WARNING - DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED

STAHL

PWR
ERR
M/S

CPU Z2
9442/35-10-00

PWR IN   M/S   PWR OUT

PM Z2
9445/35-12
24 VDC

AS EXCH
CFG ERR

RS485
LNK
ACT
LNK
ACT
USB

IS1+
Installation Zone 1 / Div. 1

9470/32-16-11 DIOM 16

/IECEx

Ta = -40°C ... +75°C

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

FB Addr

THE STRONGEST LINK.   **STAHL**

IS1+ THE REMOTE I/O
Expect the best for all hazardous areas

18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

LEADING THE WAY FOR 30 YEARS

For 30 years, explosion-protected remote I/O systems from R. STAHL have been used for a wide range of process automation applications in Zone 1 and 2 as well as in Division 1 and 2. It is here that they have proven to be the most cost-effective solution with regards to procurement and installation (CAPEX) as well as during operation (OPEX). Thanks to their large range of functions and unique flexibility, remote I/O solutions from R. STAHL are suitable for virtually all tasks relating to process technology.

- Savings in field wiring and associated project engineering.
- No need to take up space in the control room with switching and distribution cabinets.
- Extensive functions for simplifying commissioning and troubleshooting.
- Integrated diagnostics provide an early warning of failures and avoid system downtimes.
- Fully compatible with conventional and HART-enabled field devices.

CONVENTIONAL INSTALLATION

REMOTE I/O

CONTROL ROOM

CONTROL ROOM

SAFE AREA

HAZARDOUS AREA
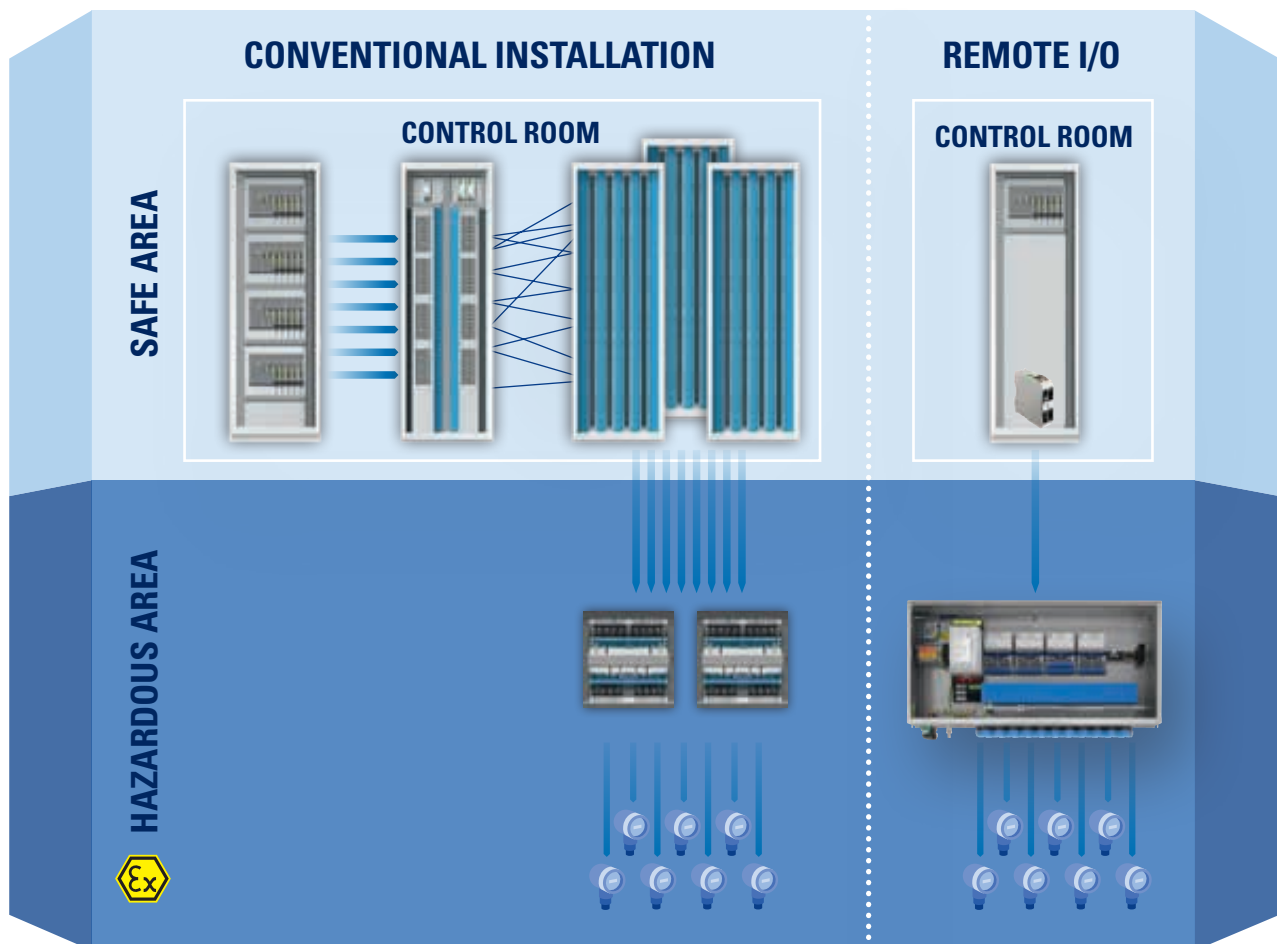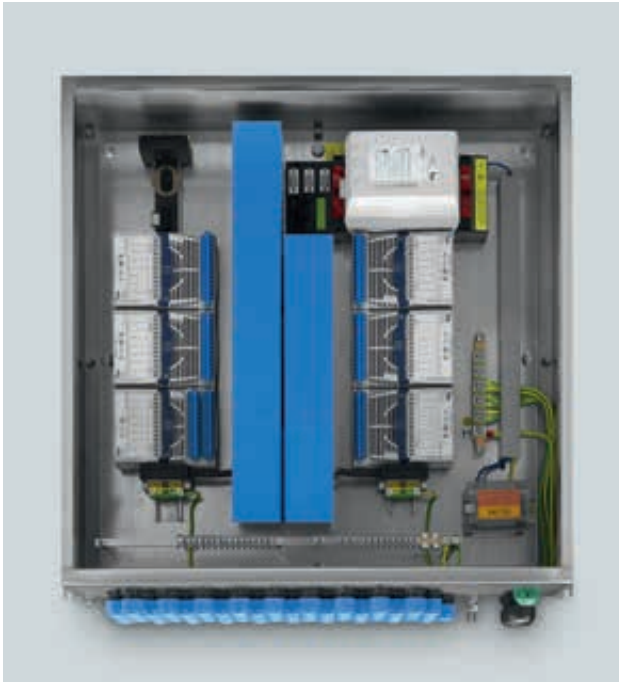
SIMPLY THE BEST REMOTE I/O

With the intrinsically safe IS1+ Remote I/O, R. STAHL has set standards on which the market has been based up to the present day.

