



THE STRONGEST LINK.

STAHL

INTERFACE AND SYSTEM SOLUTIONS

Explosion protection for automation



THE NEXT LEVEL OF EXPLOSION PROTECTION

Digital progression is transforming whole industries and will inevitably become a key measure of competitiveness for companies in the future. The search for new and more efficient solutions is becoming increasingly important in process automation. Whether under the term 'Digital Oilfield' or in working groups on the topic of 'Modular Automation' – a connection to the 'Industrial Internet of Things' and the productive use of 'Big Data' for process optimisation play a major role in all industry sectors.

The implementation of state-of-the-art automation technology in system and network structures is the crucial key factor here – connectivity everywhere! This is a major challenge for all of us, but also a huge opportunity to take explosion protection to the next level.

With 'EX 4.0 – the next level of explosion protection' we present future-proof solutions for your individual requirements. As a leading provider, R. STAHL ensures maximum reliability and quality with cutting-edge products for interface and system solutions. The implementation in state-of-the-art Ethernet networks, integration of diagnostics data in plant asset management systems and wireless communication solutions are combined effectively with explosion-protected system solutions.

This brochure features a selection of products and solutions for various applications and is designed to provide an overview of the EX 4.0 concept and its possibilities.

Would you like to discover even more? If so, please get in touch with us. We are at your service. With experienced advice, professional services and optimised solutions. Welcome to the next level of explosion protection.

**Welcome to R. STAHL,
home of EX 4.0.**



GLOBAL EXPERTISE

THE BEST SOLUTION FOR ANY TASK

WE WILL FIND A SOLUTION FOR EVEN THE MOST COMPLEX REQUIREMENTS.

As a leading supplier of automation technology for hazardous areas, R. STAHL offers state-of-the-art components and complete solutions, perfectly matched to your operating conditions.

Our regional automation experts work with you hand in hand to establish a customised solution for your explosion protection needs – from the initial concept all the way to commissioning.

An optimised combination of protection solutions and decades of experience form the basis of everything we do. Globally operating 'Competence Centres' ensure high-quality and on-time production.

We know both current and future requirements for explosion protection like nobody else, thanks to our long-standing active involvement in global standardisation committees. That is how we create solutions which you can reliably use worldwide.



IECEX



EAC



Oil & gas: offshore

For more than 25 years, customers have been applying our remote I/O solutions. They particularly appreciate the cable and weight reductions, lower engineering effort and reduced maintenance costs.



Oil & gas: refineries

Our wireless, fieldbus and remote I/O products are being integrated into the world of 'Digital Oilfields' during new system installations and modernisations.



Chemical & pharmaceutical industries

Our automation solutions are the perfect choice when it comes to the modern concepts of remote diagnostics and modular automation. Modifiable in the most flexible way – even in hazardous areas.



Maritime applications

International ship approvals and long-standing experience ensure perfectly tuned system solutions. These are used worldwide, for example on LNG tankers and FPSO vessels.



SYSTEM SOLUTIONS

FROM FIELD STATION TO CONTAINER APPLICATION

Thanks to our extensive product range and many years of experience, we can offer you customer-specific solutions for almost any task. Whether innovative fieldbus

installations, pressurised containers or the integration of modern operating systems, we design and manufacture customised system solutions.



PHARMACEUTICAL INDUSTRY: COMBINATION OF REMOTE I/O WITH FIELDBUS

- Use of IS1+ with PROFIBUS DP for all discrete I/O signals
- Foundation Fieldbus H1 with R. STAHL Ex i Field Device Couplers on the High Power Trunk
- Integration of weighing systems and solenoid valve islands



CHEMICAL INDUSTRY: EX P PRINTER FOR FILLING AND DOSING SYSTEM

- Fully automated pressurisation system (Ex px and pz) with control electronics
- Inspection window for indications and printer status
- Slide-out bottom simplifies exchange of labels and toner
- Monitored access flap for labels





CHEMICAL INDUSTRY: LOCAL CONTROL WITH OPERATING TERMINAL

- Ex i operating terminal with a 10.4" colour display and touchscreen
- Integrated Ex i isolation with ISpac isolators
- Autonomous control system with PLC in an Ex d enclosure
- Mobile operation using 115/230 VAC with plug and socket device

