USER AND SAFETY MANUAL

ROTOR INTERFERENCE DETECTION
RID 3.0

Part number	22464112
Version	1.1.2
Date	June 30, 2026

FUTURE-PROOF VALUE SINCE 1950

CONTENT

1. REVISIONS

V1.0.0	Initial document	3-11-2023
V1.0.1	Added supplier (Page 4), added extra mounting instructions (Page 5), added ventilation requirements (Page 5), added warning in case of misusage of the RID (page 5), added over voltage category (page 4)	19-11-2023
V1.0.2	Changed over voltage category (page 4)	29-11-2023
V1.0.3	Removed concept from document	19-02-2024
V1.0.4	Adjusted for CSA certification	30-01-2025
V1.0.5	Adjusted for CSA certification	25-03-2025
V1.0.6	Adjusted for CSA certification	23-04-2025
V1.1.0	See Appendix B for details.	18-12-2025
V1.1.1	Added pollution degree to specifications	08-06-2026
V1.1.2	Updated Figure 1	30-06-2026

2. LIST OF ABBREVIATIONS

ABBREVIATION	SHORT FOR	DESCRIPTION
CIP	Clean-In-Place	A procedure where a system is internally cleaned without major disassembly.
	Common Industrial Protocol	A protocol used for industrial automation that is integrated on an ethernet network.
CONT	Contamination	Product build-up between the rotor and body.
DHCP	Dynamic Host Configuration Protocol	Network management protocol for automatically assigning IP addresses and other parameters to devices connected to a network.
DLR	Device Level Ring	Network topology where ethernet devices are connected in a ring.
EDS	Electronic Datasheet	Digital file that describes the configuration of a device for plug-and-play integration in an industrial network.
ESD	Electrostatic Discharge	A sudden electric current between two objects often caused by static electricity.
IOUT	Current Out	Used as pin indication for the 4-20 mA analog output.
MS	Module Status	Used as identification of the LED indicating the module status.
MTM	Metal-To-Metal	When a direct contact between rotor and body is detected.
NS	Network Status	Used as identification of the LED indicating the network status.
OL	Open Loop	Indication for when a break in the measuring circuit is detected.
P/OL	Power/Open Loop	Used as identification of the LED indicating the power and open loop status of the device.
RID	Rotor Interference Detection	A module used for monitoring rotor to body contact by measuring resistance.
RST	Reset	Module reset

3. PREFACE

This user and safety manual applies to the DMN-WESTINGHOUSE Rotor Interference Detector (RID) 3.0, part number 22464112.

Read this information carefully to prevent damage to the module or any harm to persons or objects.

Supplier information:

DMN-WESTINGHOUSE
Gieterij 3
2211 WC Noordwijkerhout
Netherlands
Phone: +31 252 361 800

Figure 1 Overview of the RID 3.0

4. INTRODUCTION

The RID 3.0 is intended to be used for monitoring metal-to-metal contact and contamination in rotating valves. It generates alarms when a metal-to-metal contact or product build-up occurs. Therefore it can help preventing metallic particles or burrs to accidentally enter the conveyed product.

4.1. TECHNICAL SPECIFICATIONS

Table 1 Technical specifications

Supply voltage	24 VDC ± 10%, Overvoltage category I
Power consumption	150 mA
Ambient temperature	-20 °C – 60 °C (-4 °F – 140 °F)
Storage temperature	-20 °C – 60 °C (-4 °F – 140 °F)
Relative humidity	30 – 70%, non-condensing
Pollution degree	2
Max. altitude	2000 m
Resistance measurement range	0 Ω – 10 kΩ
Accuracy	0 Ω – 1 kΩ: 10 Ω 1 kΩ – 10 kΩ: 100 Ω
Sample rate	1 kHz
USB connection	USB 2.0 via USB-C
Network connection	EtherNet/IP™ (Dual port)
Analog output (IOUT)	4-20 mA
Relay max. current (OK, OL, MTM, CONT)	1 A DC
Relay max. voltage (OK, OL, MTM, CONT)	48 VDC
Input voltage (RST, CIP)	24 VDC ± 10%
Absolute max input voltage (RST, CIP)	48 VDC
Sense line voltage (S1, S2)	3.3 VDC
Maximum sense line voltage (S1, S2)	28 VDC
Sense line current (S1, S2)	<5 mA

5. SAFETY PRECAUTIONS

- The RID 3.0 may only be installed by certified electrical engineers.
- Take the necessary ESD precautions handling and installing the module.
- For ATEX Environments a Zener safety barrier (Pepperl+Fuchs Z960 or Pepperl+Fuchs Z710) must be added to the system.
- The RID 3.0 may only be operated in an indoor situation.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Make sure the electrical power is turned-off before installing the device.

6. PRODUCT OVERVIEW

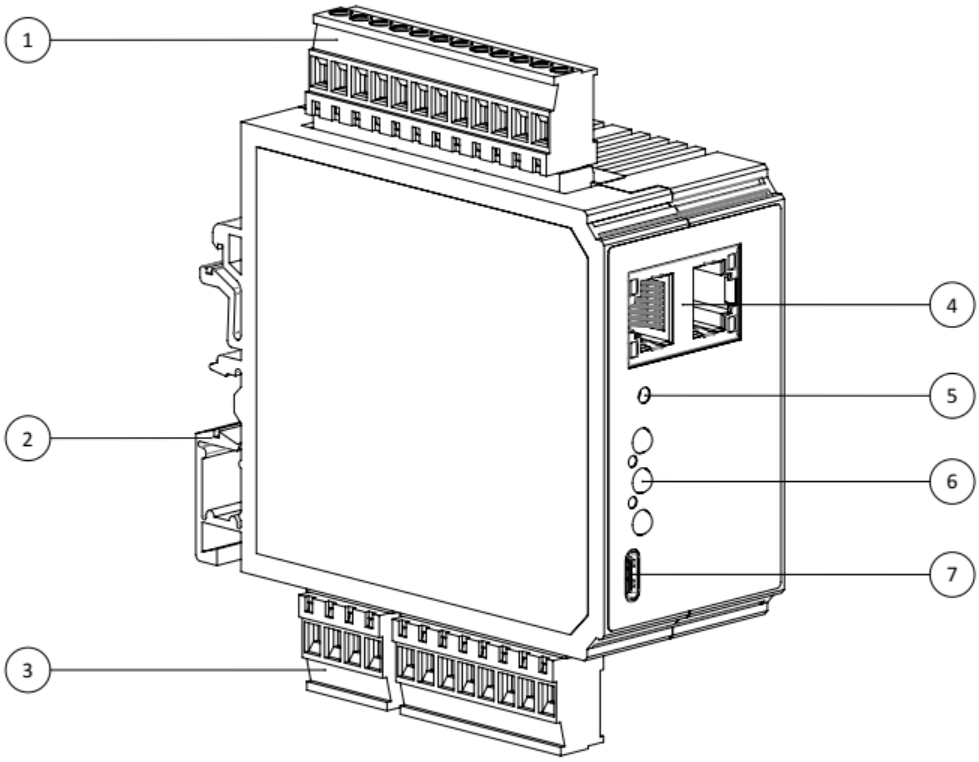


Figure 2 Product overview

1. Relay output connections
2. Rail mount
3. Power supply, input, and analog output connections
4. Ethernet/IP™ ports
5. Reset button
6. LED indicators
7. USB-C port

