><tr><td>2.0 Hz</td><td>Run</td></tr><tr><td>On</td><td>Stop</td></tr><tr><td rowspan="2">Red</td><td>2.0 Hz</td><td>Run with error</td></tr><tr><td>On</td><td>Fatal error or stop with error</td></tr></table>	LED colour	Status	Description	–	Off	No operating voltage	Yellow	1 x on	Initialisation or reset checks	Green	5 Hz	No operating system loaded	2.0 Hz	Run	On	Stop	Red	2.0 Hz	Run with error	On	Fatal error or stop with error
LED colour	Status	Description																				
–	Off	No operating voltage																				
Yellow	1 x on	Initialisation or reset checks																				
Green	5 Hz	No operating system loaded																				
	2.0 Hz	Run																				
	On	Stop																				
Red	2.0 Hz	Run with error																				
	On	Fatal error or stop with error																				
No longer valid if the colours and/or flashing modes are changed by the application program.																						

CR7132	Technical data		



CR7132	St side / input characteristics												
I00...I15	<table> <tr> <td>Resolution</td><td>12 bits</td></tr> <tr> <td>Accuracy</td><td>$\pm 1\%$ FS (in the measuring range 0...20 mA: $\pm 2\%$ FS)</td></tr> <tr> <td>Measuring ranges</td><td>0...10 V, 0...32 V, 0...20 mA, ratiometric</td></tr> </table>	Resolution	12 bits	Accuracy	$\pm 1\%$ FS (in the measuring range 0...20 mA: $\pm 2\%$ FS)	Measuring ranges	0...10 V, 0...32 V, 0...20 mA, ratiometric						
Resolution	12 bits												
Accuracy	$\pm 1\%$ FS (in the measuring range 0...20 mA: $\pm 2\%$ FS)												
Measuring ranges	0...10 V, 0...32 V, 0...20 mA, ratiometric												
Current input 0...20 mA (A)	<table> <tr> <td>Input resistance</td><td>390 Ω</td></tr> <tr> <td>Input frequency</td><td>≤ 1 kHz (default 35 Hz)</td></tr> </table>	Input resistance	390 Ω	Input frequency	≤ 1 kHz (default 35 Hz)								
Input resistance	390 Ω												
Input frequency	≤ 1 kHz (default 35 Hz)												
Voltage input 0...10 V (A)	<table> <tr> <td>Input resistance</td><td>65.6 kΩ</td></tr> <tr> <td>Input frequency</td><td>≤ 1 kHz (default 35 Hz)</td></tr> </table>	Input resistance	65.6 k Ω	Input frequency	≤ 1 kHz (default 35 Hz)								
Input resistance	65.6 k Ω												
Input frequency	≤ 1 kHz (default 35 Hz)												
