



05548E00

- Backplane bus for the IS1 system, consisting of data bus, PowerBus and address circuits
- For 2 or 4 modules
- Installation on 35 mm DIN rails NS 35/15
- The BusRail can be interconnected for up to 18 modules
- Passive component with redundancy and high availability
- Installation in
 - Zone 1 / Division 1 and Zone 2 / Division 2
 - Zone 21 and Zone 22

	Zones					
	0	1	2	20	21	22
Ex i interfaces		X	X		X	X
Installation in		X	X		X	X

General Information

Manufacturer

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Further Information on the Module

Further information on the module you will find
X in the automation catalogue (168464 / 00 006 53 78 0) or
X on the internet at www.stahl-automation.com

Symbols



Attention!

This symbol marks notes whose non-observance will endanger your health or functioning of the device.



Note

This symbol marks important additional information, tips and recommendations.

Safety instructions

The most important safety instructions are summarised in this section. It supplements the corresponding regulations which the personnel in charge must study. When working in areas subject to explosion hazards, the safety of personnel and plant depends on complying with all relevant safety regulations. Assembly and maintenance staff working on installations therefore have a particular responsibility. Precise knowledge of the applicable standards and regulations is required.



As the user, please note:

- X the national safety, accident prevention, assembly and installation regulations (e.g. IEC/EN 60079-14)
- X generally recognised technical regulations,
- X the safety instructions and information of this document, characteristic values of the type labels and the instruction plates
- X the EC Type Examination Certificate (according to ATEX) or conformity or partial certificate (after previous approval) and special conditions contained in it
- X that any damage may render explosion protection null and void.
- X that the BusRail can be operated only with IS1 CPU & Power Modules and IS1 I/O Modules.

- X that the BusRail of type 9494 is certified for use in hazardous areas of Zone1/Division 1, Zone 2/Division 2, Zone 21, Zone 22 or in the safe area. Actually certified application area depends on the installed modules.

The IS1 system consisting of the BusRail, CPU & Power Module and I/O Modules may only be used in the hazardous area for which the installed module with the lowest explosion protection is certified.

- X that at the beginning and end of every BusRail segment a termination must be assembled.
- X that every BusRail segment must be connected to every equipotential bonding of the hazardous area.

Use the component in accordance with its designated use and for its intended purpose only (see chapter "Function/Characteristics"). Incorrect and impermissible use or non-compliance with this document invalidates our warranty provision.

No modifications or alterations to the components, impairing their explosion protection, are permitted. The components may only be fitted if they are undamaged and clean.

Conformity to Standards










The components comply with the following standards and directive:

- X Directive 94/9/EC
- X EN 50014, EN 50020
- X IEC 60079-0, IEC 60079-1, IEC 60079-11, IEC 60079-15, IEC 60079-7

Function/Characteristics

The BusRail is inserted into a 35 mm DIN rail and serves for internal electrical intrinsically safe connection between the CPU & Power Modules and the I/O modules. The BusRail is designed in a passive way. It consists of internal data bus, PowerBus and the address lines for the I/O modules. The internal data bus is designed redundantly. Thanks to special design features high availability of the PowerBus is provided.

Components

Version	Description	Order number	Weight
			kg
BusRail	 for 4 modules <small>04829E00</small>	9494 / S1 - M4	0.100
	 for 2 modules begin <small>07005E00</small>	9494 / S1 - B2	0.062
	 for 2 modules end <small>07005E00</small>	9494 / S1 - E2	0.062
Termination BusRail	 begin <small>04826E00</small>	9494 / A1 - B0	0.044
	 end <small>04810E00</small>	9494 / A1 - E0	0.044
Termination with connection cable	 0.7 m <small>04769E00</small>	9494 / L1 - V7	0.210
	 1.10 m <small>04769E00</small>	9494 / L1 - V8	0.260
	 length acc. specification <small>04769E00</small>	9494 / L1 - V9	--
DIN rail	 For inserting the BusRail 2 m long, 35 x 15 x 1.5 mm (EN 50 022) <small>04768E00</small>	103714	1.410

Designing



The national installation instructions (e.g. IEC/EN 60079-14) must be observed. Intrinsically-safe and non-intrinsically safe circuits must not be used in a common conduit! Ensure that there is a distance of at least 50 mm left between the connection parts of intrinsically-safe and non-intrinsically safe circuits!