6.1. RELAY OUTPUT CONNECTIONS

CONT			MTM			OL			OK		
NO	NC	C	NO	NC	C	NO	NC	C	NO	NC	C

Figure 3 Relay output connections

- CONT (Contamination detection)

  This relay output switches when the measured resistance drops below the contamination threshold for the set duration.

- MTM (Metal to Metal detection)

  This relay output switches when the measured resistance drops below the MTM threshold, exceeds the minimum detection time and satisfies the alarm definition. When CIP mode is activated, the CIP incident and alarm definitions are used as alarm criteria.

- OL (Open loop detection)

  This relay output switches when there is an interruption in the sensor wiring.

- OK (OK signal)

  This relay is always on when the module is operating.

6.2. ANALOG OUTPUT, INPUT AND POWER SUPPLY CONNECTIONS

Figure 4 Analog output, input and power supply connections

- IOUT (Analog output)

  This connection outputs an analog 4-20 mA signal proportional to the measured resistance. The range can be adjusted, see chapter 9.3.2. NOTE: the negative side of the 4-20 mA output is connected internally to the negative terminal of the power supply connection. See Figure 8.

- RST (Reset input)

  At this optically isolated input a 24 VDC pulse can be applied to reset the module. Minimum duration of the pulse is 100 ms.

- CIP (CIP mode input)

  At this optically isolated input a 24 VDC can be applied to activate the Clean-in-Place mode (CIP). The input must be kept high to keep CIP-mode activated.

- SENSE (Sense line input)

  At this port the sense lines must be connected, terminated by the resistor box. S1 must be connected to protective ground at the machine side.

- 24VDC (Power supply)

  At this port a 24 VDC power supply should be connected.

6.3. FRONT CONNECTIONS

- RJ45 ports 1 and 2

  These connections can be used to connect the module to an Ethernet/IP™ network. Connection 2 can be used for a Device Level Ring (DLR) setup.

- USB-C port (USB 2.0)

  This port can be used to connect the module to a PC for configuration and monitoring via the service tool.

7. MOUNTING

- The RID 3.0 must be mounted on a DIN rail in accordance with EN 60715.
- The module can be mounted between other modules as long as the ambient temperature limits are satisfied at all times. See chapter 4.1.
- The RID 3.0 module must be entirely inside the enclosing cabinet.
- The RID 3.0 module does not require mechanical ventilation.

8. INSTALLATION

The RID 3.0 consists of two parts:

- The RID module itself.
- The open loop resistor box.
- The open loop resistor box is already mounted on the valve by DMN-WESTINGHOUSE. See Figure 5 for position.

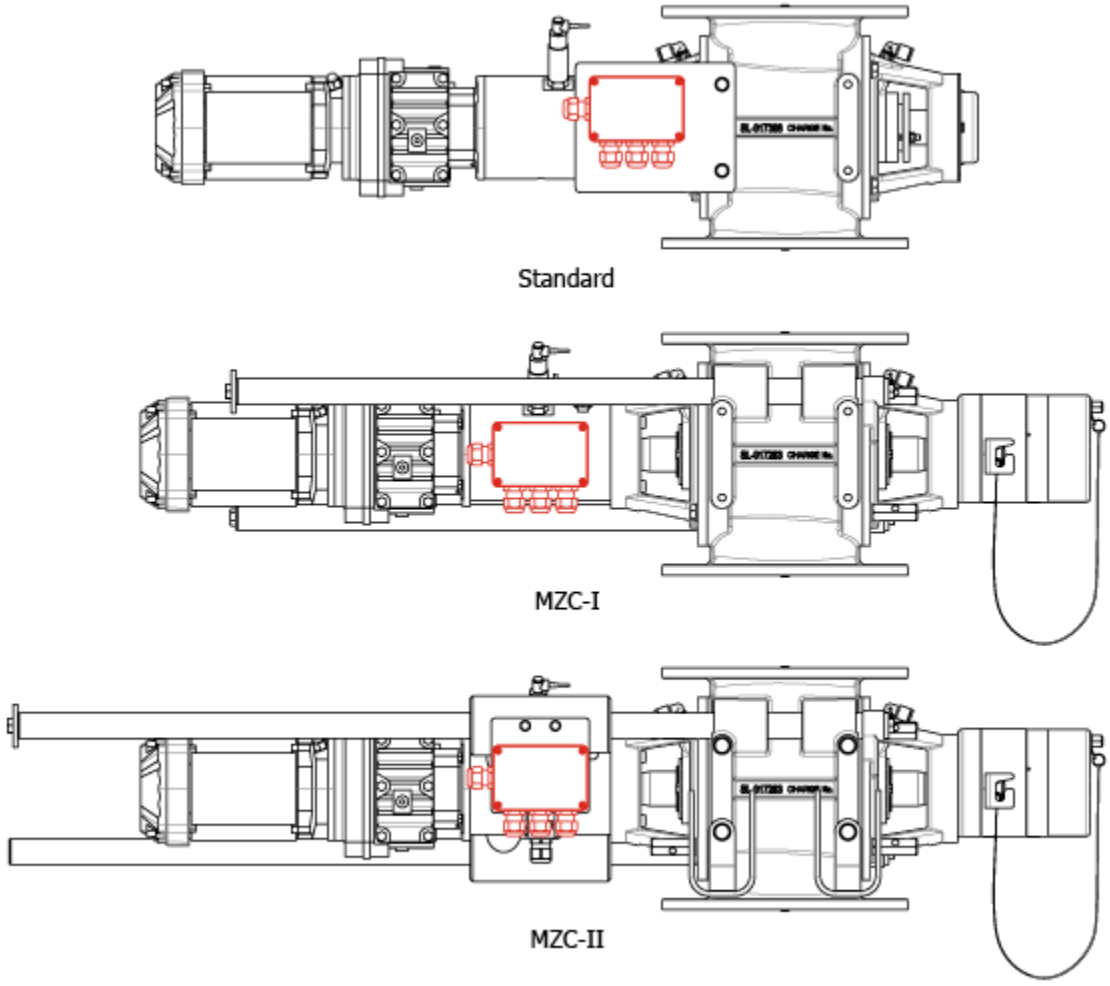


Figure 5 Position resistor box

ATTENTION!