- Extension, modification, maintenance – in ongoing operation in Zone 1 and 2 or Division 1 and 2.
- Hot-swappable for all modules and fieldbus interface connections in Zone 1 and 2 or Division 1 and 2.
- Extensive protocol support: PROFIBUS DP, Modbus TCP + RTU, PROFINET, EtherNet/IP.
- Extended temperature range -40 °C to +75 °C.
- Use of cost-effective Ex e GRP or stainless steel field enclosures – no Ex d or Ex p solutions required. Division 1 only requires a NEMA 4X enclosure.
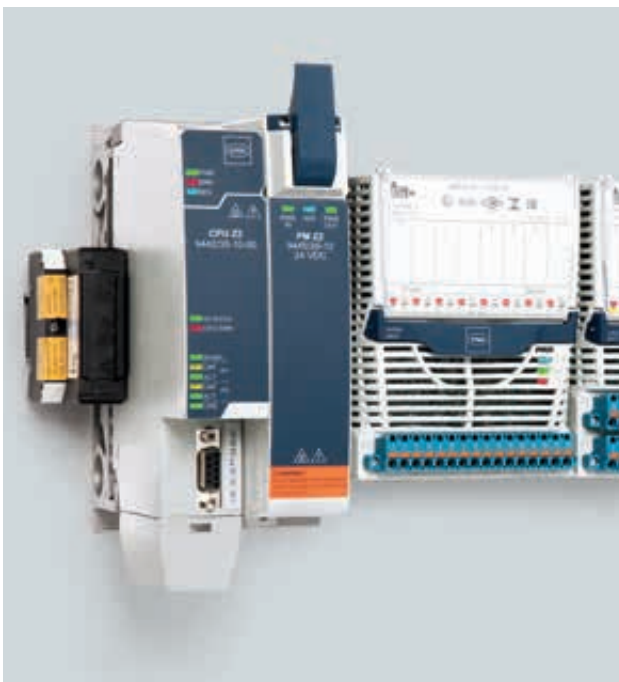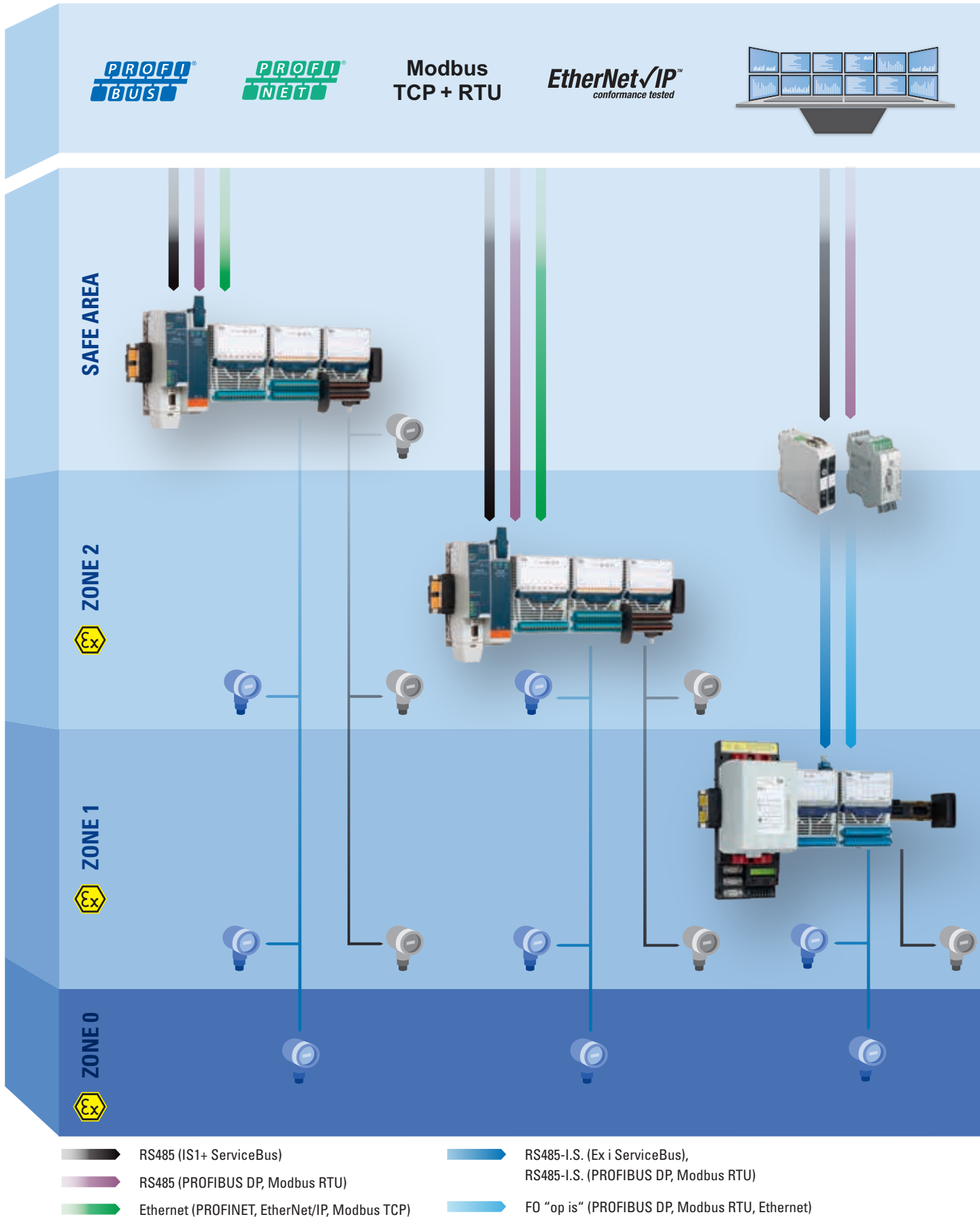
GOOD CAN ALWAYS BE BETTER

Continuous optimisations and extensions mean increasingly effective applications:

