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6 mm Series of Isolators and Converters

Models no. 3103 / 3104 /
3105 / 3108 / 3109

No. 3100V107-UK



ATEX



- DK** ▶ PR electronics A/S tilbyder et bredt program af analoge og digitale signalbehandlingsmoduler til industriel automation. Programmet består af Isolatorer, Displays, Ex-barrierer, Temperaturtransmittere, Universaltransmittere mfl. Vi har modulerne, du kan stole på i selv barske miljøer med elektrisk støj, vibrationer og temperaturudsving, og alle produkter opfylder de strengeste internationale standarder. Vores motto »Signals the Best« er indbegrebet af denne filosofi - og din garanti for kvalitet.
- UK** ▶ PR electronics A/S offers a wide range of analogue and digital signal conditioning devices for industrial automation. The product range includes Isolators, Displays, Ex Interfaces, Temperature Transmitters, and Universal Devices. You can trust our products in the most extreme environments with electrical noise, vibrations and temperature fluctuations, and all products comply with the most exacting international standards. »Signals the Best« is the epitome of our philosophy - and your guarantee for quality.
- FR** ▶ PR electronics A/S offre une large gamme de produits pour le traitement des signaux analogiques et numériques dans tous les domaines industriels. La gamme de produits s'étend des transmetteurs de température aux afficheurs, des isolateurs aux interfaces SI, jusqu'aux modules universels. Vous pouvez compter sur nos produits même dans les conditions d'utilisation sévères, p.ex. bruit électrique, vibrations et fluctuations de température. Tous nos produits sont conformes aux normes internationales les plus strictes. Notre devise »SIGNALS the BEST« c'est notre ligne de conduite - et pour vous l'assurance de la meilleure qualité.
- DE** ▶ PR electronics A/S verfügt über ein breites Produktprogramm an analogen und digitalen Signalverarbeitungsmodulen für die industrielle Automatisierung. Dieses Programm umfasst Displays, Temperaturtransmitter, Ex- und galvanische Signaltrenner, und Universalgeräte. Sie können unsere Geräte auch unter extremen Einsatzbedingungen wie elektrisches Rauschen, Erschütterungen und Temperaturschwingungen vertrauen, und alle Produkte von PR electronics werden in Übereinstimmung mit den strengsten internationalen Normen produziert. »Signals the Best« ist Ihre Garantie für Qualität!

6 MM SERIES OF ISOLATORS AND CONVERTERS

3103 / 3104 / 3105 / 3108 / 3109

CONTENTS

Warning.....	2
Safety instructions.....	4
UL installation	4
cFMus installation in Division 2 or Zone 2.....	5
IECEX, ATEX installation in Zone 2	5
Flexible supply.....	7
Mounting and demounting of system 3000	8
Installation on DIN rail	9
Supply of power rail.....	9
Side label.....	9
Highlights.....	10
Applications.....	10
Product overview.....	11
Electrical specifications.....	13
Connections	15
Installation on power rail.....	16
Marking	16
DIP-switch programming	17
3104	17
3105	18
3109	18
LED indication	19

NB.: Click on the entries in the table of contents to go to the desired section.



GENERAL

WARNING

To avoid the risk of electric shock and fire, the safety instructions of this manual must be observed and the guidelines followed. The specifications must not be exceeded, and the device must only be applied as described in the following.

Prior to the commissioning of the device, this manual must be examined carefully.

Only qualified personnel (technicians) should install this device. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Until the device is fixed, do not connect hazardous voltages to the device.

Repair of the device must be done by PR electronics A/S only.



**HAZARD-
OUS
VOLTAGE**

WARNING

In applications where hazardous voltage is connected to in-/outputs of the device, sufficient spacing or isolation from wires, terminals and enclosure to surroundings (incl. neighbouring devices), must be ensured to maintain protection against electric shock.

The connector behind the front cover of 3114 is connected to the input terminals on which dangerous voltages can occur.



CAUTION

Potential electrostatic charging hazard. To avoid the risk of explosion due to electrostatic charging of the enclosure, do not handle the units unless the area is known to be safe, or appropriate safety measures are taken to avoid electrostatic discharge.

SYMBOL IDENTIFICATION



Triangle with an exclamation mark: Read the manual before installation and commissioning of the device in order to avoid incidents that could lead to personal injury or mechanical damage.



