



Fieldbus Isolating Repeater

Series 9185



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1 General Information

1.1 Manufacturer

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74638 Waldenburg
Germany

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Internet: www.stahl-ex.com
E-Mail: info@stahl.de

1.2 Information about the manual

ID-No.: 9185602330
Publication Code: 2016-04-15-HB00-III-en-03
Hardware version: E
Software version: 01-04

1.3 Further documents



- Data sheet 9185
 - Operating instructions 9185
- For documents in further languages, see www.stahl-ex.com.

1.4 Conformity with standards and regulations

See certificates and EU Declaration of Conformity: www.stahl-ex.com.
The device has IECEx approval. See IECEx homepage: <http://iecex.iec.ch/>
Further national certificates can be downloaded via the following link:
<http://www.r-stahl.com/downloads/certificates.html>.

2 Explanation of the symbols




2.1 Symbols used in this manual

Symbol	Meaning
	Tips and recommendations on the use of the device
	Danger due to explosive atmosphere

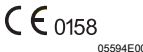




2.2 Warning notes

Warnings must be observed under all circumstances, in order to minimize the risk due to construction and operation. The warning notes have the following structure:

- Signalling word: DANGER, WARNING, CAUTION, NOTICE
- Type and source of danger/damage
- Consequences of danger
- Taking countermeasures to avoid the danger or damage

	DANGER
	Danger to persons Non-compliance with the instruction results in severe or fatal injuries to persons.
	WARNING
	Danger to persons Non-compliance with the instruction can result in severe or fatal injuries to persons.
	CAUTION
	Danger to persons Non-compliance with the instruction can result in light injuries to persons.
NOTICE	
Avoiding material damage Non-compliance with the instruction can result in material damage to the device and / or its environment.	

2.3 Symbols on the device

Symbol	Meaning
 <small>05594E00</small>	CE marking according to the current applicable directive.
 <small>02198E00</small>	According to marking, electric circuit certified for hazardous areas.
 <small>15649E00</small>	Input
 <small>15648E00</small>	Output
	Safety instructions that must always be followed: For devices with this symbol, the respective data must be noted and / or the safety-relevant instructions contained in the operating instructions must be followed!

3 Safety notes

3.1 Storage of the manual

- Read the manual carefully.
- Store the manual at the mounting location of the device.
- Observe applicable documents and operating instructions of the devices to be connected.

3.2 Safe use

Before mounting

- Read and observe the safety notes in this manual.
- Ensure that the contents of this manual are fully understood by the personnel in charge.
- Use the device in accordance with its intended and approved purpose only.
- Always consult with R. STAHL Schaltgeräte GmbH if using the device under operating conditions which are not covered by the technical data.
- Observe the document "Cabinet installation guide" for engineering (download from www.stahl-ex.com, product documentation, subitem "Engineering").
- Before installation, make sure that the device is not damaged.
- We cannot be held liable for damage caused by incorrect or unauthorised use of the device or by non-compliance with this manual.



For assembly and installation

- Observe national assembly and installation regulations (e.g. IEC/EN 60079-14).
- Observe national safety and accident prevention regulations.
- During installation and operation, observe the information (characteristic values and rated operating conditions) on the type plates and data plates and information signs located on the device.
- Install the device in Zones 2, 22 or outside of hazardous areas.
- When used in Zones 2 or 22, the device must be built into an enclosure which corresponds to the requirements of IEC/EN 60079-15 or IEC/EN 60079-31.
- Electric circuits with the "Ex i" type of protection operated with circuits with other types of protection can no longer be operated as circuits with the "Ex i" type of protection after this stage.
- Connect the device only to equipment which does not carry voltages higher than 253 V AC (50 Hz).
- The safety characteristic values of the connected field devices must correspond to the specifications in the data sheet or in the EC Type Examination Certificate.
- Interconnecting several devices in a single intrinsically safe circuit can result in different safety characteristic values. This may impair intrinsic safety!


Maintenance, repair, commissioning

- Before commissioning, make sure that the device is not damaged.
- Work on the device, such as installation, maintenance, overhaul, repair, may only be carried out by appropriately authorised and trained personnel.
- Perform only maintenance work or repair described in this manual.
- Changing the DIP switch settings is also permitted during operation in Zone 2 and with connected intrinsically safe input signals.
- Set up the power supply for 24 V DC so that it can so bridge interruptions of 20 ms (power failure bridging in accordance with EN 61326-3-2 and NE 21).
- The devices must be installed in enclosures which comply with the requirements of the installation location.
- 9185/11 only: Intrinsically safe Zone 1 devices can be connected to the intrinsically safe signal circuits.
- Intrinsically safe signal circuits must not be connected to the fieldbus isolating repeater 9185/12.

3.3 Modifications and alterations

	DANGER
	<p>Explosion hazard due to modifications and alterations to the device! Non-compliance results in severe or fatal injuries.</p> <ul style="list-style-type: none"> • Do not modify or alter the device.
	<p>No liability or warranty for damage resulting from modifications and alterations.</p>

4 Function and device design

	DANGER
	<p>Explosion hazard due to improper use! Non-compliance results in severe or fatal injuries.</p> <ul style="list-style-type: none"> • The device may only be used according to the operating conditions described in this manual. • Use the device only for the intended purpose specified in this manual.