- x The BusRail serves for electric connection between the CPU & Power Module and the I/O Modules.
- x The BusRail can be installed in hazardous areas of Zone 1/Division 1, Zone 2/Division 2, Zone 21 or Zone 22. Actually certified application area of IS1 system depends on the modules installed.
- x A mixed arrangement of the BusRail with different I/O modules is permitted. When assembling a Zone 1 module near Zone 2 module (94../15) it is required to assemble a partition (ID No.: 162740)!
- x Permitted Assembly direction of the BusRail depends on the modules installed. The distance between the BusRail and enclosure walls or other equipment depends on the modules installed.
- x At the beginning or end of every BusRail segment a BusRail termination must be assembled in order to secure the BusRail against loosening and to protect the pins of extendable BusRail against soiling and unintended contact.
- x The DIN rail of every BusRail segment must be connected to the shield buses installed in the enclosure! In Zone 1 the Ex e terminal must be used for this purpose.
- x The maximum length of a BusRail segment is:
 - in Zone 1: 10 Modules (2 x CPM, 8 x IOM)
 - in Zone 2: 18 Modules (2 x CPM, 16 x IOM).
- x The number of effectively used I/O modules can be limited by the fieldbus protocol.
- x Subsequent extension of the BusRail to the maximum length is possible. For the simple extension the last BusRail part of the segment should be extendable (Type 9494/A 1-M4).

Assembly and Installation



The national installation instructions (e.g. IEC/EN 60079-14) must be observed. Intrinsically-safe and non-intrinsically safe circuits must not be used in a common conduit! Ensure that there is a distance of at least 50 mm left between the connection parts of intrinsically-safe and non-intrinsically safe circuits!



At the beginning or end of every BusRail segment a BusRail termination must be assembled in order to secure the BusRail against loosening and to protect the pins of extendable BusRail against soiling and unintended contact.



The DIN rail of every BusRail segment must be connected to the shield buses installed in the enclosure! In Zone 1 the Ex e terminal must be used for this purpose.



The maximum length of a BusRail segment is:

- in Zone 1: 10 Modules (2 x CPM, 8 x IOM)
- In Zone 2: 18 Modules (2 x CPM, 16 x IOM)

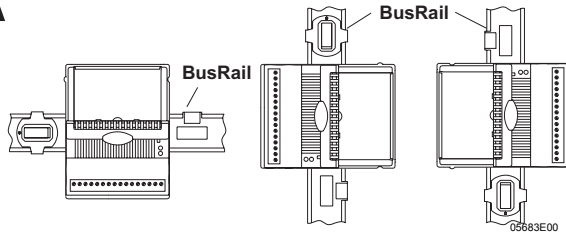


For assembly only DIN rails are certified similarly to EN 50022, Type NS35/15 (35 x 15 x 1.5), In order for the BusRail to be inserted correctly only screws with a maximum screw head height 4 mm can be used for the DIN rail assembly.

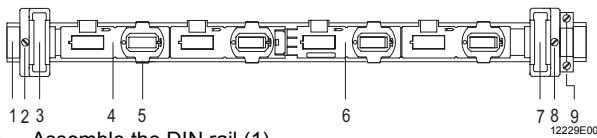


The assembly position of the DIN rail depends on the modules installed.
During operation all modules must be assembled vertically or horizontally.
The assembly position "lying" or "hanging upside down" is not permitted for all modules!

Assembly direction up:



BusRail assembly on the rail

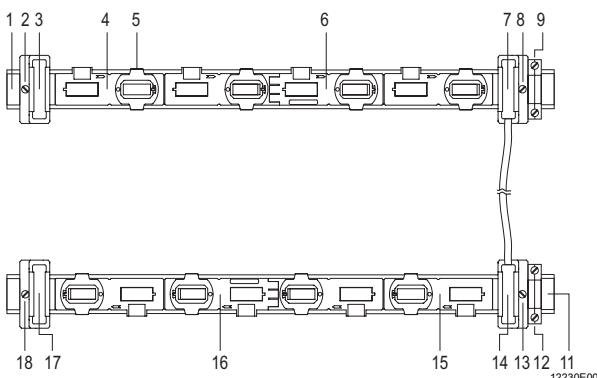


- Assemble the DIN rail (1).
- Place the termination "BusRail Begin" (3) onto the DIN rail (1) and fasten it with a mounting screw (2).
- Insert the BusRail part (4) into the DIN rail (1) and push through up to the termination "BusRail Begin" (3).
- Snatch the ground clamp (5) at the DIN rail.
- If necessary, insert a further BusRail part (6) into the DIN rail and carefully push it to the BusRail part assembled previously until the ear of the plug connector latches.
- Snatch the ground clamp (5) at the DIN rail.
- If necessary, assemble further BusRail parts so that the planned length of the BusRail is achieved.
- Place the "BusRail End" (7) onto the DIN rail (1), push to the last BusRail part and fasten it with a mounting screw (8).
- Assemble the earthing terminal (9) on the DIN rail and connect it to the shield bus of the enclosure.

Assembly of the BusRail on two rails



The maximum length of the BusRail with connection cable is 3m!



