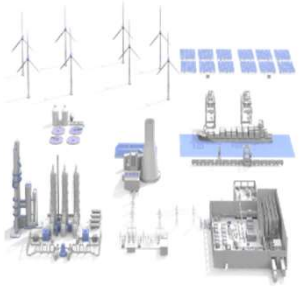
Communication Interfaces – Overview 2021

Products



Application references

NearFi Technology
Designed by Phoenix Contact

PROFIBUS

TRUSTED WIRELESS

Technologies

PoE

HART

5G

"PAVE THE WAY FOR FUTURE BUSINESS"
by addressing relevant trends

SPE & APL

5G

TSN

OPC UA

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INSPIRING INNOVATIONS

Fieldbus Communication 1

Converter
Isolator

Repeater
Segment
Coupler

Fast
connectors
(SUBCON)

Fiber optic
converter

Modular hub

Extender
Serial/Profibus

Protocol
converter

Radioline
Multipoint-
Multiplexer

Terminator
resistor

Fieldbus
Communication 2

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Fieldbus Communication 2

Serial Device Server / Gateways

Foundation fieldbus Power

Fieldbus Device Coupler Zone 2

Fieldbus Device Coupler Zone 2

Fieldbus Device Coupler Zone 1

Fieldbus Device Terminal box

Profibus DP/PA Converter

Profibus PA I/O Multiplexer

Ethernet HART Multiplexer

Fieldbus Communication 1

Ethernet Infrastructure

Technologies

HART Technology

FOUNDATION

PoE Power over Ethernet

Remote

PROFIBUS

new

NearFi Technology
Designed by Phoenix Contact

TRUSTED WIRELESS

5G

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What is Fieldbus?

- **Fieldbus interconnects “field” equipment such as sensors, actuators and I/O to a control system on a single pair of wires**
- **Fieldbus Systems – IEC 61158-2 Specification**
  - Fieldbus is an all-digital, serial, two-way communication system with a data rate of 31.25 kbit/s
    - Profibus PA & Foundation Fieldbus
    - Manchester II coding

Fieldbus Protocols

- **Foundation Fieldbus and Profibus PA are physically identical**
  - Twisted pair cables
  - Balanced power conditioning
  - Device Couplers
  - 2 terminators required
  - 9 – 32 Vdc
  - 1900 Meter total segment length (120 meter spur length maximum)

Primary Differences

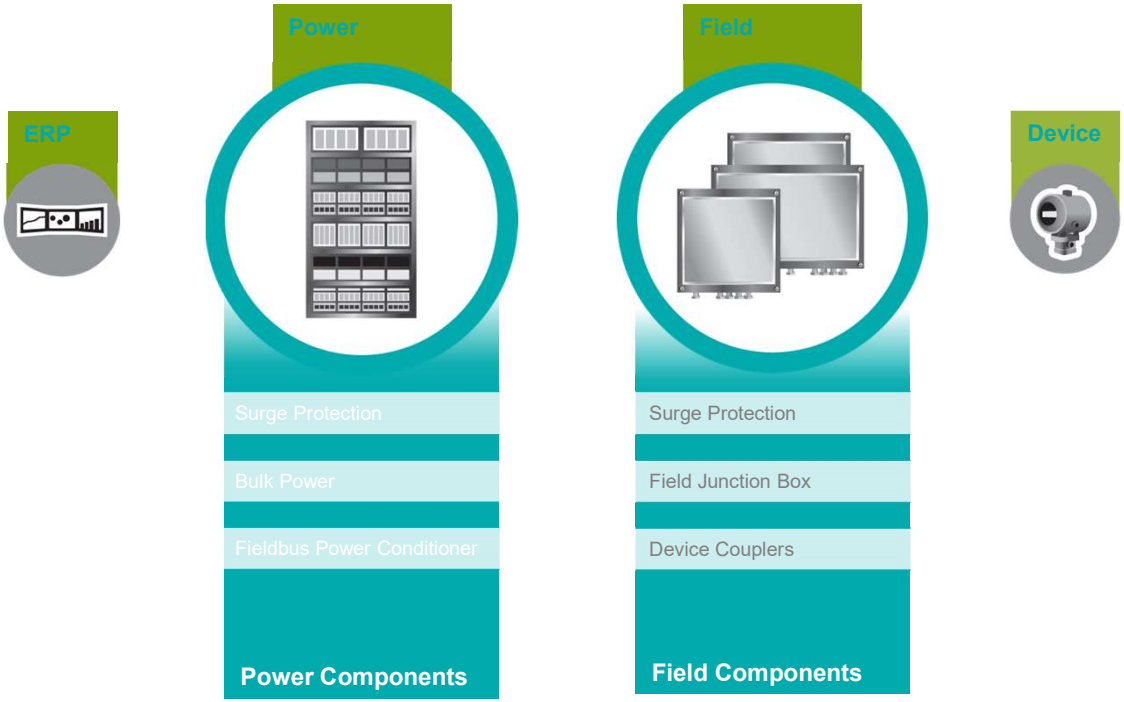
Profibus PA

- Polling – Master/Slave
- Bus Master
- Addressing instruments individually
- Device only communicates w/ master
- Communication loss – fail safe

Foundation Fieldbus

- Cyclic transmission – Publisher/Subscriber
- Link Active Scheduler (LAS)
- FF Devices automatically present on bus
- Peer to Peer communication possible
- Communication loss – backup LAS

Fieldbus Segment Components Overview



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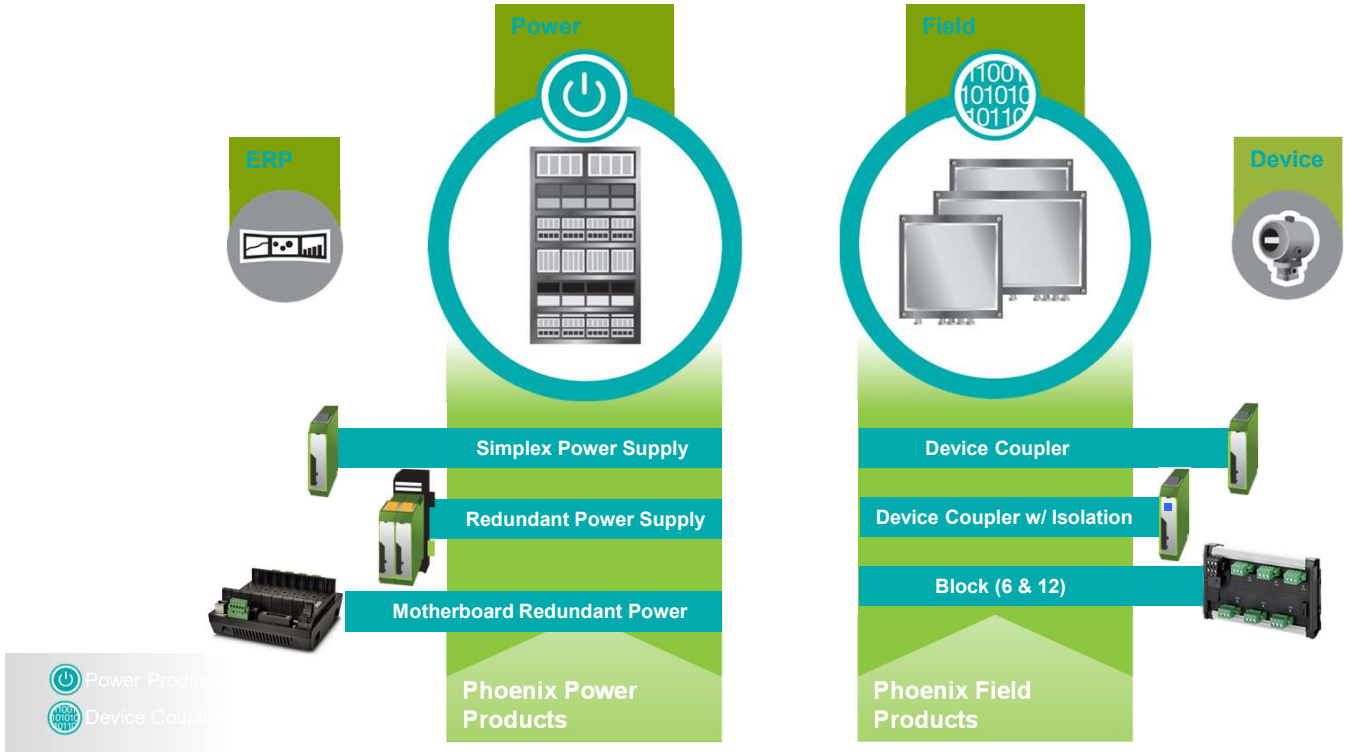
Phoenix Contact Fieldbus Components Overview



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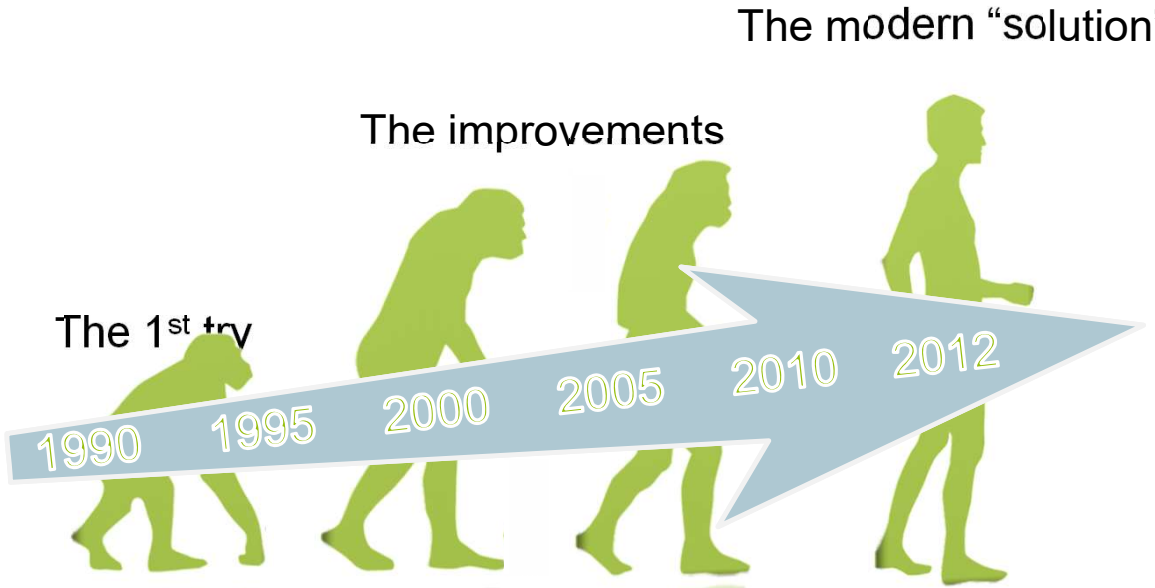
Evolution in fieldbus Infrastructure

Excurse through Automation History

- 4…20 mA loops from the 60th to today
- Fieldbus in Process Automation



Evolution of digital communication…

…to nowadays scalable and highly reliable solutions

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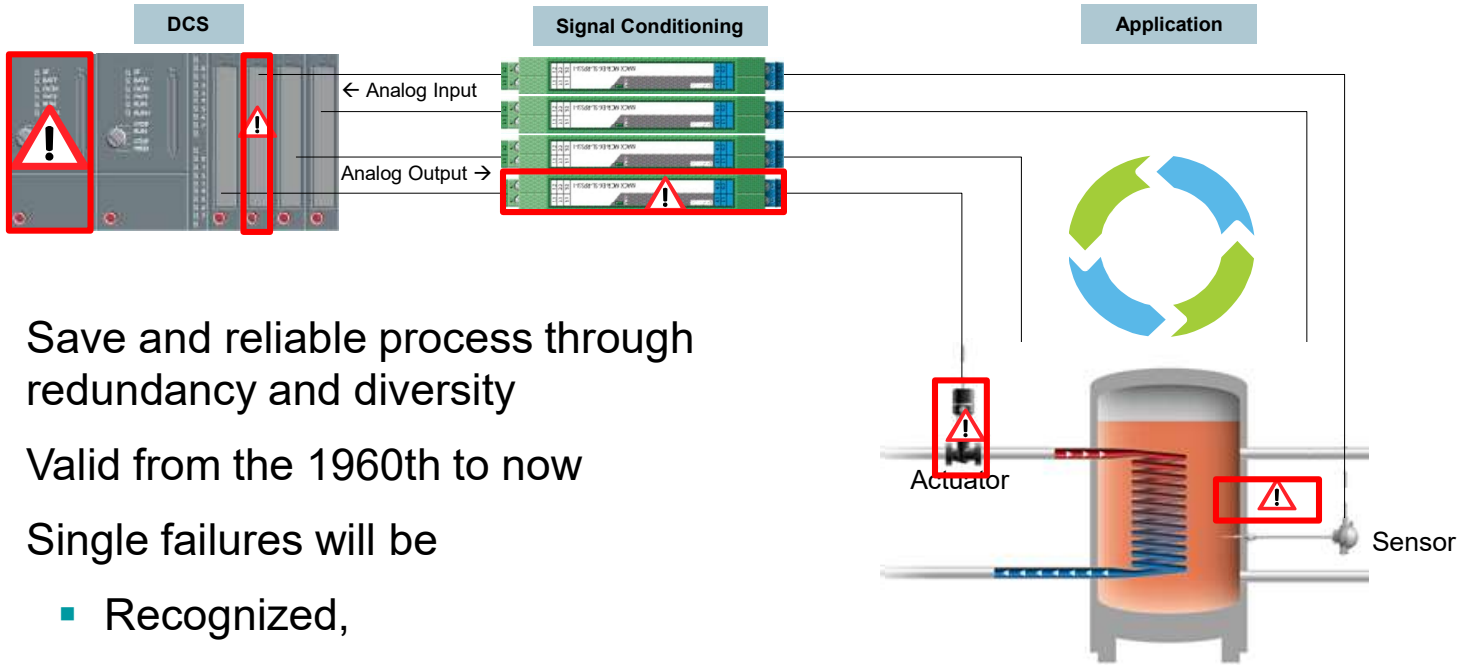
Example of 4…20mA Control Loop

- Continuous regulation of Temperature



- Save and reliable process through redundancy and diversity
- Valid from the 1960th to now
- Single failures will be
  - Recognized,
  - Removed,
  - And won‘t influence production

→ Single Loop Integrity

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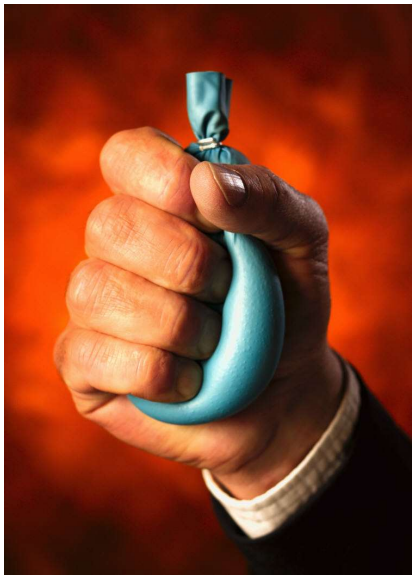
INSPIRING INNOVATIONS

The idea of fieldbus

- Saving IO cards
- Saving cables
- Saving Cabinets
- Ease of planning / installation and startup
- Enabling fully digital communication
- Still being highly reliable
- …..

→Saving Money and gaining efficiency



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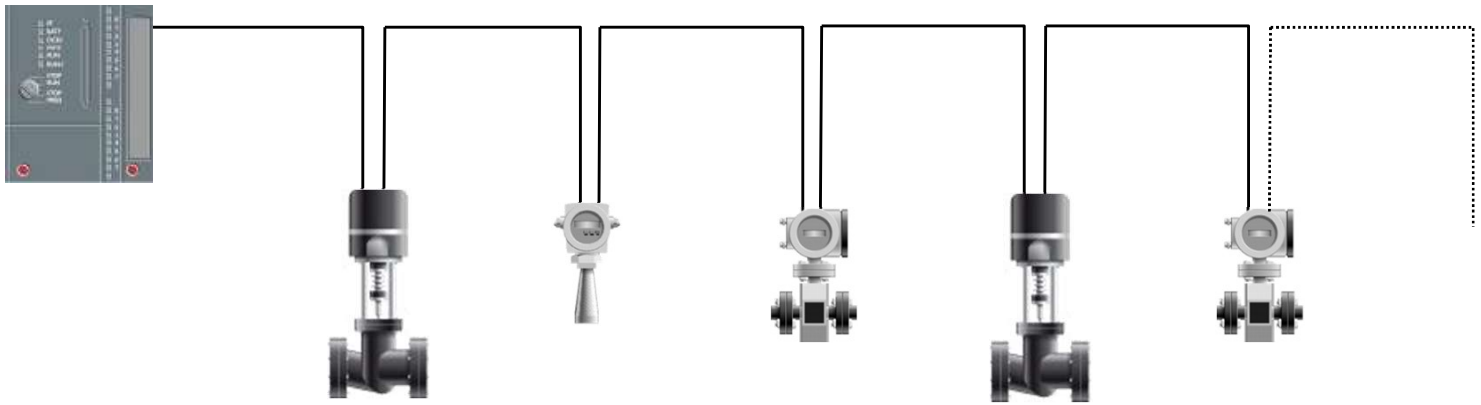
The first try

- Daisy Chain-topology / Foundation Fieldbus or Profibus PA
- Bridging a 2-wire-cable with power and communication



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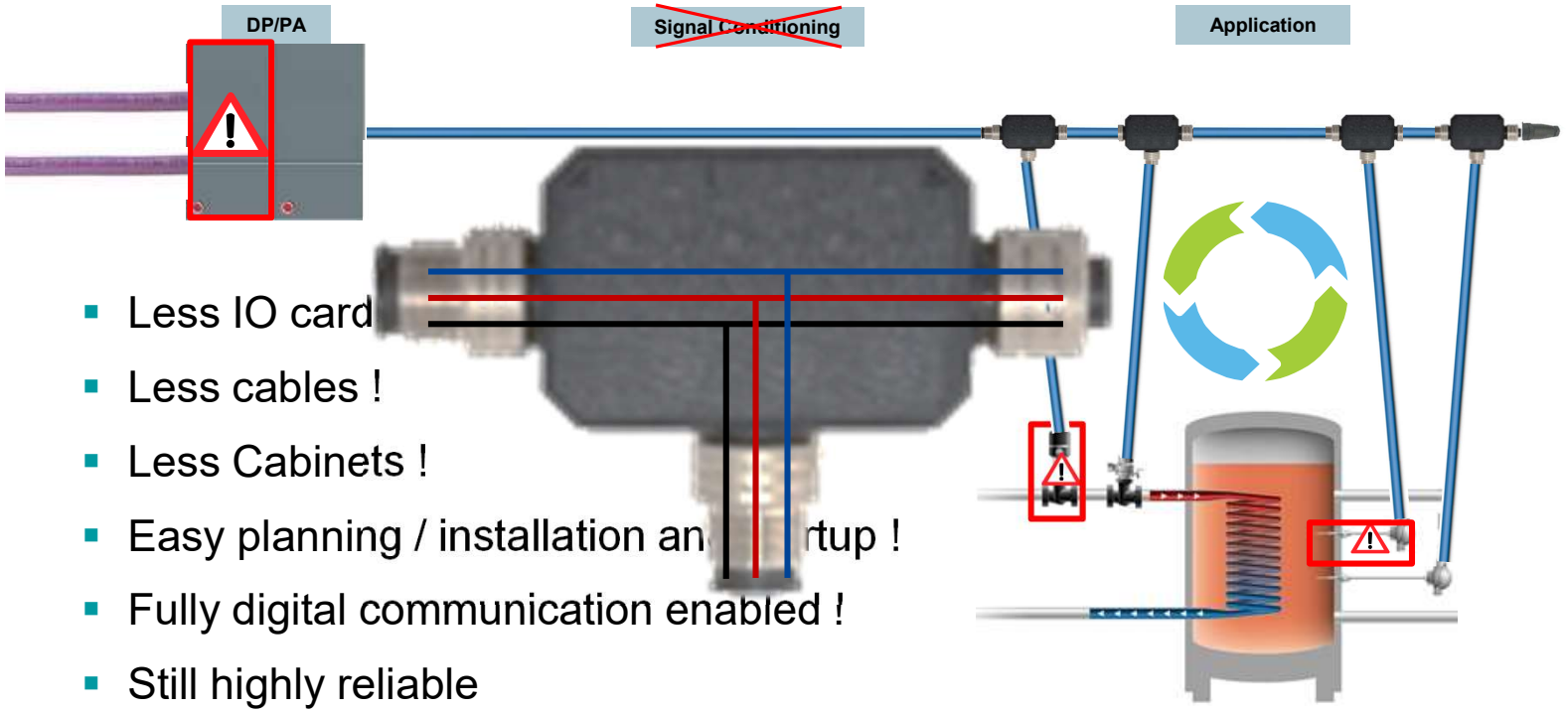
The first try – installation example

- Continuous regulation of Temperature



- Less IO card
- Less cables !
- Less Cabinets !
- Easy planning / installation an rtup !
- Fully digital communication enabled !
- Still highly reliable

Mission accomplished?

