



fieldbus solutions

modules and systems





For the last 80 years of our 130-year company history, we at R. STAHL have had a major impact in the sector of explosion protection. Development of explosion protected, electrical control devices and control units was speeded up consistently and successfully as of 1926. In 1993, three independent fieldbus systems at the R. STAHL company were used on an offshore drilling platform off the coast of Norway. What was then the company's largest fieldbus project required customer-specific, innovative solutions and a high engineering share. R. STAHL's Remote I/O System IS1 was introduced in the year 2000 as a decisive step into a new millennium, geared to the future. This pioneering system leads the market worldwide today in the fieldbus sector. At the time, safety standards were not barriers for us but challenges for us, as they still are today. We not only comply with all standards but are generally also involved in helping to create these standards and set new ones. The result is that the R. STAHL Schaltgeräte GmbH company numbers among the leading suppliers of explosion protected components and systems for measurement, control, instrumentation, power distribution, operator control and monitoring, besides lighting, worldwide. And the result of this is that we offer all-in services in the explosion protection sector.



Modules

Enclosures and Accessories

Engineering Support Service



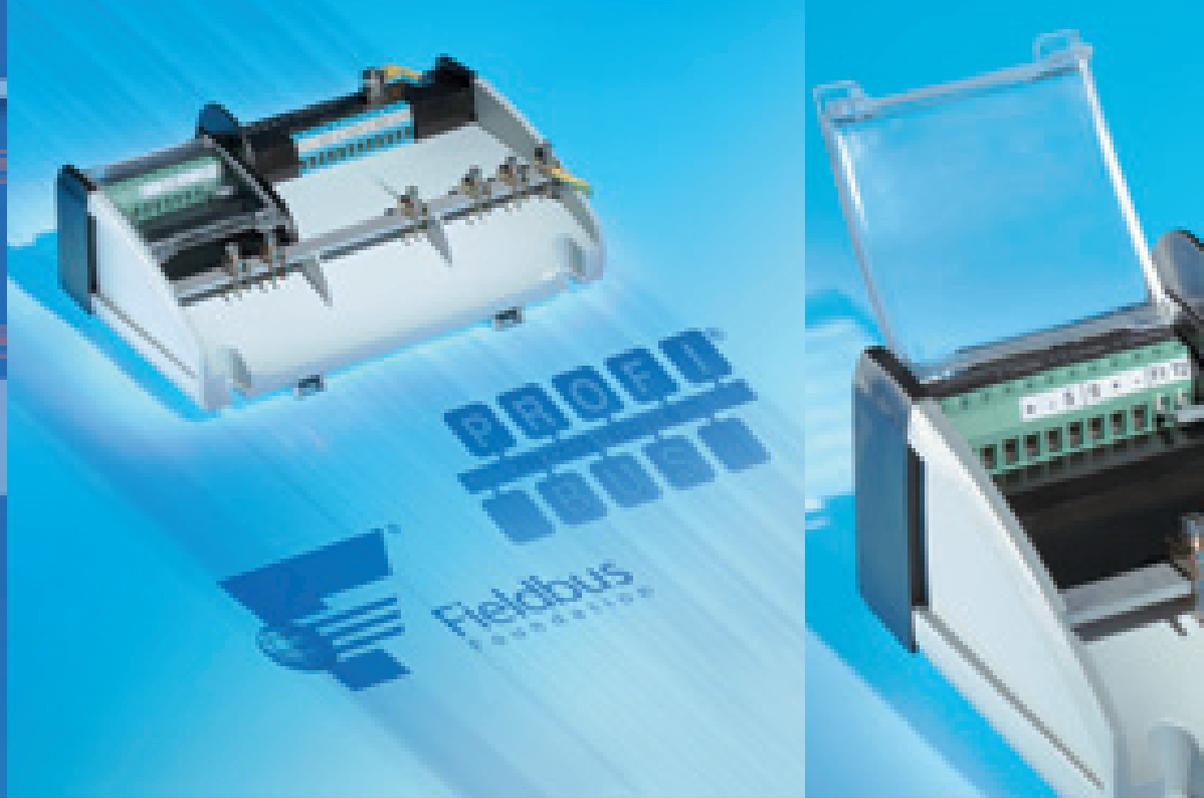
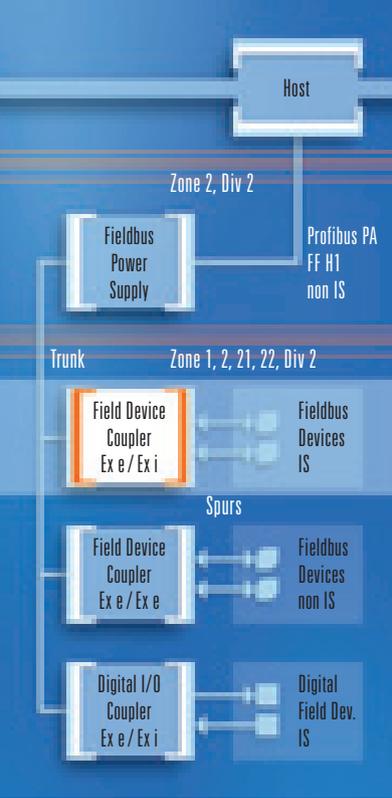
contents