- The RID 3.0 may only be installed by certified electrical engineers.
- Take the necessary ESD precautions handling and installing the module.
- For ATEX Environments a Zener safety barrier (Pepperl+Fuchs Z960 or Pepperl+Fuchs Z710) must be added to the system.
- When using a 1-channel Zener safety barrier (like Pepperl+Fuchs Z710), make sure the protective earth side is connected to S2 of the RID. Failing to do so results in wrong measurements.

8.1. ELECTRICAL INSTALLATION

1. Connect sense lines S1 and S2 to terminal 1 and 2 of the resistor box on the valve. Use wires with a cross sectional area of 0.75 mm^2 and a maximum length of 20 m.
   - For non-ATEX environments connect according Figure 6.
   - For ATEX environments add a Zener Barrier according Figure 7.
2. Connect the power supply to the 24VDC +/- terminals according Figure 8.
3. Connect the relay outputs (OK, OL, MTM, CONT) according to Figure 8.
4. Connect the analog output (IOUT) according to Figure 8.
5. Connect the inputs (RST, CIP) according to Figure 8.

ATTENTION!

- Wrong connection can result in no Metal-to-Metal alarms.
- Wrong connection can result in false alarms.
- The resistor in the resistor box will efficiently ground any static electrical charge generated by the isolated rotor.

CAUTION!

- Connect output relays to an appropriate control circuit to ensure the correct measures are taken in case of an alarm.
- It is the responsibility of the end user to ensure that a control system is installed in the system.

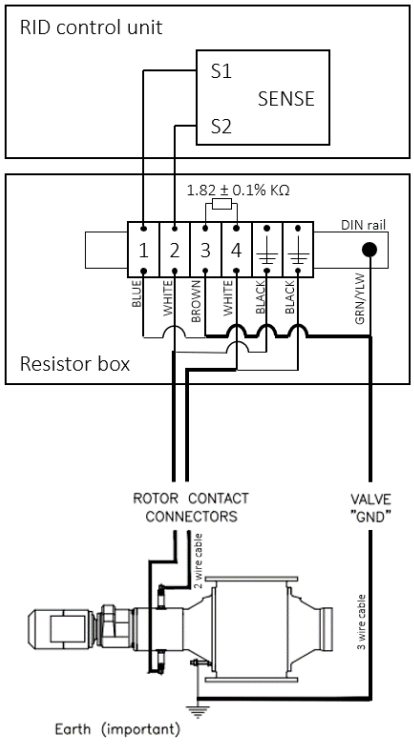


Figure 6 Sense line diagram non-ATEX

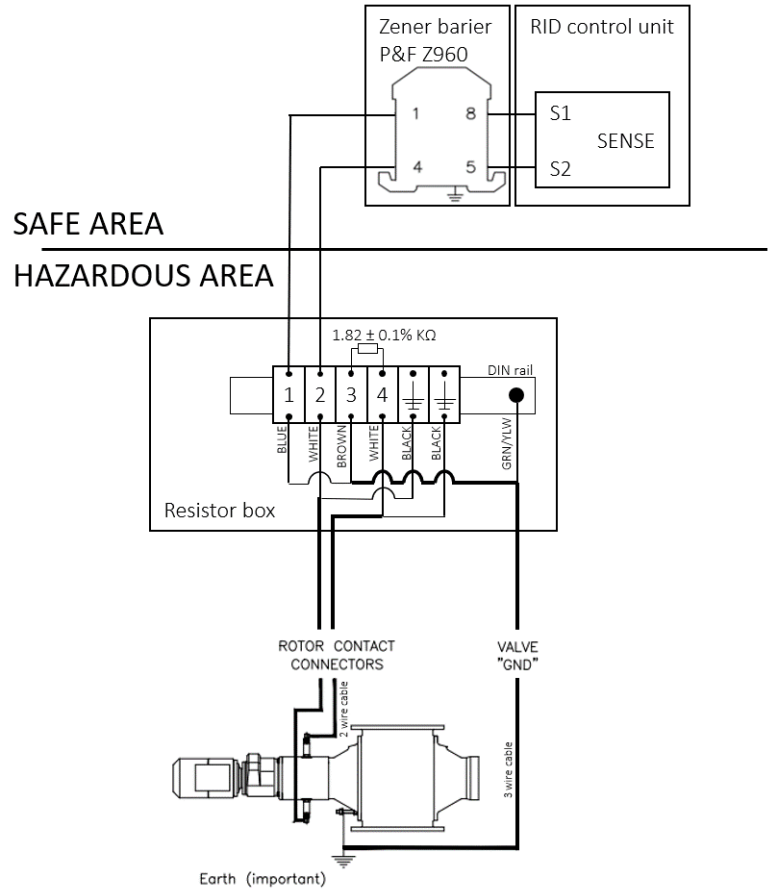


Figure 7 Sense line diagram ATEX

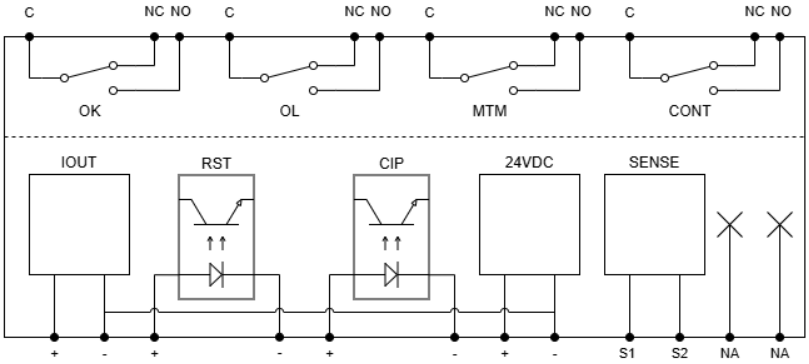


Figure 8 Connection diagram RID module

8.2. ETHERNET/IP CONNECTION

The RID 3.0 module can be configured and monitored via Ethernet/IP™.

1. Connect Port 1 of the ethernet connection (see chapter 6.3) to the Ethernet/IP™ network.
2. Port 2 can be used for Device Level Ring (DLR) and Daisy-Chain network topologies.