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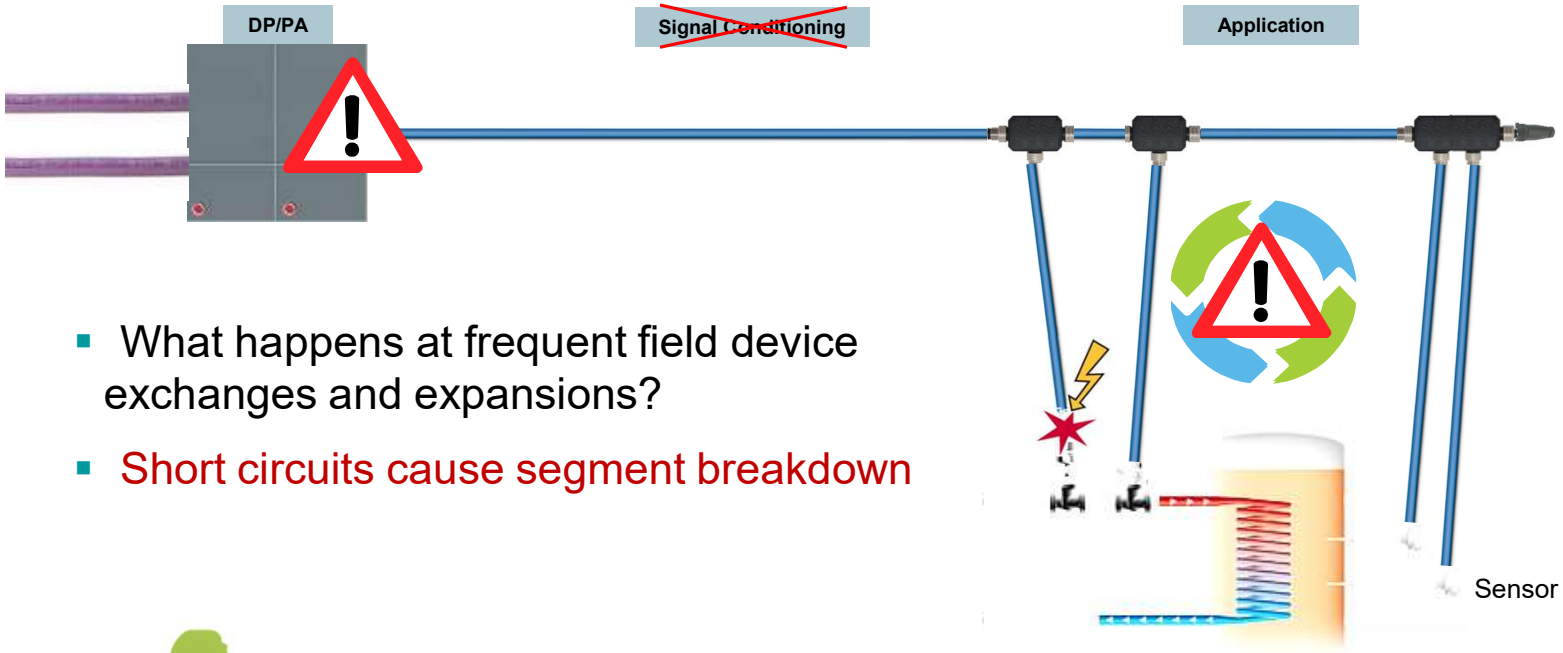
The first try – negative experiences



- What happens at frequent field device exchanges and expansions?
- Short circuits cause segment breakdown

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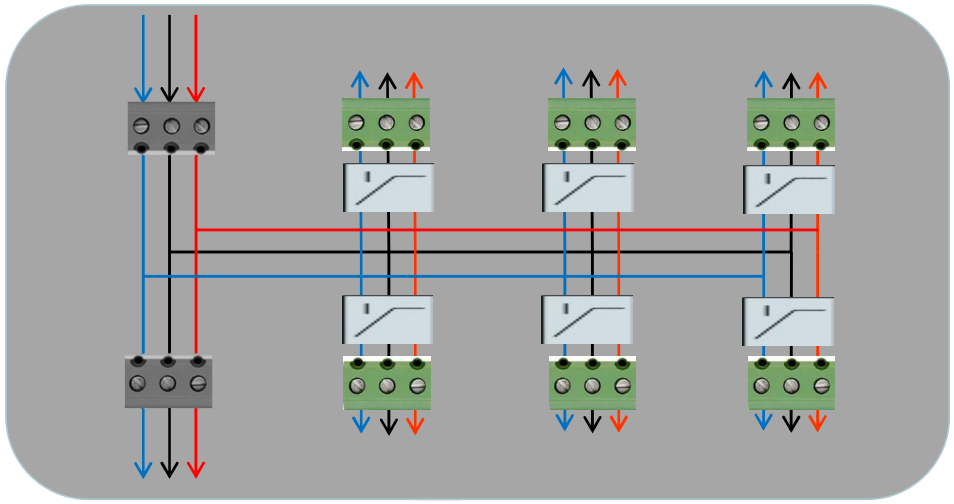
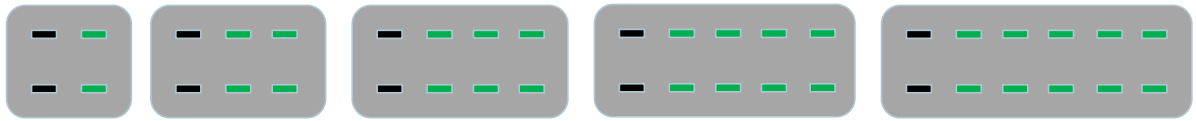
Improvement – Device Coupler



- Include short circuit protection in each channel / spur



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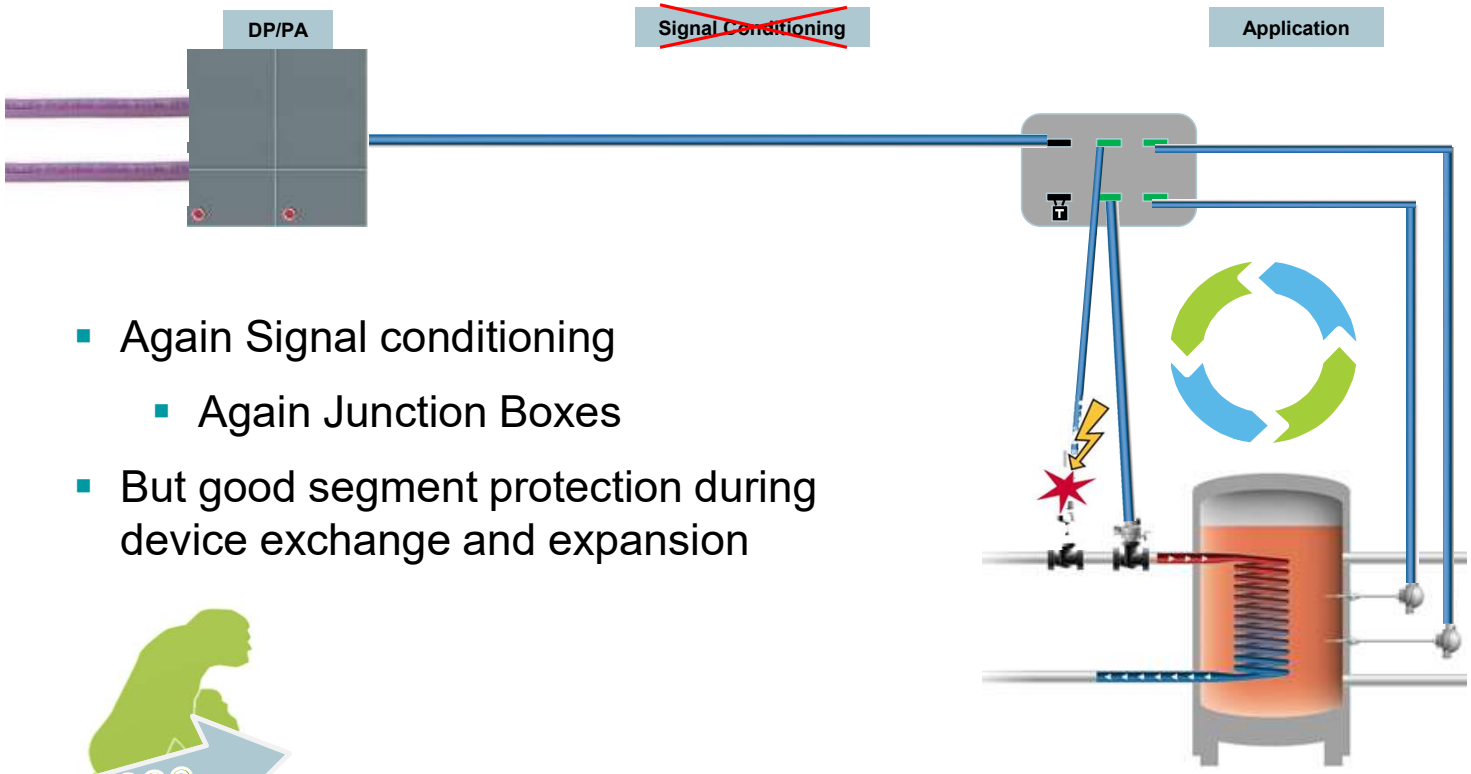
Impact of Improvement



- Again Signal conditioning
  - Again Junction Boxes
- But good segment protection during device exchange and expansion

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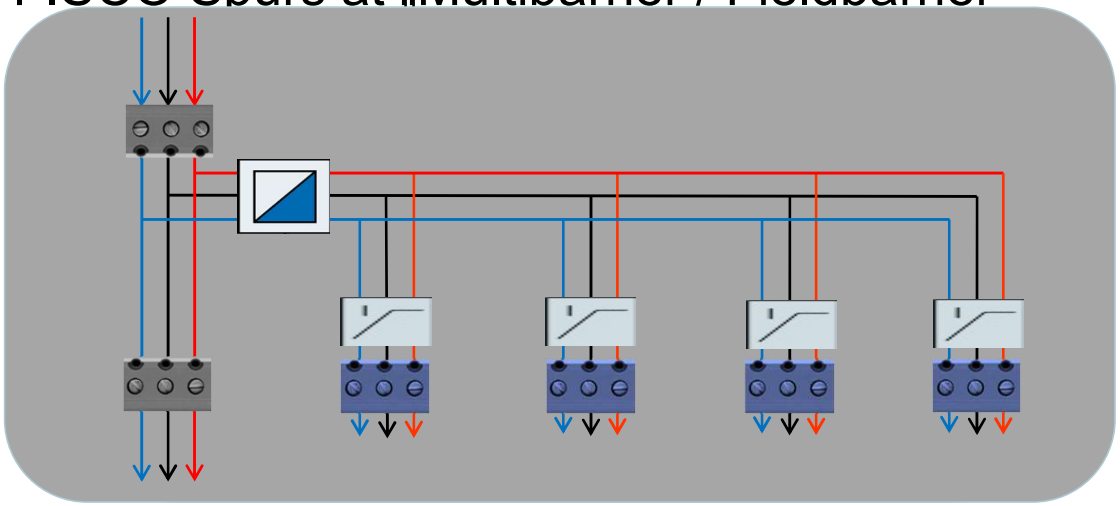
Next Improvement - Fieldbarrier

- Moving intrinsically safe isolation in the field:
  - High Power Trunk Concept
  - With FISCO Spurs at „Multibarrier / Fieldbarrier“



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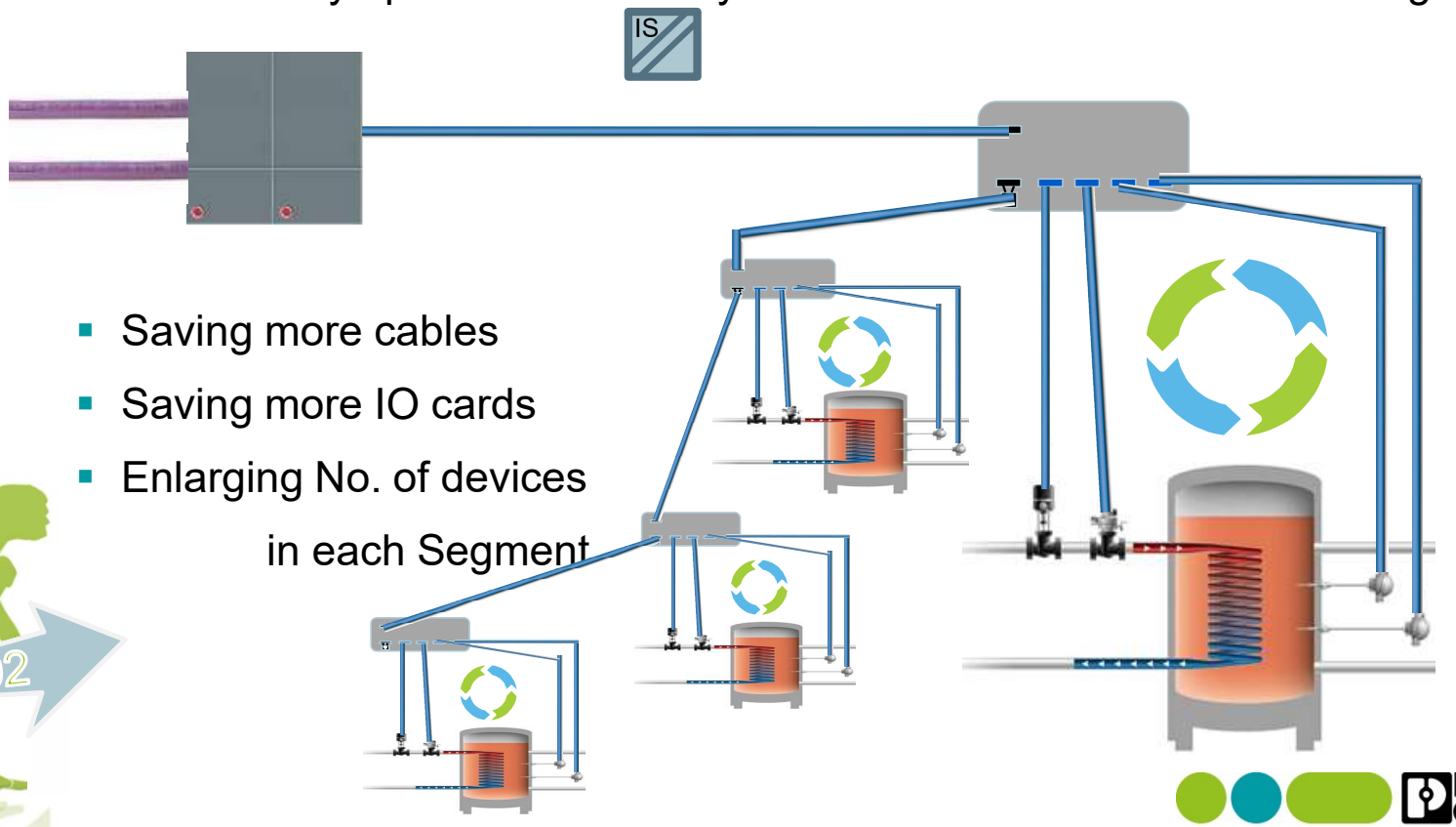
Impact of Improvement

- Energy Limitation moves from Trunk to Field (FISCO spurs)
- Realistically up to 16 intrinsically safe devices connected to each segment



- Saving more cables
- Saving more IO cards
- Enlarging No. of devices in each Segment

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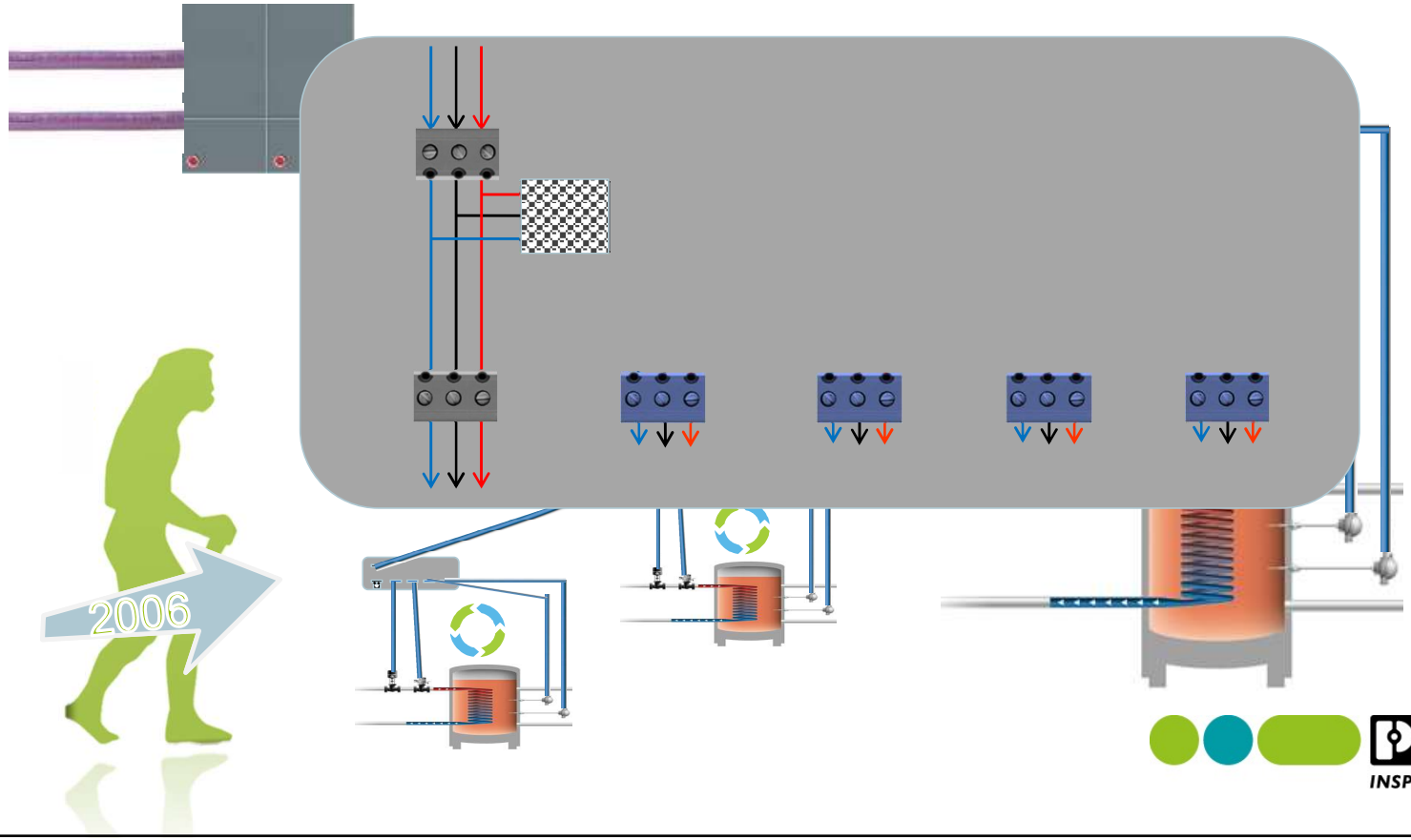
Weakness of Brick-barriers

- Current limitation and Intrinsically safe isolation creates heat
- Heat ages electrical components, reduces MTBF-times