4.1 Function

Application range

Depending on the variant, the devices can isolate and/or convert specific interfaces. The fieldbus isolating repeaters 9185/11 isolate intrinsically safe interfaces from non-intrinsically safe interfaces. The fieldbus isolating repeater 9185/12 isolates two non-intrinsically safe interfaces.

Variants

The fieldbus isolating repeater 9185/11-35-10 is used to isolate an intrinsically safe RS-485 interface from a non-intrinsically safe RS-232, RS-422 or RS-485. The device is suitable for the operation of intrinsically safe PROFIBUS DP or Modbus RTU. Using galvanic isolation and the "bit refresh" function, the isolating repeater 9185/12-4.-10 ensures the interference-free transmission of Profibus, Modbus and R. STAHL ServiceBus signals.

Mode of operation

The isolating repeater blocks any equalisation currents and protects sensitive devices against transient noise. The device supports both RS-485 and RS-422 systems. In addition, it can adapt RS-232 interfaces to RS-485 or RS-422. This enables standard PCs to be connected to RS-485 or RS-422 interfaces. Converting to RS-485 or RS-422 means that transmission systems connected to RS-232 can achieve larger transmission distances.

4.2 Device design Type 9185/11-35-10

#	#	Device component	Description
	1	Safe area interface	X1: RS-232 X2: RS-422, RS-485 7 (+), 9 (-): Auxiliary power connection ⚡: equipotential bonding connection
	2	"BAUD" decode switch	Setting the baud rate for the bus interface
	3	"SCAN" DIP switch	ON: RS-422 spring return OFF: RS-422 permanently ON
	4	"RS2" DIP switch	ON: X2 = RS-422 OFF: X2 = RS-485
	5	"PNO" DIP switch	ON: Signal Level PNO OFF: Signal Level STAHL
	6	Field-side interface	X3: RS-485 IS
	7	"RxD3" LED, green	Reception interface X3
	8	"RxD2" LED, green	Reception interface X2
	9	"RxD1" LED, green	Reception interface X1
	10	"ERR" LED, red	Error message/ baud rate search
	11	"PWR" LED, green	Auxiliary power display

Type 9185/11-45-10

#	#	Device component	Description
	1	Safe area interface	X1: RS-232 X2: RS-422, RS-485 7 (+), 9 (-): Auxiliary power connection ⏚: Equipotential bonding connection
	2	"BAUD" decode switch	Setting the baud rate for the bus interface
	3	"SCAN" DIP switch	ON: RS-422 spring return OFF: RS-422 permanently ON
	4	"RS2" DIP switch	ON: X2 = RS-422 OFF: X2 = RS-485
	5	"RS3" DIP switch	ON: X3 = RS-422 Ex i OFF: X3 = RS-485 Ex i
	6	Field-side interface	X3: RS-485 Ex i / RS-422 Ex i
	7	"RxD3" LED, green	Reception interface X3
	8	"RxD2" LED, green	Reception interface X2
	9	"RxD1" LED, green	Reception interface X1
	10	"ERR" LED, red	Error message/ baud rate search
	11	"PWR" LED, green	Auxiliary power display

Type 9185/12-45-10

#	#	Device component	Description
	1	Safe area interface	X1: RS-232 X2: RS-422, RS-485 7 (+), 9 (-): Auxiliary power connection ⏚: Equipotential bonding connection
	2	"BAUD" decode switch	Setting the baud rate for the bus interface
	3	"SCAN" DIP switch	ON: RS-422 spring return OFF: RS-422 permanently ON
	4	"RS2" DIP switch	ON: X2 = RS-422 OFF: X2 = RS-485
	5	"RS3" DIP switch	ON: X3 = RS-422 OFF: X3 = RS-485
	6	Field-side interface	X3: RS-485 / RS-422
	7	"RxD3" LED, green	Reception interface X3
	8	"RxD2" LED, green	Reception interface X2
	9	"RxD1" LED, green	Reception interface X1
	10	"ERR" LED, red	Error message/ baud rate search
	11	"PWR" LED, green	Auxiliary power display

5 Technical data

Marking

Type designation 9185/11-c5-10 (c=3, 4)
 CE marking C€0158

Explosion Protection

Version	9185/11-35-10	9185/11-45-10
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Global (IECEX)

Gas and dust | IECEx BVS 06.0004X
 Ex nA [ib Gb] IIC T4 Gc
 [Ex ib Db] IIIC

Europe (ATEX)

Gas and dust | DMT 02 ATEX E 246 X
 Ⓢ II 3 (2) G Ex nA [ib Gb] IIC T4 Gc
 Ⓢ II (2) D [Ex ib Db] IIIC

Certifications and certificates

Certificates | IECEx, ATEX, Brazil (INMETRO), India (PESO), Canada (cFM),
 Kazakhstan (TR), Korea (KCs), Russia (TR), USA (FM), Belarus (TR)
 Ship approval | BV, ClassNK, CCS, DNV GL, LR, RINA, RS

Safety data

Version	9185/11-35-10	9185/11-45-10
Max. voltage U_o	3.73 V	5.88 V
Max. current I_o	149 mA	50 mA
Max. power P_o	139 mW	73.3 mW
Connection of intrinsically safe fieldbus circuit	RS-485 IS (PNO) / RS-485 Ex i	RS-422 / -485 Ex i
Max. permissible voltage U_i	± 4.2 V	± 5.88 V
Internal capacity C_i and inductivity L_i	negligible	negligible
Safety-related maximum voltage U_m	253 V	253 V
Max. connectable inductance L_o		
IIC	--	15 mH
Max. connectable capacitance C_o		
IIC	--	43 μ F