9. OPERATION

9.1. START UP

1. Apply power to the 24 VDC terminal on the RID module.
2. The module will automatically start-up and begin measuring.

9.2. SETUP

9.2.1. SETTING THE USB CONNECTION

1. Download the RID Service Tool via https://support.dmnwestinghouse.com/en/rid-3-0/.
2. Open the RID Service Tool.
3. Connect the RID module to the PC via the USB-port (see chapter 6.3).
4. When the device is successfully connected, "Device found" is shown in the top status bar (see Figure 9).

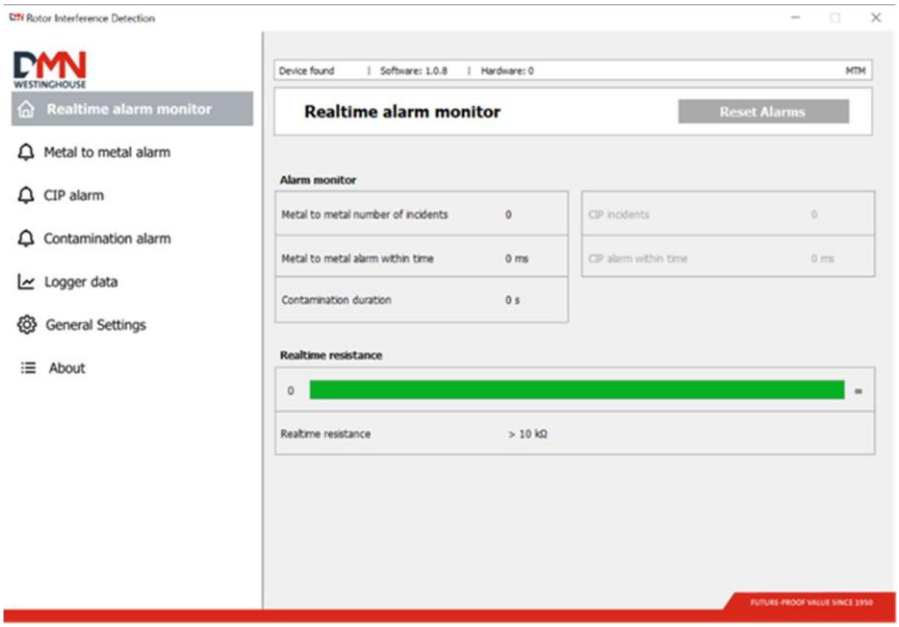


Figure 9 RID Service Tool home screen

9.2.2. SETTING THE ETHERNET/IP™ CONNECTION

1. Make sure the RID module is physically connected to the Ethernet/IP™ network.
2. Open a web browser and enter the IP address of the RID module.
3. When the Anybus CompactCom webserver appears (see Figure 10), the RID module is successfully connected to the Ethernet/IP™ network.

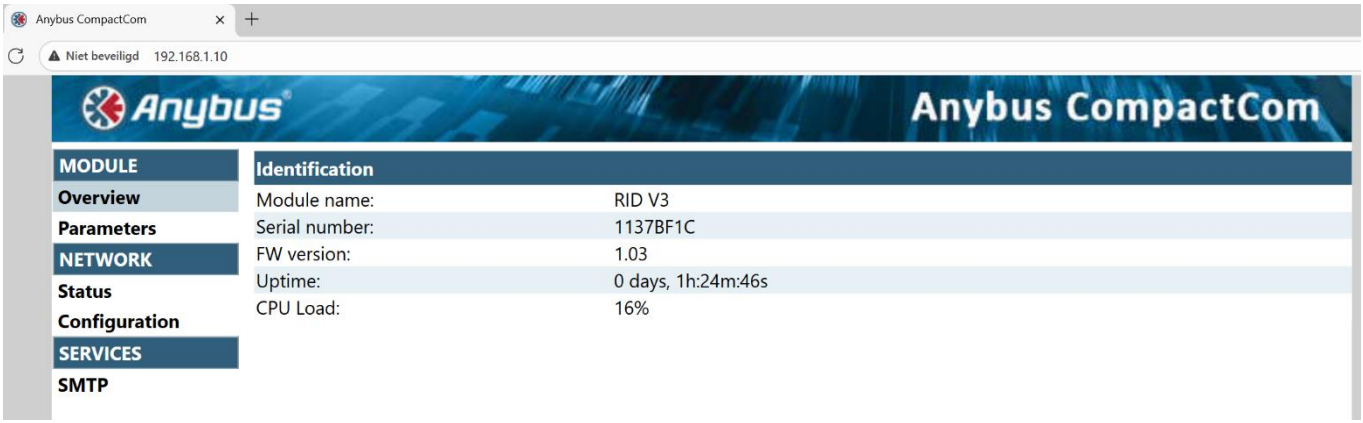


Figure 10 Anybus CompactCom Webserver

The RID is configured by default with DHCP enabled. When desired, the IP-address can be configured manually.

1. Open a web browser and enter the current IP-address of the RID module.
2. Within the Anybus CompactCom webserver go to Network -> Configuration -> IP Configuration.
3. Select DHCP: Disabled.
4. Enter a new IP Address.
5. Click "Save settings".

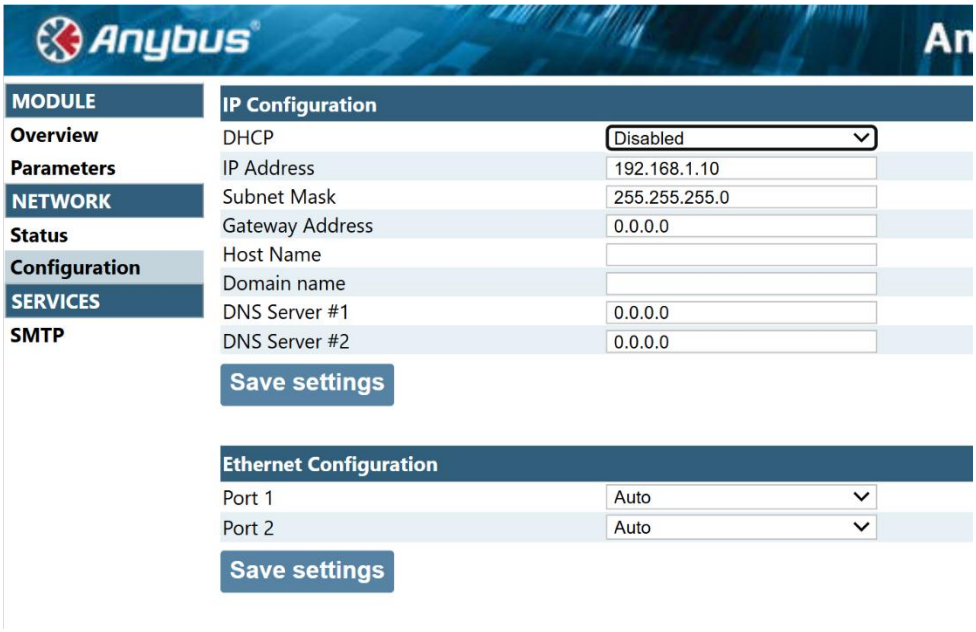


Figure 11 Anybus CompactCom IP Configuration

9.2.3. SETTING IN ROCKWELL PLC

To create the RID module in RSLogix, the EDS-file is required.