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INSPIRING INNOVATIONS

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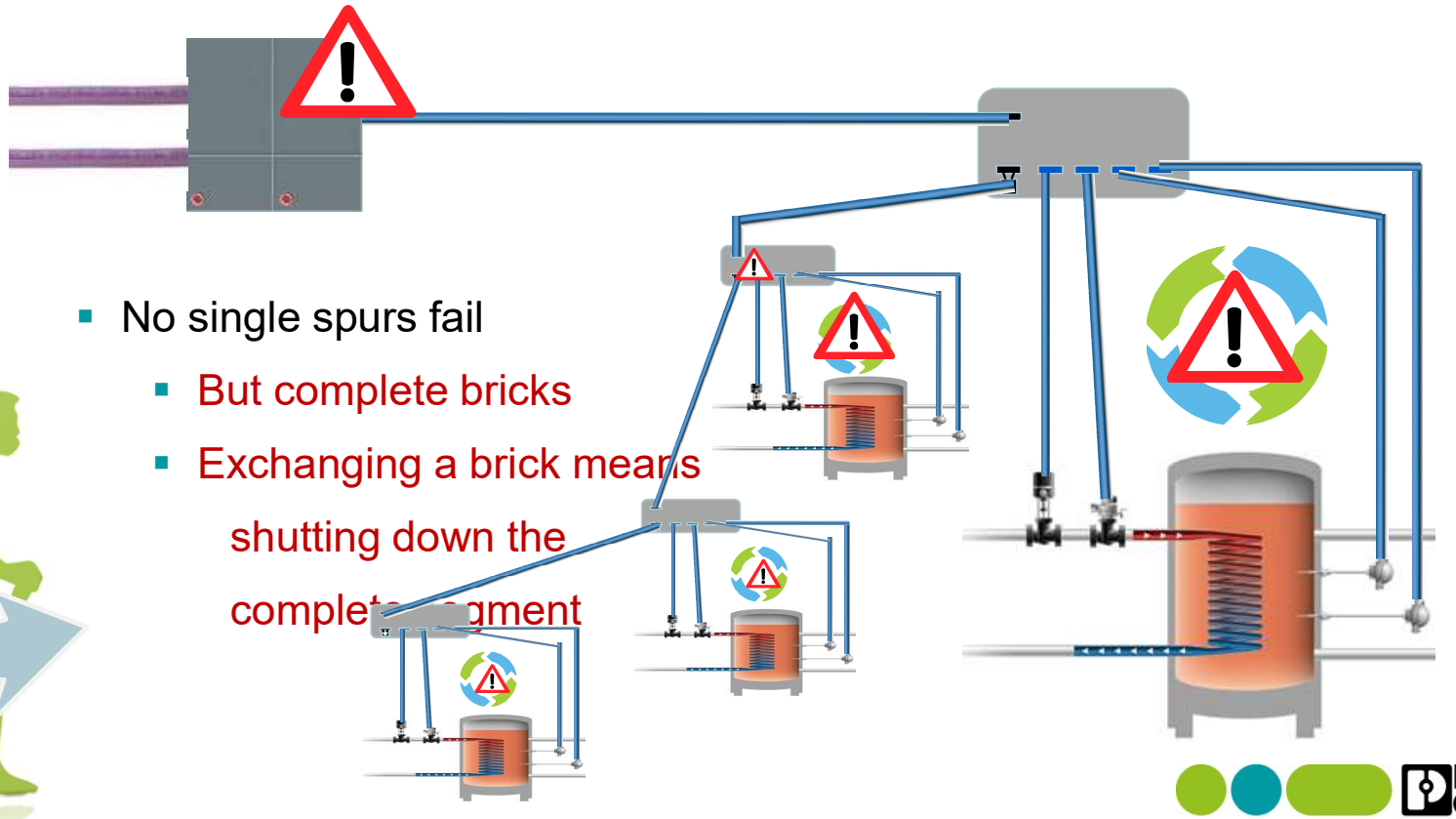

- No single spurs fail
  - But complete bricks
  - Exchanging a brick means shutting down the complete segment

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Weakness of Brick-barriers

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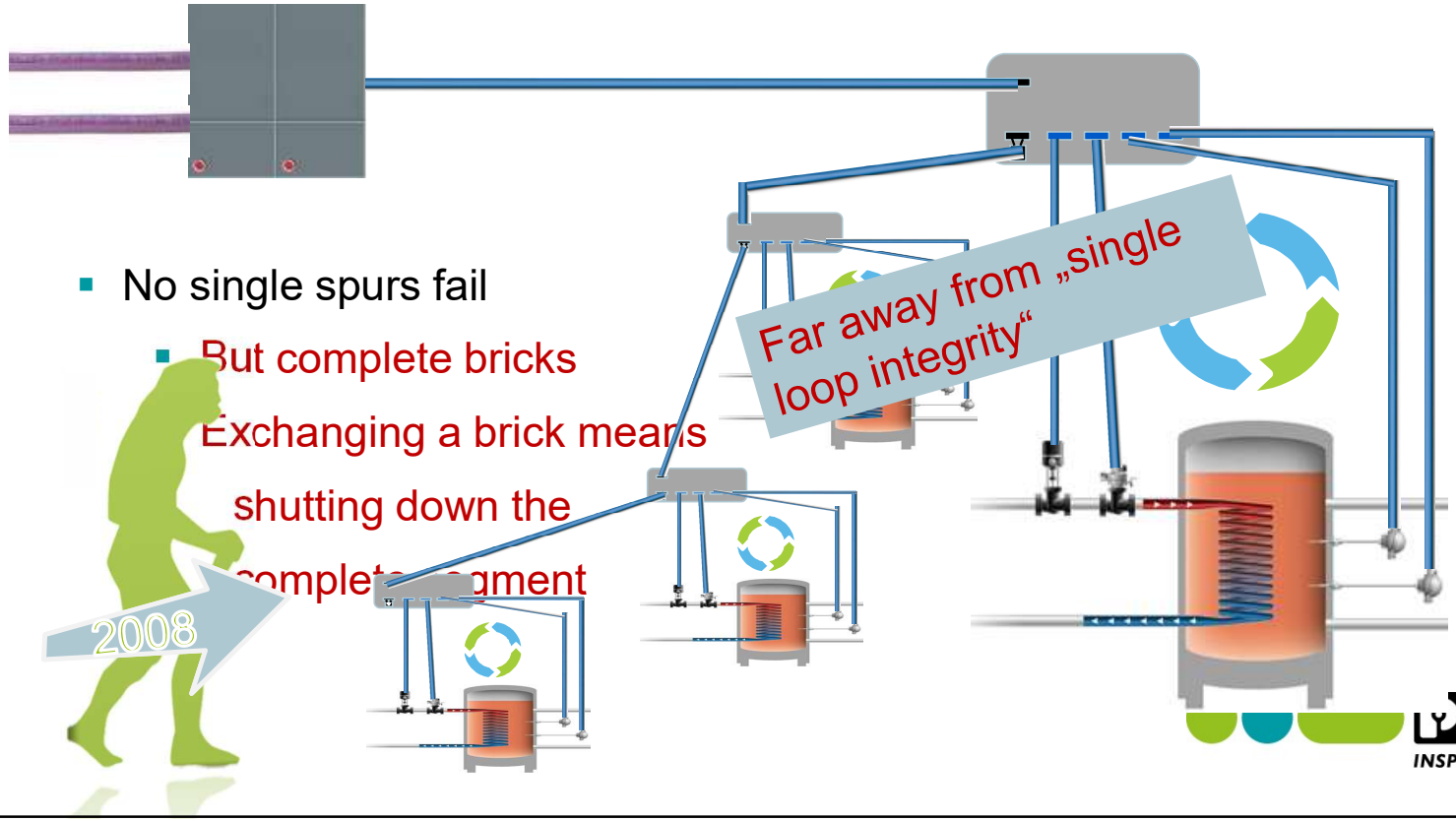

- No single spurs fail
  - But complete bricks

Exchanging a brick means shutting down the complete segment

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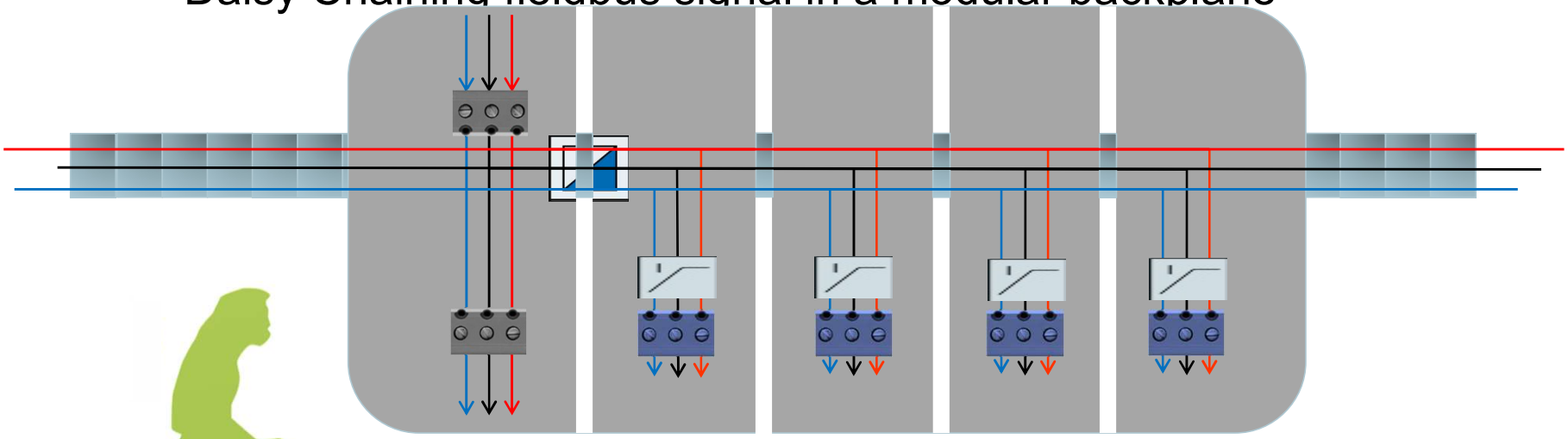
Final Improvement – Scalable Barriers

- Isolating each spur separately
- Cutting Bricks into pieces
- Daisy Chaining fieldbus signal in a modular backplane



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Final Improvement – Scalable Barriers

- How we made it happen:

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Final Improvement – Scalable Barriers

- How we made it happen:

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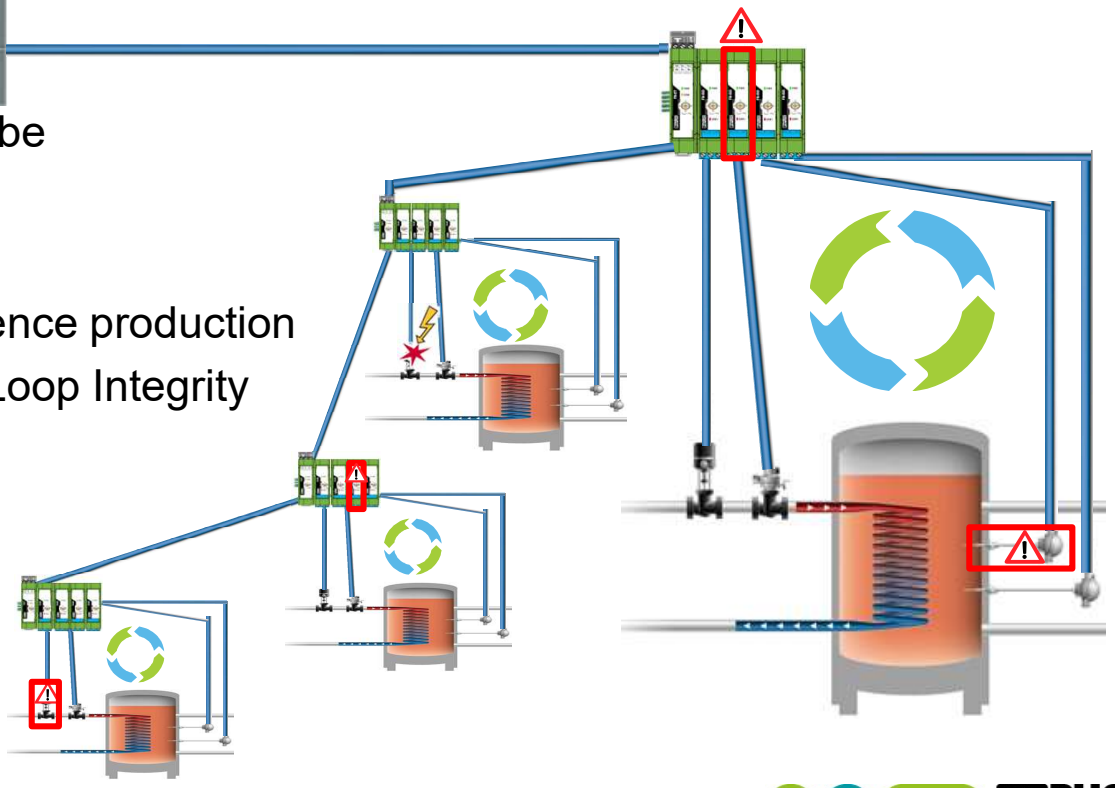
Impact of Final Improvement

- Single failures will be
  - Recognized,
  - Removed,
  - And won‘t influence production

    → Single Loop Integrity



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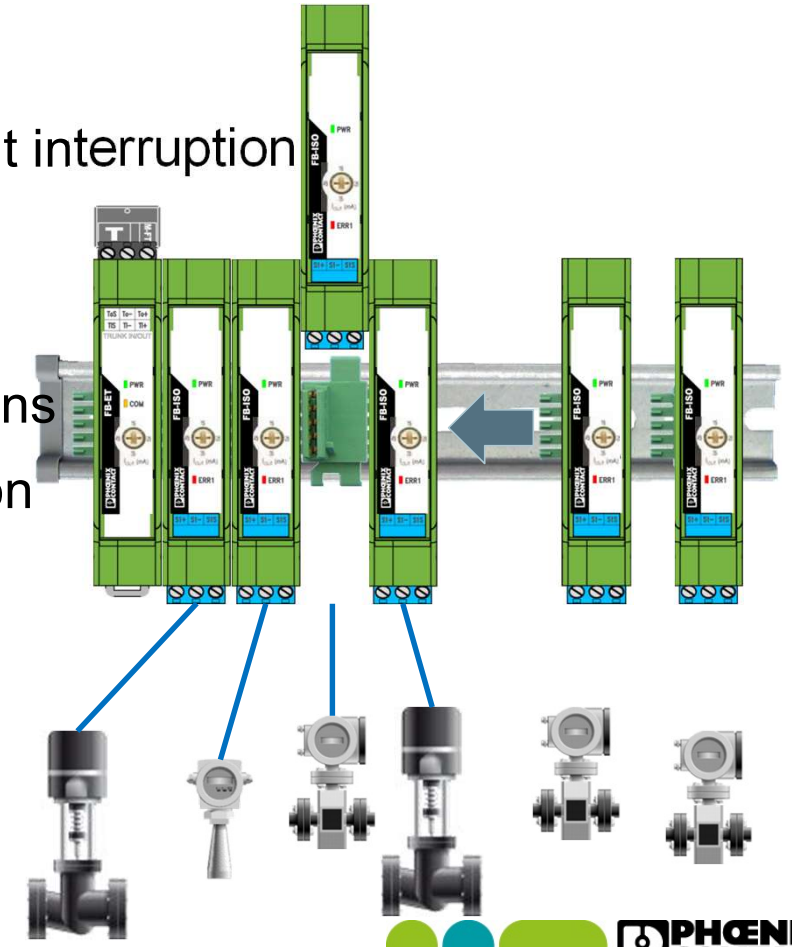
The modern solution – Scalable Barriers

- Overview
  - Exchange without segment interruption
  - Single Loop Integrity
  - Get rid of unused spare
  - Always ready for expansions
  - Channel 2 channel isolation
    - Ready for the future
      - Mixing Ex ic and Ex ia next to each other



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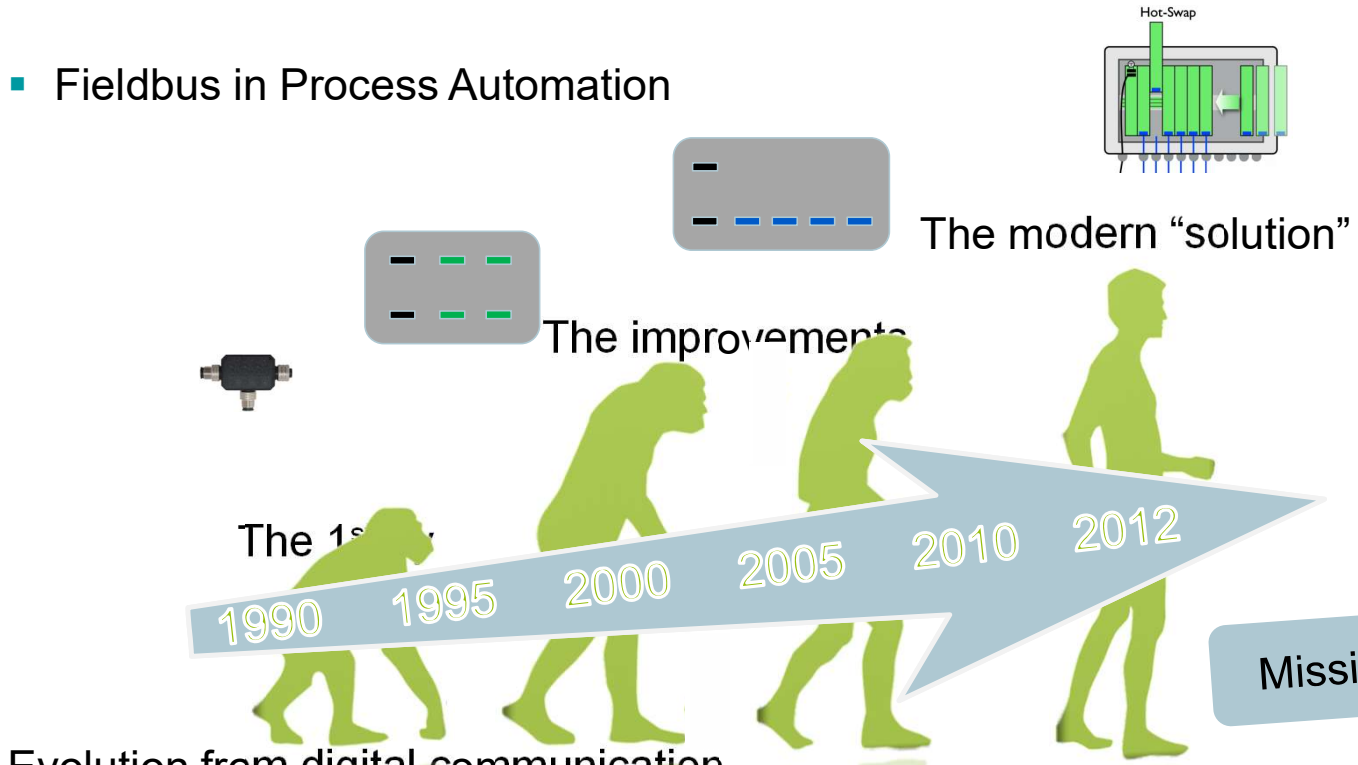
Hall 11.1 - A27

Excurse through Automation History

- Fieldbus in Process Automation



Evolution from digital communication…

…to nowadays scalable and highly reliable solutions

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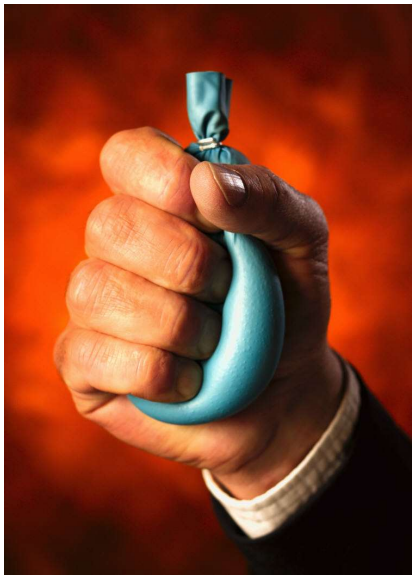
Result

- After more than 20 years of fieldbus the evolution has successfully been executed: The use of the new scalable fieldbus infrastructure system from Phoenix Contact makes planning and maintaining fieldbus' physical layer as easy as it should be. Always having the spare needed, without having unused electronic in place. Expanding and exchanging whenever necessary. This saves the user's money and gains the highest plant reliability.