The CE mark proves the compliance of the device with the essential requirements of the directives.



Ex devices have been approved according to the ATEX directive for use in connection with installations in explosive areas.

SAFETY INSTRUCTIONS

RECEIPT AND UNPACKING

Unpack the device without damaging it and check whether the device type corresponds to the one ordered. The packing should always follow the device until this has been permanently mounted.

ENVIRONMENT

Avoid direct sunlight, dust, high temperatures, mechanical vibrations and shock, as well as rain and heavy moisture. If necessary, heating in excess of the stated limits for ambient temperatures should be avoided by way of ventilation. All devices can be used for Measurement/Overvoltage Category II and Pollution Degree 2. The module is designed to be safe at least under an altitude up to 2 000 m.

MOUNTING

Only technicians who are familiar with the technical terms, warnings, and instructions in the manual and who are able to follow these should connect the device.

Should there be any doubt as to the correct handling of the device, please contact your local distributor or, alternatively,

PR electronics A/S
www.prelectronics.com

Mounting and connection of the device should comply with national legislation for mounting of electric materials, i.e. wire cross section, protective fuse, and location.

Descriptions of input / output and supply connections are shown in this manual and on the side label.

The device is provided with field wiring terminals and shall be supplied from a Power Supply having double / reinforced insulation. A power switch should be easily accessible and close to the device. The power switch shall be marked as the disconnecting unit for the device.

SYSTEM 3000 must be mounted on a DIN rail according to EN 60715.

UL INSTALLATION

Use 60/75°C copper conductors only.

Wire size AWG 26-12

UL file number E314307

The device is an Open Type Listed Process Control Equipment. To prevent injury resulting from accessibility to live parts the equipment must be installed in an enclosure.

The power supply unit must comply with NEC Class 2, as described by the National Electrical Code® (ANSI / NFPA 70).

cFMus INSTALLATION IN DIVISION 2 OR ZONE 2

Class I, Div. 2, Group A, B, C, D T4 or I, Zone 2, AEx nA IIC T4 or Ex nA IIC T4.

In class I, Division 2 or Zone 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of Class I, Division 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70) or in Canada in the Canadian Electrical Code (C22.1).

The 3000 System Isolators and Converters must be connected to limited output NEC Class 2 circuits, as outlined in the National Electrical Code® (ANSI / NFPA 70), only. If the devices are connected to a redundant power supply (two separate power supplies), both must meet this requirement.

Where installed in outdoor or potentially wet locations the enclosure shall at a minimum meet the requirements of IP54.

Warning: Substitution of components may impair suitability for zone 2 / division 2.

Warning: To prevent ignition of the explosive atmospheres, disconnect power before servicing and do not separate connectors when energised and an explosive gas mixture is present.

Warning: Do not mount or remove devices from the power rail when an explosive gas mixture is present.

IECEX, ATEX INSTALLATION IN ZONE 2

IECEX KEM 10.0068 X Ex nA IIC T4 Gc

KEMA 10ATEX0147 X..... II 3 G Ex nA IIC T4 Gc

For safe installation the following must be observed. The device shall only be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this area.

Year of manufacture can be taken from the first two digits in the serial number.

The devices shall be installed in a suitable enclosure providing a degree of protection of at least IP54 according to EN60529, taking into account the environmental conditions under which the equipment will be used.

When the temperature under rated conditions exceeds 70°C at the cable or conduit entry point, or 80°C at the branching point of the conductors, the temperature specification of the selected cable shall be in compliance with the actual measured temperature.

Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40%.

For installation on power rail in zone 2, only Power Rail type 9400 supplied by Power Control Unit type 9410 is allowed.

To prevent ignition of the explosive atmospheres, disconnect power before servicing and do not separate connectors when energised and an explosive gas mixture is present.

Do not mount or remove devices from the power rail when an explosive gas mixture is present.

CLEANING

When disconnected, the device may be cleaned with a cloth moistened with distilled water.

LIABILITY

To the extent the instructions in this manual are not strictly observed, the customer cannot advance a demand against PR electronics A/S that would otherwise exist according to the concluded sales agreement.

FLEXIBLE SUPPLY

The units can be supplied with 24 VDC \pm 30% via direct wiring and a loop between the devices. This permits the supply of up to 130 units.

Protective fuse: 2.5 A.