Fieldbus Solutions	4
ISbus Fieldbus	6
IS1 Remote I/O	10
Fieldbus Engineering	12
Competence _ Engineering Support Service	14
Progress _ Looking to the Future	15



fieldbus solutions

Three generations of field device are now in use in the process industries. Firstly, there are the classic, conventional sensors and actuators with analogue 4-20 mA signals and, secondly, the HART transmitters and positioners. The Foundation Fieldbus H1 and Profibus PA, the third generation of field device, were recently introduced. The predominant types of protection for explosion protected sensors and actuators continue to be intrinsically safe Ex i and flameproof encapsulated Ex d. The FISCO Specification in accordance with IEC 60079-27 has gained general acceptance for intrinsically safe fieldbus devices. The FISCO model was developed for the fieldbus (H1 and PA), standardised in accordance with IEC 61158-2, the explosion protected version of which was initially viewed as an intrinsically safe bus. However, the number of connectable devices is small. Far more current can be provided for more field devices if we do without intrinsic safety. However, we do not need to do without the intrinsic safety of the field device connection. Appropriate solutions must be provided for this. Besides the conventional IS isolators this does of course relate to Remote I/O Systems for hazardous areas and field device couplers for connection of H1 or PA field devices. Conventional and HART field devices can be interfaced efficiently with higher-level systems using Remote I/O. For example, this is possible with Profibus DP. R. STAHL now provides suitable couplers and a fieldbus power supply for fieldbus devices (H1 and PA). With this concept, the fieldbus is not operated intrinsically safe. This is the only way of implementing an efficient and economical installation powering an adequately large number of field devices. R. STAHL has made it its business to provide simple, efficient and economical solutions and integrate these.



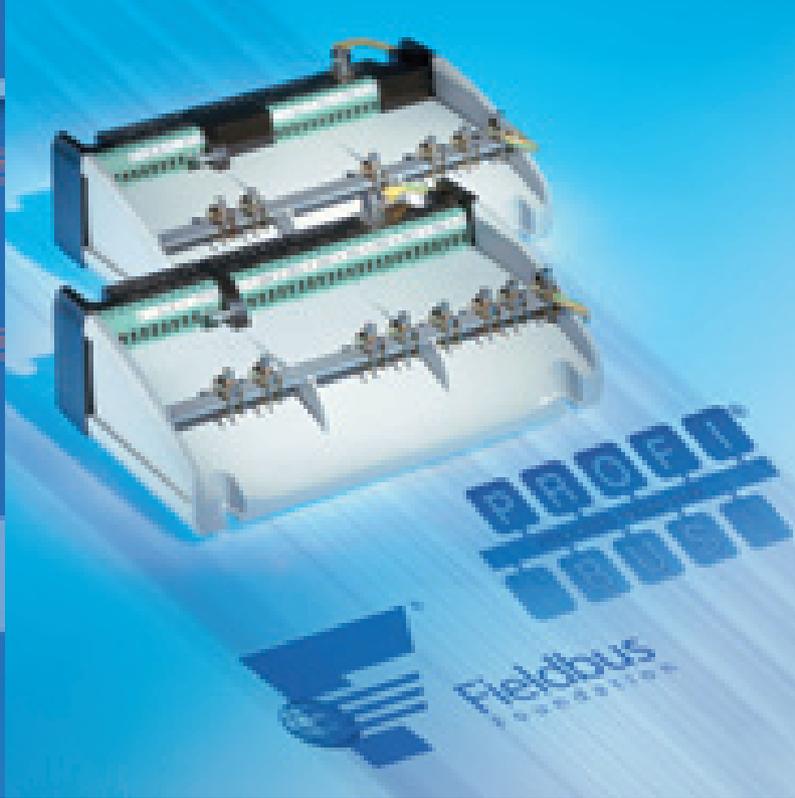
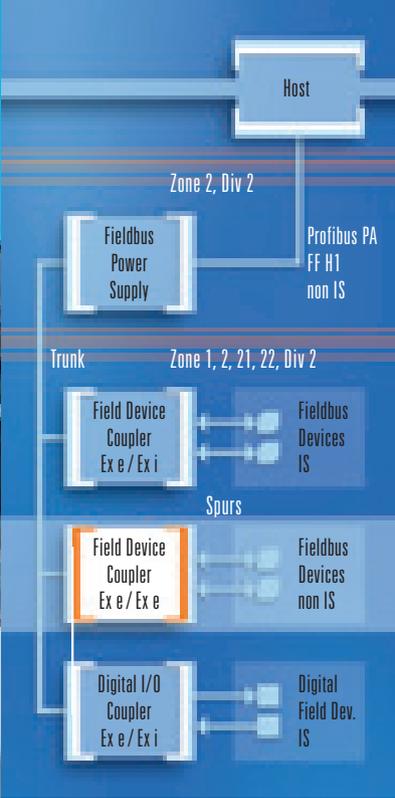
ISbus fieldbus