Zone 2

Zone 1



OIL AND CHEMICAL TANKERS: LOADING CONTROL SYSTEM WITH REMOTE I/O

- Smart combination of different types of protection such as Ex i, Ex d and Ex e enables a compact design
- PLC installed in an Ex d enclosure
- All Ex i I/O signals via an explosion-protected IS1+ Remote I/O system in the Ex e connection

Zone 2

Zone 1



PETROCHEMICAL INDUSTRY: CONTAINER WITH CONTROL SYSTEM AND EX I ISOLATORS

- Planning, assembly, cabling, FAT and logistics: all provided by R. STAHL
- Cabinets with ventilation technology for DCS and Ex i isolators
- Cabinets with IT network technology
- Double bottom with power supply and field wiring

INTERFACE SOLUTIONS

FOR PROCESS AUTOMATION

CONTROL SY

SAFETY BARRIERS
INTRINSPEC

ISOLATORS
ISAP

REMOTE I/O
ISI+

FIELD BUS
ISbus

ZONE 2



ZONE 1



FIELD DEVI





SYSTEM LEVEL

NETWORK PRODUCTS

SYSTEMS & SOLUTIONS



CONTROL STATION



GROUNDING MONITORING



DEVICE LEVEL



ISA100.11a



EtherNet/IP™
conformance tested

Modbus
TCP

Modbus
RTU

INTRINSPAK SAFETY BARRIERS



Machine-building: compact, robust Ex i protection

Safety barriers from R. STAHL allow the use of intrinsically safe sensors. The compact and robust design fulfils machine-building demands.



Oil & gas: condition monitoring for compressors

Early wear detection makes maintenance planning possible and reduces costs. Safety barriers allow the intrinsically safe operation of vibration sensors.



Oil & gas: drill head monitoring

Intrinsically safe sensor operation in rough environments – safety barriers from R. STAHL are the right solution.



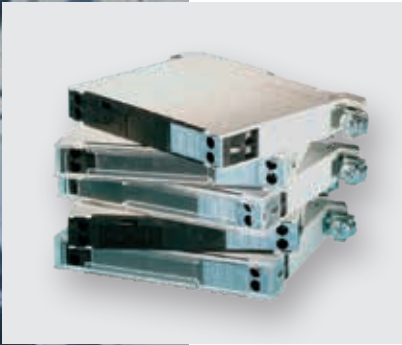
INTRINSPAK SAFETY BARRIERS

INDIVIDUAL POINT-TO-POINT SOLUTIONS

Safety barriers are a robust, compact and adaptable solution to connect Ex i field devices to control technology. A suitable barrier will always be found – an individual barrier or a combination of barriers – for standard signals like 4...20 mA and for less common signals.

As one of the pioneers in safety barriers, we attach great importance to easy installation and maintenance. Details such as the combination of assembly and equipotential bonding connection or a uniform, exchangeable backup fuse make INTRINSPAK unique.





THE COMPLETE SPECTRUM IN A COMPACT DESIGN

A wide range of sensors is used for the automation of machines. Every device requires the appropriate solution for Ex i protection. INTRINSPAK covers this spectrum with a range of more than 150 variants – with a footprint of just 12 mm.



MORE THAN 150 VARIANTS – ONLY ONE BACKUP FUSE

A backup fuse which can be easily replaced protects the safety barrier. One type for all barriers reduces storage needs and prevents mistakes during replacement.



INSTALLATION AND EQUIPOTENTIAL BONDING CONNECTION IN ONE GO

Mounting onto the DIN rail only takes a few seconds. Mechanical and electrically conductive mounting is done with a snap-on assembly with simultaneous equipotential bonding connection. There is no need for complex single wiring.



CONSULTATION AND SERVICE

Our experienced specialists are always there for you to provide expert consultation for selecting a suitable barrier, assessing simple electric equipment and verifying intrinsic safety.

ISPAC ISOLATORS



Chemical industry: completely engineered cabinets

Wiring of 140 cabinets with ISpac isolators, power supply units and third-party materials in record time for a fertiliser plant.