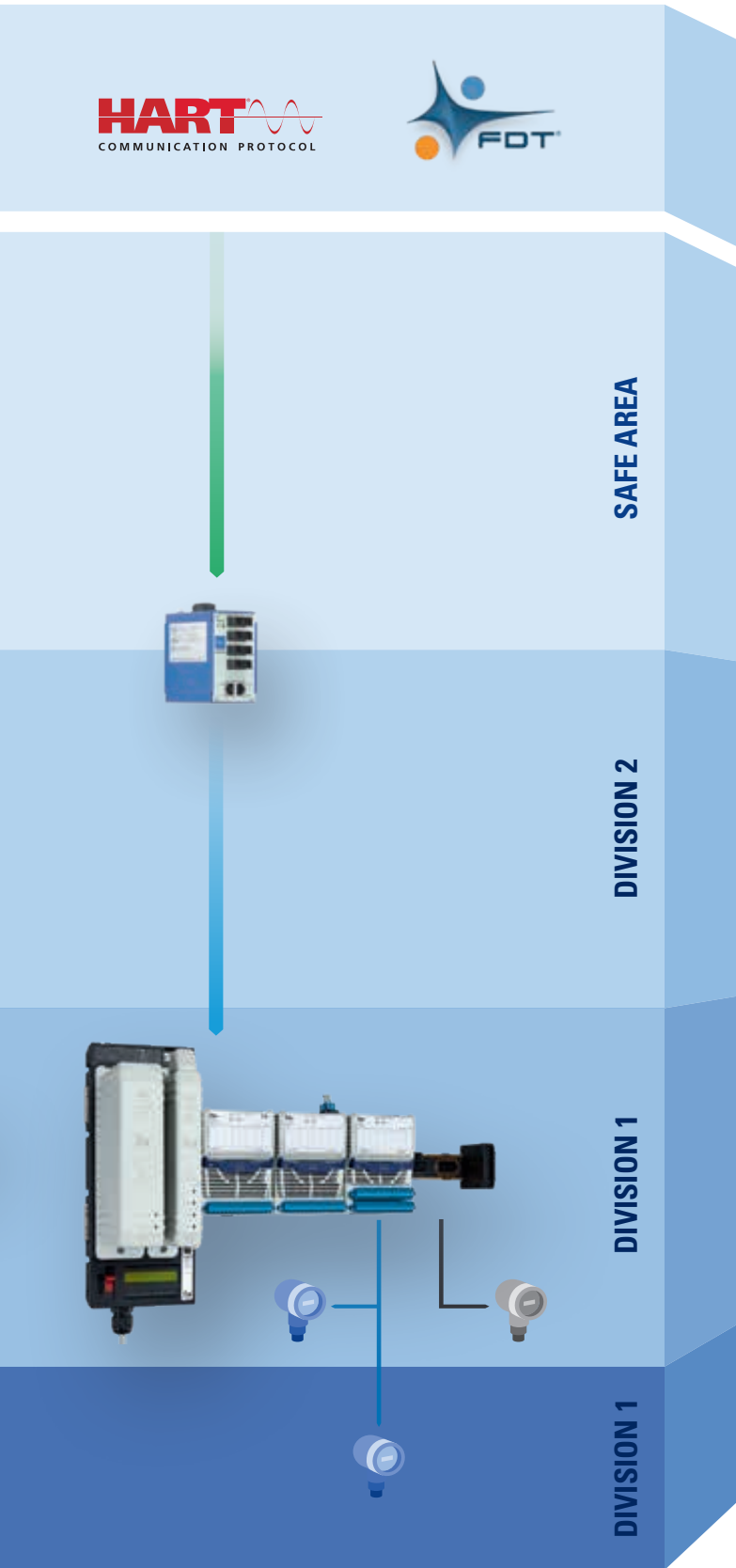- Mixture of I/O modules for Ex i and non-Ex i signals.
- 8-channel Zone 1 and Division 1 modules with pneumatics and for Ex d valves.
- Multifunctional I/O modules for input/output signals.
- Zone 2 and Division 2 multiprotocol CPU, protocol adjustable by the user.
- Innovative proactive diagnostics provide an early warning of failures by means of a blue LED and alert telegrams as per NAMUR NE107.

INNOVATIONS IN DETAIL

PROFIBUS **PROFINET** Modbus TCP + RTU EtherNet/IP conformance tested

SAFE AREA

ZONE 2

ZONE 1

ZONE 0

RS485 (IS1+ ServiceBus)

RS485 (PROFIBUS DP, Modbus RTU)

Ethernet (PROFINET, EtherNet/IP, Modbus TCP)

RS485-I.S. (Ex i ServiceBus), RS485-I.S. (PROFIBUS DP, Modbus RTU)

FO "op is" (PROFIBUS DP, Modbus RTU, Ethernet)

SAFE AREA

DIVISION 2

DIVISION 1

DIVISION 1

Ex i analogue/digital field signals

Non-Ex i analogue/digital field signals

Fieldbus isolating repeater Ex i
PROFIBUS DP, Modbus RTU.

Fibre optic isolating repeater "op is"
PROFIBUS DP, Modbus RTU.

Switch 4 FX/2 TX "op is"
fibre optic.

Zone 2 CPU and Power Module
PROFIBUS DP, PROFINET, Modbus
TCP, EtherNet/IP.

Zone 2 I/O modules for
Ex i field devices.

Zone 2 I/O modules for
non-Ex i field devices.

Zone 1 CPU and Power Module
PROFIBUS DP, Modbus RTU.

Zone 1 CPU and Power Module
PROFIBUS DP, PROFINET, Modbus
TCP, EtherNet/IP.

Zone 1 I/O modules for
Ex i field devices.

Zone 1 I/O modules for
non-Ex i field devices
(pneumatics, relay).

YOUR BENEFITS AT A GLANCE

IS1+ SUPPORTS PROFIBUS DP, PROFINET, MODBUS TCP/RTU AND ETHERNET/IP.

Flexible and easy to use in virtually any automation system.

ATEX   **IECEx**   **cFMus**   **EAC**

IS1+ BASED ON GLOBAL STANDARDS.

Can be combined with other products and technologies regardless of the manufacturer and process control system.

IS1+ FACILITATES INSTALLATION AND MAINTENANCE.

By effectively combining types of protection, there is no need for the "d" and "p" enclosure – all components in Zone 1 and 2 or Division 1 and 2 are hot-swappable.
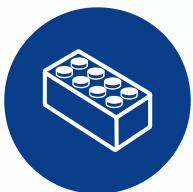
IS1+ IS EASY TO PLAN AND QUICK TO INSTALL.

System design without special planning tools, three components are sufficient: CPU and Power Module, BusRail, I/O modules.

IS1+ IS UNIQUELY ROBUST AND DURABLE.

Specially developed and built for harsh field use in hazardous areas – typical service life of 15 years or longer.

INMETRO   PESO   KTL

IS1+ IS INNOVATION WITH 30 YEARS OF EXPERIENCE.
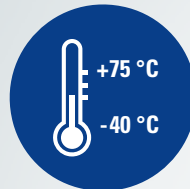
IS1+ is our third generation of remote I/O. Our experienced system specialists mean that we can find solutions for virtually all requirements.

IS1+ IS DESIGNED AND MANUFACTURED FOR EXTREME ENVIRONMENTS.

+75 °C
-40 °C

Can be used both horizontally and vertically for temperatures from -40 °C to +75 °C. Also perfect for use on offshore platforms and LNG tankers.