Technical Data

Electrical data

Auxiliary power	
Nominal voltage U_N	24 V UC
DC voltage range	18 ... 31.2 V
AC voltage range	24 V \pm 15 %
Residual ripple within DC voltage range	$\leq 3.6V_{SS}$
Nominal current (24 V)	66 mA
Power input	1.6 W
Field side interface (X3)	
Version	RS-485 IS intrinsically safe, RS-422/RS-485
Level	setting: RS-485 IS (PNO specification) and RS-485 Ex i (R. STAHL specification)
Connections	Sub-D socket X3, 9-pole
Transmission rate	1.2 kBit/s ... 1.5 MBit/s
Settings	fixed transmission speed or automatic detection > 9.6 kBit/s (only with Profibus DP)
Conductor length	depends on transmission rate and cable
Terminating resistor	to be set in external plug
Data transmission indication	LED green "RxD3"
Safe area interface (X1)	
Version	RS-232 C
Connection	Sub-D plug X1, 9-pole
Level	EIA RS-232 C
Transmission rate	1.2 ... 93.75 kBit/s
Settings	fixed transmission speed or automatic detection > 9.6 kBit/s (only with Profibus DP)
Conductor length	≤ 20 m
Data reception indication	"RxD1" LED, green

Technical Data

Safe area interface (X2)

Version	RS-485/RS-422
Connection	Sub-D plug X2, 9-pole
Level	EIA RS-485, EIA RS-422
Transmission rate	1.2 kBit/s ... 1.5 MBit/s
Settings	Keying RS-422 transmitter on/off
Conductor length	depends on transmission rate and cable
Terminating resistor	to be connected in external plug
Data reception indication	"RxD2" LED, green

Mounting / Installation

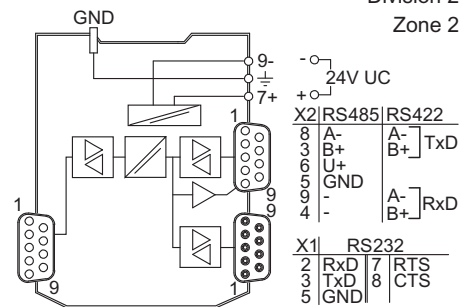
Connection diagram

for types 9185/11-35-10.

Hazardous area
Division 1
Zone 1

Safe area
Division 2
Zone 2

X3	RS485 IS
8	A-
3	B+
6	ISP (+)
5	ISGND



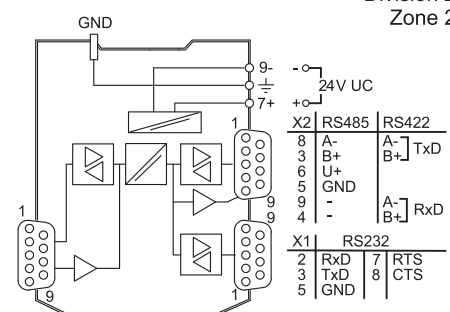
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for types 9185/11-45-10.

Hazardous area
Division 1
Zone 1

Safe area
Division 2
Zone 2

X3	RS485	RS422
8	A-	A-] TxD
3	B+	B+] TxD
9	-	A-] RxD
4	-	B+] RxD



18110E00

Marking

Type designation 9185/12-45-10
 CE marking C€0158

Explosion Protection

Version	9185/12-45-10
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Global (IECEX)

Gas | IECEx BVS 06.0004X
 | Ex nA IIC T4 Gc

Europe (ATEX)

Gas | BVS 10 ATEX E 105 X
 | Ⓢ II 3 G Ex nA IIC T4 Gc

Certifications and certificates

Certificates | IECEx, ATEX, Brazil (INMETRO), India (PESO), Canada (cFM),
 Kazakhstan (TR), Korea (KCs), Russia (TR), USA (FM), Belarus (TR)
 Ship approval | BV, ClassNK, CCS, DNV GL, LR, RINA, RS

Technical Data

Electrical data

Auxiliary power

Nominal voltage U _N	24 V UC
DC voltage range	18 ... 31.2 V
AC voltage range	24 V ± 15 %
Residual ripple within DC voltage range	≤ 3.6V _{SS}
Nominal current (24 V)	66 mA
Power input	1.6 W
Operation indication	LED green "PWR"
Undervoltage monitoring	yes

Field side interface
(X3)

Version	RS-485/RS-422
Level	EIA RS 485, EIA RS 422
Connections	Sub-D socket X3, 9-pole
Transmission rate	1.2 kBit/s ... 1.5 MBit/s
Settings	fixed transmission speed or automatic detection > 9.6 kBit/s (only with Profibus DP)
Conductor length	depends on transmission rate and cable
Terminating resistor	to be set in external plug
Data transmission indication	LED green "RxD3"

Technical Data

System side interface (X1)

Version	RS-232 C
Connection	Sub-D plug X1, 9-pole
Level	EIA RS-232 C
Transmission rate	1.2 ... 93.75 kBit/s
Settings	fixed transmission speed or automatic detection > 9.6 kBit/s (only with Profibus DP)
Conductor length	≤ 20 m
Terminating resistor	--
Data reception indication	"RxD1" LED, green