Voltage input 0...32 V (A)	<table> <tr> <td>Input resistance</td><td>50.7 kΩ</td></tr> <tr> <td>Input frequency</td><td>≤ 1 kHz (default 35 Hz)</td></tr> </table>	Input resistance	50.7 k Ω	Input frequency	≤ 1 kHz (default 35 Hz)								
Input resistance	50.7 k Ω												
Input frequency	≤ 1 kHz (default 35 Hz)												
Voltage input ratiometric (A)	<table> <tr> <td>Input resistance</td><td>50.7 kΩ</td></tr> <tr> <td>Input frequency</td><td>≤ 1 kHz (default 35 Hz)</td></tr> </table>	Input resistance	50.7 k Ω	Input frequency	≤ 1 kHz (default 35 Hz)								
Input resistance	50.7 k Ω												
Input frequency	≤ 1 kHz (default 35 Hz)												
Frequency input (FRQ)	<table> <tr> <td>Input resistance</td><td>3.2 kΩ</td></tr> <tr> <td>Input frequency</td><td>≤ 30 kHz</td></tr> <tr> <td>Switch-on level</td><td>$> 0.35 \dots 0.48 U_B$</td></tr> <tr> <td>Switch-off level</td><td>$< 0.29 U_B$</td></tr> </table>	Input resistance	3.2 k Ω	Input frequency	≤ 30 kHz	Switch-on level	$> 0.35 \dots 0.48 U_B$	Switch-off level	$< 0.29 U_B$				
Input resistance	3.2 k Ω												
Input frequency	≤ 30 kHz												
Switch-on level	$> 0.35 \dots 0.48 U_B$												
Switch-off level	$< 0.29 U_B$												
Digital input (B_{LH})	<table> <tr> <td>Input resistance</td><td>3.2 kΩ</td></tr> <tr> <td>Input frequency</td><td>≤ 50 Hz (default 35 Hz)</td></tr> <tr> <td>Switch-on level</td><td>$> 0.7 U_B (\pm 20\%)$</td></tr> <tr> <td>Switch-off level</td><td>$< 0.3 U_B (\pm 20\%)$</td></tr> <tr> <td>Diagnosis wire break</td><td>$> 0.95 U_B$</td></tr> <tr> <td>Diagnosis short circuit</td><td>< 1 V</td></tr> </table>	Input resistance	3.2 k Ω	Input frequency	≤ 50 Hz (default 35 Hz)	Switch-on level	$> 0.7 U_B (\pm 20\%)$	Switch-off level	$< 0.3 U_B (\pm 20\%)$	Diagnosis wire break	$> 0.95 U_B$	Diagnosis short circuit	< 1 V
Input resistance	3.2 k Ω												
Input frequency	≤ 50 Hz (default 35 Hz)												
Switch-on level	$> 0.7 U_B (\pm 20\%)$												
Switch-off level	$< 0.3 U_B (\pm 20\%)$												
Diagnosis wire break	$> 0.95 U_B$												
Diagnosis short circuit	< 1 V												
Test input	During the test mode (e.g. programming) the connector pin must be connected to VBB_S (8...32 V DC). For the "RUN" mode, connect the test input to GND. Observe the notes on the configuration of the inputs/outputs! ("SafetyController" system manual)												