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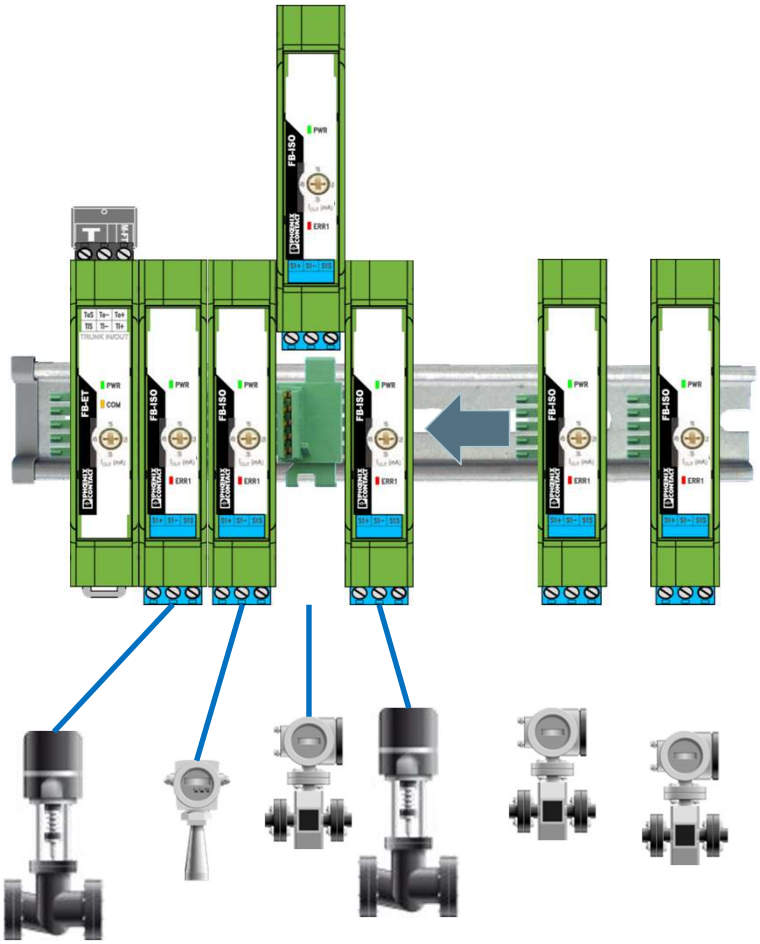

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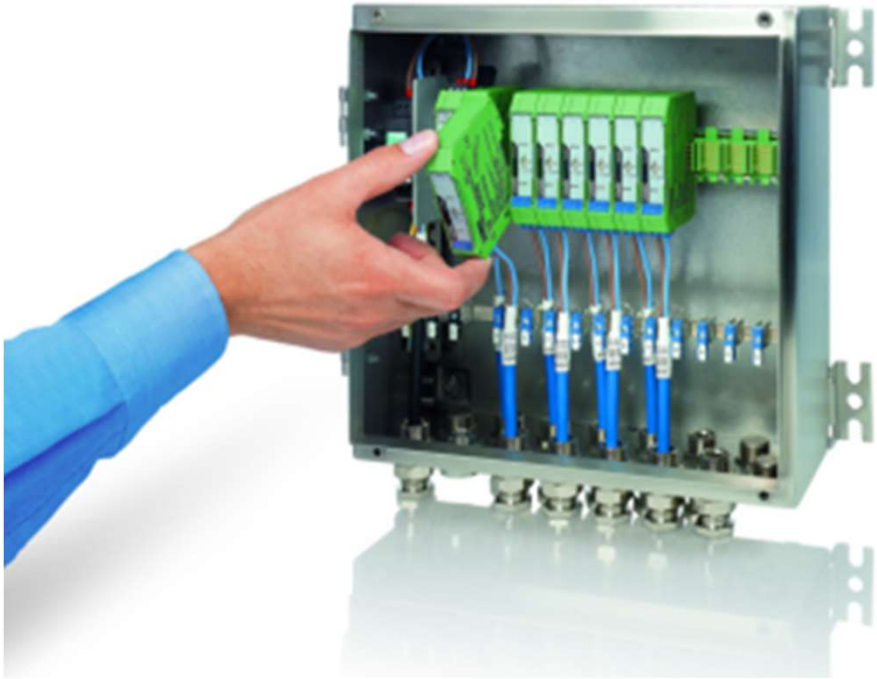
Availible also as Enclosure Solution!



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Foundation Fieldbus Technology

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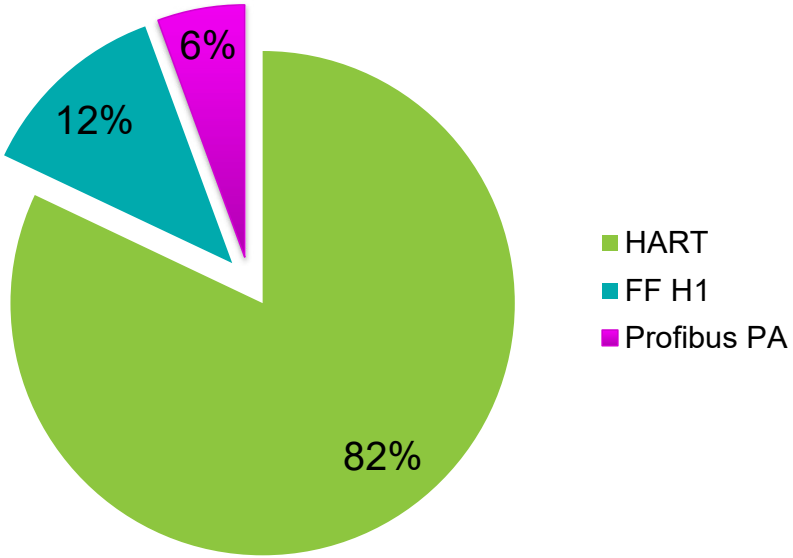
Process Automation Market Focus

Analysis

Field-Mounted Devices with Digital Interface



35+ Mio (76%) devices globally with HART interfaces.

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The future of automation.

The Connected Plant

0…5/10V Profibus PA Digital I/O Modbus RTU RAW/ASCII

Foundation Fieldbus 4…20mA Temperature HART

Profinet Ethernet-IP

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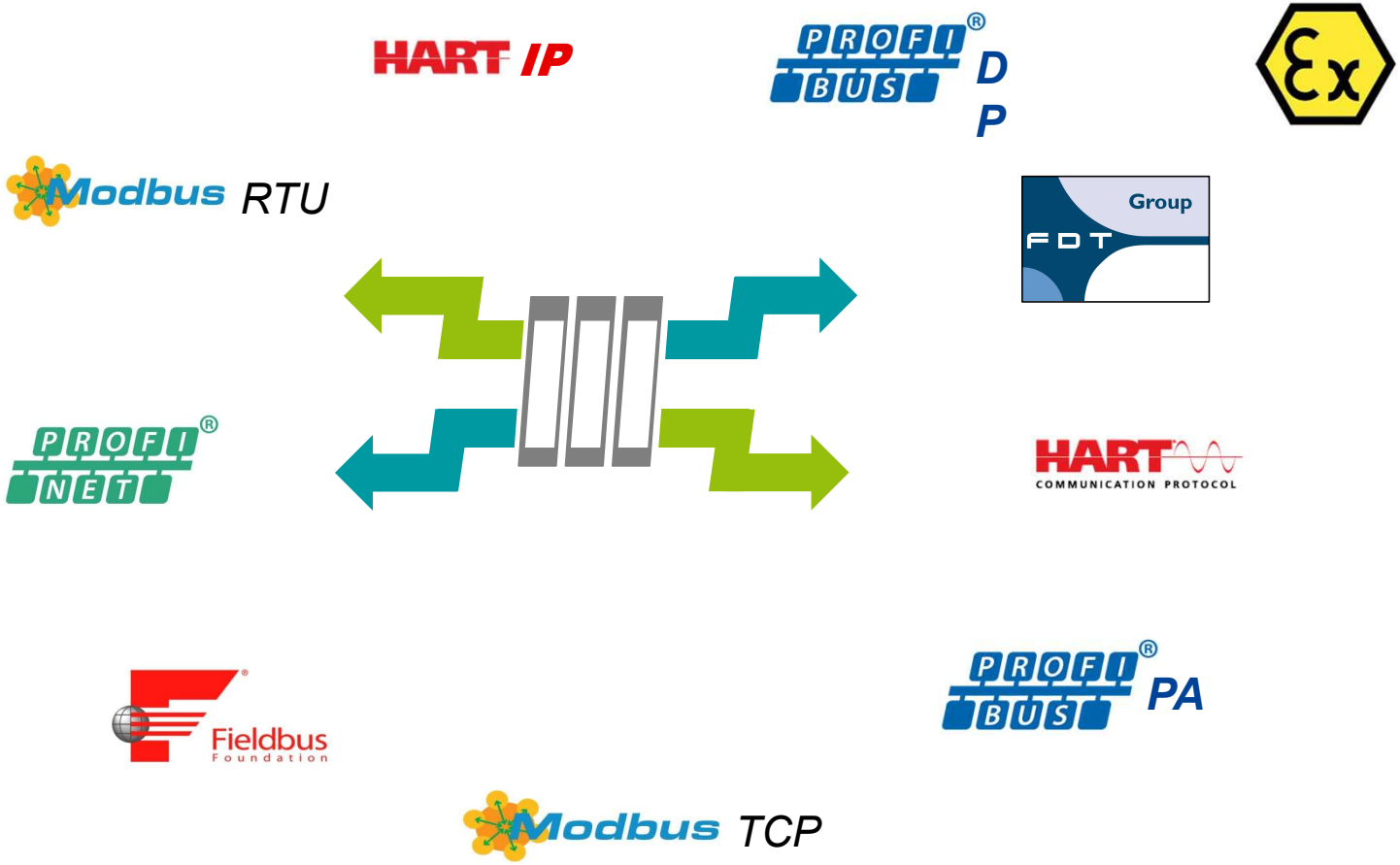
Connect your process



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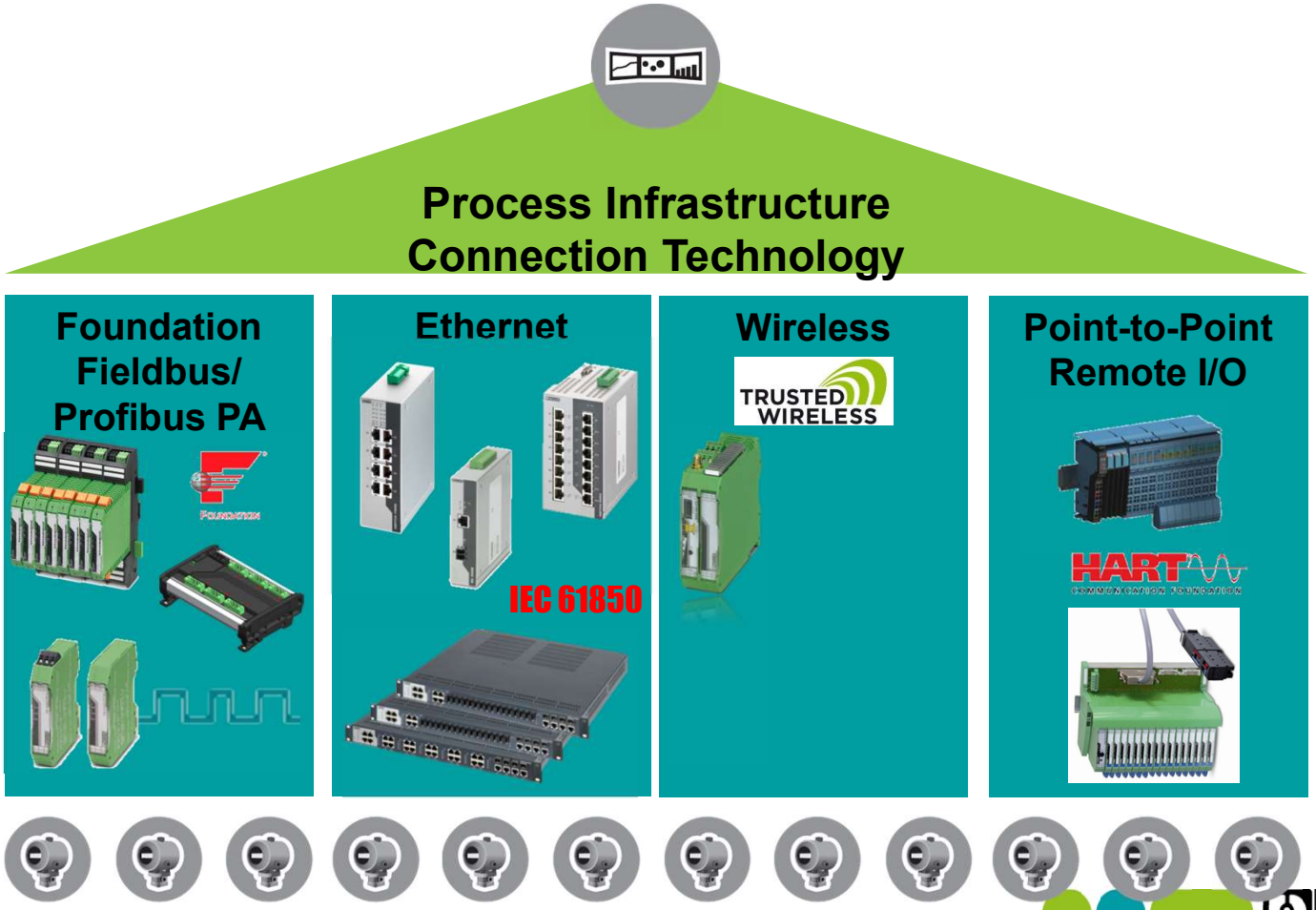
Excellence in Process Connection Technologies



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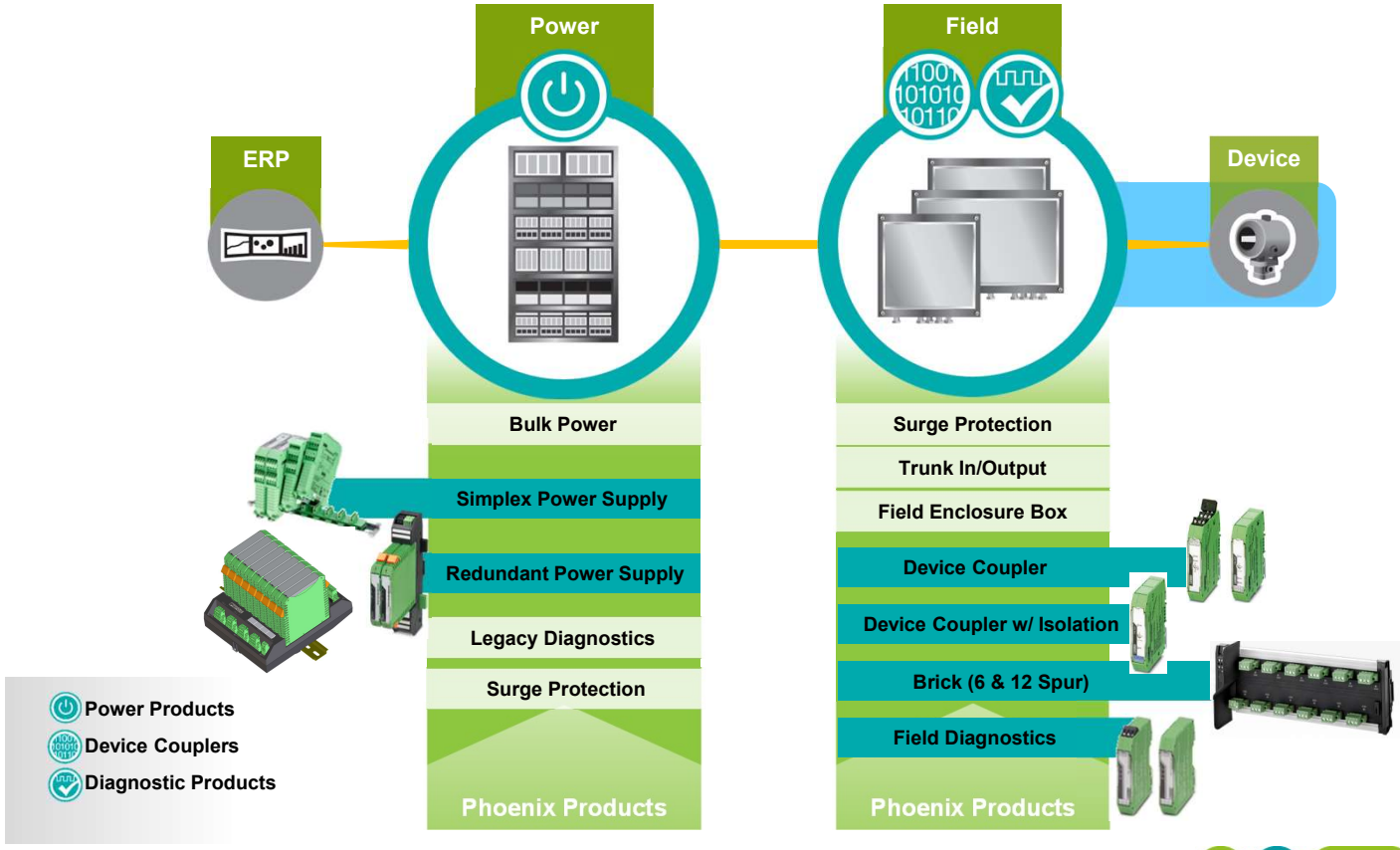
Phoenix Contact Fieldbus Components Overview



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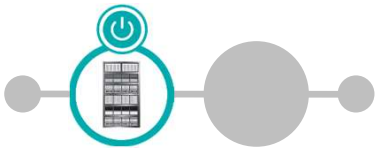
From the Control Cabinet…



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Industrial Power Supplies

Features and Benefits

- QUINT - The standard for Industrial Power Supplies
- Unique **SFB technology** and preventive function monitoring for superior system availability
- Static power reserve **POWER BOOST** with up to 1.5 times nominal current continuously
- Reports critical operating conditions before an error occurs, remote monitoring

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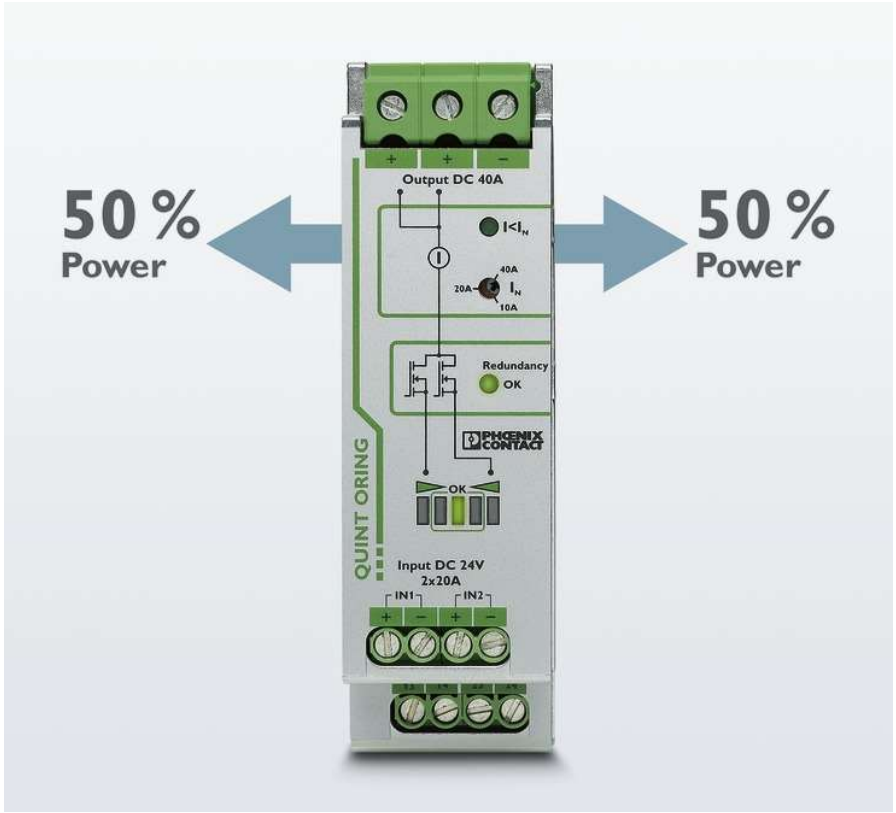
Industrial Power Supplies



ACB TECHNOLOGY

Features and Benefits

- QUINT with ORing using ACB Technology
- **Preventive Monitoring Function**
  Report all conditions of critical operations before an error through continuous monitoring of input voltage, output current and decoupling
- **Doubles the life of power supplies** 50% Load Sharing using **ACB Technology**

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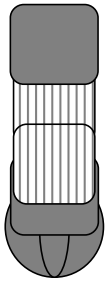
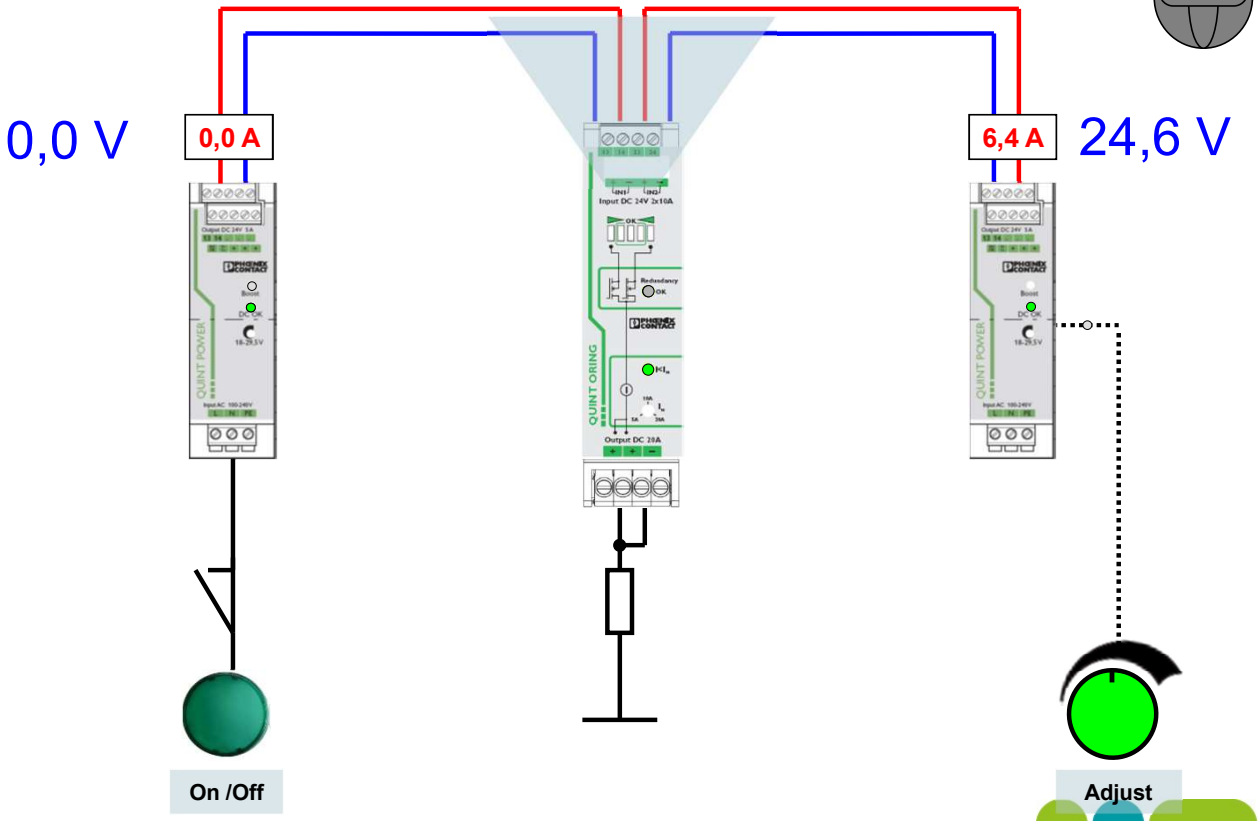
How Does

ACB Technology Work?