1. Download the latest EDS-file via https://support.dmnwestinghouse.com/en/rid-3-0/.
2. Start the EDS Hardware Installation tool in RSLogix.
3. Follow the prompts to register a new EDS device.
4. When asked, browse to the location of the downloaded EDS-file and register as single file.

5. Continue until the import is completed.
6. In the I/O configuration tree select "New Module".
7. Select the RID3 adapter and press create.
8. Give the module a name and fill in the IP-address of the device.
9. Press "OK"

When connecting to a Rockwell PLC it is advised to use a static IP-address. Go to chapter 9.2.2 for instructions on how to disable DHCP.

9.2.4. CUSTOM ETHERNET/IP™ CONNECTION

To connect to the module via Ethernet/IP™ without the use of an EDS or for custom environments, use the Ethernet/IP™ definitions in Appendix A.

9.3. CONFIGURATION

9.3.1. WIRE CALIBRATION

Before operation the RID module must be calibrated to eliminate the effect of the resistance on the sense lines.

ATTENTION!

- When a Zener Barrier is used and the wire calibration is not performed, the readings will be off.
- Before performing the calibration, make sure the valve is cleaned, dried and completely free of product.

Calibration via the Reset button (from firmware V1.1.0)

1. Locate the Reset button on the front of the RID module. See chapter 6.
2. Press and hold the button for minimum 5 seconds.
3. When the reset-button is released the yellow LED-indicator (CONT) blinks for approximately 2 seconds.
4. Depending on the calibration result, the green (P/OL) or red (MTM) LED-indicator turns on for 10 seconds.
   - When the green (P/OL) LED-indicator turns on the calibration was successful.
   - When the red (MTM) LED-indicator turns on the calibration has failed, for example when the circuit has a resistance increase of 150 Ω.
5. After 10 seconds all LED-indicators turn on for a short moment and the RID module returns to normal operation.

Calibration via the service tool

1. Connect the RID module to a PC with the RID Service Tool (see chapter 9.2.1).
2. Go to General Settings within the RID Service Tool.
3. Make sure no open-loop alarm is given.
4. Click on the "Calibrate wiring" button.
5. Follow the prompts.
6. Wait till a prompt with "Wiring Calibrated" is shown and click "OK".

7. The RID module is now calibrated for the wiring.

Calibration via the webserver

1. Connect the RID module to the Ethernet/IP™ network according chapter 9.2.2.
2. Within the webserver go to Module -> Parameters.
3. With the arrows on the top of the screen, navigate to the Calibrate_Wiring parameter.
4. Change the value next to the Calibrate_Wiring parameter from 0 to 1.
5. Click the "Set" button.
6. After a few seconds the value will change to 2.
7. With the arrows on the top of the screen, navigate to the "Store" parameter.
8. Change the value from 0 to 1 and click the "Set" button.
9. After a few seconds the value will change to 2.
10. The RID module is now calibrated for the wiring.

9.3.2. RID CONFIGURATION

General settings

The general settings include:

Table 2 General settings

PARAMETER	UNIT	STANDARD VALUE	DESCRIPTION
4-20mA lower setpoint	[Ω]	0	Sets the lower range boundary of the analog output (corresponding to 4 mA).
4-20mA upper setpoint	[Ω]	1000	Sets the upper range boundary of the analog output (corresponding to 20 mA).
Open loop detection after	[ms]	5000	Sets the time of how long an open loop must be detected continuously before the alarm is given.
Auto reset alarm after 5 seconds	[-]	Disabled	Sets if the alarm should reset automatically after 5 seconds.
Metal to metal alarm pulse time relay	[s]	0	Sets the time after which an MTM alarm is reset automatically. (0 = never reset)
CIP alarm pulse time relay	[s]	0	Sets the time after which a CIP alarm is reset automatically. (0 = never reset)
Contamination alarm pulse time relay	[s]	0	Sets the time after which a Contamination alarm is reset automatically. (0 = never reset)

MTM settings

The MTM settings define the threshold for an MTM alarm. They include:

Table 3 MTM settings

PARAMETER	UNIT	STANDARD VALUE	DESCRIPTION
Detection level	[Ω]	50	Sets the resistance threshold under which an MTM detection is registered.
Minimum detection time	[ms]	1000	Sets the minimum time the resistance must be under the detection level before an MTM detection is registered.
Number of incidents	[-]	3	Sets the minimum amount of MTM detections within a certain time frame for the MTM alarm to be given.
Within time	[ms]	5000	Sets the time frame for the MTM alarm. This must be either 0 (OFF) or larger than Minimum detection time x Number of incidents.

CIP settings

The CIP settings also define the threshold for an MTM alarm. However they are only valid when CIP mode is activated. This is useful during a Clean-in-Place procedure.

Table 4 CIP settings

PARAMETER	UNIT	STANDARD VALUE	DESCRIPTION
Detection level	[Ω]	10	Sets the resistance threshold under which an MTM detection is registered.
Minimum detection time	[ms]	1000	Sets the minimum time the resistance must be under the detection level before an MTM detection is registered.
Number of incidents	[-]	3	Sets the minimum amount of MTM detections within a certain time frame for the MTM alarm to be given.
Within time	[ms]	5000	Sets the time frame for the MTM alarm. This must be either 0 (OFF) or larger than Minimum detection time x Number of incidents.
Activate CIP mode	[-]	Disabled	This enables or disables CIP mode.

Contamination settings

The contamination settings define the threshold for a contamination alarm. They include:

Table 5 Contamination settings

PARAMETER	UNIT	STANDARD VALUE	DESCRIPTION
Detection level	[Ω]	1000	Sets the resistance threshold under which a contamination alarm is given.
Minimum duration	[s]	60	Sets the minimum time the resistance must be under the detection level before a contamination alarm is given.