System side interface (X2)

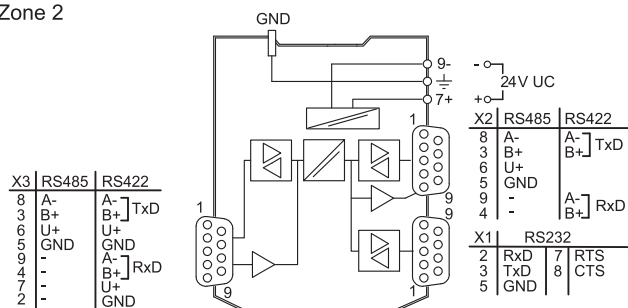
Version	RS-485/RS-422 (switchable)
Connection	Sub-D plug X2, 9-pole
Level	EIA RS-485, EIA RS-422
Transmission rate	1.2 kBit/s ... 1.5 MBit/s
Settings	Keying RS-422 transmitter on/off
Conductor length	depends on transmission rate and cable
EOL resistor	to be connected in external plug
Data reception indication	"RxD2" LED, green

Mounting / Installation

Connection diagram

for types 9185/12-45-10

Safe area
Division 2
Zone 2



18111E00

Technical Data**Ambient conditions**

Ambient temperature	
Single device	-20 ... +70 °C
Group assembly	-20 ... +60 °C
	The installation conditions affect the ambient temperature.
Storage temperature	-40 ... +80 °C
Relative humidity (no condensation)	≤ 95 %
Use at the height of	< 2000 m

Mechanical data

Connection	Screw terminals	Spring clamp terminals
Single-wire connection		
- rigid	0.2 ... 2.5 mm ²	0.2 ... 2.5 mm ²
- flexible	0.2 ... 2.5 mm ²	0.2 ... 2.5 mm ²
- flexible with core end sleeves (without / with plastic sleeve)	0.25 ... 2.5 mm ²	0.25 ... 2.5 mm ²
two-wire connection		
- rigid	0.2 ... 1 mm ²	–
- flexible	0.2 ... 1.5 mm ²	–
- flexible with core end sleeves	0.25 ... 1 mm ²	0.5 ... 1 mm ²

For further technical data, see www.stahl-ex.com.

6 Engineering**NOTE**

Device failure due to high ambient temperature.

Non-compliance can result in damage to the device.



- Make sure that operation of the device is possible within the permissible temperature range.

7 Transport and storage

- Transport and store the device only in the original packaging.
- Store the device in a dry place (no condensation) and vibration-free.
- Do not drop the device.
- Comply with storage and transport temperatures.

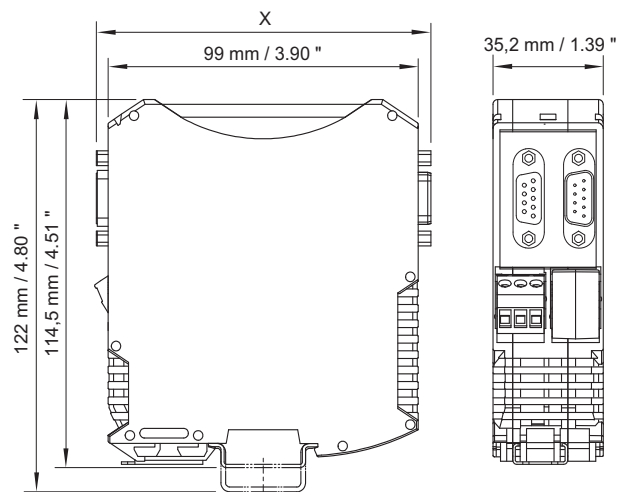
8 Mounting and installation

The device is approved for use in gas explosion hazardous areas of Zone 2 and dust explosion hazardous area of Zone 22 and in safe areas.

	DANGER
	<p>Explosion hazard due to installation without approved field enclosure! Non-compliance results in severe or fatal injuries!</p> <ul style="list-style-type: none"> In hazardous areas Zone 2 or 22, the device must be installed in an enclosure which fulfils the requirements of IEC/EN 60079-15 or IEC/EN 60079-31.
	DANGER
	<p>Explosion hazard due to incorrect installation of the device! Non-compliance results in severe or fatal injuries.</p> <ul style="list-style-type: none"> Carry out installation strictly according to the instructions and national safety and accident prevention regulations to maintain the explosion protection. Select and install the electrical device so that explosion protection is not affected due to external influences, i.e. pressure conditions, chemical, mechanical, thermal and electric impact such as vibration, humidity and corrosion (see IEC/EN 60079-14). The device must only be installed by trained qualified personnel who is familiar with the relevant standards.

8.1 Dimensions / fastening dimensions

Dimensional Drawing (All Dimensions in mm / inches) – Subject to Alterations

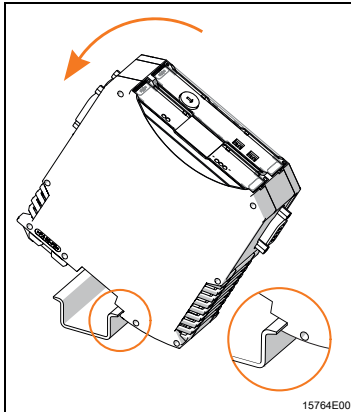


	Dimension X
Screw terminals	108 mm / 4.25 in
Spring cage terminals	118 mm / 4.66 in

09820E00

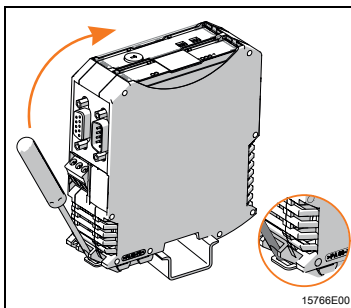
8.2 Mounting / dismantling, operating position

8.2.1 Mounting / dismantling on top hat rail Mounting



- Position the device on the top hat rail. Position the cut-out of the enclosure on the outside edge of the top hat rail.
- Engage the device on the top hat rail.
- When swivelling the device onto the top hat rail, make sure that it is not set at an angle.