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Modular FB Power Supply
Single Channel

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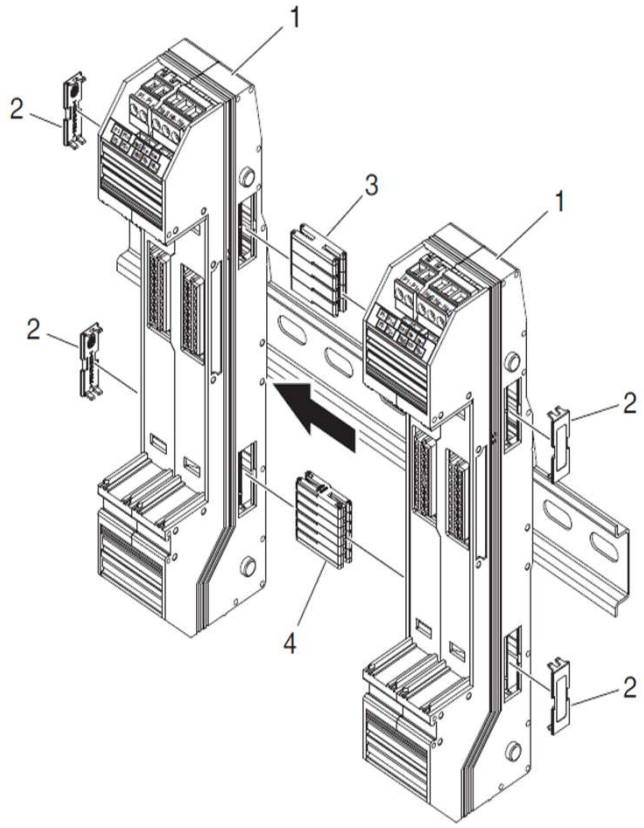
Modular FB Power Supply
Single Channel

Creating a multi-channel FB Power Supply using innovative Modular concept



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Redundant Power Supply

ACB TECHNOLOGY

Features and Benefits

- Utilizes Key Features of QUINT line with the reliability of Fieldbus
- Modular base eliminates unused capacity
- Integrated diagnostic relay in each base
- Bulk power distribution and common error messaging between bases
- **ACB Technology** maximizes the service life of the power supplies
- 500 mA @ 28 VDC

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4 Channel Fieldbus Redundant PS

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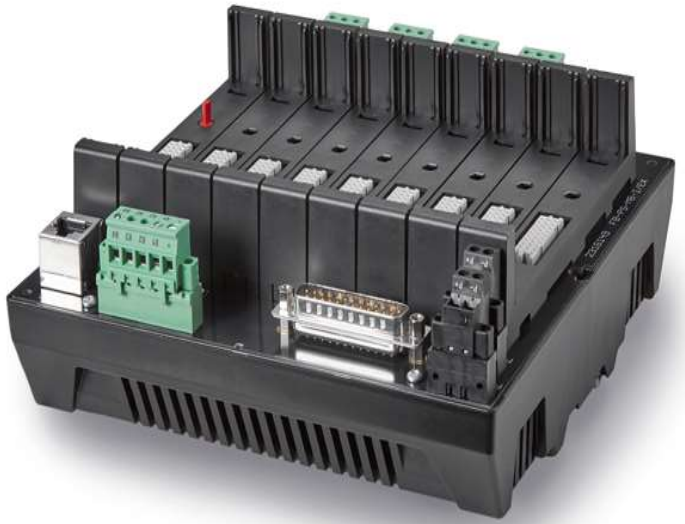
4 Channel Base specifications

- Class 1 Division 2, Zone 2 Installation
- -40C….+70C operating temperature range
- 180mm x 77mm x 180mm
- Fieldbus certification - FF-831



INSPIRING INNOVATIONS

4 Channel Fieldbus PS

Redundant Bulk Power Supply Connection

Host Connections*

Redundant power supply Alarm relay loop

RJ45 Diagnostics Connector

Fieldbus 4 Ch. Diagnostics Plug slot

Power Supply Plug slots (x8)

Trunk Shield Connector

Segment Terminal Blocks (x4)

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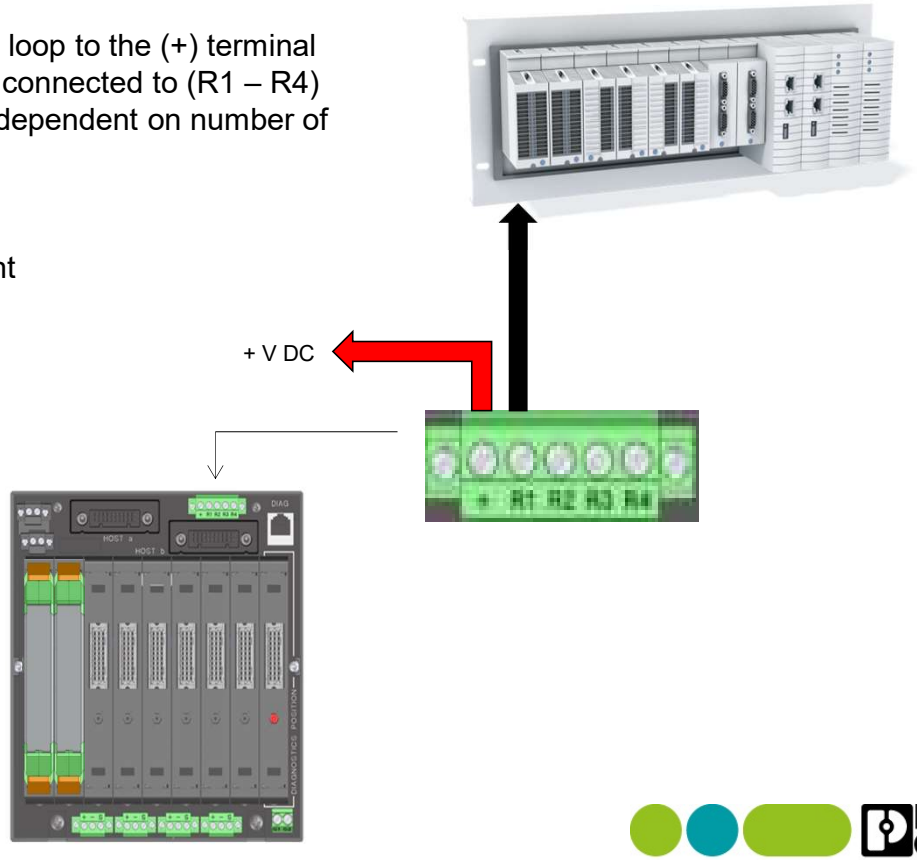
Power Plug Alarm Relay Loop

- Connect Source V DC for the alarm loop to the (+) terminal
- Terminals for the “return” signal are connected to (R1 – R4)
  Only 1 return connection is used, dependent on number of redundant power supplies.

- Alarm loop set up for single segment power redundancy



PHOENIX CONTACT
INSPIRING INNOVATIONS

Power Plug Alarm Relay Loop

- Connect Source V DC for the alarm loop to the (+) terminal
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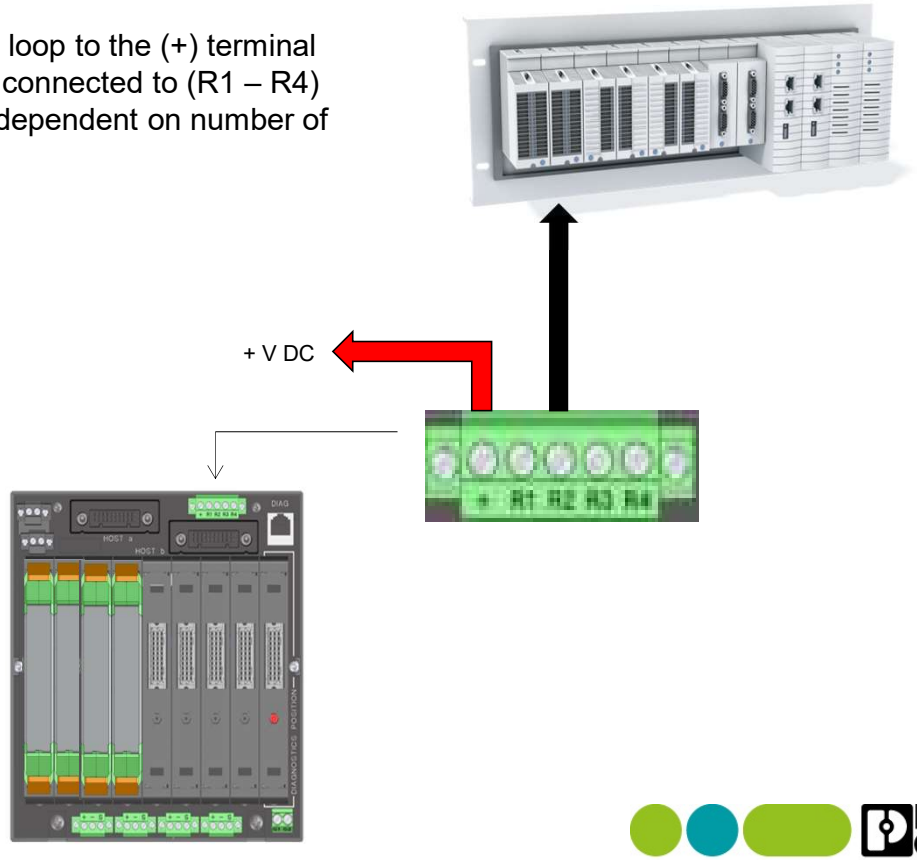
- Alarm loop set up for two segment power redundancy



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INSPIRING INNOVATIONS

Power Plug Alarm Relay Loop

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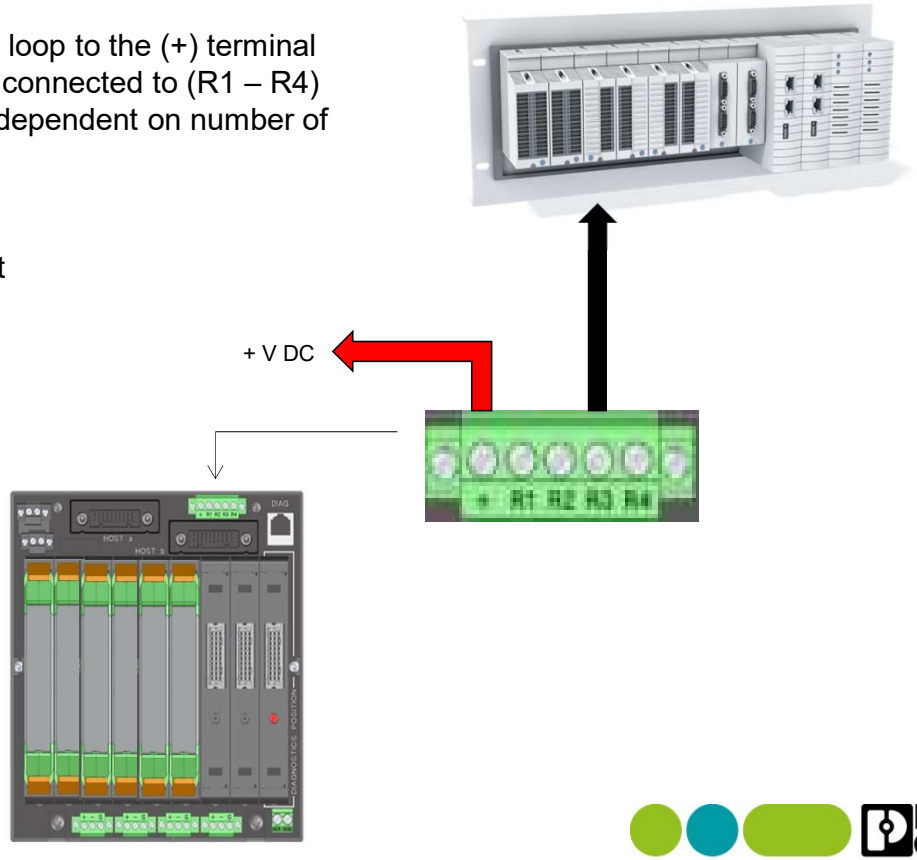
  Only 1 return connection is used, dependent on number of redundant power supplies.

- Alarm loop set up for three segment power redundancy

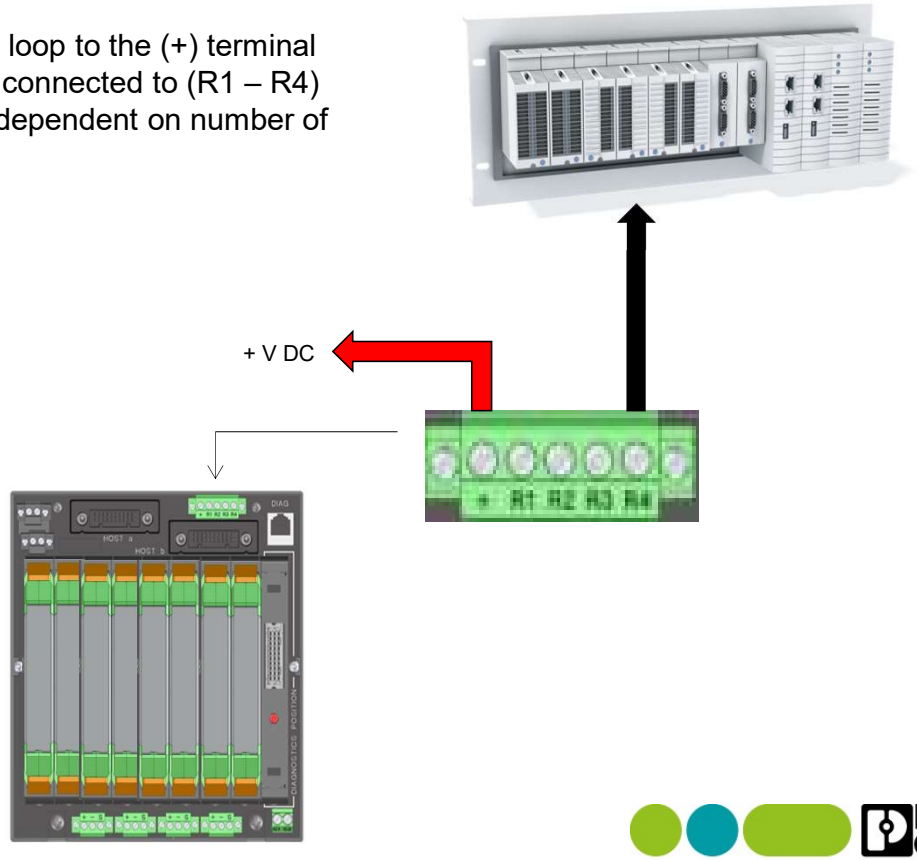


PHOENIX CONTACT
INSPIRING INNOVATIONS

Power Plug Alarm Relay Loop

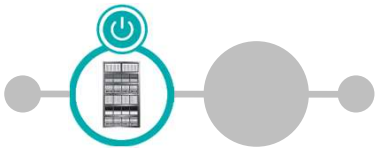
- Connect Source V DC for the alarm loop to the (+) terminal
- Terminals for the “return” signal are connected to (R1 – R4)
  Only 1 return connection is used, dependent on number of redundant power supplies.

- Alarm loop set up for four segment power redundancy



PHOENIX CONTACT
INSPIRING INNOVATIONS

…to the Field Instrument



PHOENIX CONTACT
INSPIRING INNOVATIONS

Device Couplers - Modular

Features and Benefits

- Smallest footprint
- Single loop integrity from coupler to device
- Couplers can be added while segment is live without interrupting terminator
- **Mix FISCO instruments with general purpose and/or Zone 2 / Division 2 instruments on same T-Bus**
- True spur-spur isolation using isolator

PHOENIX CONTACT
INSPIRING INNOVATIONS

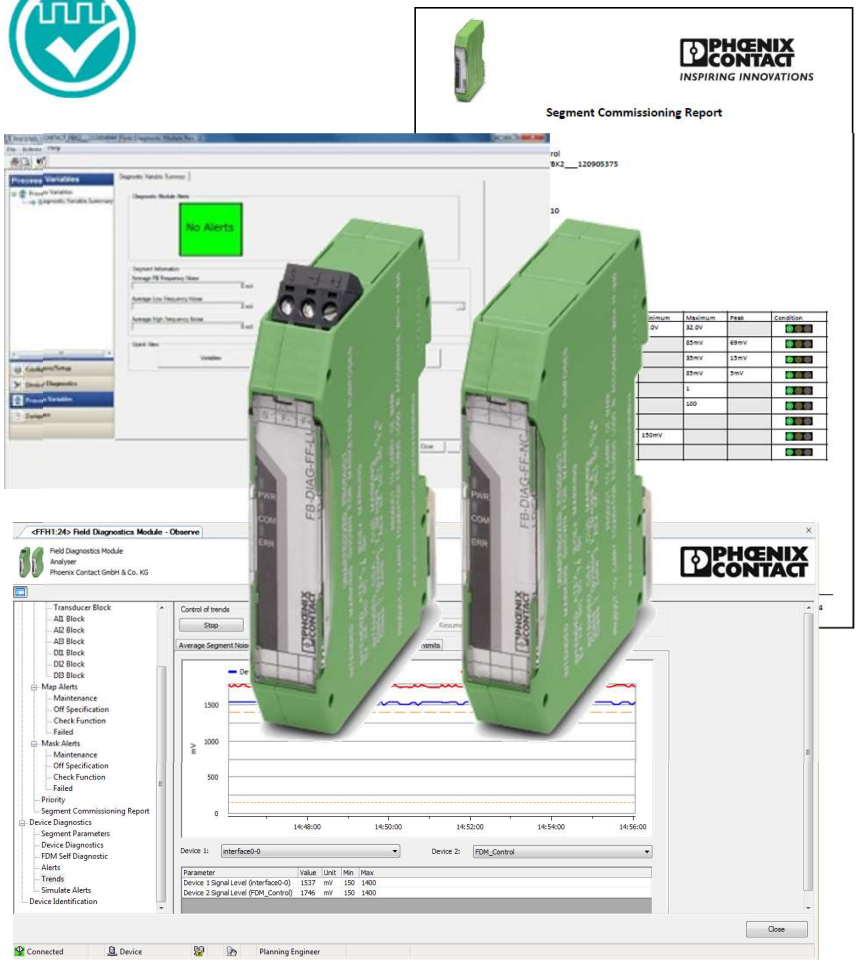
Device Couplers - Block

Features and Benefits

- ‘Smart’ Terminal block for Device connectivity
- Concept rooted in Phoenix Contact’s Industry proven terminal connectors
- 6 & 12 spur configuration
- Terminal block orientation allows for bottom-installed cable glands
- Removable bus terminator with status LED
- Zone 2 / Division 2 approved

PHOENIX CONTACT
INSPIRING INNOVATIONS

Field Diagnostics Module



Features and Benefits

- **High-integrity diagnostics**
- **“Anywhere” mountable**
- Alarming and communication via H1
- T-Bus compatible or connection to legacy installation with terminal block
- No licenses required
- Easy hardware and software integration with DTM functionality