Changing settings via the service tool

1. Connect the RID module to a PC with the RID Service Tool (see chapter 9.2.1).
2. Navigate to the parameter you want to change via the navigation bar on the left of the Service Tool.
3. Fill in the desired value next to the parameter.
4. Click the "Write to module" button on the top right to save the setting to the RID module.
5. The setting is now saved.

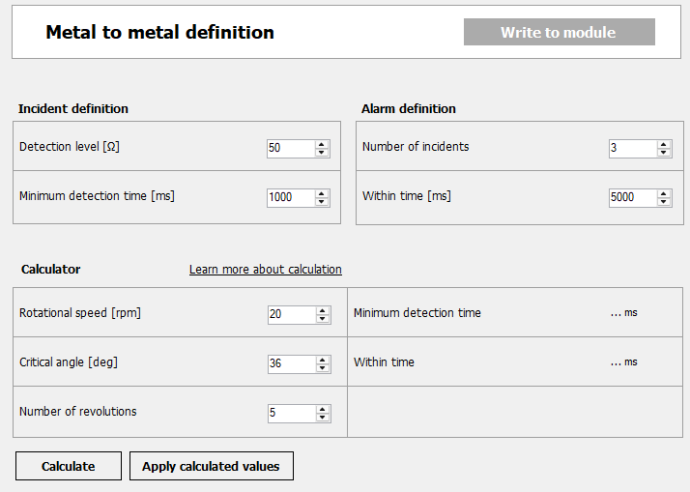


Figure 12 Example of settings window RID Service Tool

Changing settings via the webserver

1. Connect the RID module to the Ethernet/IP™ network according chapter 9.2.2.
2. Within the webserver go to Module -> Parameters.
3. With the arrows on the top of the screen, navigate to the parameter you want to change.
4. Change the value next to the parameter.
5. Click the "Set" button.
6. The setting is now saved to the RID module.

ATTENTION!

- Take care changing the parameters. Contact DMN-WESTINGHOUSE in case of any doubt.

9.4. BUTTONS

The RID Module has only a reset button, that can only be operated using a small pin. It is located on the front of the module, see item 5 in chapter 6. The button has two functions:

1. A single click resets all the active alarms.
2. Press-and-hold to calibrate for the wiring, see chapter 9.3.1.

9.5. INDICATORS

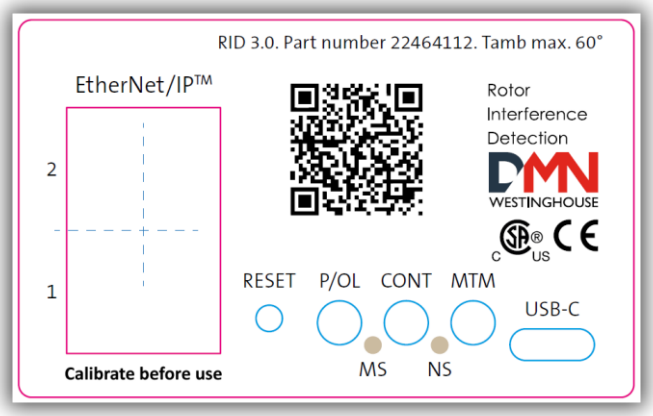


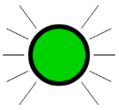
Figure 13 Front panel RID Module

The RID 3.0 has LED indicators for status monitoring:

- Operations indicators
- P/OL
- CONT
- MTM
- Network indicators
- MS
- NS
- 4 Ethernet connector indicators

9.5.1. MEANIONG OF INDICATOR SYMBOLS

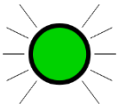
Table 6 Indicator symbol explanation (green is an example, meaning is the same for all indicator colours)

		
Indicator is off	Indicator is on steadily	Indicator is blinking

9.5.2. OPERATIONS INDICATORS

During start up, all operations indicators light up together for a short period of time.

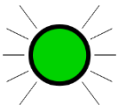
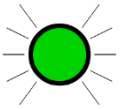
Table 7 Operation indicators

P/OL		• Module operating
		• Open loop alarm
CONT		• Contamination alarm
MTM		• MTM alarm

9.5.3. NETWORK INDICATORS

During start up, both indicators show red and green for a short period of time.

Table 8 Network indicators

MS		• No power • No IP address
		• Online, one or more connections established
		• Online, no connections established
		• Duplicate IP address • Fatal error
NS		• No power
		• Controlled by a scanner in run state • Time is synchronized to a grandmaster clock (if CIP sync enabled)
		• Not configured • Scanner in idle state • Time is synchronized to a grandmaster clock (if CIP sync enabled)
		• Recoverable fault(s) • Module configured, but parameters differ from currently used parameters

9.5.4. ETHERNET CONNECTOR INDICATORS

These indicators do not light up during startup.

Table 9 Ethernet connector indicators

		No network connection
		Link detected 10Mbit
		Link detected 100Mbit
		Link detected 1Gbit

9.6. DATA LOGGING VIA THE SERVICE TOOL

The RID module is able to save measurements and alarms for a maximum of 11 days. This data can be extracted via the RID Service Tool.

1. Connect the RID module to a PC with the RID Service Tool (see chapter 9.2.1).
2. Navigate to the "Logger data" menu in the Service tool.
3. Click the "Update selection from RID" button.
4. Set the start and end sliders to set the wanted time frame.
5. Click the "Get logged data from RID" button. The graph window should now show the measurements during the selected time frame.

The data can be exported to a .csv-file.

6. Click the "Save logged data to file" button.
7. Select a destination.
8. Click "Save".

Earlier saved data can also be imported from a .csv-file.

9. Click the "Update selection from file" button.
10. Select the time frame with the sliders.
11. Click "Get logged data from file". The graph window should now show the measurements during the selected time frame.

ATTENTION!

- If power is removed from the module, the log data is lost.