Dismounting



- Pull out the base bolt slightly using a screwdriver.
- Swivel out the device.

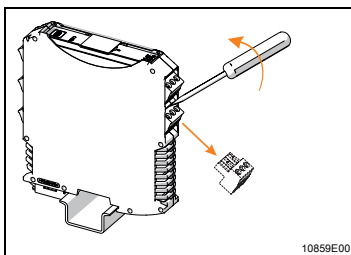
8.2.2 Mounting / dismantling pluggable terminals

All devices are equipped with pluggable terminals.

Mounting

- Plug the terminal into the device until the terminal engages.

Dismounting



- Position the screwdriver behind the terminal.
- Push out the terminal.

8.3 Installation



Operation under difficult conditions, such as, in particular, on ships, requires additional measures to be taken for correct installation, depending on the place of use. Further information and instructions on this can be obtained from your regional sales contact on request.

8.3.1 Electrical connections

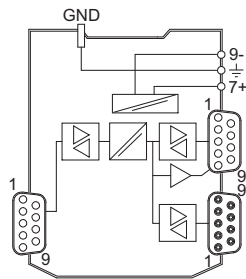
- Follow the information provided in the section on "Technical Data".
- The conductor must be connected carefully.
- The conductor insulation must reach the clamping units.
- Do not damage the conductor (nicking) when stripping it.
- Ensure that the maximum permissible conductor temperatures and the maximum permissible surface temperature are not exceeded by selecting suitable electric lines and means of running them.
- Avoid mechanical damage to the conductor insulation due to rubbing against sharp-edged or moving metal parts.
- Make sure that the correct tightening torque is used (0.5 to 0.6 Nm).

8.3.2 Schematic diagram

Type 9185/11-c5-10, c=3,4

Hazardous area
Division 1
Zone 1

X3| RS485 IS
8 A-
3 B+
6 ISP (+)
5 ISGND

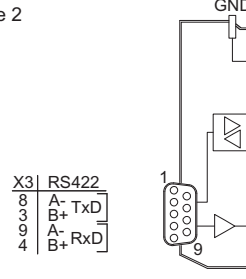


X2| RS485 RS422
8 A- TxD
3 B+ A-
6 U+ B+
5 GND
4 - RxD

X1| RS232
2 RxD 7 RTS
3 TxD 8 CTS
5 GND

Type 9185/12-45-10

Safe area
Division 2
Zone 2



X3| RS422
8 A- TxD
3 B+ A-
6 U+ B+
5 GND
4 - RxD

X1| RS232
2 RxD 7 RTS
3 TxD 8 CTS
5 GND

X2| RS485
8 A-
3 B+
6 U+
5 GND
4 -

X1| RS232
2 RxD 7 RTS
3 TxD 8 CTS
5 GND

09816E00

15725E00

	9185/11-35-10	9185/11-45-10	9185/12-45-10
Interface Division 1 and Zone 1, 21 Safe area	x x	x x	x
Field-side interface X3	RS-485 IS	RS-485 Ex i RS-422 Ex i	RS-485 RS-422
Safe area interface X1 X2	RS-232 RS-485 RS-422	RS-232 RS-485 RS-422	RS-232 RS-485 RS-422

X1: Service and programming interface
Ex i = Intrinsically safe interface

8.3.3 Compatibility at the PROFIBUS DP Ex i (9185/11-35-10)

i	Components of PROFIBUS DP Ex i bus topology according to the specification of R. STAHL and components according to "PROFIBUS RS-485 IS" of PNO specification cannot be combined in a bus segment because of their different functional characteristics.
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When engineering a PROFIBUS DP Ex i segment, the specification according to which the segment will be structured must be defined (see the section on "Operation of devices at PROFIBUS DP Ex i").

A DIP switch can be used to adapt the fieldbus isolating repeater 9185/11-35-10 to both bus specifications.

8.3.4 Compatibility at the PROFIBUS RS-485 IS (PNO) and RS-485 Ex i (STAHL) (9185/11-35-10)

Operation of devices at the PROFIBUS DP Ex i (plug X3, RS-485 IS)