IS1+ IS CONTINUOUSLY BEING EXTENDED AND OPTIMISED.

As a result of our continuous further development, the system is becoming increasingly diverse – but is always downward compatible.

IS1+ INCREASES THE AVAILABILITY OF YOUR SYSTEMS.

Redundancy and intelligent diagnostics ensure safe operation and predictive maintenance.

IS1+ OFFERS SIGNIFICANT COST SAVINGS COMPARED WITH OTHER SOLUTIONS.

Multifunctionality and new functions mean savings of up to 50% compared to conventional installations.

REMOTE I/O IS1+ IN DETAIL

PROFI BUS®

PROFI NET®

Modbus TCP + RTU

EtherNet/IP™ conformance tested

24 V DC or 120/230 V AC *
Power supply for Ex i supply of 8 Zone 1 or 16 Zone 2 modules.

* for Zone 1 PROFIBUS DP and Modbus RTU.

Increased availability
with CPU, Power Module or system redundancy and ring structures.

Free fieldbus selection
via rotary switch ** and multiprotocol CPU.**

** For new Zone 2 CPU.

Plant asset management
and engineering via ServiceBus or process bus.

Intrinsically safe fieldbus
via copper cable or inherently safe "op is" with fibre optic.

IS1+
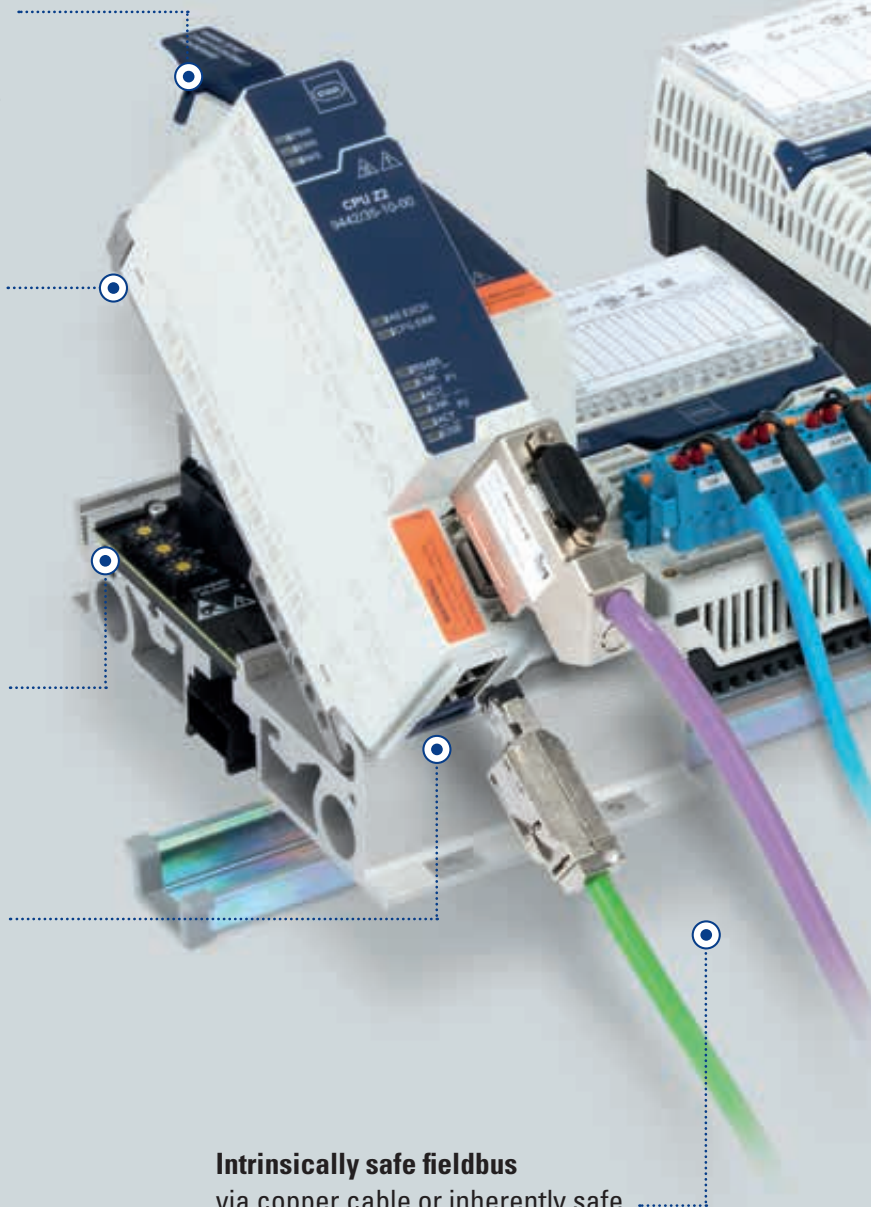
HART COMMUNICATION PROTOCOL

FDT

4-, 8- and 16-channel modules
for Ex i and non-Ex i signals, digital outputs with SIL2.

Extensive integrated diagnostics
for signal errors or maintenance requirements with LED indicators and alarms.

Ex i and non-Ex i signals
can be mixed on the BusRail and are hot-swappable in Zone 1 and 2 or Division 1 and 2.

Robust BusRail installation
with internal Ex i system bus for power supply and data transmission.