PHOENIX CONTACT
INSPIRING INNOVATIONS

PHOENIX CONTACT
INSPIRING INNOVATIONS

Segment Commissioning Report

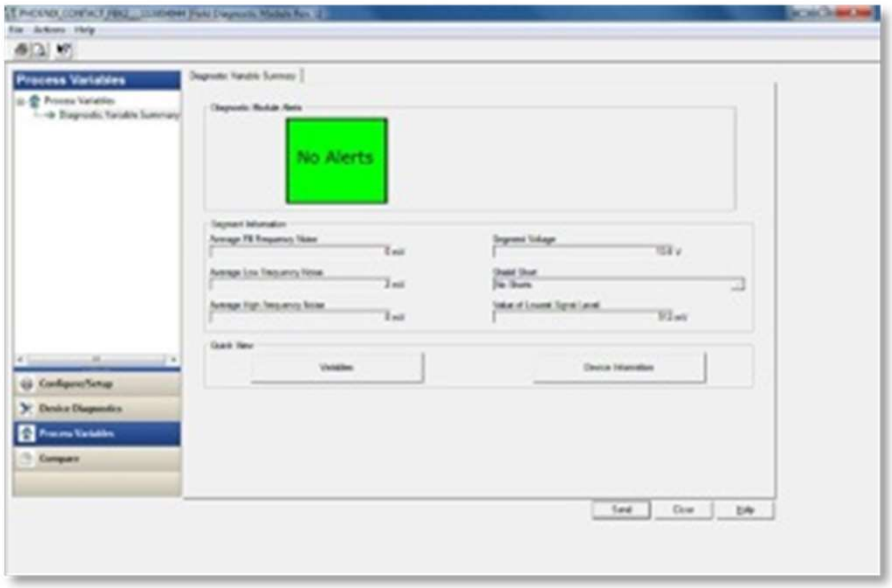
Physical Device Tag: FDM_Control
Device Id: 5078430321_____FBK2___120905375
Firmware Version: 8.0
DTM Revision: 1.1.0

Date of Report: 2014-01-03 16:10
Segment Tag Name:
Segment Description:
Segment Location:
Technician:
Segment Health Status:

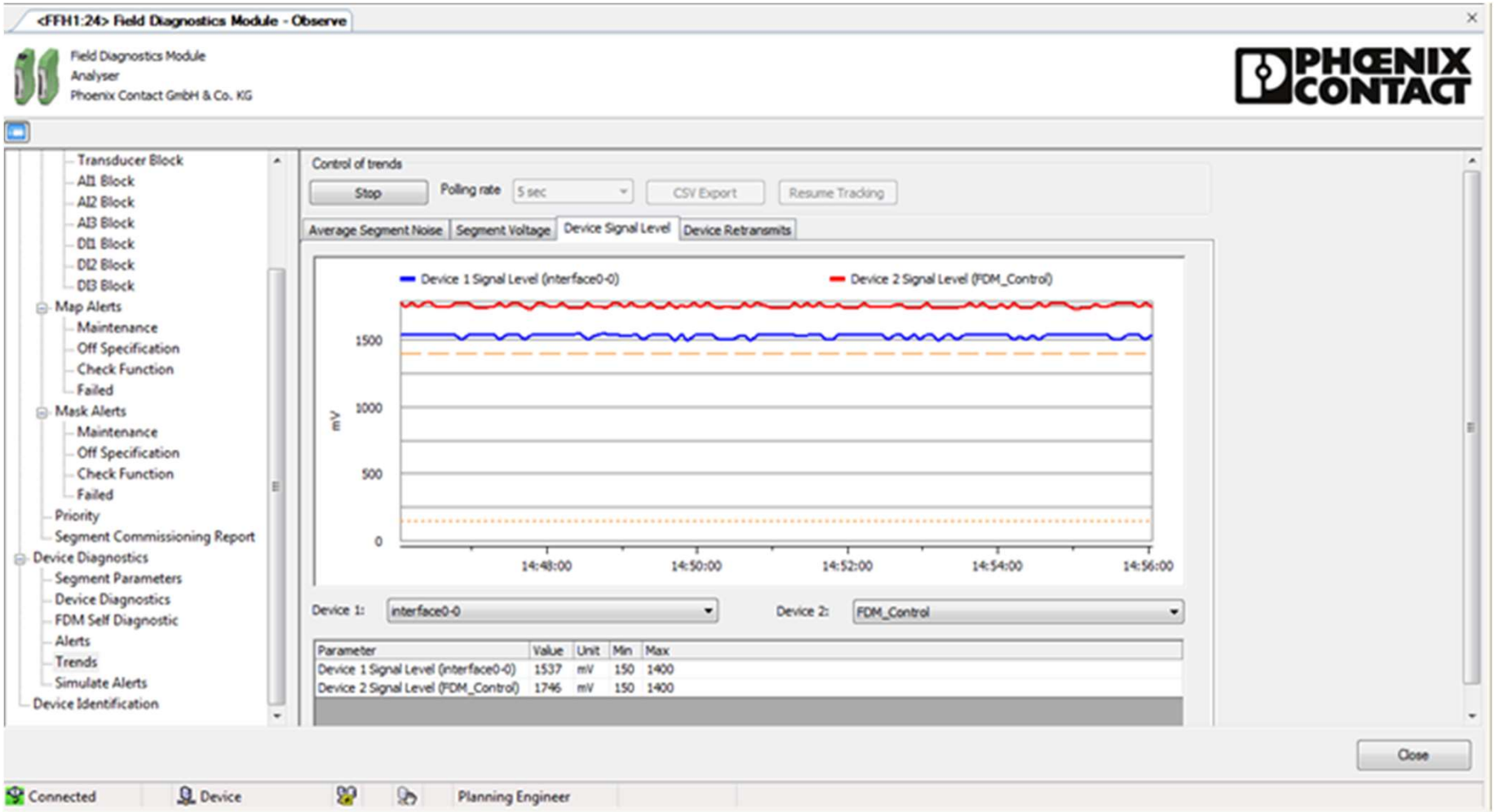
Segment Parameter Overview

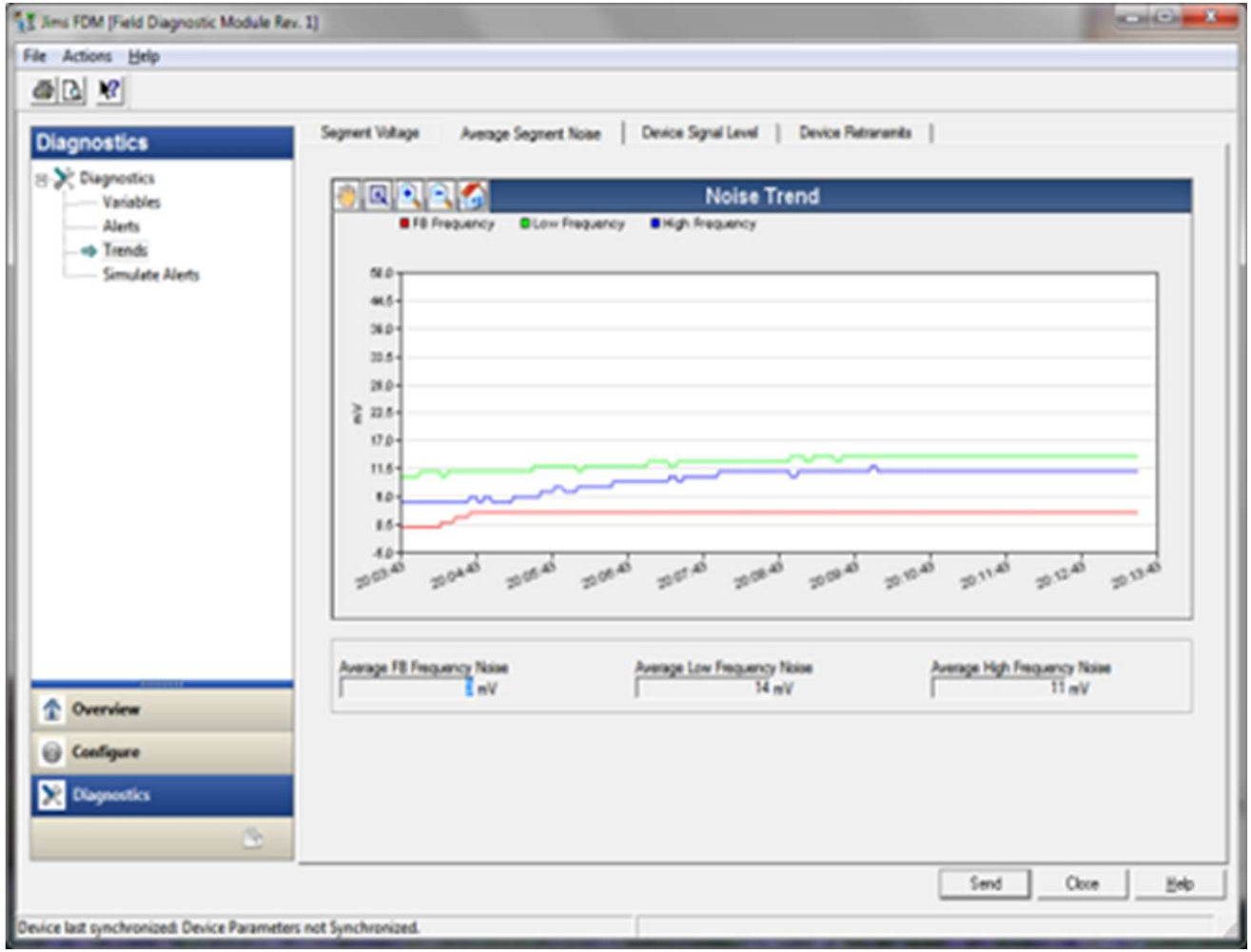
	Actual	Minimum	Maximum	Peak	Condition
Segment Voltage	26.3V	12.0V	32.0V		
Average Low Frequency Noise	0mV		85mV	69mV	
Average FB Frequency Noise	1mV		35mV	15mV	
Average High Frequency Noise	0mV		85mV	5mV	
Retransmits per hour	0		1		
Retransmits per day	0		100		
Total Retransmits	0				
Value of Lowest Signal Level	1484mV	150mV			
Shield Short	No Shorts				

Technician: Date: 2014-01-03 16:10 Page: 1/4



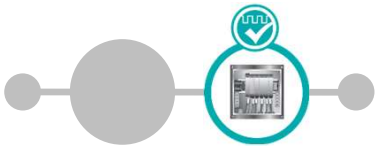
INSPIRING INNOVATIONS





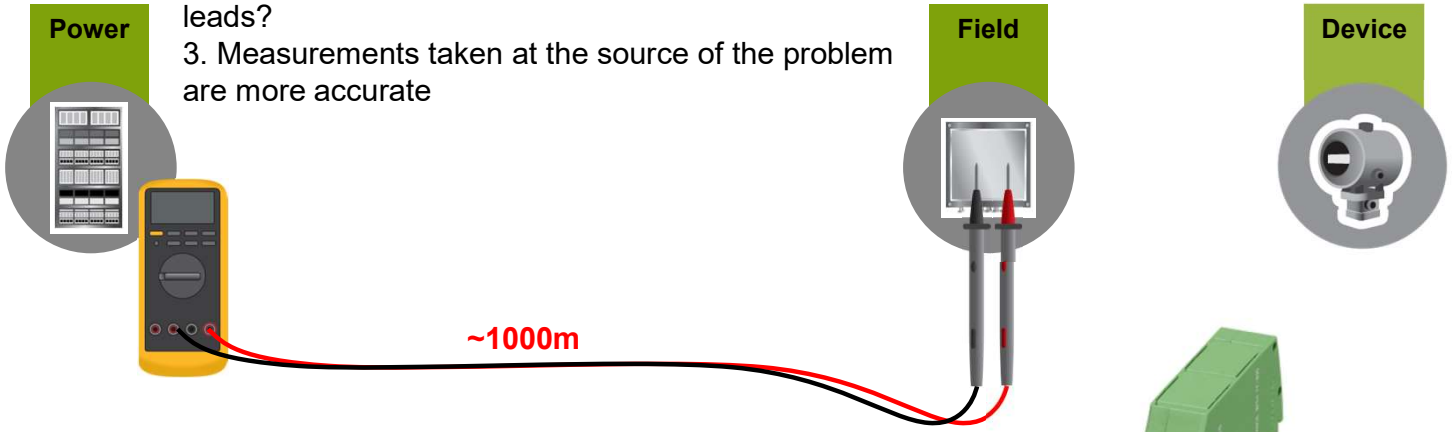
PHOENIX CONTACT
INSPIRING INNOVATIONS

Field Diagnostic Module



Install it where it matters the most…

1. Do you actually know what is happening out here?
2. Would you **trust** decisions to a meter with 1km leads?
3. Measurements taken at the source of the problem are more accurate



In the Field… with Modular or Block couplers

- That's where your instruments & control are
- Electrically different (far) from control cabinet
- Enables the 'Smart' Junction Box
- Acts like a Field technician maintenance 'tool'
- Ability to read Physical Layer measurements in the Control Room

PHOENIX CONTACT
INSPIRING INNOVATIONS

Field Diagnostics Module

Easy System Integration

- **Operates over H1 protocol**
  - No secondary bus structure
  - No superimposed signaling on top of H1
  - Bus powered
  - Not in control schedule, report by exception
- **Integrate using DD, EDD, DTM**
  - Commission just like a Field device
  - Plug & play in AMS, PRM, etc
  - FF-912 & NE-107 ‘Field Diagnostics’
  - Legacy DCS support through function blocks

Key Diagnostic Measurements:

- ✓ Bus voltage
- ✓ Min & max signal levels
- ✓ Fieldbus noise levels
- ✓ Shield short information
- ✓ Device addresses
- ✓ Live List
- ✓ Data retransmits
- ✓ Ambient temperature
- ✓ Commissioning Report

PHOENIX CONTACT
INSPIRING INNOVATIONS

Field Diagnostics Module

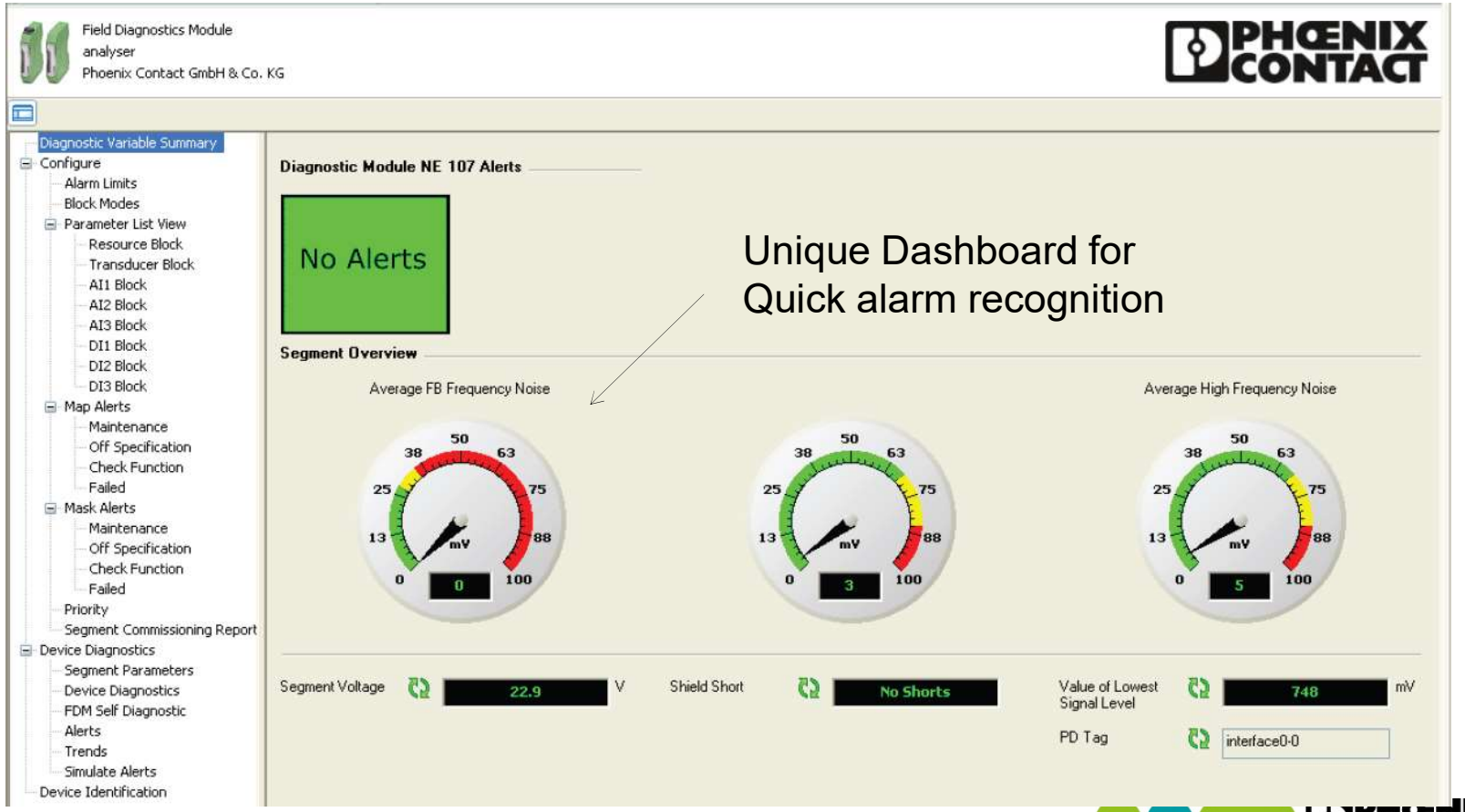
- License-Free Software
- DTM and EDD capable, easy download from website
- Easy integration into all FDT Container software
- Tested in approved for some DCS Manufacturers

Configuration File

	Description	Language	Revision
☐	[zip, 4 MB] **Configuration File** Device type manager (DTM) FDM_DTM_1.2.0.541.zip	International	1.2.0
☐	[zip, 437 KB] **Configuration File** Device description (DD) with electronic device description language (EDDL, DD5) FDM_DD_W_AMS_1.0.zip	Internation	

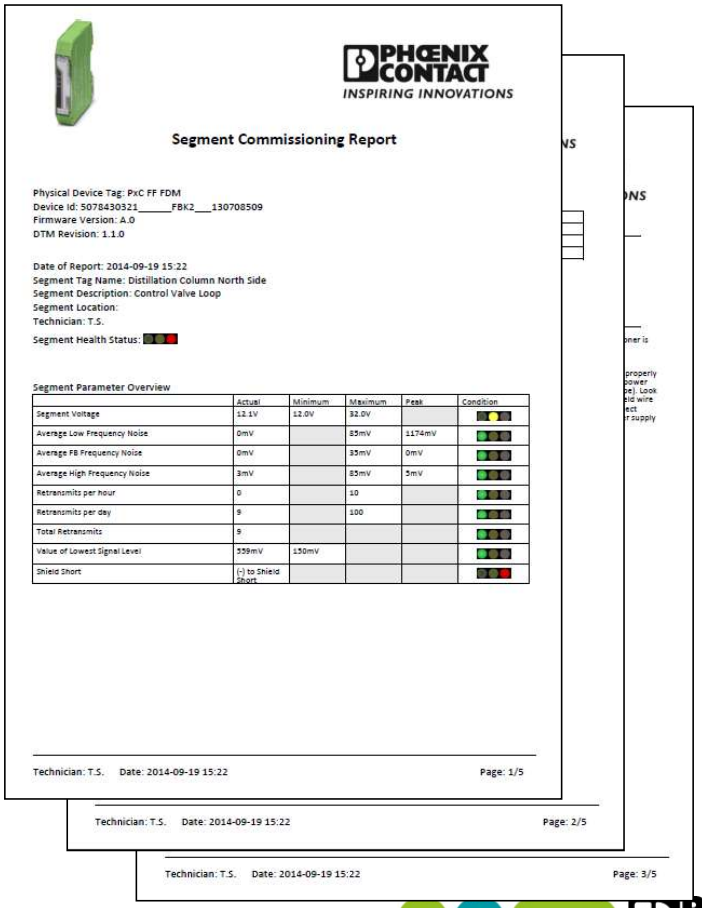
PHOENIX CONTACT
INSPIRING INNOVATIONS

Field Diagnostics Module Demo



Field Diagnostics Module Report

- Field report gives an overview of Segment health in a convenient PDF or Excel style format
- Report highlights alarm conditions and measurements of import physical layer characteristics such as voltage, noise, device signal level, and re-transmits



PHOENIX CONTACT
INSPIRING INNOVATIONS

Segment Commissioning Report

Physical Device Tag: PxC FF FDM
Device Id: 5078430321_____FBK2___130708509
Firmware Version: A.0
DTM Revision: 1.1.0

Date of Report: 2014-09-19 15:22
Segment Tag Name: Distillation Column North Side
Segment Description: Control Valve Loop
Segment Location:
Technician: T.S.
Segment Health Status:

Segment Parameter Overview

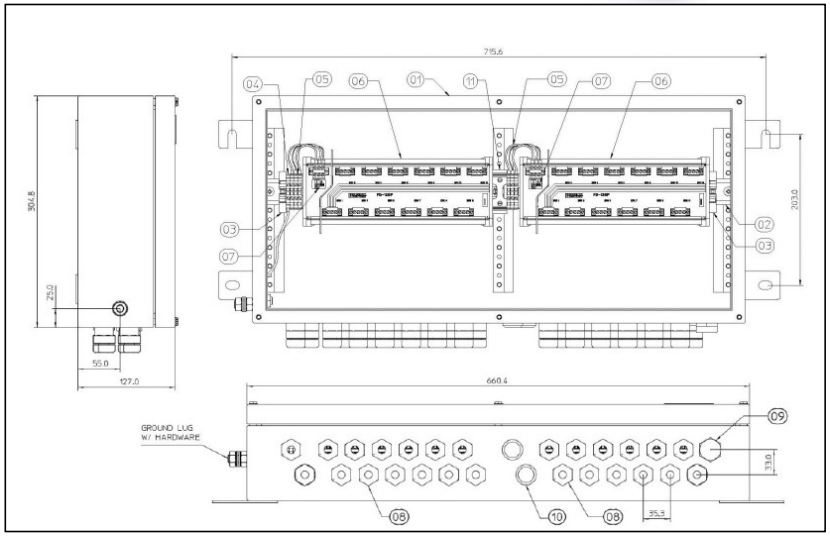
	Actual	Minimum	Maximum	Peak	Condition
Segment Voltage	12.1V	12.0V	32.0V		
Average Low Frequency Noise	0mV		85mV	1174mV	
Average FB Frequency Noise	0mV		85mV	0mV	
Average High Frequency Noise	3mV		85mV	5mV	
Retransmits per hour	0		10		
Retransmits per day	9		100		
Total Retransmits	9				
Value of Lowest Signal Level	359mV	150mV			
Shield Short	(-) to Shield Short				

Technician: T.S. Date: 2014-09-19 15:22 Page: 1/5

Technician: T.S. Date: 2014-09-19 15:22 Page: 2/5

Technician: T.S. Date: 2014-09-19 15:22 Page: 3/5

Professional Services



Custom Turnkey Solutions

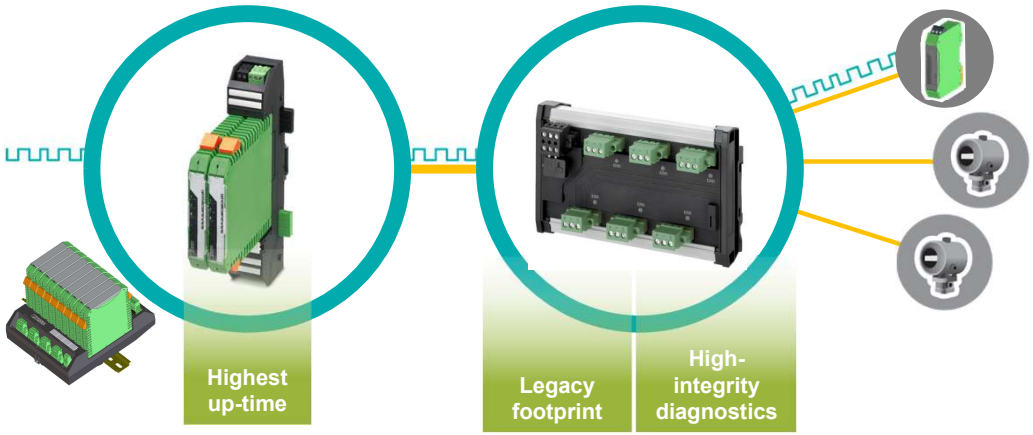
- Standard configurations
  - Weeks delivery
  - Customer-specified configurations
    - Lead-time based on complexity
- Certified Approval testing
  - ATEX
  - UL 508/698
- Commitment to stocked sub-assemblies
- Engineering services

PHOENIX CONTACT
INSPIRING INNOVATIONS

Solution Profile

Centralized Distribution Architecture

- **Preconfigured assembly** for non-critical and/or zone 2 areas
- **Highest up-time** through ACB technology
- **Footprint** for legacy environments
- **High integrity** supervised communication

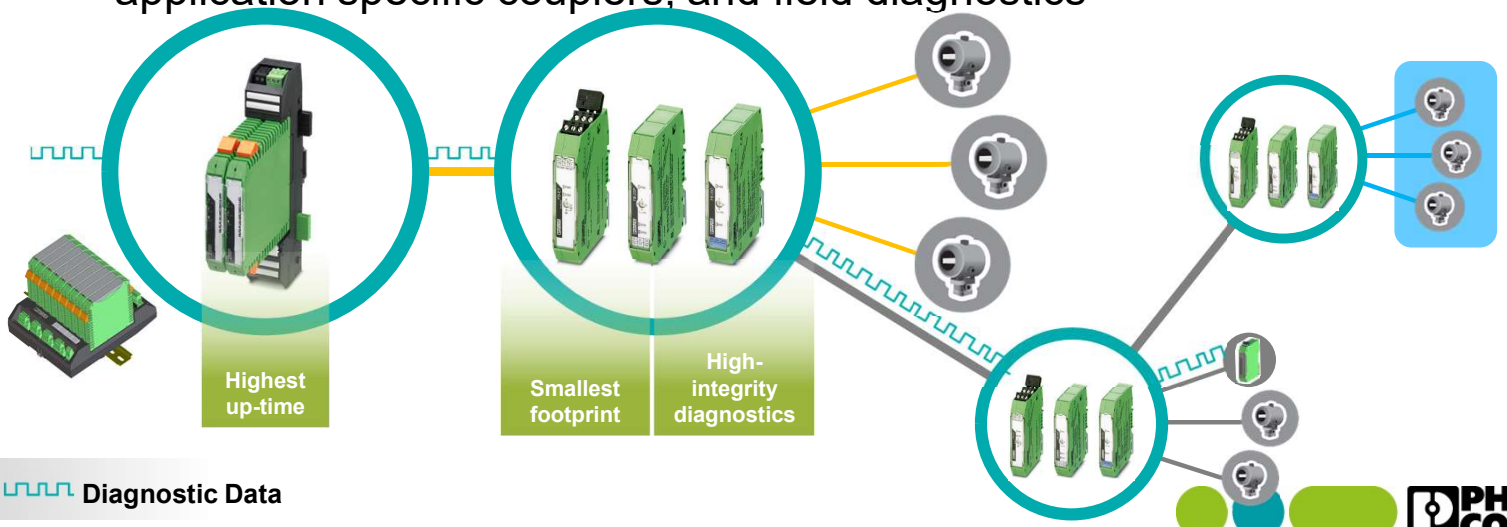


PHOENIX CONTACT
INSPIRING INNOVATIONS

Solution Profile

Modular Distribution Architecture

- Modular couplers for mixing hazardous area classifications
- Highest up-time through ACB technology
- Smallest footprint through modularity
- Accurate diagnostic information through flexible FDM
- Highest integrity through redundant bulk and fieldbus power, application specific couplers, and field diagnostics



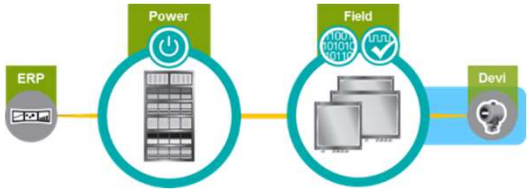
PHOENIX CONTACT
INSPIRING INNOVATIONS

FOUNDATION Fieldbus Power

ACB TECHNOLOGY

ISA G3 Harsh Severity Level tested

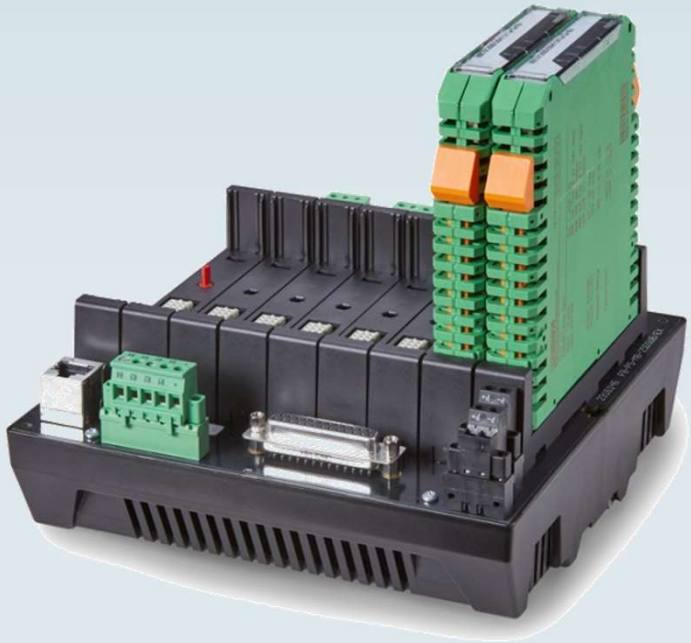
- Utilizes Key Features of QUINT line with the reliability of Fieldbus
- Modular base eliminates unused capacity
- Integrated diagnostic relay in each plug
- Bulk power distribution and common error messaging between bases
- ACB Technology maximizes the service life of the power supplies
- 500 mA @ 28 VDC



Product overview

PHOENIX CONTACT
INSPIRING INNOVATIONS

FOUNDATION Fieldbus Power



ISA G3 Harsh Severity Level tested

- Class 1 Division 2, Zone 2 Installation
- -40C….+70C operating temperature range
- 180mm x 77mm x 180mm
- Integrated Relay diagnostics
- Host Connection options
  - D-SUB 25 socket connector
  - Invensys® D-SUB 25 cable
  - Two Yokogawa AKB336 20-pin cables
  - Four terminal block connections (no approvals)

FOUNDATION Fieldbus Power

							
	FB-PS-PLUG-24DC/28DC/0.5/EX	**FB-PS-BASE/EX**	**FB-PS-MB-25DSUB/EX**	**FB-PS-MB-Y/EX**	**FB-PS-MB-I/EX**	**D-FB-PS**	**ZEC 1,5/ 4-LPV-5,0 C2,4 BK**
Description	Power supply plug for fieldbus system in hazardous locations	Base for fieldbus power supply plugs.	Universal four-channel, redundant fieldbus power supply base with D-SUB 25 host connector. **Universal four channel redundant fieldbus power supply base with Host Terminal blocks available (2316155)**	Yokogawa four-channel, redundant fieldbus power supply base with host connectors for two AKB336 Yokogawa 20-pin cables.	Invensys four-channel, redundant, fieldbus power supply base with host connector for Invensys D-SUB 25 cable.	End cover for FB-PS-BASE/EX base. Use in power and indicator bus at each end base.	PCB connector, nominal current: 10 A, rated voltage (III/2): 320 V, number of positions: 4, pitch: 5 mm, color: black, contact surface: Tin, mounting: Direct plug-in method
	Provides 500 mA @ 28 V DC to couplers along the trunk.	Provides redundancy when 2 plugs are installed. Redundancy is maintained across multiple bases via internal power buses. Additional internal bus provides remote indication.					
Order number	2316132	2316145	2316146	2316148	2316149	2316226	1793260

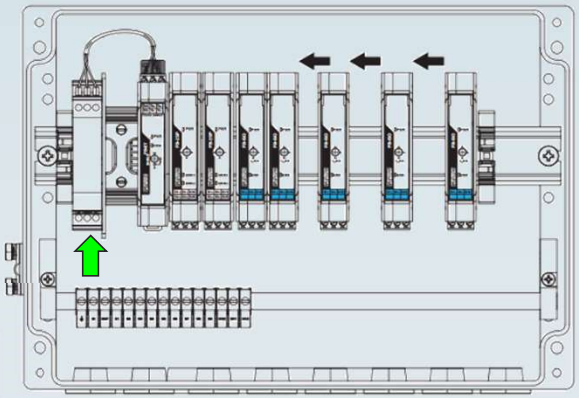
INSPIRING INNOVATIONS

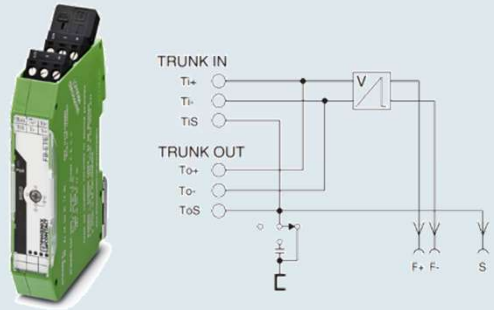
Fieldbus Device Couplers

Modular field device coupler for Zone 2

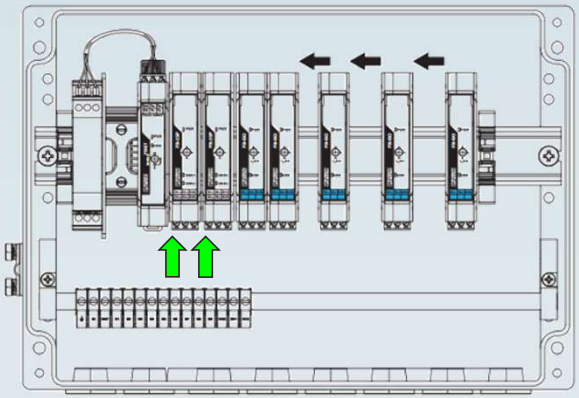
- For PROFIBUS PA and Foundation Fieldbus
- Three main devices:
  - Trunk line module
  - Coupling module
  - Diagnostic module
- For Zone 2 installations, with connection of Zone 0, 1 and 2 instruments in the same housing
- Integration in the control level is carried out via standard H1 (FF) communication and device management using DD, EDDL and DTM.

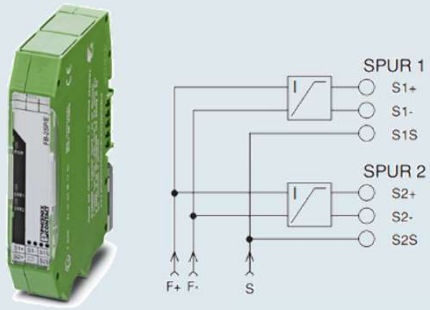
Fieldbus Device Couplers



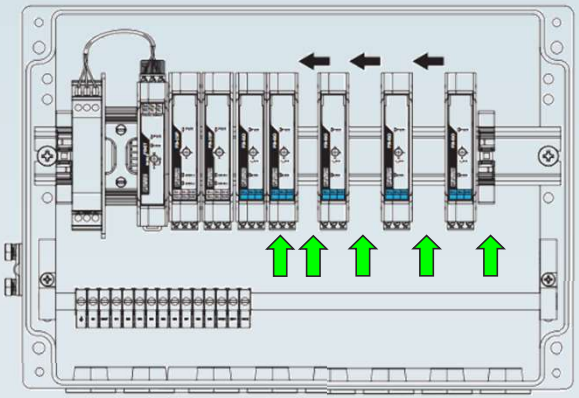


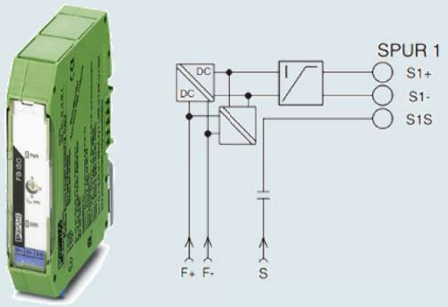
FB-ET/E





FB-2SP/E





FB-ISO

Fieldbus Device Couplers






	FB-ET/E	FB-2SP/E	FB-2SP/24DC	FB-ISO	FB-DIAG/FF/LI	FB-DIAG/FF/NC
Description	Trunk module for Foundation Fieldbus and PROFIBUS PA modular device couplers with terminator	Device coupler for Foundation Fieldbus and PROFIBUS PA with terminal connections for 2 spurs connected to fieldbus end devices	Foundation Fieldbus isolator for Zone 2 installation using the intrinsically safe [ic] protection method.	Device coupler for Foundation Fieldbus and PROFIBUS PA. Provides intrinsically safe FISCO connection to a single end device.	Field diagnostics module, legacy installation, includes pluggable side connector. For Foundation Fieldbus	Field diagnostic module, includes TBUS connector. For Foundation Fieldbus
	Redundancy (High Reliability)		ATEX ic Zone 2	Ex ia, Zone 0		
Order number	2316050	2316052	2316352	2316064	2316284	2316297

INSPIRING INNOVATIONS

Fieldbus Device Couplers

	FB-MODULAR-PP	FIELDBUS TERMINATOR
Description	Partition plate used between two fieldbus modular device couplers and provides the required 50 mm spacing between an **intrinsically safe** electrical connection and a **non-intrinsically safe** electrical connection.	The fieldbus terminator plug is pre-installed in the trunk out connection of device couplers. It is required to be installed at the end of each fieldbus segment to realize impedance matching of the network.
Order number	2316061	2316034

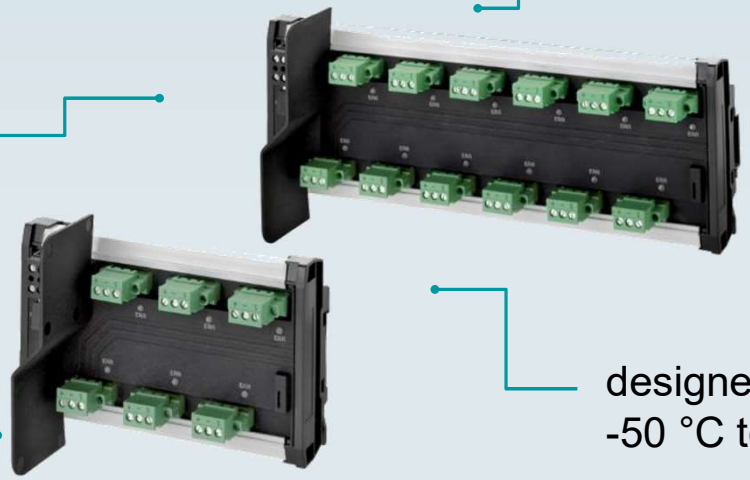
Example of non-intrinsically safe and intrinsically safe signal connections on same t-bus back plane

PHOENIX CONTACT
INSPIRING INNOVATIONS

Fieldbus Device Couplers

Field device coupler for Zone 2 / Division 2

Field device couplers for **PROFIBUS PA** and **FOUNDATION Fieldbus** with **6 and 12 channels**



Save space
highly compact and connection takes place on one side from below

Terminator preinstalled

designed for ambient temperatures of -50 °C to +90 °C.

ISA G3 Harsh Severity Level tested

PHOENIX CONTACT
INSPIRING INNOVATIONS

Fieldbus Device Couplers

Zone 1 Installation

IP 30 Trunk cover

1 kilogram

2g Vibration
15g shock

NAMUR NE 21
FF-846
ISA G3 tested

1500 V AC Isolation
between Trunk and Spur

-40º ... 80º Celsius
operating temperature

35mA maximum current draw per spur

PHOENIX CONTACT
INSPIRING INNOVATIONS

Fieldbus Device Couplers




	FB-6SP	FB-12SP	FB-8SP ISO	FB-12SP ISO
Interface 1	Foundation Fieldbus and PROFIBUS PA Segment			
No. of ports	6	12	8	12
Located in	Zone 2	Zone 2	Zone 1	Zone 1
Order number	2316307	2316310	2316311	2316312

PHOENIX CONTACT
INSPIRING INNOVATIONS

Fieldbus Device Couplers – Terminal box

Enclosure Solution for Zone 2 / Division 2

Grounding Lug

316 Stainless Steel

Removable Hinges

Pad lock capable

6 and 12 channel

Available with Terminal blocks or Surge base for Trunk Connection

Single piece gasket – IP66

ATEX, IEC Ex , Class 1 Div 2 System

Fieldbus Device Couplers – Terminal box

				
	FB1-S1-6SP-T-0-10-00-0-0	**FB1-S1-6SP-S-0-10-00-0-0**	**FB2-S1-12SP-T-0-16-00-0-0**	**FB2-S1-12SP-S-0-16-00-0-0**
Description	FF/PA - 6-spur block junction box	FF/PA - 6-spur block junction box	FF/PA - 12-spur block junction box	FF/PA - 12-spur block junction box
Connect up to	6 field devices	6 field devices	12 field devices	12 field devices
Surge protection	No	**Trunk cable (+, -, S) is connected to a Plugtrab surge base (PT 4+F-BE)**	No	**Trunk cable (+, -, S) is connected to a Plugtrab surge base (PT 4+F-BE)**
Features	Terminator preinstalled Provides current limiting short-circuit protection per spur	Terminator preinstalled Provides current limiting short-circuit protection per spur	Terminator preinstalled Provides current limiting short-circuit protection per spur	Terminator preinstalled Provides current limiting short-circuit protection per spur
Order number	2316420	2316446	2316417	2316433

PHOENIX CONTACT
INSPIRING INNOVATIONS

Protocol Converter

A **Protocol converter** is a device used to convert the protocol of one device to the protocol suitable for the other device or tools to achieve the interoperability. This is sometimes referred to as a gateway, although a gateway typically has higher functionality.