- Assemble the DIN-rails (1, 11).
- Place the termination "BusRail Begin" (3) onto the DIN rail (1) and fasten it with a mounting screw (2).
- Insert the BusRail part (4) into the DIN rail (1) and push through to the termination "BusRail Begin" (3).
- Snatch the ground clamp (5) at the DIN rail.
- If necessary, insert a further BusRail part (6) into the DIN rail and carefully push it to the BusRail part (4) assembled previously until the ear of the plug connector latches.
- Snatch the ground clamp (5) at the DIN rail.
- If necessary, assemble further BusRail parts so that the planned length of the first BusRail segment is achieved.
- Place the termination of the connection cable (7) on the DIN rail (1), carefully push it to the last BusRail part (6) and fasten it with a mounting screw (8).

- Assemble the earthing terminal (9) on the DIN rail (1) and connect it to the shield bus of the enclosure.
- Place the second termination of connection cable (14) on the DIN rail (11), and fasten it with a mounting screw (13).
- Insert the BusRail part (15) into the DIN rail (11) and push it carefully to the termination of the connection cable.
- Snatch the ground clamp (5) at the DIN rail.
- If necessary, insert a further BusRail part (16) into the DIN rail (11) and carefully push it to the BusRail part (15) assembled previously until the ear of the plug connector latches.
- Place the "BusRail End" (17) on the DIN rail (11), push it to the last BusRail part and fasten it with a mounting screw (18).
- Assemble the earthing terminal (12) on the DIN rail (11) and connect it to the shield bus of the enclosure.

Repair and Maintenance

The BusRail is maintenance-free.
Observe the function according to designated use.
Adhere to the directives according to IEC/EN 60079-17.
Adhere to the permissible temperatures according to IEC/EN 60079-0.

Repair

For repair send the BusRail to the responsible sales organisation (address see www.stahl.de).
Repair is only to be performed by the manufacturer.

Transport and Storage

Transport and storage are only permitted in the original packing.

Disposal

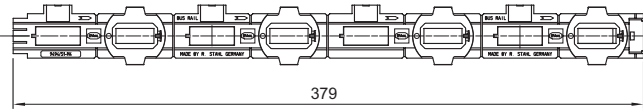


Observe the national standard for refuse disposal.

Technical Data

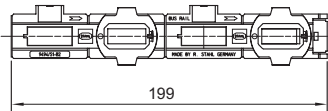
Types	9494/S1-M4	9494/S1-E2	9494/S1-B2
Certificates	see certificates for CPU & Power Module Type 9440		
Number of module slots	4	2	2
Extensible at the beginning	yes	yes	no
Extensible at the end	yes	no	yes
Internal data bus redundant	yes	yes	yes
High availability internal power	yes	yes	yes
Max length	3 m, BusRail including connection cable 9494/2.		
DIN rail	For installation of the BusRail, as per EN 50 022 (material thickness 1.5 mm), NS35 /15		
Engineering notes	The BusRail is available in lengths for 2 or 4 modules. Terminations are required both at the beginning and at the end. The terminations are available as „BusRail begin“ and „BusRail end“ and with integrated connection cable. The use of the connection cable permits several BusRail segments to be built up in one enclosure.		

Dimension drawings (all dimensions in mm) - subject to alteration

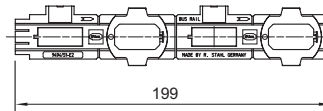


09890E00

BusRail, middle

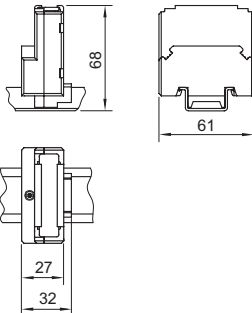


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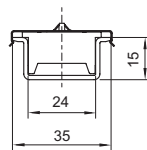


10525E00

BusRail, begin



BusRail, end



09891E00

09888E00

Termination BusRail begin / end

Rail for support similar to EN 50 022 NS 35/15

Accessories and Spare Parts

Designation	Illustration	Description	Order number
Designation strips	 05871E00	For Bus rail, for 1 Bus rail with 16 I/O modules	162793

Declaration of Conformity



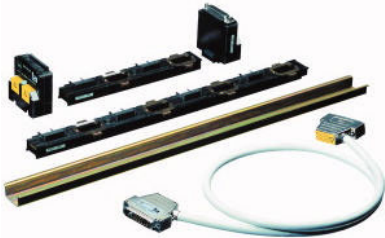
Note

The BusRail has been checked and certified together with the CPU & Power Module and is included into the EC Type Examination Certificate of type 9440/22.

You can find the current EC Type Examination Certificate with all addenda at www.stahl.de.