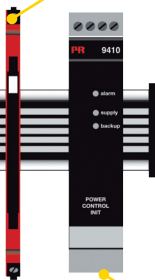
Protective fuse: 0.4 A.

Alternatively, the 24 V supply voltage can be distributed via a power rail that receives the voltage from another connected unit (3103, -04, -05, -08, -09, or -14). In this way up to 20 units can be supplied.

Fuse characteristics: The 2.5 A fuse must break after not more than 120 seconds at 6.4 A.

The power connector unit 3405 is a standalone supply unit which supplies the power rail. With 3405, up to 100 units can be supplied.

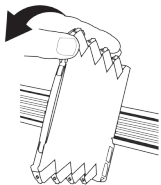
Protective fuse: 2.5 A.



Protective fuse: PR 9410.

With the power control unit 9410 redundant supply is possible. This solution can supply up to 200 units.

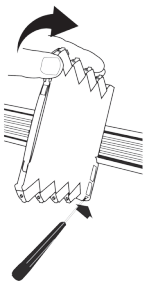
MOUNTING AND DEMOUNTING OF SYSTEM 3000



Picture 1:

Mounting on DIN rail / power rail.

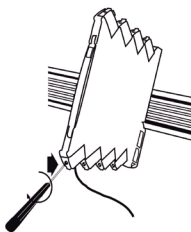
Click the device onto the rail



Picture 2:

Demounting from DIN rail / power rail .

First, remember to demount the connectors with hazardous voltages. Detach the device from the rail by lifting the bottom lock.



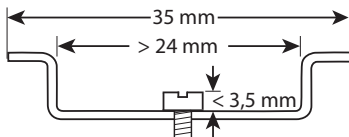
Picture 3:

Wire size 0.13 x 2.5 mm² stranded wire.

Screw terminal torque 0.5 Nm.

INSTALLATION ON DIN RAIL

To avoid short circuit between the power rail connectors on the 3000 devices and the screws holding the 7.5 mm DIN rail, the head of the screws shall be no more than 3.5 mm high.



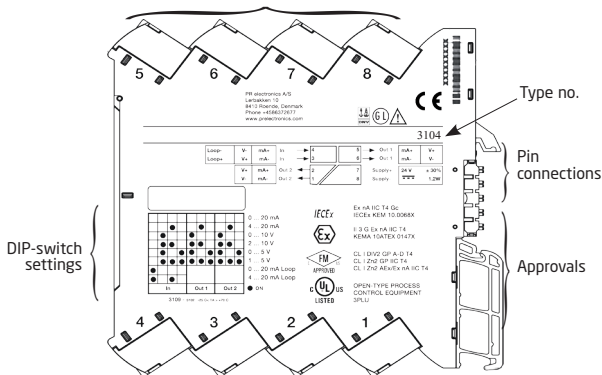
SUPPLY OF POWER RAIL

It is possible to supply the power rail via the supply terminals.

The terminals can pass a current of max. 400 mA.

SIDE LABEL

Terminal numbers



6 MM SERIES OF ISOLATORS AND CONVERTERS 3103 / 3104 / 3105 / 3108 / 3109

The product family 3103, 3104, 3105, 3108 & 3109 are slimline isolators for 24 VDC fixed supply and can be used for different purposes.

Highlights

- *Can be supplied separately or installed on power rail*
- *Can be delivered with customer parameterisation on request*
- *Approvals by CE, UL, DNV, GL, ATEX zone 2, IECEx zone 2 and FM Div. 2*
- *Possibility of loop supply output*

Applications

The 3000 isolator family are designed for the automation and process industries. These devices are the result of extensive development and test procedures making them very well suited for conversion and galvanic isolation in the following applications:

- Isolation and 1:1 conversion of current signals in the range 0...20 mA.
- Isolation and conversion of standard DC signals.
- Power supply and signal isolator for 2-wire transmitters.
- Isolation and splitting of standard DC signals.
- Installation in ATEX Ex zone 2 / IECEx zone 2 / FM division 2.
- Suitable for environments with high vibration stress, e.g. ships