Chemical industry: plug & play on a large scale

Testing and installation of Ex i isolators, DCS and additional peripheral devices in containers. Letting R. STAHL handle the project management saves time at the building site and reduces the risk for the overall project.



Refinery: Ex i isolators

Space- and time-saving installation of two-channel Ex i isolators and pac-Carriers including functional safety (SIL).



Oil & gas: loading arm control

Delivery of a complete solution of Ex i isolators combined with PLC and other components in Ex d enclosures for controlling loading arms for combustible liquids.



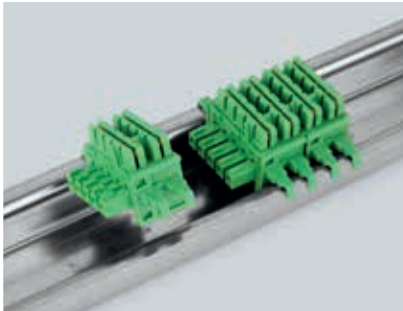
ISPAC ISOLATORS

SYSTEMATIC POINT-TO-POINT SOLUTION



Point-to-point connections with conventional isolators are a proven and easy-to-use solution. Isolator portfolio ISpac is characterised in particular by a quick and cost-saving installation. The new, slim 12 mm modules provide up to 30% more space.

ISpac isolators are perfectly suited for applications regarding functional safety. Evaluation according to SIL2 or SIL3 also includes devices with trip amplifier function. With a combination of isolators, HART multiplexers and transfer boards, HART signals are efficiently transmitted to asset management systems.



EASY AND QUICK INSTALLATION – PAC-BUS

Reduce wiring effort and expenditure by more than 20 % with the pac-Bus. Mounting, connection of the power supply and connection of the group error message in one step – combined with a unique robustness.



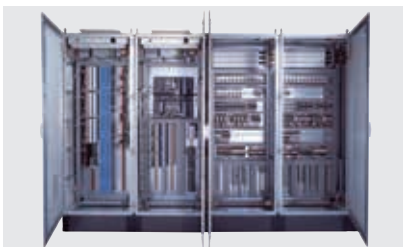
THE COMPLETE SPECTRUM IN A COMPACT DESIGN

Automation systems consist of a large variety of different field devices – each of which requires an appropriate isolator. ISpac covers this spectrum – with one-channel and two-channel modules. It is only 12 or 17.6 mm (0.47" or 0.7") wide.



PAC-CARRIER – RAPID INTEGRATION

The pac-Carriers reduce installation time for a large number of signals by more than 40 %. Wiring errors are impossible thanks to the use of a standardised connection cable. The robust pac-Carrier scores thanks to its wide range of tailored solutions.



COMPLETE SOLUTIONS – ISOLATORS AND MORE IN THE CABINET

You can benefit from our many years of experience in cabinet building! A high quality standard, on-time order processing and profound knowledge about explosion protection: these are our strengths.

IS1+ REMOTE I/O



Pharmaceutical industry: remote I/O with fieldbus

Combining the advantages of remote I/O with fieldbus technology. Integration of both technologies in customer-specific enclosure solutions.



Chemical industry: remote I/O in accordance with NEC 500

IS1+ is the only remote I/O which can be installed in Division 1 and which permits hot swap of all components.



LNG: remote I/O with ship approvals

IS1+ is one of the most effective solutions for use on ships in hazardous areas. Space savings and reduced weight create definite cost advantages.