field device coupler ex e/ex i

The R. STAHL field device coupler Ex e/Ex i connects intrinsically safe field devices to the non-intrinsically safe trunk. Up to four field devices can each be powered with 40 mA, so there is still adequate reserve for a hand-held tester. A feedback effect on the trunk and, thus, on the entire system must be prevented in the case of short-circuits. For this reason, each spur features 50 mA current limiting. The intrinsically safe spurs comply with FISCO and are electrically isolated from the trunk. The field device coupler features power management, described on Page 7. The coupler is mounted on DIN rails or directly in the housings made of fibre glass-reinforced polyester, sheet steel or stainless steel. The cables are connected either with screw terminals or with cage clamp terminals. The cable shields can be earthed capacitively at the terminals or directly at the bus bar. An IP 30 cover protects the non-intrinsically safe connections of the trunk so that work can be carried out at any time on the intrinsically safe spurs. The field device coupler Ex e/Ex i can be installed in Zone 1, Zone 2, Zone 21, Zone 22 or Division 2.

Technical Details

- > for intrinsically safe Foundation Fieldbus H1 or Profibus PA field devices
- > 4 channels
- > electrical isolation between non-Ex i trunk and Ex i spurs
- > 40 mA per spur, current limitation < 50 mA
- > power management
- > connection using screw terminals or cage clamp terminals
- > capacitive or direct earthing for cable shields
- > fitted terminating resistor



Sbus fieldbus

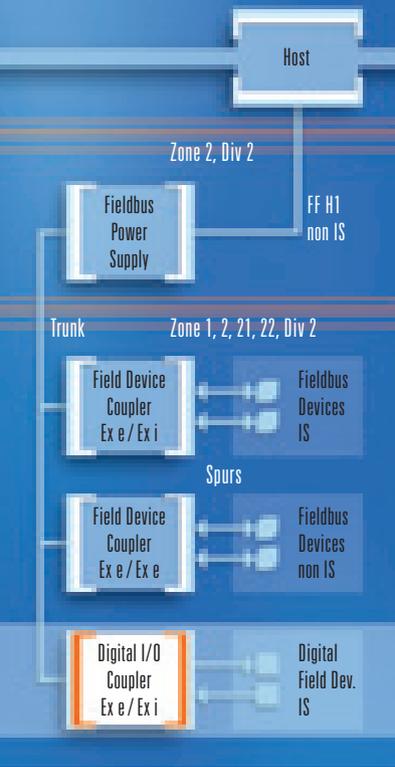
field device coupler ex e/ex e

The R. STAHL field device coupler Ex e/Ex e connects non-intrinsically safe field devices to the trunk which is also not intrinsically safe. Four or eight field devices can each be powered with 40 mA, so there is still adequate reserve for a hand-held tester. Here as well, each spur features 50 mA current limiting in order to prevent feedback effects on the trunk and, thus, on the entire system in the event of short-circuits. Installation, wiring, housings, terminals and shield earthing etc. are designed as on the field device coupler Ex e/Ex i.