Product overview

PR type no.	3103	3104	3105
PR product name	Isolated repeater	Isolated converter	Isolated converter
Description	Fixed loop isolator / repeater.	Loop isolator / converter for standard DC signals. DIP-switch setup.	Loop isolator / converter for standard DC signals. DIP-switch setup. Low cost.
Parameterisation	None	DIP-switch	DIP-switch
Input signal	0...20 mA	0/2...10 V 0/1...5 V 0/4...20 mA	0/2...10 V 0/1...5 V 0/4...20 mA
2-wire supply		>17 V @ 20 mA	
Output signal (active)	0...20 mA (1:1)	0/2...10 V 0/1...5 V 0/4...20 mA	0/2...10 V 0/1...5 V 0/4...20 mA
Approvals	UL, safety, FM Div. 2, ATEX zone 2, IECEX zone 2, DNV, marine, GL, marine, GOST Ex	UL, safety, FM Div. 2, ATEX zone 2, IECEX zone 2, DNV, marine, GL, marine, GOST Ex	UL, safety, DNV, marine, GL, marine, GOST R

PR type no.	3108	3109
PR product name	Isolated repeater / splitter	Isolated converter / splitter
Description	Fixed loop isolator / repeater with dual output.	Loop isolator / converter for standard DC signals. DIP-switch setup. Dual output.
Parameterisation	None	DIP-switch
Input signal	0...20 mA	0/2...10 V 0/1...5 V 0/4...20 mA
2-wire supply		>17 V @ 20 mA
Output signal (active)	0...20 mA (1:1)	0/2...10 V 0/1...5 V 0/4...20 mA
Approvals	UL, safety, FM Div. 2, ATEX zone 2, IECEX zone 2, DNV, marine, GL, marine, GOST Ex	UL, safety, FM Div. 2, ATEX zone 2, IECEX zone 2, DNV, marine, GL, marine, GOST Ex

Electrical specifications

Specifications range	-25°C to +70°C
Specifications range, 3105.....	0 to +70°C
Storage temperature	-40°C to +85°C
Supply voltage, DC	16.8...31.2 VDC
Internal consumption, typ. / max.	0.4 W / 0.65 W
Max. consumption.....	≤ 1.2 W
Max. consumption, 3103, -05 & -08.....	≤ 0.8 W
Isolation voltage, test.....	2.5 kVAC
Isolation voltage, working.....	300 VAC / 250 VAC (Ex)
Double isolation.....	Input / output 1 / output 2 / supply
Accuracy	< ±0.05% of span
Accuracy, 3105.....	< ±0.2% of span
Temperature coefficient.....	< ±0.01% of span / °C
Temperature coefficient, 3105.....	< ±0.015% of span / °C

EMC immunity influence	< ±0.5% of span
Extended EMC immunity: NAMUR NE 21, A criterion, burst	< ±1% of span

Signal / noise ratio	Min. 60 dB
Response time (0...90%, 100...10%): mA / V input	< 7 ms
Calibration temperature	20...28°C
2-wire supply (terminal 3...4).....	> 17 VDC / 20 mA
Relative humidity.....	< 95% RH (non-cond.)
Dimensions (HxWxD).....	113 x 6.1 x 115 mm
DIN rail type.....	EN 60715 - 35 mm
Protection degree.....	IP20
Weight	70 g

Current input

Measurement range.....	0...20.5 mA
Programmable measurement ranges.....	0...20 and 4...20 mA
Functional range	0...23 mA
Input voltage drop.....	< 1.5 VDC
Input resistance.....	Nom. 20 Ω + PTC 50 Ω

Voltage input

Measurement range.....	0...10.25 VDC
Programmable measurement ranges.....	0...10 / 2...10 / 0...5 / 1...5 VDC
Functional range	0...11.5 VDC / 0...5.75 VDC
Input resistance.....	≥ 500 kΩ

Current output

Signal range (span)	0...20.5 mA
Programmable signal ranges.....	0...20 / 4...20 mA
Load (max.), 3103, 3104 & 3105.....	23 mA / 600 Ω / 13.8 VDC
Load (max.), 3108 & 3109	23 mA / 300 Ω / 6.9 VDC
Load stability	< 0.002% of span / 100 Ω
Current limit	≤ 28 mA

Voltage output

Signal range	0...10 VDC
Programmable signal ranges.....	0...10 / 2...10 / 0...5 / 1...5 VDC
Load (min.).....	> 10 kΩ

of span = of the selected range

Approvals

EMC 2004/108/EC	EN 61326-1
LVD 2006/95/EC.....	EN 61010-1
UL, Standard for Safety	UL 61010-1
Safe Isolation.....	EN 61140
GOST R	