Copyright Bergesen World Wide Gas

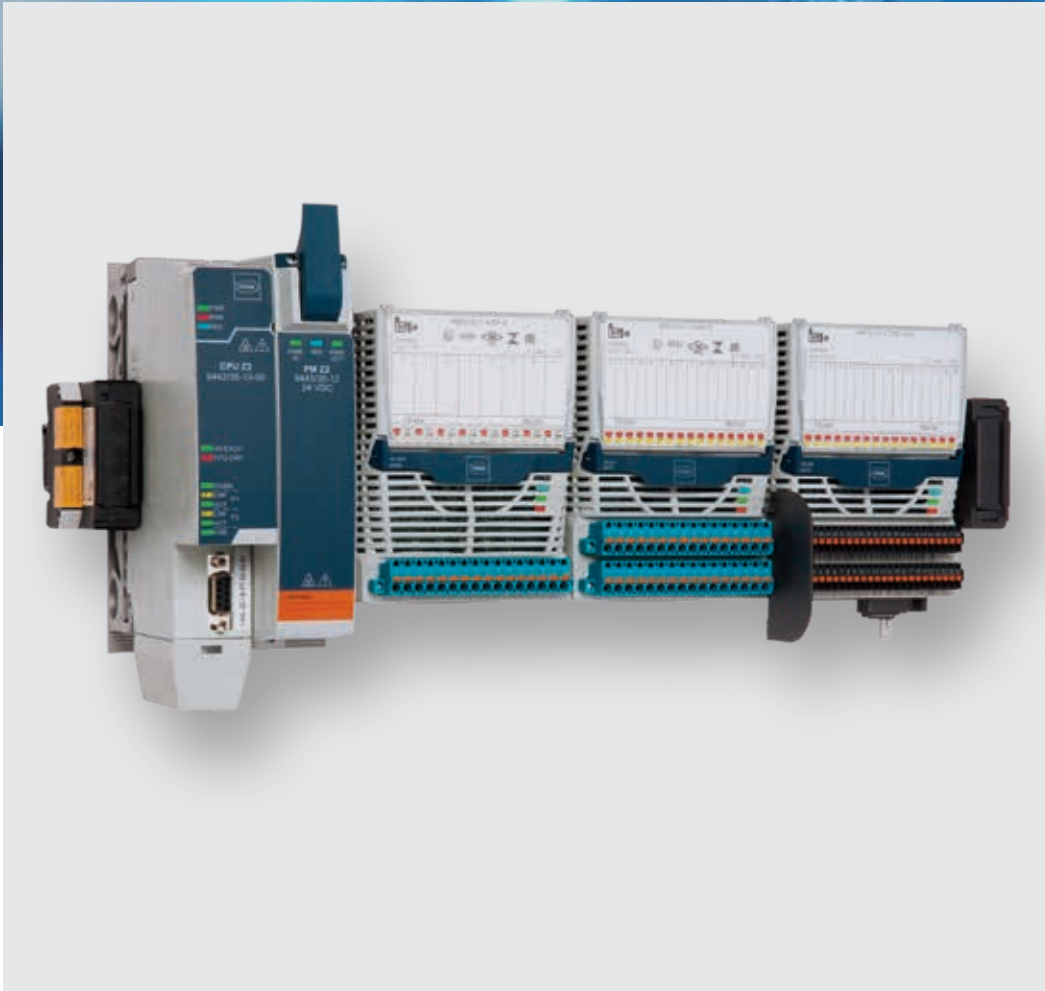
Offshore: remote I/O is the robust solution

IS1+ has proven itself for many years as a robust solution for offshore applications on platforms or FPSOs worldwide.



IS1+ REMOTE I/O

PLAYING A LEADING ROLE FOR HAZARDOUS AREAS



The intrinsically safe IS1+ sets the standard for hazardous areas. Without complex Ex d or Ex p enclosures, changes and extensions are possible at any point during operation.

IS1+ is the number-one remote I/O system used in Zone 1 and Zone 2 or Div. 1 and Div. 2 thanks to its international certificates for explosion protection and ship approvals.