Detachable terminals
for field signals in screw-type and spring terminals, with lock.
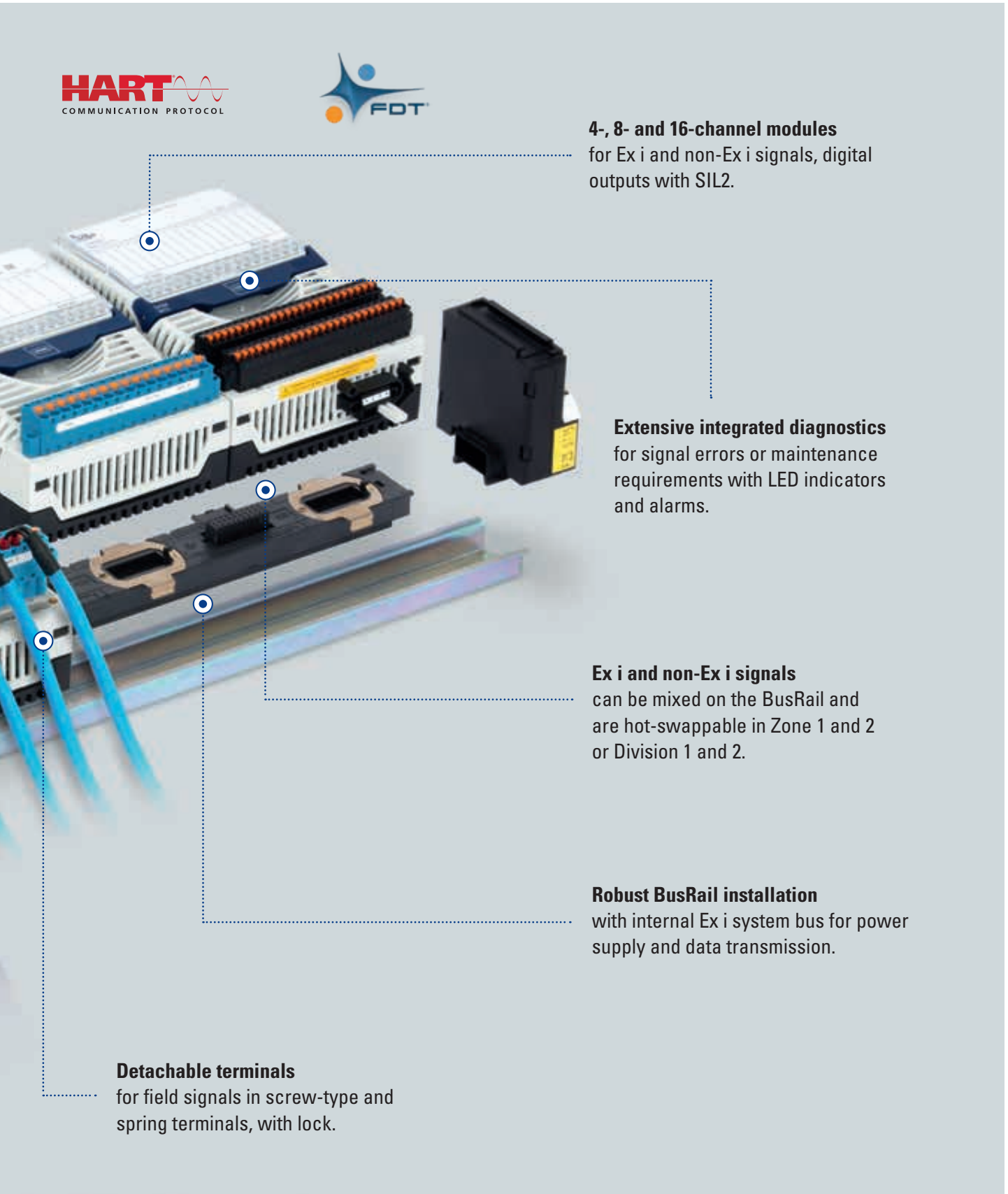
THE MULTIFUNCTIONAL I/O LEVEL

Signal/error status LED per channel.

Downward compatible with previous models.

Extensive diagnostics, maintenance requirements display with blue LED.

Multifunctional input/output, adjustable parameters.

Communications modules for Zone 1 and Zone 2 or Division 1 and 2

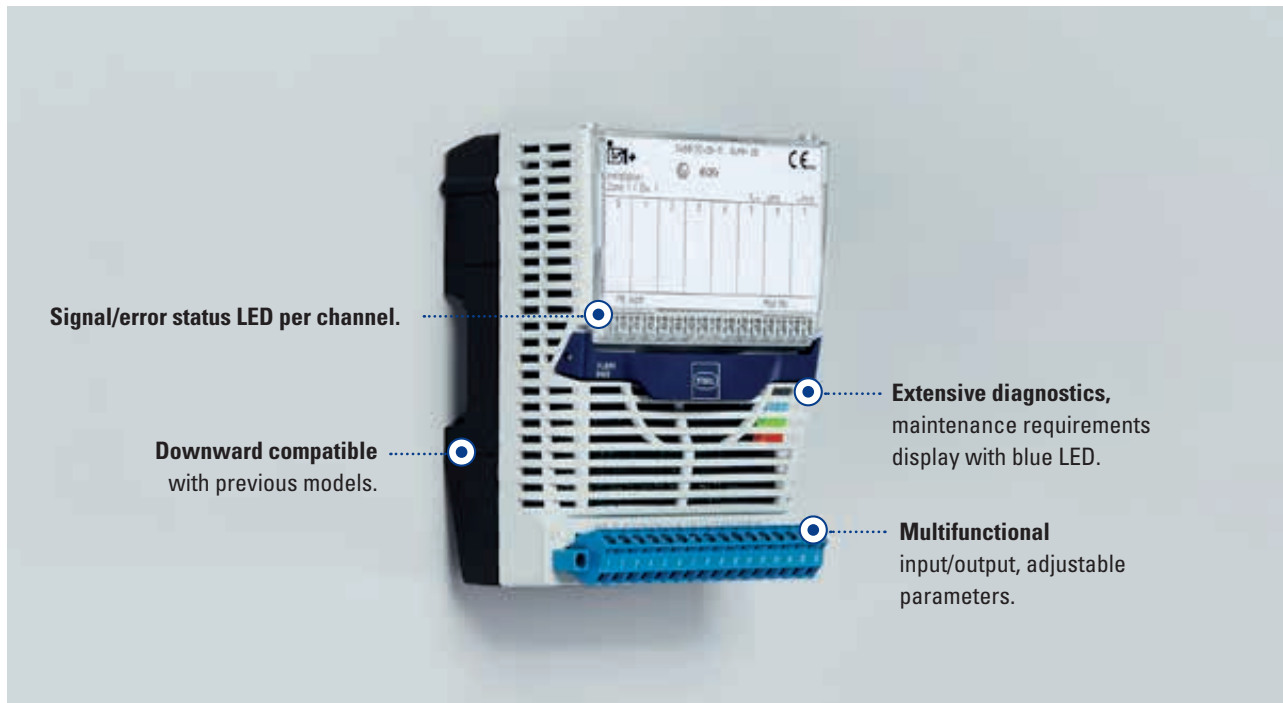| Protocols	Installation	Max. no. of I/O modules	Power supply		Type series
PROFIBUS DP or Modbus RTU	Zone 1 / Div. 1	8	24 V DC	120/230 V AC	9440/22
Modbus TCP or EtherNet/IP or PROFINET	Zone 1 / Div. 1	8	24 V DC		9441/12
PROFIBUS DP, PROFINET, EtherNet/IP and Modbus TCP	Zone 2 / Div. 2	16	24 V DC		9442/35

Zone 2 and Division 2 I/O modules, Ex i signals

Function	Channels	Application	Type series
Analogue Universal Module HART	8	Analogue inputs/outputs: 0/4 … 20 mA with HART	9468/33-08-10
Temperature Input Module	8	Resistance thermometers (2-, 3-,4-wire), THCs and potentiometers, joysticks	9482/33-08-10
Digital Input Output Module	16	Digital inputs/outputs: Contacts, proximity switches and low-power solenoid valves	9470/33-16-10
Digital Output Module	8	Solenoid valves 12.6 V/30 mA	9475/33-08-50
Digital Output Module	8	Solenoid valves 17.5 V/30 mA	9475/33-08-60