CR7132	St side / output characteristics												
Q00...Q15	<table> <tr> <td>Accuracy</td><td>$\pm 2\%$ FS (for inductive loads)</td></tr> <tr> <td>Protective circuit for inductive loads</td><td>integrated</td></tr> <tr> <td>Diagnosis via current feedback</td><td>Wire break/overload</td></tr> <tr> <td>Diagnosis via voltage feedback</td><td>Short circuit</td></tr> </table>	Accuracy	$\pm 2\%$ FS (for inductive loads)	Protective circuit for inductive loads	integrated	Diagnosis via current feedback	Wire break/overload	Diagnosis via voltage feedback	Short circuit				
Accuracy	$\pm 2\%$ FS (for inductive loads)												
Protective circuit for inductive loads	integrated												
Diagnosis via current feedback	Wire break/overload												
Diagnosis via voltage feedback	Short circuit												
PWM output (PWM)	<table> <tr> <td>Output frequency</td><td>20...250 Hz (per channel)</td></tr> <tr> <td>Pulse/pause ratio</td><td>1...1000 ‰</td></tr> <tr> <td>Resolution</td><td>1 ‰</td></tr> <tr> <td>Switching current</td><td>8 x 0.01...2 A 8 x 0.01...2 A / 0.02...4 A (4 of these outputs with H-bridge function)</td></tr> </table>	Output frequency	20...250 Hz (per channel)	Pulse/pause ratio	1...1000 ‰	Resolution	1 ‰	Switching current	8 x 0.01...2 A 8 x 0.01...2 A / 0.02...4 A (4 of these outputs with H-bridge function)				
Output frequency	20...250 Hz (per channel)												
Pulse/pause ratio	1...1000 ‰												
Resolution	1 ‰												
Switching current	8 x 0.01...2 A 8 x 0.01...2 A / 0.02...4 A (4 of these outputs with H-bridge function)												
Digital output (B _H and B _{HIL})	<table> <tr> <td>Switching voltage</td><td>8...32 V DC</td></tr> <tr> <td>Switching current</td><td>8 x 0.01...2 A 8 x 0.02...4 A (4 of these outputs with H-bridge function)</td></tr> </table>	Switching voltage	8...32 V DC	Switching current	8 x 0.01...2 A 8 x 0.02...4 A (4 of these outputs with H-bridge function)								
Switching voltage	8...32 V DC												
Switching current	8 x 0.01...2 A 8 x 0.02...4 A (4 of these outputs with H-bridge function)												
Current-controlled output (PWM)	<table> <tr> <td>H-bridge (channel pair)</td><td>Q01 / Q03 Q09 / Q11</td></tr> <tr> <td>Output frequency</td><td>20...250 Hz (per channel)</td></tr> <tr> <td>Control range</td><td>8 x 0.01...2 A / 0.02...4 A 8 x 0.01...2 A</td></tr> <tr> <td>Setting resolution</td><td>1 mA</td></tr> <tr> <td>Control resolution</td><td>1 / 2 mA</td></tr> <tr> <td>Load resistor</td><td>$\geq 3\ \Omega$ (at 12V DC) $\geq 6\ \Omega$ (at 24V DC)</td></tr> </table>	H-bridge (channel pair)	Q01 / Q03 Q09 / Q11	Output frequency	20...250 Hz (per channel)	Control range	8 x 0.01...2 A / 0.02...4 A 8 x 0.01...2 A	Setting resolution	1 mA	Control resolution	1 / 2 mA	Load resistor	$\geq 3\ \Omega$ (at 12V DC) $\geq 6\ \Omega$ (at 24V DC)
H-bridge (channel pair)	Q01 / Q03 Q09 / Q11												
Output frequency	20...250 Hz (per channel)												
Control range	8 x 0.01...2 A / 0.02...4 A 8 x 0.01...2 A												
Setting resolution	1 mA												
Control resolution	1 / 2 mA												
Load resistor	$\geq 3\ \Omega$ (at 12V DC) $\geq 6\ \Omega$ (at 24V DC)												
Reference voltage V _{REF} OUT (sensor supply)	For sensors and joysticks 5/10 V, 400 mA, accuracy $\pm 7\%$ Short-circuit proof and overload protected (10 V reference only from a supply voltage U_B ≥ 13 V)												
Internal relays	NO contacts for the second switch-off way of the outputs. In series of 8 semiconductor outputs each Forced control via the hardware and additional control via the user program. The relays must always be switched without load! <table> <tr> <td>Switching current</td><td>0.1...15 A</td></tr> <tr> <td>Overload current</td><td>20 A</td></tr> <tr> <td>Number of operating cycles (without load)</td><td>$\geq 10^6$</td></tr> <tr> <td>Switching time constant</td><td>≤ 3 ms</td></tr> </table>	Switching current	0.1...15 A	Overload current	20 A	Number of operating cycles (without load)	$\geq 10^6$	Switching time constant	≤ 3 ms				
Switching current	0.1...15 A												
Overload current	20 A												
Number of operating cycles (without load)	$\geq 10^6$												
Switching time constant	≤ 3 ms												
Load current per output group (VBB _R , VBB _O)	≤ 12 A (for continuous operation ≤ 6 A; i.e. operation ≥ 10 min)												
Overload protection (valid for all outputs)	Max. 5 minutes (at 100% overload)												
Short-circuit strength to GND	Switch-off of the outputs via output driver and/or the runtime system												