Marine:

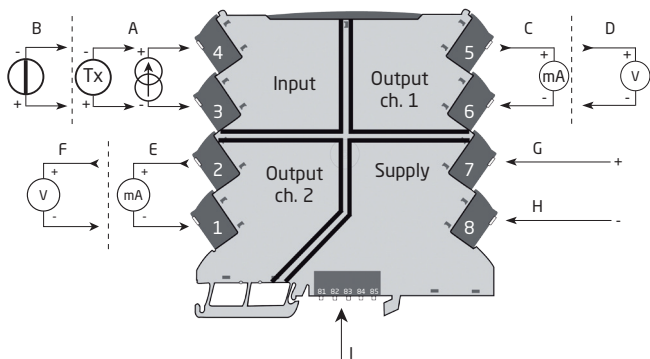
Det Norske Veritas, Ships & Offshore	Stand. f. Certific. No. 2.4
Germanischer Lloyd	VI-7-2

Ex / I.S.:

*ATEX 94/9/EC	KEMA 10ATEX0147 X
*IECEX.....	KEM 10.0068 X
*c FM us.....	3041043-C
*GOST Ex	

* Does not apply to 3105

CONNECTIONS

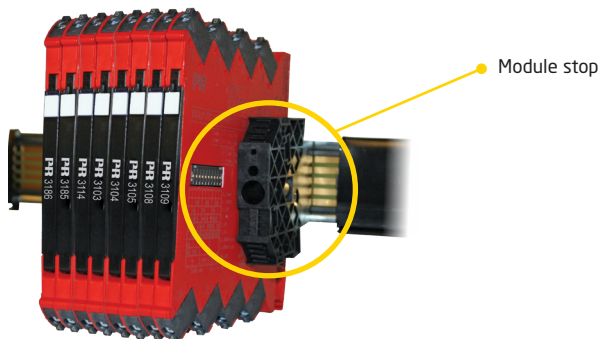


	Input signals	3103	3104	3105	3108	3109
A	Current	x	x	x	x	x
B	Voltage		x	x		x

	Output signals	3103	3104	3105	3108	3109
C	Current 1	x	x	x	x	x
D	Voltage 1		x	x		x
E	Current 2				x	x
F	Voltage 2					x

	Supply	3103	3104	3105	3108	3109
G	Supply +	x	x	x	x	x
H	Supply -	x	x	x	x	x
I	Power rail connections	x	x	x	x	x

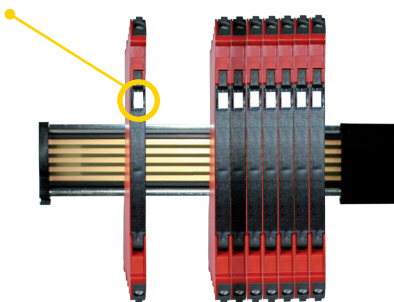
INSTALLATION ON POWER RAIL



All devices can be installed on a power rail (PR part number 9400) supported, i.e. in marine applications, by module stops for power rail (PR part number 9404). Power supply units can be mounted on the power rail according to customer requirements.

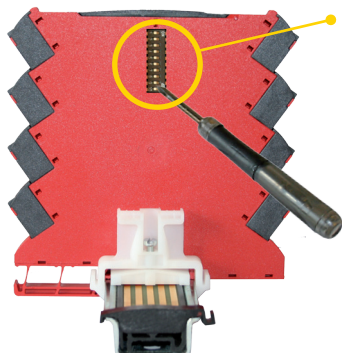
MARKING

The front cover of the 3000 series has been designed with an area for affixation of a click-on marker. The area assigned to the marker measures 5 x 7.5 mm. Markers from Weidmüller's MultiCard System, type MF 5/7.5, are suitable.



DIP-SWITCH PROGRAMMING

The devices 3104, 3105 and 3109 can be configured via DIP-switches. The DIP-switches are located on the side of the device and can be adjusted with a small screwdriver or other implement.



Adjustment of DIP-switches.

Default factory settings are:

Input = 0...20 mA

Output = 0...20 mA

All DIP-switches in the OFF position

The tables below show the configuration based on DIP-switch settings.

NA = no function of DIP-switch.