Power management with the R. STAHL field device coupler: as soon as the voltage on the trunk exceeds 16 V, the spurs are activated one after the other. In the event of a short-circuit, the spur in question is deactivated until the short-circuit is eliminated. If several spurs are affected by the short circuit, the trunk is loaded only with maximum one short-circuit current. This minimises the current consumption of the trunk and the power loss of the coupler under all operating conditions.

Technical Details

- > for non-intrinsically safe Foundation Fieldbus H1 or Profibus PA field devices
- > 4 or 8 channels
- > 40 mA per spur, current limiting < 50 mA
- > power management
- > connection using screw terminals or cage clamp terminals
- > capacitive or direct earthing for cable shields
- > fitted terminating resistor



I Sbus fieldbus

digital I/O coupler ex e/ex i

8



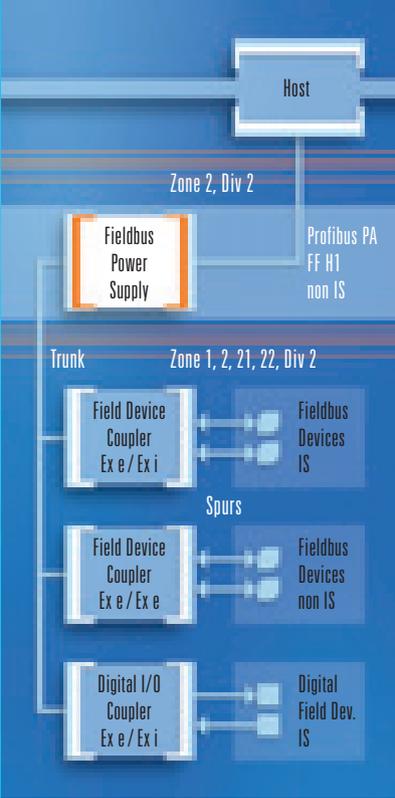
The R. STAHL digital I/O coupler Ex e/Ex i connects solenoid valves, LED indicating lamps, contacts and proximity switches to the non-intrinsically safe trunk. Alternatively, the digital I/O coupler Ex e/Ex i can be used on an intrinsically safe trunk. The coupler features eight fully fledged, non-multiplexed Ex i NAMUR inputs and four digital outputs. All inputs and outputs feature open-circuit monitoring and short-circuit monitoring and are electrically isolated from the trunk. Two versions are available: in the case of the 2-wire coupler, power is supplied by the trunk. However, this is possible only on the non-intrinsically safe trunk. The 4-wire coupler is powered from an external 24V power supply. In this case, it makes no difference whether the trunk is operated in intrinsically safe or non-intrinsically safe manner.

Technical Details

- > for Foundation fieldbus H1
- > 8 NAMUR inputs, intrinsically safe
- > 2 inputs, configurable as frequency/counter input
- > 4 outputs, intrinsically safe for solenoid valves and LEDs
- > 30/15 mA
- > 13V @ 30 mA
- > open-circuit and short-circuit monitoring
- > electrical isolation between inputs, outputs and trunk
- > trunk Ex e or Ex i
- > power supply provided by trunk 17...32V or external 24V DC
- > LED indicators for all inputs and outputs (optional)

FF Function Blocks

- > DI, DO
- > MDI, MDO (multiple DI, DO)
- > AI for frequency input
- > CI for counter input
- > timer for logic functions



I Sbus fieldbus

fieldbus power supply

The R. STAHL fieldbus power supply serves both as an infeed for the DC power supply for powering the field devices and for impedance adaptation to the trunk. Several bus segments are decoupled by electrical isolation between the 24 V DC power supply and the trunk. This is important primarily in the case of faults occurring. The terminating resistor required for the host end is fitted. Power supply and trunk are monitored for undervoltage and an error is signalled with a volt-free contact. Up to five fieldbus power supplies, with up to ten channels, can be easily interconnected. In this case, the power is looped through from one carrier to the next and the fault signalling contacts are connected in series. The fieldbus power supply is mounted on DIN rails in Zone 2, Division 2 or in the safe area.

Technical Details

- > 2 channels or 1 channel with redundancy
- > redundant 24 V DC power input
- > trunk power supply with 25 V/0-350 mA
- > fault signalling contact
- > LEDs for power and output (trunk)
- > fitted terminating resistor
- > Fieldbus Foundation listed (tested to FF 831)