MODBUS RTU
MODBUS TCP



EtherNet/IP™
conformance tested



HART™
COMMUNICATION PROTOCOL



EDDL™



r-stahl.com/en/IS1plus



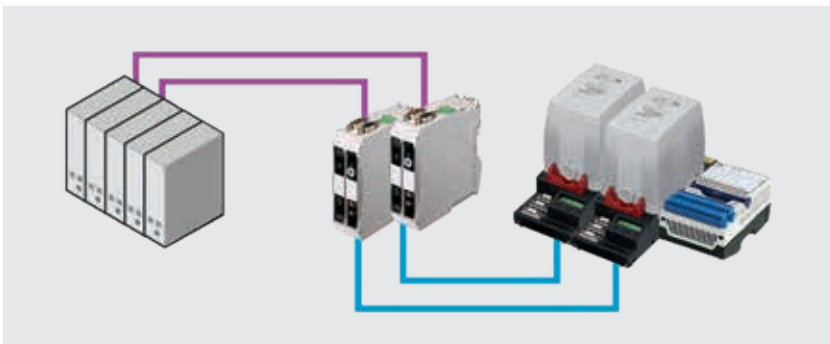
CONNECTIVITY

IS1+ is the first explosion-protected Remote I/O that supports Ethernet protocols as well as the traditional PROFIBUS DP. It is the most flexible solution for integration in different automation systems.



SPACE-SAVING INSTALLATION

Cost savings of up to 20 % are possible, thanks to the integration of solenoid valve islands or temperature transmitters in standard I/O modules.



HIGH AVAILABILITY

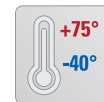
Integrated diagnostics and 'End of service life' warning as well as fully redundant systems ensure optimum system operation.

YOUR PLUS FACTOR: THE NEW IS1+ MODULES FOR I/O AND COMMUNICATION

For operating your applications even more efficiently



Multifunctional I/O modules and CPU assembly



Extended temperature range



Service life up to 15 years



Optimised for Zone 2 / Zone 1 or Div. 2 / Div. 1



Enhanced diagnostic functions



Additional status indications



100 % downward-compatible



Effective and cost-saving

ISBUS FIELD BUS TECHNOLOGY



Refinery: one of the largest fieldbus installations

Installation of thousands of ISbus field device couplers in Zone 2 and Zone 1 in customer-specific enclosures in an Indian plant.



Petrochemical industry: fieldbus and surge protection in Malaysia

Delivery by R. STAHL of a complete package which includes installation in a stainless steel enclosure with a subsequent system inspection to check the correctness of the installation and earthing system.



Gas exploration and water treatment

Selection by an Australian customer of the 12-channel ISbus Zone 2 device couplers due to their robust design and the sturdy field enclosures.



Copyright by APLNG

Chemical industry: PROFIBUS PA in the United States

Only ISbus power management and softstart made it possible to commission the segments with up to 20 field devices each within the requested project schedule.



ISBUS FIELDBUS TECHNOLOGY

INNOVATIVE SOLUTIONS FOR FF AND PA



ISbus stands for high-performance products for fieldbus installations with PROFIBUS PA and Foundation Fieldbus H1. Thanks to the use of the High Power Trunk concept and

our extensive spectrum of accessories, we offer the most effective installation solutions for Zone 1 and Zone 2 or Div. 2 on the market.



PROFIBUS

PROFIBUS

FDT TECHNOLOGY

EDDL™





FIELDBUS SUPPLY – MODULAR AND FLEXIBLE

ISbus offers a single or redundant power supply with DCS-specific bus-Carriers. The standard integrated physical layer diagnostics are unique to R. STAHL. Migration solutions for FF H1 on Modbus TCP or PROFIBUS PA on PROFINET are available.



EFFICIENT INSTALLATION WITH FIELD DEVICE COUPLERS

Couplers with up to 12 channels make planning, installation and expansion in Zone 1 and Zone 2 or Div. 2 easier thanks to their integrated power management. Integration of intrinsically safe (FISCO) and non-intrinsically safe devices is possible.



SCALABLE PHYSICAL LAYER DIAGNOSTICS

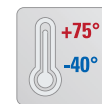
An integrated PC interface, smartphone app, alarm relay with traffic light LEDs and online access via FF H1 with DTM/EDD are available, depending on the specific requirements and project budget.

FIELDBUS INSTALLATIONS EVEN MORE EFFECTIVE WITH ISBUS:

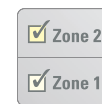
Scalable diagnostics and high-performance device couplers



Power management with softstart



Extended temperature range



Optimised for Zone 2 / Zone 1 or Div. 2



Reactive physical layer diagnostics



Proactive physical layer diagnostics



Online physical layer diagnostics



Trend monitoring



All devices tested and certified

NETWORK PRODUCTS



Oil & gas: WirelessHART gateway on offshore platforms

Customer-specific solution: WirelessHART gateway in combination with fibre optics media converter, splice box and Ethernet terminals suited for industrial applications.