Protocol Converter - MODBUS – DP/PA/FF

Converts Modbus RTU variables to modern digital Fieldbus signals

Set up and Parameterization via DD, EDD, GSD, & DTM from the Host/Asset Management System

Connect up to 4 legacy Modbus RTU devices to a fieldbus (maximum of 16 total registers per converter)

2-wire RS485 interface (1200…115.2kbps)

MODBUS RTU
to Profibus DP, Profibus PA or Fieldbus Foundation converter

Protocol Converter HART – DP/PA/FF

Set up and Parameterization via DD, EDD, GSD, & DTM from the Host/Asset Management System

Converts HART instrument data to modern digital Fieldbus signals

Connects up to 4 HART instruments to a Fieldbus (4 process variables maximum per converter)

2-wire HART loop signal connections using terminal blocks

Digital HART data to Profibus DP, Profibus PA or Fieldbus Foundation converter

Protocol Converter

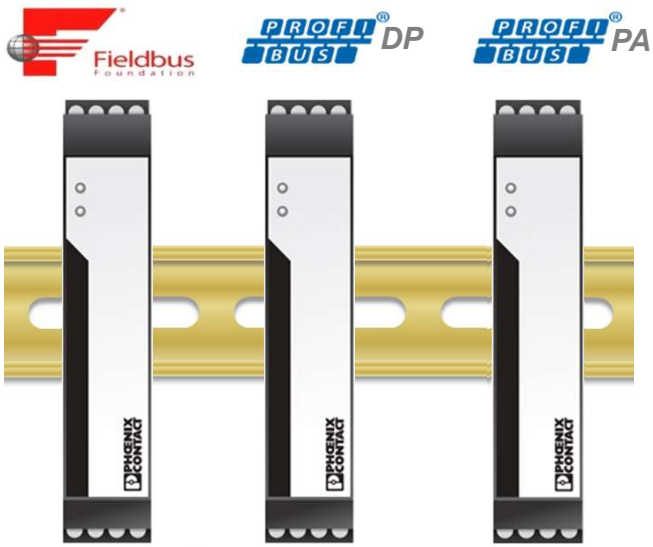
	GW PL FF/MODBUS	GW PL PA/MODBUS	GW PL DP/MODBUS	GW PL FF/HART	GW PL PA/HART	GW PL DP/HART
Description	Modbus/RTU to FOUNDATION Fieldbus protocol converter	Protocol converter capable of connecting four Modbus/RTU devices to a PROFIBUS PA network	Modbus/RTU to PROFIBUS DP protocol converter	Protocol converter capable of connecting four HART (4-20 mA) devices to a Foundation Fieldbus network	Protocol converter capable of connecting four HART (4-20 mA) devices to a PROFIBUS PA network	Protocol converter capable of connecting four HART (4-20 mA) devices to a PROFIBUS DP network
Interface 1	Foundation Fieldbus	Profibus PA	Profibus DP	Foundation Fieldbus	Profibus PA	Profibus DP
Interface 1 connector	Combicon	Combicon	D-SUB 9, Combicon	Combicon	Combicon	D-SUB 9, Combicon
Interface 2	HART FSK	HART FSK	Modbus RTU	HART FSK	HART FSK	HART FSK
Interface 2	Combicon	Combicon	Combicon	Combicon	Combicon	Combicon
Order number	2316363	2316364	2316365	2316360	2316361	2316362

PHOENIX CONTACT
INSPIRING INNOVATIONS

Protocol Converters

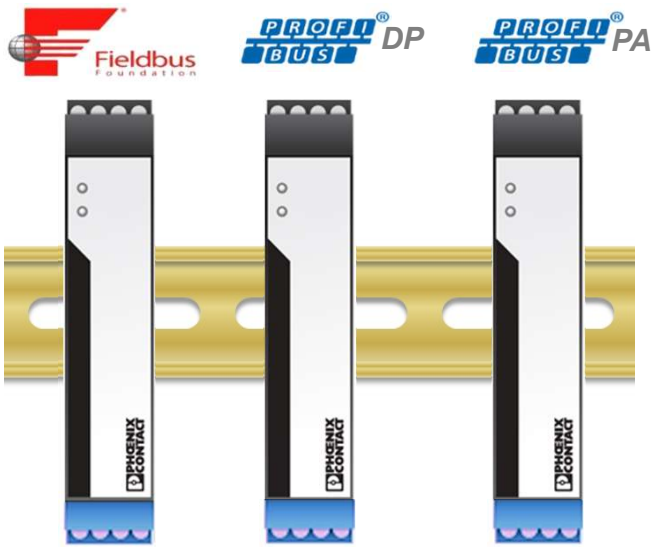
new

Available July 2015!



Modbus

- connect up to 4 Modbus devices
- 2-wire RS485 interface (1200…115.2kbps)
- converts up to 4 variables (float, unsigned, integer) per device



HART COMMUNICATION PROTOCOL

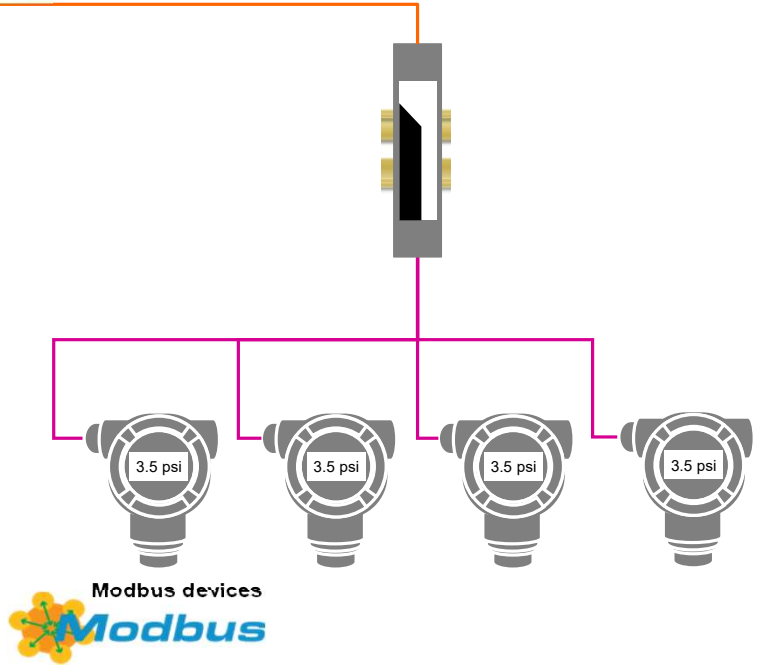
- connect up to 4 HART devices
- supplies loop current (intrinsically safe)
- supports active current sourcing devices
- converts HART universal commands

PHOENIX CONTACT INSPIRING INNOVATIONS

Application example

Fieldbus OR PROFIBUS DP OR PROFIBUS PA

Modbus	PA
4XXXX	AI 1–TB 1
4XXXX	AI 2-TB 2
4XXXX	AI 3–TB 3
4XXXX	AI 4-TB 4



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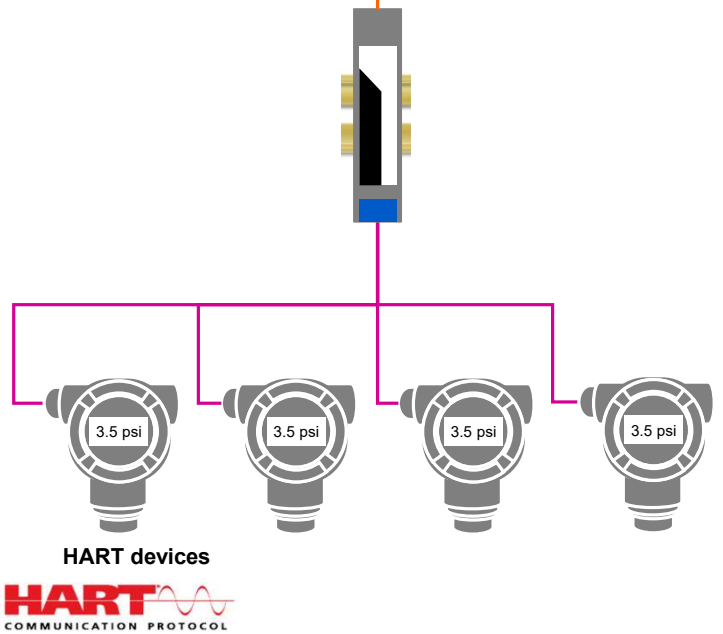
Application example

Fieldbus Foundation OR PROFIBUS DP OR PROFIBUS PA

HART	PA
PV	AI 1–TB 1
SV	AI 2-TB 2
TV	AI 3–TB 3
QV	AI 4-TB 4



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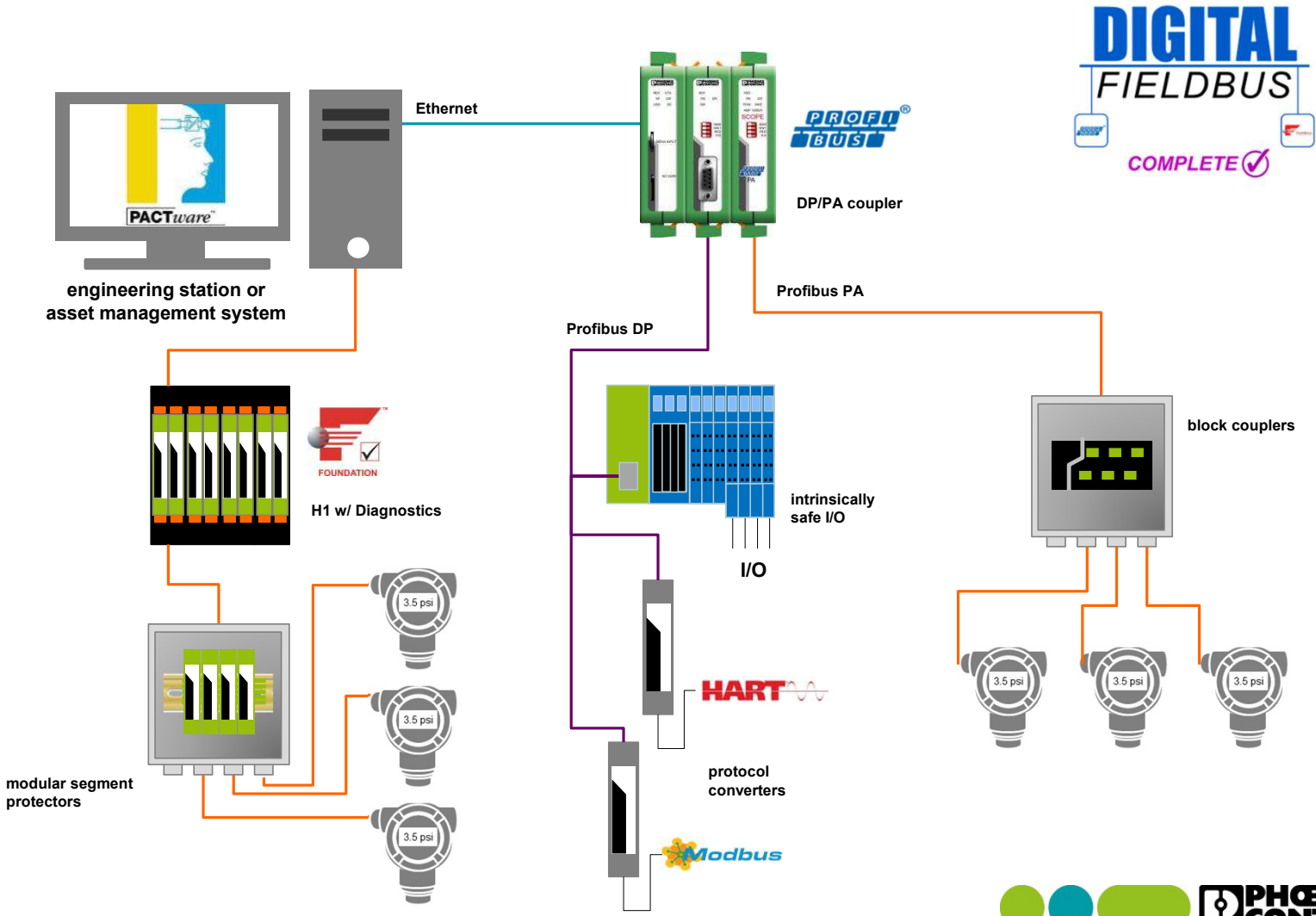

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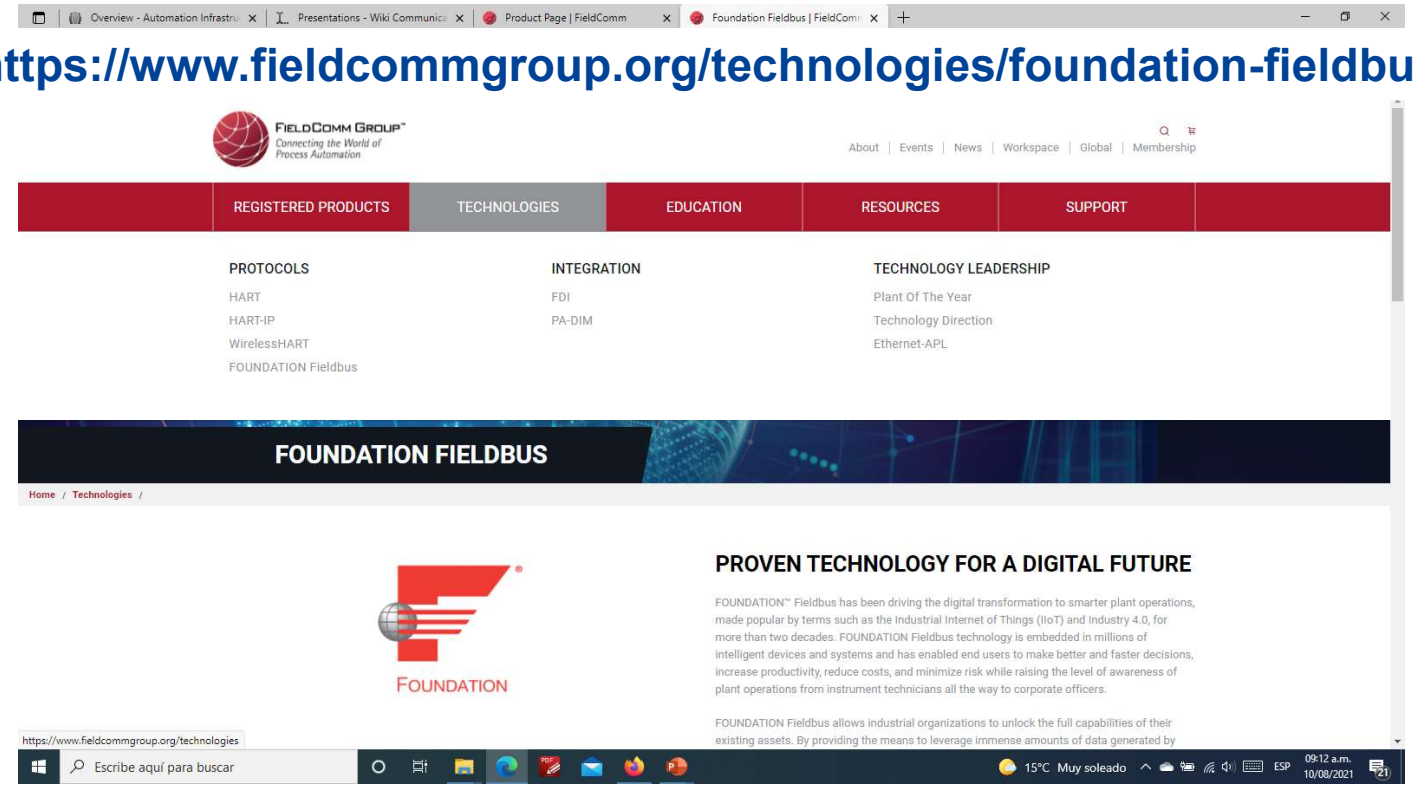
Foundation Fieldbus

https://www.fieldcommgroup.org/technologies/foundation-fieldbus



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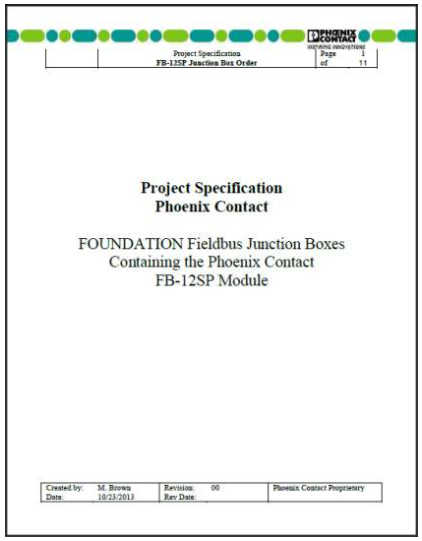
Foundation Fieldbus

Success Story

- Expansion project at refinery has elected to use custom junction boxes using FB-12SP (60+ enclosures)
- I/O & Networks Engineering designed custom enclosures according to specification from partner
- Future expansion projects planned for refinery using enclosure systems with FB-ISO and Diagnositcs module (FDM)



Project Specification
FB-12SP Junction Box Order

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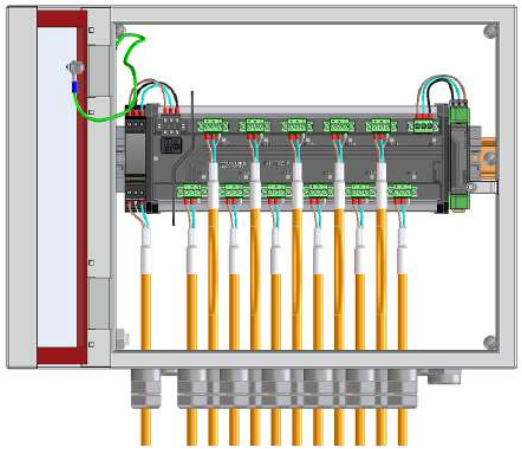
of 11

Project Specification
Phoenix Contact

FOUNDATION Fieldbus Junction Boxes
Containing the Phoenix Contact
FB-12SP Module

Created by: M. Brown		Revision: 00	Phoenix Contact Proprietary
Date: 10/23/2013		Rev Date:	



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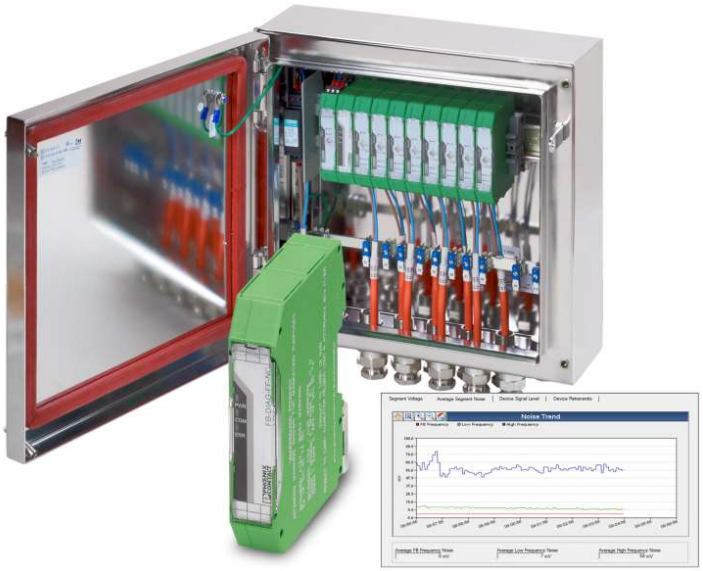
Success Story

- Project Origin
  - Project originated after last project
  - The end-user is ….one of the largest oil companies in the world
  - Had a need for Fieldbus Diagnostics as they were having communication issues on their Fieldbus network
- Solution Results
  - Phoenix Contact was able to provide a solution with partner solution to help solve their communication issues
  - The customer implemented (11) FDM, (11)FB-ET and (30) FB-2SP modules as part of a plant expansion
  - The end-user was very impressed with the functionality of the FDM and also how versatile the module is for their application needs



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Success Story

- Phoenix Contact has built a strong relationship with Emerson partner, promoting Foundation Fieldbus technology

- Foundation Fieldbus project identified with a mining expansion project for the treatment of water for mineral separation

- Initial order for 17 segments consisting of Diagnostics (FDM), FB-ET, FB-2SP, and PxC terminals and Power

- Partner plans to use FDM as diagnostics standard for both future and legacy Fieldbus installations

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Success Story

- **Project Origin**
  - Local process sales had relationship with head of instrumentation at the plant. ETP project was identified and meeting was set to discuss concerns over the migration to Ex ic from “nonincendive”.
- **Challenge**
  - EU did not want to rely on the FF power supply to be the source of voltage limitation; risk reduction
  - EU wanted the Ex ic circuit to start at the device coupler. This was not available in the market.
- **Solution**
  - A new product is designed to meet EU’s needs: FB-2SP/24VDC
  - Sole on-spec for the project with our new module solution. Includes FDM per segment, redundant power, terminal marshaling cabinets, and all custom FF boxes based on our standard platform.

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Success Story

- Foundation Fieldbus project WWT identified with a mining expansion project for the treatment of water for mineral separation

- Initial order for 73 segments consisting of custom Junction Boxes including FB-ET, FB-2SP, and PxC terminals for Surge. Also 73 FF Power Segments.

- SI Process plans to use FDM as diagnostics standard for both future and legacy Fieldbus installations

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Solutions for Process Automation

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Built to last | Shell's Prelude

Gracias por su presencia

Antonio Gordillo agordillo@phoenixcontact.com.mx 55 3233 6518

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