CR7132	Ex side / input characteristics												
I00_E...I15_E	<table> <tr> <td>Resolution</td><td>12 bits</td></tr> <tr> <td>Accuracy</td><td>$\pm 1\%$ FS (in the measuring range 0...20 mA: $\pm 2\%$ FS)</td></tr> <tr> <td>Measuring ranges</td><td>0...10 V, 0...32 V, 0...20 mA, ratiometric</td></tr> </table>	Resolution	12 bits	Accuracy	$\pm 1\%$ FS (in the measuring range 0...20 mA: $\pm 2\%$ FS)	Measuring ranges	0...10 V, 0...32 V, 0...20 mA, ratiometric						
Resolution	12 bits												
Accuracy	$\pm 1\%$ FS (in the measuring range 0...20 mA: $\pm 2\%$ FS)												
Measuring ranges	0...10 V, 0...32 V, 0...20 mA, ratiometric												
Current input 0...20 mA (A)	<table> <tr> <td>Input resistance</td><td>390 Ω</td></tr> <tr> <td>Input frequency</td><td>≤ 1 kHz (default 35 Hz)</td></tr> </table>	Input resistance	390 Ω	Input frequency	≤ 1 kHz (default 35 Hz)								
Input resistance	390 Ω												
Input frequency	≤ 1 kHz (default 35 Hz)												
Voltage input 0...10 V (A)	<table> <tr> <td>Input resistance</td><td>65.6 kΩ</td></tr> <tr> <td>Input frequency</td><td>≤ 1 kHz (default 35 Hz)</td></tr> </table>	Input resistance	65.6 k Ω	Input frequency	≤ 1 kHz (default 35 Hz)								
Input resistance	65.6 k Ω												
Input frequency	≤ 1 kHz (default 35 Hz)												
Voltage input 0...32 V (A)	<table> <tr> <td>Input resistance</td><td>50.7 kΩ</td></tr> <tr> <td>Input frequency</td><td>≤ 1 kHz (default 35 Hz)</td></tr> </table>	Input resistance	50.7 k Ω	Input frequency	≤ 1 kHz (default 35 Hz)								
Input resistance	50.7 k Ω												
Input frequency	≤ 1 kHz (default 35 Hz)												
Voltage input ratiometric (A)	<table> <tr> <td>Input resistance</td><td>50.7 kΩ</td></tr> <tr> <td>Input frequency</td><td>≤ 1 kHz (default 35 Hz)</td></tr> </table>	Input resistance	50.7 k Ω	Input frequency	≤ 1 kHz (default 35 Hz)								
Input resistance	50.7 k Ω												
Input frequency	≤ 1 kHz (default 35 Hz)												
Frequency input (FRQ)	<table> <tr> <td>Input resistance</td><td>3.2 kΩ</td></tr> <tr> <td>Input frequency</td><td>≤ 30 kHz</td></tr> <tr> <td>Switch-on level</td><td>$> 0.35 \dots 0.55 U_B$</td></tr> <tr> <td>Switch-off level</td><td>$< 0.29 U_B$</td></tr> </table>	Input resistance	3.2 k Ω	Input frequency	≤ 30 kHz	Switch-on level	$> 0.35 \dots 0.55 U_B$	Switch-off level	$< 0.29 U_B$				
Input resistance	3.2 k Ω												
Input frequency	≤ 30 kHz												
Switch-on level	$> 0.35 \dots 0.55 U_B$												
Switch-off level	$< 0.29 U_B$												
Digital input ($B_{L/H}$)	<table> <tr> <td>Input resistance</td><td>3.2 kΩ</td></tr> <tr> <td>Input frequency</td><td>≤ 50 Hz (default 35 Hz)</td></tr> <tr> <td>Switch-on level</td><td>$> 0.7 U_B (\pm 20\%)$</td></tr> <tr> <td>Switch-off level</td><td>$< 0.3 U_B (\pm 20\%)$</td></tr> <tr> <td>Diagnosis wire break</td><td>$> 0.95 U_B$</td></tr> <tr> <td>Diagnosis short circuit</td><td>< 1 V</td></tr> </table>	Input resistance	3.2 k Ω	Input frequency	≤ 50 Hz (default 35 Hz)	Switch-on level	$> 0.7 U_B (\pm 20\%)$	Switch-off level	$< 0.3 U_B (\pm 20\%)$	Diagnosis wire break	$> 0.95 U_B$	Diagnosis short circuit	< 1 V
Input resistance	3.2 k Ω												
Input frequency	≤ 50 Hz (default 35 Hz)												
Switch-on level	$> 0.7 U_B (\pm 20\%)$												
Switch-off level	$< 0.3 U_B (\pm 20\%)$												
Diagnosis wire break	$> 0.95 U_B$												
Diagnosis short circuit	< 1 V												