Automotive industry: Painting systems with Remote I/O

Use of the IS1+ Remote I/O in a PROFINET network with fibre optics in Zone 1 or Division 1.
Use of special Ethernet switches with op is interfaces.



Photo: Eisenmann

Chemical industry: data transmission for mobile devices

Installation of a WLAN/WiFi network for transmitting maintenance information and data regarding the condition of the plant.



NETWORK PRODUCTS

THE POSSIBILITIES ARE ENDLESS

Ethernet and wireless technology are bound to play a decisive role in the implementation of Industry 4.0 / IIoT in the process industry. Its main applications are data transmission for mobile operating devices and integration and diagnostics of sensors and actuators.

R. STAHL offers products for installing Ethernet networks and WLAN and WirelessHART solutions in hazardous areas. We also consider ourselves your partner when it comes to making your network applications in hazardous areas a reality.



WirelessHART
Gateway +
Ethernet-Switch



WLAN ACCESS POINT A' LA CARTE

R. STAHL helps you integrate your chosen WLAN access point in hazardous areas in no time. Our design guarantees easy installation and maintenance.



FULL ANTENNA SELECTION

HFisolator makes the use of the complete range of industrial antennae in hazardous areas possible. Together with the wide range of Ex d or Ex p enclosures, a solution for any wireless technology can be found.



ETHERNET INSTALLATION FOR FIBRE OPTICS AND COPPER

The Ethernet terminal and splice box ensure fast installation of a wired Ethernet system. - a successful combination of explosion protection and easy handling.



FIBRE OPTICS IN ZONE 1

Media converters and switches ensure easy use of Ethernet in Zone 1. The optical FX ports use the „op is“ type of protection in accordance with EN 60079-28, utilizing the benefits of intrinsic safety for optical data transmission. State-of-the-art explosion protection for state-of-the-art plants.

EXP CONTROL PANELS



Pharmaceutical industry: filling and dosing systems

Fully automated pressurised systems with control electronics for equipment such as label printers. An inspection window enables status indication monitoring.



Machine-building: Ex p control panel in drive technology

Allows the easy use of use frequency converters and other industrial components in the hazardous area. Climate control included.



Chemical industry: displaying and operating

Standard industrial components such as computers or programmable logic controllers (PLCs) with screen are made explosion-protected thanks to pressurisation.



EX P CONTROL PANELS

PRESSURISATION FOR HAZARDOUS AREAS



WORLDWIDE USE GUARANTEED

We turn your industrial applications into explosion-protected control panels without affecting their functions. The tried-and-tested

and cost-efficient solution for all machine control systems and other electrical units.

Internationally recognised certificates such as ATEX, IEC and NEC guarantee worldwide use.





ATEX SOLUTIONS

Simple and safe in regard to assembly and application. Different standard components are available for small enclosures and large cabinets. Available supply voltage from 24 VDC up to 240 VAC.



NEC SOLUTIONS

Depending on the use and application range (Class I Div. 2 or Class I Div. 1), different system components are installed. Solutions for explosive dust atmospheres are also possible as well and available as a manually or automatically operating system.



STANDARD ENCLOSURES FOR EX P FROM STOCK

Our extensive spectrum of ex stock enclosures made from sheet steel, stainless steel and plastic/GRP make short delivery times and flexible solutions possible – with volumes between 1 litre and 20 cubic metres. Our modular systems simplify extensions and modifications.

REDUCTION OF RETROFITTING COSTS

No matter if performance-intensive control panels need to be cooled or if easy handling of industrial products is required – we will take care of it without the need for extensive retrofitting.

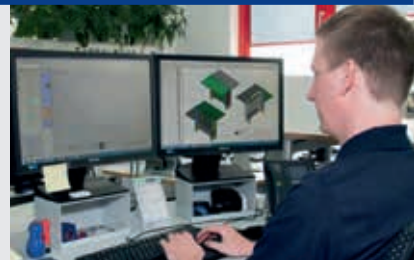
EXPERTISE FOR AUTOMATION SOLUTIONS IN HAZARDOUS AREAS

STATE-OF-THE-ART PRODUCTION RESOURCES
FOR EXECUTING LARGE-SCALE PROJECTS WITH SYSTEM SOLUTIONS



Engineering

Our experienced engineers cooperate with you to design the optimum and most effective solution for your application.