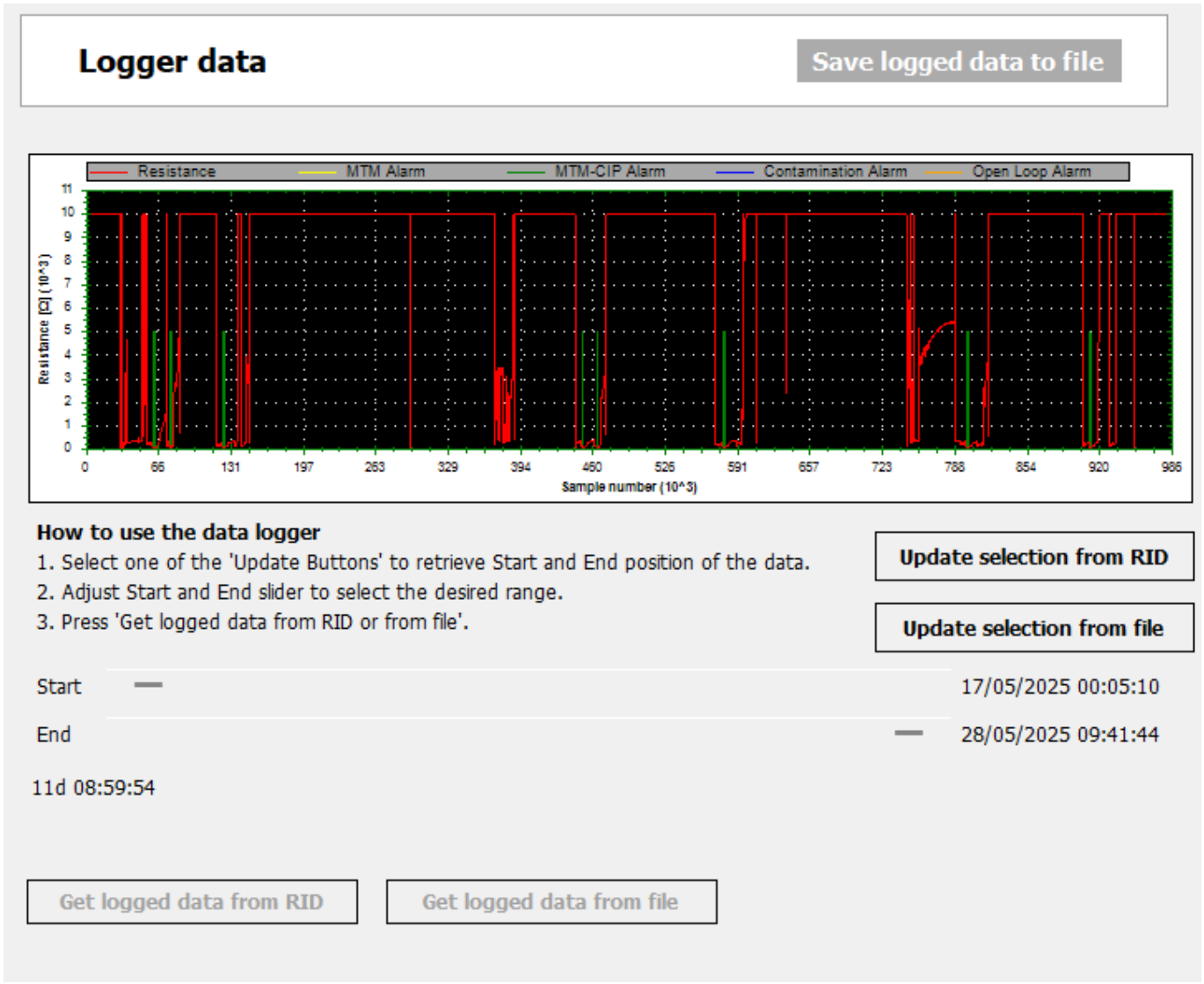


Figure 14 Logger data menu Service Tool

APPENDIX A. ETHERNET/IP DEFINITIONS

APPENDIX A.1. PARAMETER DEFINITION

APPENDIX A.1.1. PARAMETER DESCRIPTION

Table 10 Ethernet/IP parameter description

PARAMETER	NAME	ACCESS	DATA TYPE	DATA SIZE (BYTES)	DESCRIPTION
Param1	Sw_Ver_Major	Get	SINT	1	Major software version number
Param2	Sw_Ver_Minor	Get	SINT	1	Minor software version number
Param3	Sw_Ver_Rev	Get	SINT	1	Revision of the software version
Param4	Hw_Ver	Get	SINT	1	Hardware version
Param5	MTM_Resistance	Get/Set	INT	2	MTM resistance setpoint
Param6	MTM_Detection_Time	Get/Set	INT	2	MTM detection time
Param7	MTM_Incidents	Get/Set	INT	2	MTM number of incidents allowed
Param8	MTM_Within_Time	Get/Set	INT	2	MTM incidents within time
Param9	MTM_Relay_Time	Get/Set	INT	2	MTM relay time
Param10	CIP_Resistance	Get/Set	INT	2	CIP resistance setpoint
Param11	CIP_Detection_Time	Get/Set	INT	2	CIP detection time
Param12	CIP_Incidents	Get/Set	INT	2	CIP number of incidents allowed
Param13	CIP_Within_Time	Get/Set	INT	2	CIP incidents within time
Param14	CIP_Relay_Time	Get/Set	INT	2	CIP relay time
Param15	CONT_Resistance	Get/Set	INT	2	Contamination resistance setpoint
Param16	CONT_Detection_Time	Get/Set	INT	2	Contamination detection time
Param17	CONT_Relay_Time	Get/Set	INT	2	Contamination relay time
Param18	Auto_Reset	Get/Set	BOOL	1	Auto reset of module
Param19	Switch_To_Cip	Get/Set	BOOL	1	Switch from MTM to CIP
Param20	OL_Detection_Tim	Get/Set	INT	2	Open loop detection time
Param21	Current_Range_Lower	Get/Set	INT	2	4-20mA range lower setpoint
Param22	Current_Range_Upper	Get/Set	INT	2	4-20mA range upper setpoint
Param23	Store	Get/Set	INT	2	Store settings
Param24	Current_Resistance	Get	INT	2	Current resistance measured
Param25	Alarms	Get	WORD	2	Alarm bytes
Param26	MTM_Current_Incidents	Get	INT	2	MTM current number of incidents
Param27	MTM_Current_Within_Time	Get	INT	2	MTM current within time
Param28	CIP_Current_Incidents	Get	INT	2	CIP current number of incidents

PARAMETER	NAME	ACCESS	DATA TYPE	DATA SIZE (BYTES)	DESCRIPTION
Param29	CIP_Current_Within_Time	Get	INT	2	CIP current within time
Param30	CONT_Current_Duration	Get	INT	2	Contamination current duration
Param31	Reset	Get/Set	INT	2	Reset the alarms
Param32	Calibrate_Wiring	Get/Set	INT	2	Calibrate wiring
Param33	Calibrate_Offset	Get/Set	INT	2	Calibrate offset
Param34	Calibrate_Supply	Get/Set	INT	2	Calibrate supply
Param35	Calibration_Values_Supply	Get	INT	2	Stored calibration value for supply
Param36	Calibration_Values_Offset	Get	INT	2	Stored calibration value for offset
Param37	Calibration_Values_Wiring	Get	INT	2	Stored value for wiring and barrier
Param38	RPI range	Get/Set	UDINT	4	RPI range