CR7132**Q00_E...Q15_E**

PWM output (PWM)

Digital output (B_H and B_{HL})Current-controlled output (PWM_I)**Q16_E...Q31_E**
Digital output (B_H)

Internal relays

Load current per output group
(VBB_n)Overload protection
(valid for all outputs)

Short-circuit strength to GND

Ex side / output characteristics

Accuracy	± 2 % FS (for inductive loads)
Protective circuit for inductive loads	Integrated
Diagnosis via current feedback	Wire break/overload
Diagnosis via voltage feedback	Short circuit

Output frequency	20...250 Hz (per channel)
Pulse/pause ratio	1...1000 %
Resolution	1 %
Switching current	8 x 0.01...2 A 8 x 0.01...2 A / 0.02...4 A (4 of these outputs with H-bridge function)

Switching voltage	8...32 V DC
Switching current	8 x 0.01...2 A 8 x 0.02...4 A (4 of these outputs with H-bridge function)

H-bridge (channel pair)	Q01_E / Q03_E Q09_E / Q11_E
Output frequency	20...250 Hz (per channel)
Control range	8 x 0.01...2 A / 0.02...4 A 8 x 0.01...2 A
Setting resolution	1 mA
Control resolution	1 / 2 mA
Load resistance	≥ 3 Ω (at 12V DC) ≥ 6 Ω (at 24V DC)

Switching voltage	8...32 V DC
Switching current	16 x ≤ 2 A
Diagnosis via voltage feedback	Wire break/short circuit

NO contacts for the second switch-off way of the outputs.
In series of 8 semiconductor outputs each
Forced control via the hardware
and additional control via the user program.

The relays must always be switched without load!

Switching current	0.1...15 A
Overload current	20 A
Number of operating cycles (without load)	≥ 10 ⁶
Switching time constant	≤ 3 ms

≤ 12 A
(for continuous operation ≤ 6 A; i.e. operation ≥ 10 min)

Max. 5 minutes (at 100% overload)