Production

From field enclosures to explosion-protected containers – our production team manufactures your solution reliably, quickly and with certified quality in accordance with ATEX, IECEx or NEC.



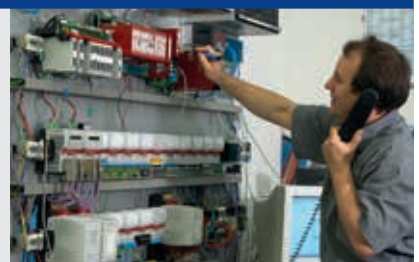
Factory acceptance test

Visit us in our spacious production area for the inspection and acceptance of your solutions. Our production team is immediately available for any change request.



Support

Our cooperation certainly does not end with the delivery of your system. Our support team is available during the initial on-site commissioning and over the entire operating life.



R. STAHL – YOUR COMPETENT PARTNER

FROM IDEA TO SMOOTH OPERATION





Handling of all dispatch details – all over the world

In-house or on-site training sessions for your personnel



Our goal: everything for your most effective plant



Support during on-site commissioning



Aftersales support for smooth operation



R. STAHL: YOUR GLOBAL PARTNER

FOR THE SAFETY OF YOUR EMPLOYEES AND YOUR GLOBAL PROJECTS

We are at your service around the globe: with seven production sites, subsidiaries in 23 countries and more than 50 agencies. Our international employees understand your needs and offer you R. STAHL quality – no matter where you need it.

Thanks to this global presence, we realise international joint projects that include customers, planners, installation companies and operators from various countries. And we take care of the needs of everyone involved in the project – right on-site. At the same time we ensure compliance with the various legal stipulations relevant for each project since we have international certifications and approvals available worldwide.



OUR PRODUCTION SITES :

R. STAHL

STAHL Headquarters
■ Production site

● Subsidiary
● Agency



Germany – Waldenburg

Germany – Weimar



Germany – Cologne

Netherlands

Norway

India

USA

R. STAHL: YOUR PARTNER FOR EXPLOSION PROTECTION

SYSTEMATIC PROTECTION – FOR SUSTAINABLE SOLUTIONS

With our products and systems we ensure the safety of people, machines and the environment in hazardous areas, and offer our clients customised solutions that are reliable and innovative.

Our technology is always state-of-the-art. You can be sure that you have selected a modern and sustainable solution. Trust our know-how, our extensive product and service portfolio, our system expertise, our high quality and our reliability when it comes to certification questions.



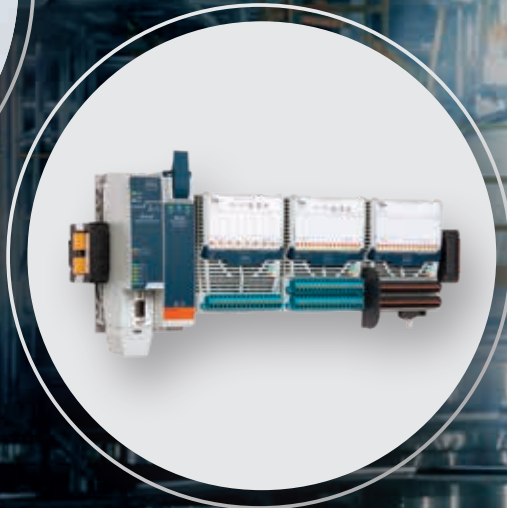


EXTENSIVE PRODUCT PORTFOLIO: OUR BUSINESS UNITS

**INSTALLATION
AND CONTROLS**



**LIGHTING AND
SIGNALLING**



AUTOMATION

V-2331



**OPERATING
AND MONITORING**



**SYSTEM AND
INTEGRATED
SOLUTIONS**

MARINE/OFFSHORE

V-2341

THE STRONGEST LINK.





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