Zone 2 and Division 2 I/O modules, other signals

Function	Channels	Application	Type series
Universal Module HART	8	Analogue and digital Ex nA/ec inputs/outputs: 0/4 … 20 mA with HART, pnp contacts, digital output 24 V/0.5 A; SIL2 output shutdown	9469/35-08-12
Digital Input Output Module NAMUR	16	Digital Ex nA/ec inputs/outputs: Contacts, (pnp) proximity switches, low-power solenoid valves	9471/35-16-11
Digital Output Module 24 V	16	Digital Ex nA/ec inputs/outputs: Contacts, (pnp) proximity switches, 24 V/0.5 A solenoid valves; SIL2 output shutdown	9472/35-16-12
Digital Output Module Relais	8	Integrated Ex nA/ec NO for loads up to 250 V AC/2 A	9477/15-08-12

Separate shutdown input
Shuts down all digital outputs –
suitable for SIL2.

Special functions
e.g., integrated solenoid
valves in Zone 1 and
Division 1.

Modules with Ex i and non-Ex i signals
can be mixed in the system.
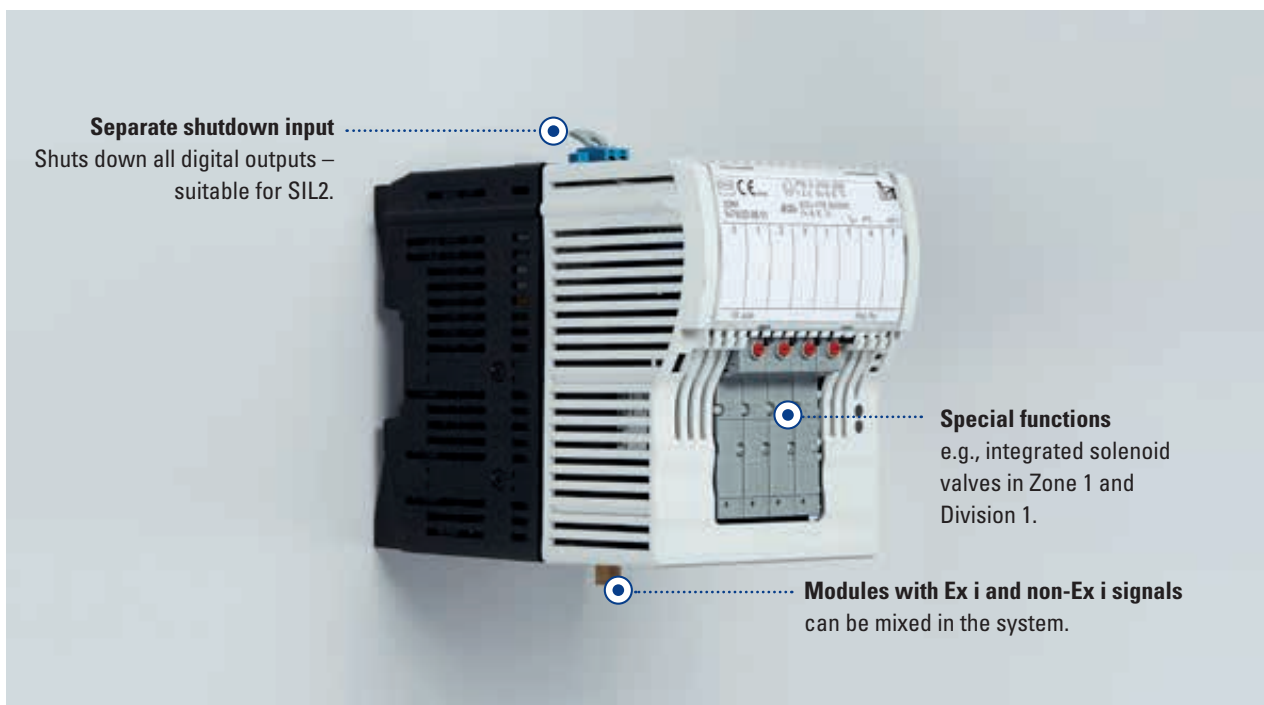
Zone 1 and Division 1 I/O modules, Ex i signals

Function	Channels	Application	Type series
Analogue Universal Module HART	8	Analogue inputs/outputs: 0/4 … 20 mA with HART	9468/32-08-11
Temperature Input Module	8	Resistance thermometers (2-, 3-, 4-wire), THCs and potentiometers, joysticks	9482/32-08-11
Digital Input Output Module	16	Digital inputs/outputs: Contacts, proximity switches and low-power solenoid valves	9470/32-16-11
Digital Output Module	4	Solenoid valves 11.3 V/40 mA; SIL2 output shutdown	9475/32-04-12
Digital Output Module	4	Solenoid valves 12.3 V/75 mA; SIL2 output shutdown	9475/32-04-22
Digital Output Module	4	Hydraulic valves 12.3 V / 75 mA; Output shutdown SIL2	9475/32-04-72
Digital Output Module	8	Solenoid valves 12.6 V/30 mA; SIL2 output shutdown	9475/32-08-52
Digital Output Module	8	Solenoid valves 17.5 V/20 mA; SIL2 output shutdown	9475/32-08-62

Zone 1 and Division 1 I/O modules, non-Ex i / pneumatic signals

Function	Channels	Application	Type series
Digital Output Module Valve	8	Pneumatic control of valves via 3/2-way solenoid valves with 2.5 … 7 bar; SIL2 output shutdown	9478/22-08-51
Digital Output Module Relais	6	Integrated relay contacts for loads up to 250 V AC/2 A	9477/12-06-12
Digital Output Module Relais	8	Integrated relay contacts for loads up to 60 V AC/2 A	9477/12-08-12

THE STANDARD
FOR ZONE 1 AND 2 OR DIVISION 2

**STANDARD ENCLOSURES FOR IS1+
– DELIVERY TIMES APPROX. 3 WEEKS.**

IS1+ Remote I/O offers great flexibility for a wide range of intended purposes. We have designed a series of STANDARD field enclosures based on many years of experience with customer-specific system solutions. These field enclosures are available from stock with short delivery times and already meet most requirements in the standard version. For even greater flexibility, in the STANDARD+ version, we provide the option of performing adaptations and modifications in a very short time period.

- Preconfigured field enclosures for installation in Zone 1 or Zone 2 and Division 2.
- Prepared for installation of IS1+ for up to 120 analogue or 240 digital signals.
- Version according to EN 61439, no additional acceptances or certificates required.
- Various options available, e.g., heating, inspection window, fibre optic.

User-friendly:
Front doors with cover support and cam locks, rating label.

Equipped and wired:
BusRail, base (Zone1), cable ducts (Zone 1), connection terminals.