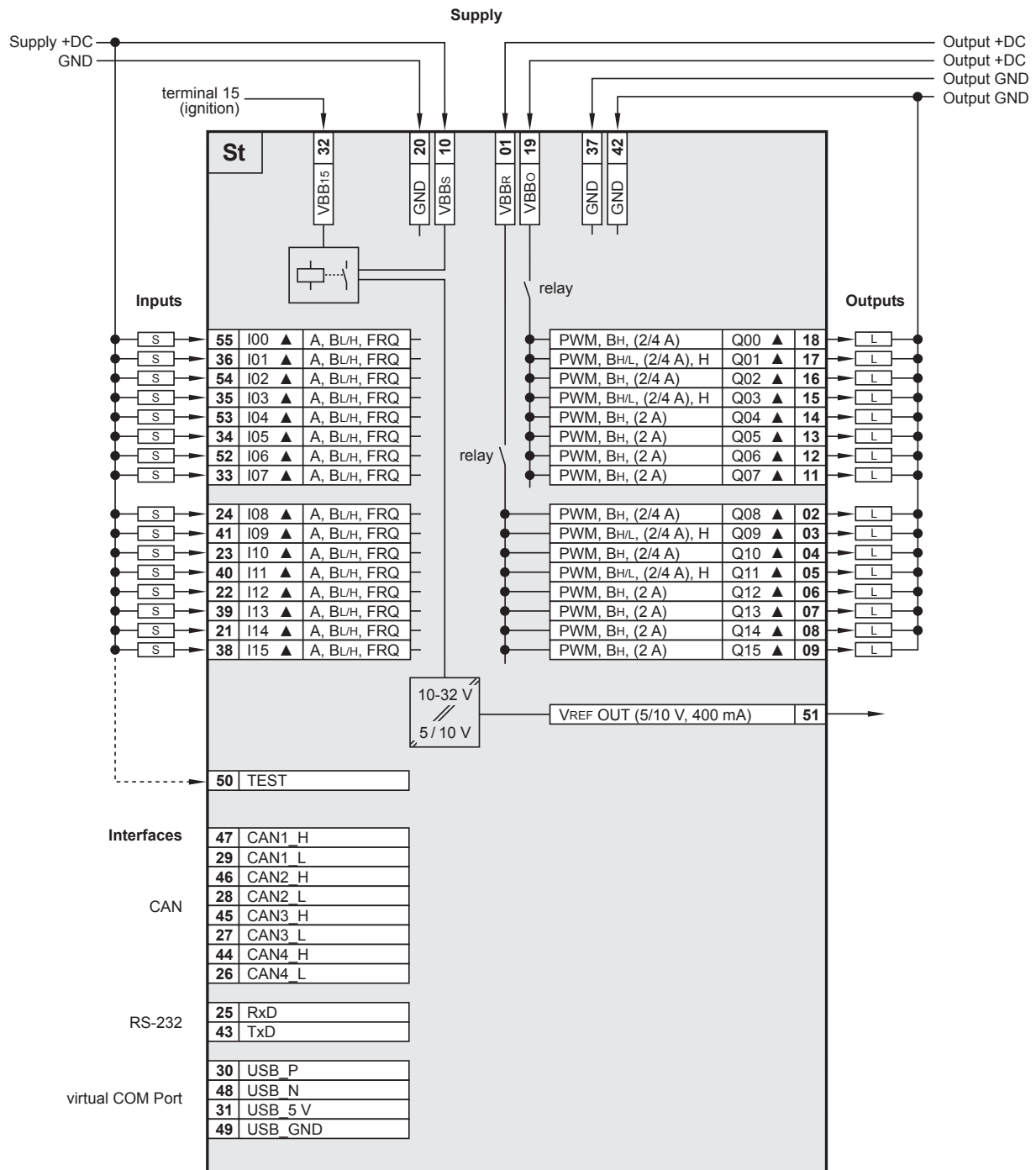
Switch-off of the outputs is carried out via the output driver