Certification Drawing

Class I, Div. 1 / Zone 1 Installation for connection of CPU & Power Module to Remote I/O modules located in Class I, II, III, Division 1, Group A-G, or Class I, Zone 1, Group IIC/IIB Hazardous (Classified) Locations (see note 3)



The Type 9494 BusRail is a passively constructed bus rail mounted into standard 35 mm DIN rail. It consists of an internal data bus, Power bus and the address lines for the interconnection of the I.S. 1 CPU & Power supply to Remote I/O modules. It is approved for installation in a Class I, II, III, Division 1, Group A-G or Class I, Zone 1, Group IIC/IIB hazardous location according to NEC Article 504/505.

Selection table:

Version	Part Number
BusRail 4 modules	9494/S1-M4
BusRail 2 modules, begin	9494/S1-B2
BusRail 2 modules, end	9494/S1-E2
End Cap BusRail, begin	9494/A1-B0
End Cap BusRail, end	9494/A1-E0
End Cap BusRail, begin Sub-D	9494/A2-B0
End Cap BusRail, end Sub-D	9494/A2-E0
Connection cable BusRail	9491/Z0-VB

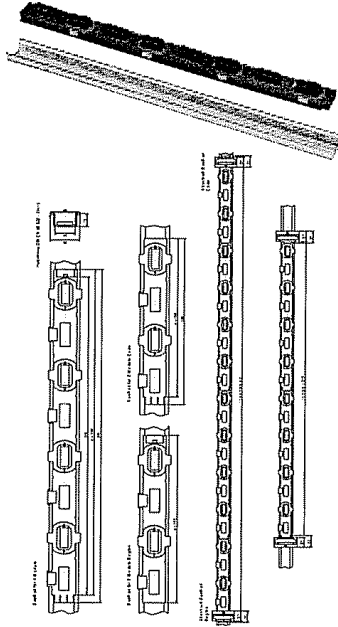
Notes:

- 1.) Installation should in accordance with [Article 504/505](#) of the [National Electrical Code, ANSI/NFPA 70](#) and [ANSI/ISA RP12.06.01](#).
- 2.) Use a general purpose enclosure meeting the requirements of [ANSI/ISA S82](#) for use in nonhazardous or Class I, Division 1 hazardous (Classified) Locations.
- 3.) Use an FMRC Approved or NRTL listed Dust-ignitionproof enclosure appropriate for environment protection in Class II, Division 1, Groups E, F and G; and Class III, hazardous (Classified) Locations.

Certification Drawing

Revision	Date	Approved		Title	Date	Name	Drawing Number	
C	11/04	T. Stahl		I.S.1 Remote I/O System BusRail Type 9494	Drawn	01.02.01	Tobey	94 006 01 31 0
B	6/04	Toby			Checked	01.02.01	Feindel	Sheet 3 of 18
A	8/01	Feindel			Approved			Agency FM
Div. 1								

Class I, Div 2/Zone 2 Installation
for Connection of CPU & Power module to Remote I/O
modules located in Class I, II, III, Division 2
Group A-G, or Class I, Zone 2,
Group IIC/IIIB Hazardous (Classified) Locations
(see note 3)



The Type 9494 BusRail is a passively constructed bus rail mounted into standard 35mm DIN rail. It consists of an internal data bus, PowerBus and the address lines for the interconnection of the I.S.1 CPU & power supply to remote I/O modules. It is approved for installation in a Class I,II,III, Division 2, Group A-G, or Class I, Zone 2 Group IIC/IIIB hazardous location according to NEC Article 504/505.


Selection Table:

Version	Part Number
BusRail 4 modules	9494/S1-M4
BusRail 2 modules, begin	9494/S1-B2
BusRail 2 modules, end	9494/S1-E2
End Cap BusRail, begin	9494/A1-B0
End Cap BusRail, end	9494/A1-E0
End Cap BusRail, begin Sub-D	9494/A2-B0
End Cap BusRail, end Sub-D	9494/A2-E0
Connection cable BusRail	9491/Z0-VB

Notes

- 1.) Installation should be in accordance with Article 504/505 of the National Electrical Code, ANSI/NFPA 70 and ANSI/ISA RP12.06.01.
- 2.) Use a general purpose enclosure meeting the requirements of ANSI/ISA S82 for use in nonhazardous or Class I, Division 2 hazardous (Classified) Locations.
- 3.) Use an FMRC Approved or NRTL listed Dust-ignitionproof enclosure appropriate for environmental protection in Class II, Division 1, Groups E, F and G; and Class III, hazardous (Classified) Locations.

Certification Drawing

Revision			Title	Date	Name	Drawing Number		
B	6/04	Tobey				 <p>I.S.1 Remote I/O System BusRail Type 9494</p>	Drawn 7/2/00 Checked 7/2/00 Approved	Tobey Feindel
A	2/13/01	Feindel	Sheet					
Revision	Date	Approved	Div. 2	Agency	FM			





IS1 I/O-Modules

BusRail Series 9494