3104

Input setup					Output setup						
	1	2	3	4		5	6	7	8	9	10
0...20 mA	OFF	OFF	OFF	OFF	0...20 mA	OFF	OFF	OFF	NA	NA	NA
4...20 mA	OFF	OFF	ON	OFF	4...20 mA	OFF	ON	OFF	NA	NA	NA
0...10 V	OFF	ON	OFF	OFF	0...10 V	ON	OFF	OFF	NA	NA	NA
2...10 V	OFF	ON	ON	OFF	2...10 V	ON	ON	OFF	NA	NA	NA
0...5 V	OFF	ON	OFF	ON	0...5 V	ON	OFF	ON	NA	NA	NA
1...5 V	OFF	ON	ON	ON	1...5 V	ON	ON	ON	NA	NA	NA
0...20 mA Tx	ON	OFF	OFF	OFF							
4...20 mA Tx	ON	OFF	ON	OFF							

3105

Input setup					Output setup						
	1	2	3	4		5	6	7	8	9	10
0...20 mA	NA	OFF	OFF	OFF	0...20 mA	OFF	OFF	OFF	NA	NA	NA
4...20 mA	NA	OFF	ON	OFF	4...20 mA	OFF	ON	OFF	NA	NA	NA
0...10 V	NA	ON	OFF	OFF	0...10 V	ON	OFF	OFF	NA	NA	NA
2...10 V	NA	ON	ON	OFF	2...10 V	ON	ON	OFF	NA	NA	NA
0...5 V	NA	ON	OFF	ON	0...5 V	ON	OFF	ON	NA	NA	NA
1...5 V	NA	ON	ON	ON	1...5 V	ON	ON	ON	NA	NA	NA

3109

Input setup					Output setup						
					Channel 1			Channel 2			
	1	2	3	4		5	6	7	8	9	10
0...20 mA	OFF	OFF	OFF	OFF	0...20 mA	OFF	OFF	OFF	OFF	OFF	OFF
4...20 mA	OFF	OFF	ON	OFF	4...20 mA	OFF	ON	OFF	OFF	ON	OFF
0...10 V	OFF	ON	OFF	OFF	0...10 V	ON	OFF	OFF	ON	OFF	OFF
2...10 V	OFF	ON	ON	OFF	2...10 V	ON	ON	OFF	ON	ON	OFF
0...5 V	OFF	ON	OFF	ON	0...5 V	ON	OFF	ON	ON	OFF	ON
1...5 V	OFF	ON	ON	ON	1...5 V	ON	ON	ON	ON	ON	ON
0...20 mA Tx	ON	OFF	OFF	OFF							
4...20 mA Tx	ON	OFF	ON	OFF							

LED INDICATION



The device is equipped with a green power LED in the front to indicate the operation status, see the table below.

LED	Condition	Output and loop supply	Action required
OFF	No supply / device error or code-flash CRC error	De-energized	Connect supply / replace device
1 Flash (0.5 s OFF + 0.5 s ON)	Power-up or restart	De-energized	-
Flashing 13 Hz (15 ms ON)	Device OK	Energized	-
Flashing 1 Hz (15 ms ON)	Illegal DIP-switch setting	De-energized	Correct setting and re-power device
Flashing 1 Hz (0.5 s ON)	Restarting due to: Supply error/hardware. RAM or program flow error	De-energized	Adjust supply / replace device



Displays Programmable displays with a wide selection of inputs and outputs for display of temperature, volume and weight, etc. Feature linearisation, scaling, and difference measurement functions for programming via PReset software.



Ex interfaces Interfaces for analogue and digital signals as well as HART® signals between sensors / I/P converters / frequency signals and control systems in Ex zone 0, 1 & 2 and for some devices in zone 20, 21 & 22.



Isolation Galvanic isolators for analogue and digital signals as well as HART® signals. A wide product range with both loop-powered and universal isolators featuring linearisation, inversion, and scaling of output signals.



Temperature A wide selection of transmitters for DIN form B mounting and DIN rail devices with analogue and digital bus communication ranging from application-specific to universal transmitters.



Universal PC or front programmable devices with universal options for input, output and supply. This range offers a number of advanced features such as process calibration, linearisation and auto-diagnosis.



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QUALITY SYSTEM AND ENVIRONMENTAL MANAGEMENT SYSTEM
 DS/EN ISO 9001
 DS/EN ISO 14001