CR7132

Technical data

Wiring

St side



Abbreviations

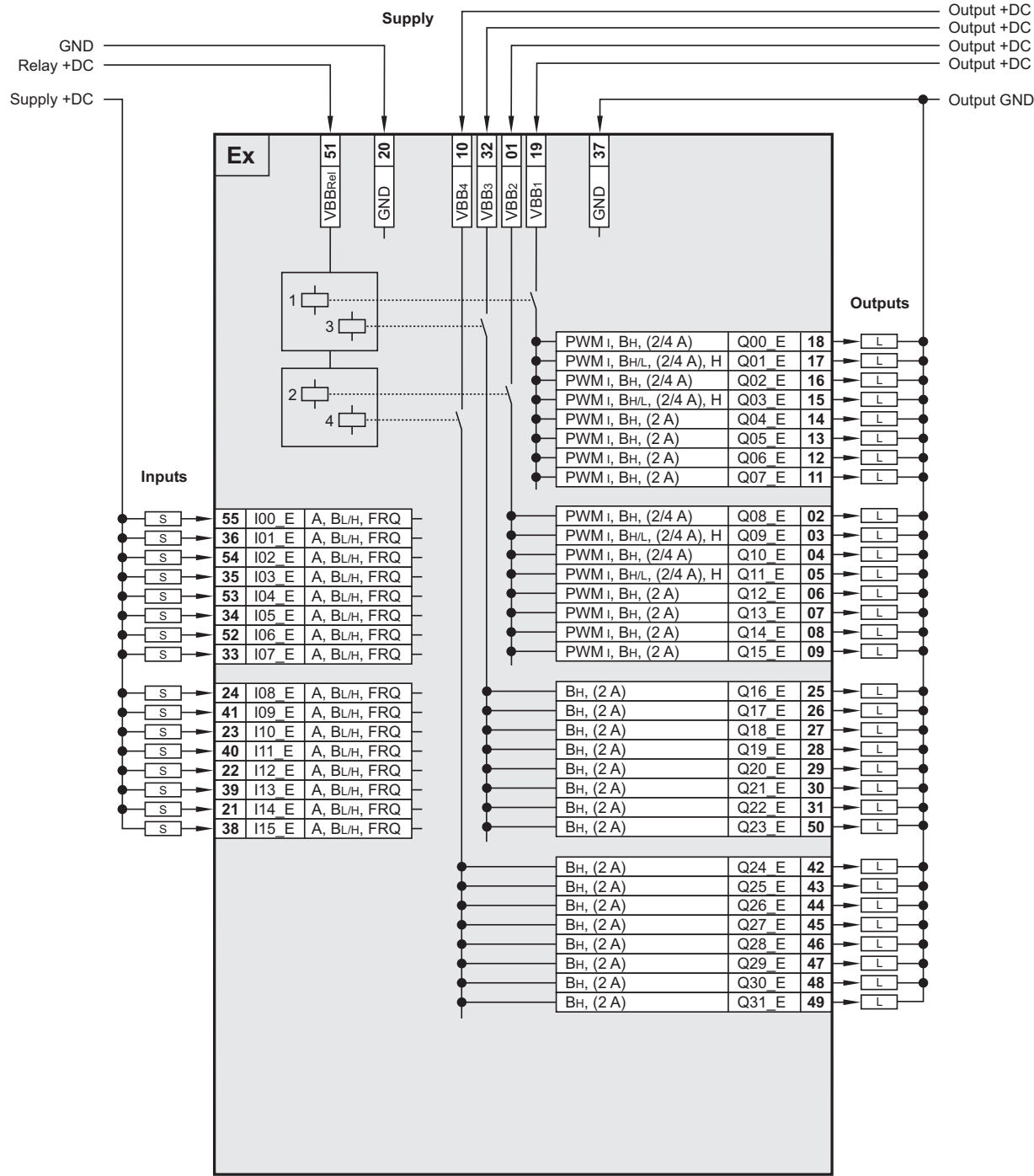
A	Analogue
B _H	Binary high side
B _L	Binary low side
FRQ	Frequency/pulse inputs
H	H-bridge function
PWM	Pulse width modulation
VBB _O	Supply outputs
VBB _S	Supply sensors/module
VBB _R	Supply via relay
▲	Safety-compatible input/output

CR7132

Technical data

Wiring

Ex side



Abbreviations

- A Analogue
B_H Binary high side
B_L Binary low side
FRQ Frequency/pulse inputs
H H-bridge function
PWM Pulse width modulation
(VBB_n) Supply of the outputs via relays 1/3 and 2/4

8 Maintenance, repair and disposal

The unit is maintenance-free.

- ▶ Do not open the housing as the device does not contain any components which can be repaired by the user. The device must only be repaired by the manufacturer.
- ▶ Dispose of the device in accordance with the national environmental regulations.

9 Approvals/standards

Test standards and regulations (→ 7 Technical data)

The EC declaration of conformity and approvals can be found at:
www.ifm.com