according to "PROFIBUS RS-485 IS" (PNO specification)	according to "R. STAHL specification"
Only devices according to "PROFIBUS RS-485 IS" specification may be connected to a bus segment.	Only devices according to "R. STAHL specification" may be connected to a bus segment.
Combination with devices according to "R. STAHL specification" is not permissible.	Combination with devices according to "PROFIBUS RS-485 IS" (PNO specification) is not permissible.
Switchable devices such as the fieldbus isolating repeater 9185/11-35-10 must be adapted to the DP bus topology according to "PROFIBUS RS-485 IS".	Switchable devices such as the fieldbus isolating repeater 9185/11-35-10 must be adapted to the DP bus topology according to "R. STAHL specification".
Bus termination according to "PROFIBUS RS-485 IS" specification, for example, <ul style="list-style-type: none"> • with Sub-D PROFIBUS plug order number: 201805 (angled) • with Sub-D PROFIBUS plug order number: 162693 	For bus termination according to "R. STAHL specification", see the "Engineering, Installation and Commissioning of the RS-485 Fieldbus System from R. STAHL for Safe and Hazardous Areas" manual, for example, <ul style="list-style-type: none"> • with R. STAHL PROFIBUS plug order number: 162699

i	Non-Ex PROFIBUS plugs must not be used in the Ex i segment. Ex PROFIBUS plugs must not be used in non-Ex segments.
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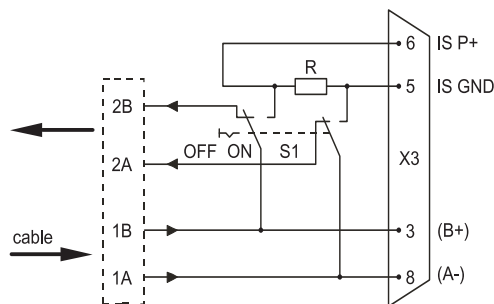
Bus connection to devices with PROFIBUS plug connectors from R. STAHL

Device	Bus topology according to	
	RS-485 IS PNO	RS-485 Ex i (R. STAHL specification)
Fieldbus isolating repeater Interface X3	162693 (straight) 201805 (angled)	162699
CPM 9440/12-.... (24V Z1)	-	
CPM 9440/22-.... (230V Z1)	162693 (straight)	

i Combination of several PROFIBUS segments with different specifications in one PROFIBUS network is permissible.

Plug for X3 (RS-485 IS or RS-485 Exi)

	RS-485 IS PNO	RS-485 Ex i (R. STAHL specification)
Termination	Both bus ends of a segment actively terminated with 200 Ω	Ex i segment terminated with 120 Ω active EOL resistor.
Plug	162693 (straight) or 201805 (angled)	162699
Wiring	R = 200 Ω	R = 120 Ω



08998E00

8.3.5 Connection and plug assignment overview

Fieldbus isolating repeater 9185/11-35-10		
Connection (pin)	Designation	
X1:	RS-232 (system side)	
2	RxD	
3	TxD	
5	GND	
7	RTS	
8	CTS	
X2:	RS-485 (system side)	RS-422 (system side)
8	A-	A- (TxD)
3	B+	B+ (TxD)
6	U+	–
5	GND	–
9	–	A- (RxD)
4	–	B+ (RxD)
X3:	RS-485 (field side)	
8	A-	
3	B+	
6	ISP+	
5	IS GND	
Auxiliary power		
7	U+ (24 V UC)	
8	PA	
9	U- (0 V)	


Fieldbus isolating repeater 9185/1.-45-10		
Connection (pin)	Designation	
X1:	RS-232 (system side)	
2	RxD	
3	TxD	
5	GND	
7	RTS	
8	CTS	
X2:	RS-485 (system side)	RS-422 (system side)
8	A-	A- (TxD)
3	B+	B+ (TxD)
6	U+	–
5	GND	–
9	–	A- (RxD)
4	–	B+ (RxD)
X3:	RS-485 (field side)	RS-422 (field side)
8	A-	A- (TxD)
3	B+	B+ (TxD)
6	U+	U+
5	GND	GND
9	–	A- (RxD)
4	–	B+ (RxD)
7	–	U+
2	–	GND
Auxiliary power		
7	U+ (24 V UC)	
8	PA	
9	U- (0 V)	

9 Parameterization and commissioning

Before commissioning, ensure the following:

- Installation of the device according to regulations.
- Correct connection of the cables.
- No damage at the device and connection cables.
- Tight seat of the screws at the terminals. Correct tightening torque: 0.5 ... 0.6 Nm.

i	Changing the switch settings is also permitted during operation in Zone 2 and with connected intrinsically safe input signals.
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	<p>Incorrect parameterization or an incorrect update can result in the device not working properly.</p> <ul style="list-style-type: none"> • Please carry out parameterization carefully and exactly as per the instructions.
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9.1 Replacement of the device


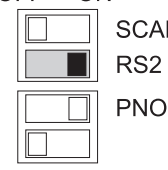




- If replacing by a device with identical design, readjust the DIP switch, if necessary.

9.2 Overview of functions

Type	Field side (X3)	RS2 switch	Auto baud rate detection	Bit retiming *)	Full duplex
9185/11-35-10	RS-485 IS	any	Yes (PROFIBUS)	Yes	No
9185/11-45-10	RS-485 Ex i	OFF	Yes (PROFIBUS)	Yes	No
	RS-422 Ex i	ON	No	No	Yes
9185/12-45-10	RS-485	OFF	Yes (PROFIBUS)	Yes	No
	RS-422	ON	No	No	Yes

*) Bit retiming only from 93.75 kBit

9.3 DIP switch settings 9185/11-35-10

System-side interface (X2)			
RS-485 *) OFF ON 		RS-422 OFF ON 	
RS-422 transmitter (If RS2 = OFF)		RS-422 transmitter (If RS2 = ON)	
switched off *)	direction	permanently on	spring return
OFF ON 	OFF ON 	OFF ON 	OFF ON 