Ready for installation:
Stainless steel enclosure 1.4301, cable runs, breathers.

Exemplary enclosure for Zone 1
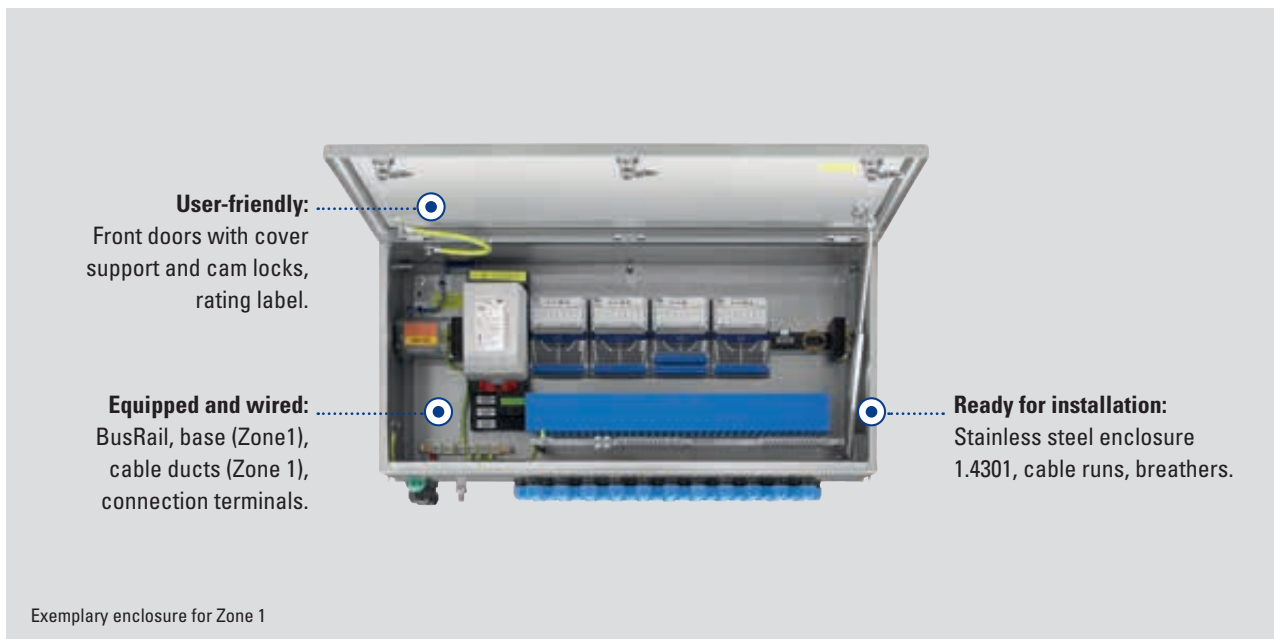
Field enclosures for Zone 1 and Zone 2 or Division 2

Zone 2 enclosures (similar to representation for Zone 1 – see above)					
Max. signals Zone 1	40 analogue / 80 digital	64 analogue / 128 digital	56 analogue / 112 digital	64 analogue / 128 digital	112 analogue / 224 digital
Max. signals Zone 2	40 analogue / 80 digital	72 analogue / 144 digital	56 analogue / 112 digital	88 analogue / 176 digital	120 analogue / 240 digital
Enclosure sizes	360 x 750 x 230 mm	360 x 1300 x 230 mm	600 x 600 x 230 mm	760 x 760 x 300 mm	800 x 1000 x 300 mm

YOUR SYSTEM SOLUTIONS

FIELD STATION WITH IS1+ ETHERNET AND INTEGRATED SOLENOID VALVE ISLAND

- Installation possible in Zone 1 or Zone 2 and Division 1 or Division 2.

- Control of processes with intrinsically safe and pneumatic signals.

- IS1+ Zone 1 solenoid valve module 9478 for shortening distances when using pneumatics.

- Options for communication via EtherNet/IP, Modbus TCP or PROFINET.

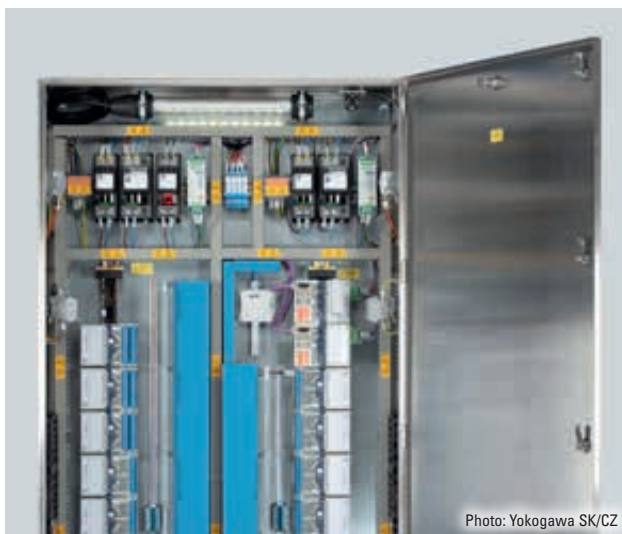- Interference-free fibre optic transmission up to Zone 1 and Division 1.

Photo: Yokogawa SK/CZ

HIGHLY AVAILABLE FIELD STATION FOR ZONE 2 OUTDOOR INSTALLATION IN A REFINERY

- Fully redundant system design with redundant PROFIBUS DP, redundant CPM assembly, redundant power supply and redundant heating.

- Integrated remote monitoring via temperature sensor and humidity sensor.

- Installed surge protection for the fieldbus cable and moulded case circuit breakers for all power supply circuits.

- Stainless steel field enclosures with LED lighting controlled via door contact and metal cable entries for armoured cables.

- Very easy retrofitting for Zone 1 field station by installing Zone 1 CPM assemblies with 230 V AC.

COMPACT REMOTE I/O SOLUTION FOR INSTALLATION ON OFFSHORE PLATFORMS AND LNG TANKERS

- Ready for connection for Zone 1 with ATEX, IECEx and shipbuilding approvals.

- Compact cabinet design with double doors to save space when opening.

- Various sizes for up to 150 analogue or 300 digital signals.

- Optimised internal structure for special EMC requirements.

- Additional Ex i operating and display elements integrated in the front doors and operated via IS1+.