APPENDIX A.1.2. PARAMETER VALUES

Table 11 Ethernet/IP parameter values

PARAMETER	NAME	MIN VALUE	MAX VALUE	DEFAULT VALUE	UNIT
Param1	Sw_Ver_Major	0	127	0	-
Param2	Sw_Ver_Minor	0	127	0	-
Param3	Sw_Ver_Rev	0	127	0	-
Param4	Hw_Ver	0	127	0	-
Param5	MTM_Resistance	0	500	50	ohm
Param6	MTM_Detection_Time	10	5000	1000	ms
Param7	MTM_Incidents	1	20	3	-
Param8	MTM_Within_Time	0	32000	5000	ms
Param9	MTM_Relay_Time	0	1000	0	s
Param10	CIP_Resistance	0	500	10	ohm
Param11	CIP_Detection_Time	10	5000	1000	ms
Param12	CIP_Incidents	1	20	3	-
Param13	CIP_Within_Time	1000	32000	5000	ms
Param14	CIP_Relay_Time	0	1000	0	s
Param15	CONT_Resistance	100	10000	1000	ohm
Param16	CONT_Detection_Time	1	600	60	s
Param17	CONT_Relay_Time	0	1000	0	s
Param18	Auto_Reset	0	1	0	-
Param19	Switch_To_Cip	0	1	0	-

PARAMETER	NAME	MIN VALUE	MAX VALUE	DEFAULT VALUE	UNIT
Param20	OL_Detection_Tim	1000	10000	5000	ms
Param21	Current_Range_Lower	0	10000	0	ohm
Param22	Current_Range_Upper	100	10000	1000	ohm
Param23	Store	0	1	0	-
Param24	Current_Resistance	0	32767	0	ohm
Param25	Alarms	0x0000	0x7FFF	0x0000	-
Param26	MTM_Current_Incidents	0	32767	0	-
Param27	MTM_Current_Within_Time	0	32767	0	ms
Param28	CIP_Current_Incidents	0	32767	0	-
Param29	CIP_Current_Within_Time	0	32767	0	ms
Param30	CONT_Current_Duration	0	32767	0	s
Param31	Reset	0	1	0	-
Param32	Calibrate_Wiring	0	2	0	-
Param33	Calibrate_Offset	0	2	0	-
Param34	Calibrate_Supply	0	2	0	-
Param35	Calibration_Values_Supply	0	32767	3300	mV
Param36	Calibration_Values_Offset	-32768	32767	0	mV
Param37	Calibration_Values_Wiring	0	32767	0	ohm
Param38	RPI range	1000	3200000	10000	ms

APPENDIX A.1.3. ALARM BYTE DEFINITION

The BYTE definition for Param25.

Table 12 Ethernet/IP Param25 BYTE definition

ALARM BYTE	NAME	DESCRIPTION
0x0000	Metal_To_Metal_Alarm	Metal-to-Metal alarm
0x0001	Contamination_Alarm	Contamination alarm
0x0002	Open_Loop_Alarm	Open loop alarm
0x0003	Clean_In_Place_Alarm	Metal-to-Metal alarm during CIP mode
0x0004	Clean_In_Place_Mode	CIP mode active

APPENDIX A.2. CONNECTION DEFINITION

Table 13 Ethernet/IP connection definition

CONNECTION	NAME	RPI	O->T SIZE	O->T ASSEMBLY	T->O SIZE	T->O ASSEMBLY
Connection1	Exclusive owner	Param38	38	Assem150	54	Assem100

APPENDIX A.3. ASSEMBLY DEFINITION

Table 14 Ethernet/IP assembly definition

ASSSEMBLY	NAME	BYTE OFFSET	DATA SIZE (BYTE)	PARAMETER
Assem150	Consuming Data	0	2	Param5
		2	2	Param6
		4	2	Param7
		6	2	Param8
		8	2	Param9
		10	2	Param10
		12	2	Param11
		14	2	Param12
		16	2	Param13
		18	2	Param14
		20	2	Param15
		22	2	Param16
		24	2	Param17
		26	1	Param18
		27	1	Param19
		28	2	Param20
		30	2	Param21
		32	2	Param22
		34	2	Param23
		36	2	Param31
Assem100	Producing Data	0	1	Param1
		1	1	Param2
		2	1	Param3
		3	1	Param4
		4	2	Param5
		6	2	Param6
		8	2	Param7
		10	2	Param8
		12	2	Param9
		14	2	Param10
		16	2	Param11
		18	2	Param12
		20	2	Param13
		22	2	Param14
		24	2	Param15

ASSSEMBLY	NAME	BYTE OFFSET	DATA SIZE (BYTE)	PARAMETER
		26	2	Param16
		28	2	Param17
		30	1	Param18
		31	1	Param19
		32	2	Param20
		34	2	Param21
		36	2	Param22
		38	2	Param24
		40	2	Param25
		42	2	Param26
		44	2	Param27
		46	2	Param28
		48	2	Param29
		50	2	Param30
		52	2	Param31

APPENDIX B. REVISION 1.1.0 CHANGE LOG

Revisions

- Created separate "Revisions" chapter

List of abbreviations

- Created chapter with list of abbreviations

Preface

- No changes

Introduction

- Changed overview from bullet list to table for better readability

Safety precautions

- Added warning icon
- Removed contact details from list
- Added warning for turn-off power during assembly

Product overview

- Chapter added
- Moved overview of connections from chapter "Installation" to this chapter

Mounting

- Changed to bullet list
- Moved from chapter "Installation" and created new chapter "Mounting"

Installation

- Moved overview of connections to chapter 5 "Product overview"
- Added views for positions of the resistor box.
- Added instructions for installation
- Added connection diagram for RID module
- Added attention and caution points
- Rephrased caution point for the single channel Zener safety barrier

Operation

- Added sub-chapter "Start up"
- Added instructions for setup of:
  - USB connection
  - Ethernet/IP connection
  - Rockwell PLC connection
  - Custom Ethernet/IP connection
- Added sub-chapter "Configuration"
- Added instructions for calibration
- Moved settings to sub-chapter "Configuration"
- Changed overview of settings to table and added descriptions
- Added instruction for changing settings
- Added calibrate function to reset button function overview
- Added figure 12

- Changed style of network indicator descriptions with visuals of LEDs and consistent table style
- Added description of the data log function

Appendix A. Ethernet/IP definitions

- Added ethernet/ip definition

Appendix B. Revision 1.1.0 change log

- Added chapter