Field-side transmission level (X3)	
R. STAHL	PNO *)
<p>OFF ON</p> <p><input type="checkbox"/> SCAN</p> <p><input type="checkbox"/> RS2</p> <p><input checked="" type="checkbox"/> PNO</p> <p><input type="checkbox"/></p> <p>08719E00</p>	<p>OFF ON</p> <p><input type="checkbox"/> SCAN</p> <p><input type="checkbox"/> RS2</p> <p><input checked="" type="checkbox"/> PNO</p> <p><input type="checkbox"/></p> <p>08713E00</p>

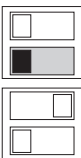
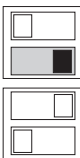
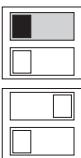
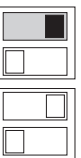
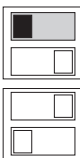
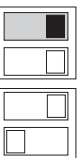
*) = Default setting

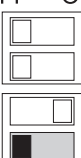

9.4 DIP switch settings 9185/11-45-10

System-side interface (non-Ex i (X2))			
<p>RS-485</p> <p>OFF ON</p> <p><input type="checkbox"/> SCAN</p> <p><input checked="" type="checkbox"/> RS2</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/> RS3</p> <p>08803E00</p>		<p>RS-422 *)</p> <p>OFF ON</p> <p><input type="checkbox"/> SCAN</p> <p><input checked="" type="checkbox"/> RS2</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/> RS3</p> <p>08751E00</p>	
RS-422 transmitter (If RS2 = OFF)		RS-422 transmitter (If RS2 = ON)	
switched off *)	direction	permanently on	spring return
<p>OFF ON</p> <p><input checked="" type="checkbox"/> SCAN</p> <p><input type="checkbox"/> RS2</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/> RS3</p> <p>09000E00</p>	<p>OFF ON</p> <p><input type="checkbox"/> SCAN</p> <p><input checked="" type="checkbox"/> RS2</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/> RS3</p> <p>08994E00</p>	<p>OFF ON</p> <p><input checked="" type="checkbox"/> SCAN</p> <p><input type="checkbox"/> RS2</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/> RS3</p> <p>08996E00</p>	<p>OFF ON</p> <p><input type="checkbox"/> SCAN</p> <p><input checked="" type="checkbox"/> RS2</p> <p><input type="checkbox"/></p> <p><input type="checkbox"/> RS3</p> <p>08999E00</p>
Field-side interface Ex i (X3)			
RS-485		RS-422 *)	
<p>OFF ON</p> <p><input type="checkbox"/> SCAN</p> <p><input type="checkbox"/> RS2</p> <p><input type="checkbox"/></p> <p><input checked="" type="checkbox"/> RS3</p> <p>08992E00</p>	<p>OFF ON</p> <p><input type="checkbox"/> SCAN</p> <p><input type="checkbox"/> RS2</p> <p><input type="checkbox"/></p> <p><input checked="" type="checkbox"/> RS3</p> <p>08991E00</p>		

*) = Default setting

9.5 DIP switch settings 9185/12-45-10

System-side interface (X2)			
RS-485 *) OFF ON  SCAN RS2 RS3 <small>08803E00</small>		RS-422 OFF ON  SCAN RS2 RS3 <small>08751E00</small>	
RS-422 transmitter (If RS2 = OFF)		RS-422 transmitter (If RS2 = ON)	
switched off *)	direction	permanently on	spring return
OFF ON  SCAN RS2 RS3 <small>09000E00</small>	OFF ON  SCAN RS2 RS3 <small>08994E00</small>	OFF ON  SCAN RS2 RS3 <small>08996E00</small>	OFF ON  SCAN RS2 RS3 <small>08999E00</small>

Field-side interface (X3)	
RS-485 *) OFF ON  SCAN RS2 RS3 <small>08992E00</small>	RS-422 OFF ON  SCAN RS2 RS3 <small>08991E00</small>

*) = Default setting

9.6 "BAUD" decode switch for setting the transmission speed

In the fieldbus isolating repeater, the speed (baud rate) of data transfer between the fieldbus isolating repeater itself and the operating device is set using the decode switch. The corresponding possible settings are shown in the following table.

	0 *)	1	2	3	4	5	6	7
Bit/s	Auto **)	1.2 k	2.4 k	4.8 k	9.6 k	19.2 k	38.4 k	45.45 k
Conductor length		≤ 1200 m	≤ 1200 m	≤ 1200 m	≤ 1200 m	≤ 1200 m	≤ 1200 m	≤ 1200 m
	8	9	A	B	C	D	E	F
Bit/s	57.6 k	93.75 k	187.5 k	375 k	500 k	1 M	1.5 M	Reserved
Conductor length	≤ 1200 m	≤ 1200 m	≤ 1000 m	≤ 400 m	≤ 400 m	≤ 200 m	≤ 200 m	

*) Default setting upon delivery

**) 9185/11-35-10: AutoDetect (PROFIBUS DP only)

9185/1.-45-10: AutoDetect at RS2 = OFF (PROFIBUS DP only) / 57.6 kBits/s at RS2 = ON

10 Operation

10.1 Operation

Transmission characteristic

All three interfaces of the fieldbus isolating repeater (X1-X3) are equal communication channels. The data received on one of the interfaces is always sent to the other two interfaces.