IS1+ ALWAYS THE RIGHT SOLUTION FOR ANY SITUATION

Selection of previously implemented couplings

		PROFI BUS	Modbus RTU	PROFI NET	Modbus TCP	EtherNet/IP conformance tested
Emerson	DeltaV	✔	✔	✔	✔	✔
Yokogawa	Centum CS	✔	✔			
	Centum VP	✔	✔		✔	
Honeywell	Experion C200	✔				
	Experion C300	✔	✔			
Siemens	S7 / PCS7	✔	✔	✔		
Azbil	Harmonas DEO	✔	✔			
ABB	Sattline	✔				
	Freelance	✔				
	Symphony	✔				
	800xA	✔		✔		
Kongsberg Maritime	K-Chief 700	✔	✔			
Schneider Electric	M580				✔	✔
	M340		✔		✔	✔
	EVO	✔				
Mitsubishi	MELSEC-Q	✔			✔	
Rockwell	SLC500	✔				
	ControlLogic	✔			✔	✔

Incl. connection to common plant asset management systems, e.g., AMS, FDM, FieldCare, FieldMate, PACTware, PDM, PRM, etc.

Photo: Eisenmann

PAINTING FACTORY IN ACCORDANCE WITH NEC
IS1+ in Division 1 with communication via PROFINET and explosion-protected "op is" fibre optic.

IS1+ FOR USE ON FPSO
Typical installation on a floating conveyor system, located near Rio de Janeiro.

ETHERNET AND REMOTE I/O
One of the world's first installations with Ethernet in Zone 1 and redundancy is in Germany.

REMOTE I/O AT HIGH TEMPERATURES
IS1+ can be used without active cooling thanks to the extended temperature range from -40 °C to +75 °C.

REMOTE I/O FOR USE ON LNG TANKERS
IS1+ is a highly space-saving and lightweight solution which is certified in accordance with most shipping standards.
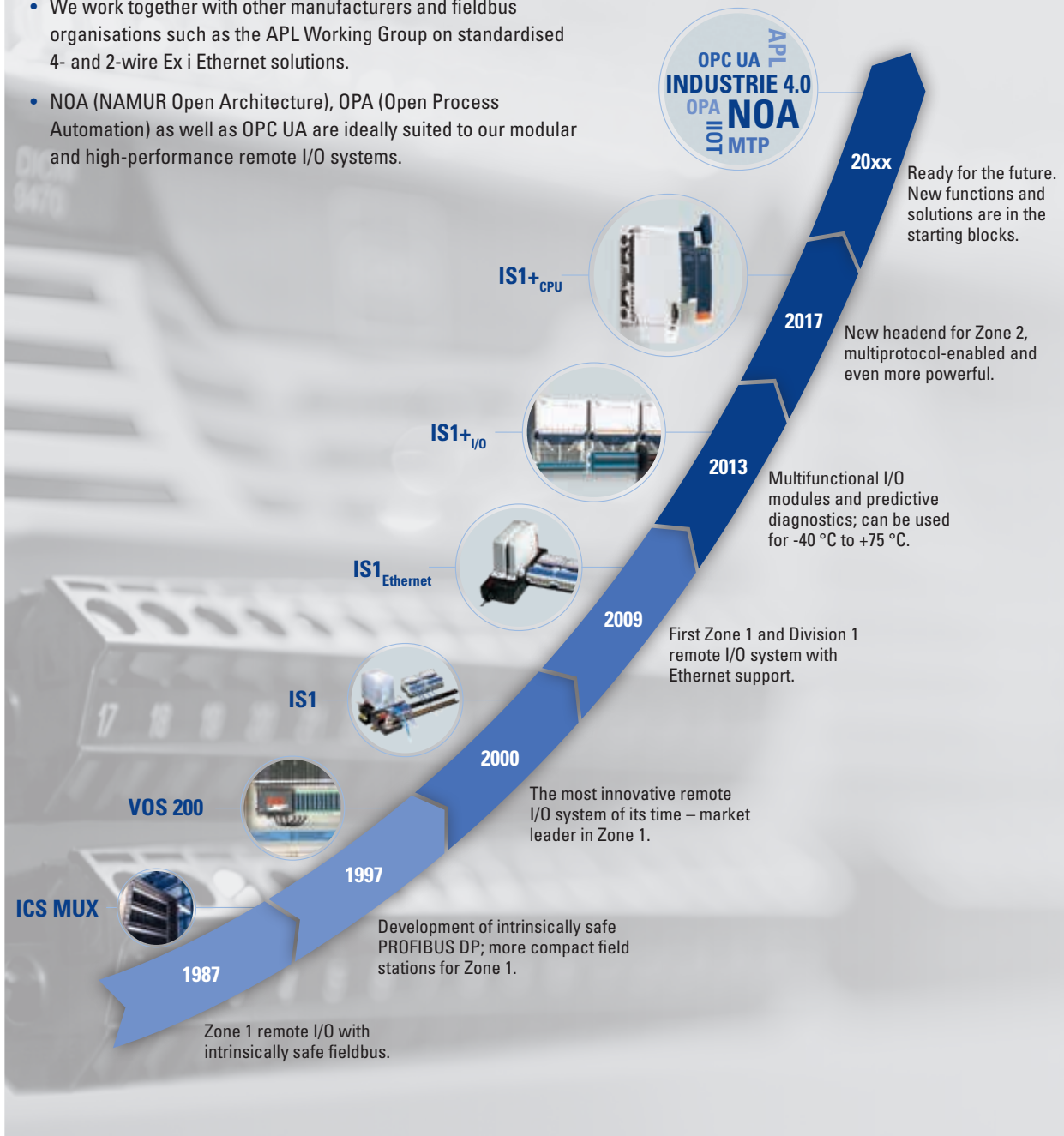

REMOTE I/O AND FIELDBUS
In a pharma plant in India, signals are transmitted both via remote I/O and PROFIBUS DP as well as via fieldbus couplers and FF H1.

THE EVOLUTION OF REMOTE I/O

Nothing is more resistant than change – this still applies today and, in particular, to process automation. Remote I/O is playing an important role in this:

- Ethernet is becoming increasingly established for communication in the field – with IS1+, solutions for Zone 1 with optical interface are already available.

- We work together with other manufacturers and fieldbus organisations such as the APL Working Group on standardised 4- and 2-wire Ex i Ethernet solutions.

- NOA (NAMUR Open Architecture), OPA (Open Process Automation) as well as OPC UA are ideally suited to our modular and high-performance remote I/O systems.

OPC UA
APL
INDUSTRIE 4.0
OPA NOA
IIOT MTP

20xx
Ready for the future. New functions and solutions are in the starting blocks.

IS1+_{CPU}

2017
New headend for Zone 2, multiprotocol-enabled and even more powerful.

IS1+_{I/O}

2013
Multifunctional I/O modules and predictive diagnostics; can be used for -40 °C to +75 °C.

IS1_{Ethernet}

2009
First Zone 1 and Division 1 remote I/O system with Ethernet support.

IS1

2000
The most innovative remote I/O system of its time – market leader in Zone 1.

VOS 200

1997
Development of intrinsically safe PROFIBUS DP; more compact field stations for Zone 1.

ICS MUX

1987
Zone 1 remote I/O with intrinsically safe fieldbus.