Line fault detection

Line faults (wire breakage, short circuit) are detected by the device ("ERR" LED = ON) and not transmitted to other segments, thus allowing a failure-free and independent operation of different segments.

Signal regeneration (bit refresh)

The amplitude and the bit offset (phase) of the received data are regenerated when the data is sent to the other segment. This will not limit the maximum conductor length and the number of users in a PROFIBUS network.

Automatic baud rate detection

If the "BAUD" decode switch is set to "0" and the PROFIBUS is used on RS-422, the baud rate is automatically detected by evaluating the start delimiters.

After PWR-ON, the device starts with the baud rate search ("ERR" LED will flash).

If valid start delimiters are received, the device will use the detected baud rate ("ERR" LED = Off).

If the interfaces do not receive any telegrams for longer than bit time of 32.768 (Rev. A-C) or 122.880 (Rev. D or higher), the device starts the baud rate search again.

Data formats / function

Rev. A-C	All baud rates: <ul style="list-style-type: none"> • 1 start bit, 8 data bits, 1 parity bit, 1 or 2 stop bits • Bit refresh function on. $11 T_{\text{Bit}}$ waiting time.
Rev. D-E	Fixed baud rate: 1.2-57.6 Kbaud: <ul style="list-style-type: none"> • 1 start bit, 1-9 data bits (incl. parity bit), 1 or 2 stop bits • Waiting time after end of telegram for transmission direction switchover $\geq 11 T_{\text{bit}}$ • No bit refresh function. $11 T_{\text{bit}}$ waiting time.
	Fixed baud rate of 93.75 Kbaud to 1.5 Mbaud and automatic baud rate detection: <ul style="list-style-type: none"> • 1 start bit, 8 data bit, 1 parity bit, 1 or 2 stop bits (e.g. PROFIBUS) • Bit refresh function on

10.2 Indications

The corresponding LEDs on the device indicate the operating conditions of the device and the line fault states (also refer to chapter "Function and Device Design").

LED	Colour	Display
"PWR" LED	green	lit: Supply voltage OK
"ERR" LED	red	lit: Short circuit flashing: Baud rate search with automatic baud rate detection
"RxD1" LED	green	flashing: Reception on X1
"RxD2" LED	green	flashing: Reception on system side X2
"RxD3" LED	green	flashing: Reception on field side X3

10.3 Troubleshooting

Observe the following troubleshooting plan for troubleshooting:

Error	Cause of error	Troubleshooting
"PWR" LED is off	<ul style="list-style-type: none"> Auxiliary power failure Defective device fuse Polarity reversal of the auxiliary power source 	<ul style="list-style-type: none"> Check the polarity of the auxiliary power source. Check the wiring of the auxiliary power source. If the fuse is defective, have the device repaired.
"ERR" LED is lit	Short circuit	Check the connection cable and plug.
"ERR" LED is flashing	No telegrams are being received by the system	<ul style="list-style-type: none"> Check the system. Check the cables. For non-PROFIBUS DP protocols: Set the baud rate manually at the "BAUD" rotary switch.
No communication	<ul style="list-style-type: none"> Bus not active Wrong plug used with passive EOL resistor 	<ul style="list-style-type: none"> Start bus. Use a plug with active EOL resistor.

If the error cannot be eliminated using the mentioned procedures:

- Contact R. STAHL Schaltgeräte GmbH.

For fast processing, have the following information ready:

- Type and serial number of the device
- Purchase information
- Error description
- Intended use (in particular input / output wiring)

11 Maintenance and repair

11.1 Maintenance


- Consult the relevant national regulations to determine the type and extent of inspections.
- Adapt inspection intervals to the operating conditions.

During maintenance of the device, check at least:


- whether the clamping screws holding the electric lines are securely seated,
- whether the device enclosure and / or protective enclosure have cracks or other visible signs of damage,
- whether the permissible ambient temperatures are observed,
- whether the device is used according to its designated use.

11.2 Maintenance

The device does not require regular maintenance.

	Observe the relevant national regulations in the country of use.
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11.3 Repair

	DANGER
	<p>Explosion hazard due to improper repair! Non-compliance results in severe or fatal injuries.</p> <ul style="list-style-type: none"> • Repair work on the devices must be performed only by R. STAHL Schaltgeräte GmbH.

11.4 Returning the device

Use the "Service form" to return the device if repair or service is required.
On the internet site "www.stahl-ex.com" under "Downloads > Customer service":

- Download the service form.
- Fill out the service form.
- Send the device along with the service form in the original packaging to R. STAHL Schaltgeräte GmbH.

12 Cleaning


- To avoid electrostatic charging, the devices located in potentially explosive areas may only be cleaned using a damp cloth.
- When cleaning with a damp cloth, use water or mild, non-abrasive, non-scratching cleaning agents.
- Do not use aggressive detergents or solvents.

13 Disposal

- Observe national and local regulations and statutory regulation regarding disposal.
- Separate materials when sending it for recycling.
- Ensure environmentally friendly disposal of all components according to the statutory regulations.

14 Accessories and Spare parts

NOTE	
<p>Malfunction or damage to the device due to the use of non-original components. Non-compliance can result in material damage.</p> <ul style="list-style-type: none"> • Use only original accessories and spare parts from R. STAHL Schaltgeräte GmbH. 	

	For accessories and spare parts, see data sheet on our homepage www.stahl-ex.com .
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