

INT - TRANSMITTER

INT-433 Transmitter for differential pressure and flow



Application

Various versions of the transmitter, DS III series, are available with a two-wire circuit. The output signal is a load-independent direct current of 4 to 20 mA linearly proportional to the input pressure.

Transmitters conforming to the type of protection 'Intrinsic safety' and 'Explosion-proof' may be installed within potentially explosive atmospheres (zone 1) or zone 0. The transmitters are provided with an EU prototype test certificate and comply with the corresponding harmonized European standards of the CENELEC.

Transmitters with the type of protection 'Intrinsic safety' for use in zone 0 may be operated with power supply units of category 'ia' and 'ib'.

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The transmitters can be programmed locally using three input keys or externally via HART. The following table describes the fundamental parameters. Further parameters for special applications are accessible via HART.

Elements for parameterization of transmitter

Parameterization using	Input keys	HART communication
Start-of-scale value	●	●
Full-scale value	●	●
Electric damping	●	●
Start-of-scale value without application of a pressure ("Blind setting")	●	●
Full-scale value without application of a pressure ("Blind setting")	●	●
Zero adjustment (correction of position)	●	●
Current transmitter	●	●
Fault current	●	●
Disabling of keys, write protection	●	● ¹⁾
Type of dimension and actual dimension	●	●
Characteristic (linear, square-rooted)	● ²⁾	● ²⁾
Diagnostics		●
- Event counter		
- Slave pointer		
- Maintenance timer		
- Simulation functions		

¹⁾ Cancel apart from write protection

● Possible

²⁾ Only differential pressure

Transmitter for differential pressure and flow

This type of transmitter is used to measure

- the differential pressure
- a small positive or negative pressure
- the flow $q \sim \sqrt{\Delta p}$ (together with a primary differential pressure device)

Spans are possible from 1 mbar to 30 bar.

SITRANS P, DS III series, for

Differential pressure and flow
INT-433

Pressure limit of medium for differential pressure and flow transmitters

Span	Upper pressure limit of medium (nominal pressure)
	INT-433
1.0 to 20 mbar	32
1.0 to 60 mbar	160
2.5 to 250 mbar	160
6.0 to 600 mbar	160
16.0 to 1,600 mbar	160
50.0 to 5,000 mbar	160
300.0 to 30,000 mbar	160

Input

Measured variable	Differential pressure and flow
Measuring range	
• Span (continuously adjustable)	
- Nominal pressure PN 32	1 mbar to 20 mbar
- Nominal pressure PN 160	1 mbar to 30 bar
- Nominal pressure PN 420	2.5 mbar to 30 bar
• Lower measuring limit	
- Measuring cell with silicone oil filling	-100 % ¹⁾ of max. span or 30 mbar (absolute)

Accuracy	Reference conditions	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm (with level: mounting flange without tube), silicone oil filling and room temperature (25 °C) $r = \text{max. span} / \text{set span} = \text{span ratio}$
Error in measurement with fixed-point setting (including hysteresis and repeatability)		
- Linear characteristic		
$r \leq 10$		
$10 < r \leq 30$		
$30 < r \leq 100$		$\leq (0.005 \cdot r + 0.05 \%)$
- Square-root characteristic		
Flow > 50 %		$\leq 0.1 \%$ at $r \leq 10$ $\leq 0.2 \%$ at $10 < r \leq 30$
Flow 25 to 50 %		$\leq 0.2 \%$ at $r \leq 10$ $\leq 0.4 \%$ at $10 < r \leq 30$

SITRANS P, DS III series, for	Differential pressure transmitter series INT-433		
• Repeatability		Included in error in measurement	
• Hysteresis		Included in error in measurement	
Response time (T ₆₃ , without electric damping)			Approx. 0.2 s, approx. 0.3 s with 20- and 60-mbar measuring cells
Long-term drift per 12 months			$\leq (0.1 \cdot r) \%$

SITRANS P, DS III series, for	Differential pressure transmitter series INT-433		
Medium conditions			
• Process temperature			
- Measuring cell with silicone oil filling		-40 to +100 °C	
30-bar measuring cell		-40 to +85 °C	
- Measuring cell with inert filling liquid		-20 to +100 °C	
30-bar measuring cell		-20 to +85 °C	
• Process temperature limits		See process temperature	
• Process pressure limits		Nominal pressure (PN)	

Ordering data		Bestell-Nr.
Transmitter for differential pressure and flow two-wire system, Series DS III, PN 32/160		INT 433-
Meas. cell filling	Meas. cell cleaning	
Silicone oil	normal	1
Inert filling liquid	grease-free	3
PN 32, span	1 to 20 mbar ¹⁾	B
PN 160, span	1 to 60 mbar	C
	2,5 to 250 mbar	D
	6 to 600 mbar	E
	16 to 1.600 mbar	F
	50 to 5.000 mbar	G
	300 to 30.000 mbar	H
Wetted parts material (Process flanges made of stainless steel)		
Seal diaphragm	Meas. Cell parts	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Tantalum ²⁾	Tantalum	E
Monel ²⁾	Monel	H
Gold ^{2),3)}	Gold	L
Design for remote seals		Y
Process connection		
Female thread 1/4-18 NPT and flange connection to DIN 19 213		
Sealing screw oppsite process connection		
- Mounting thread M 10		0
- Mounting thread 7/16-20 UNF		2
Sealing screw at side on process flange		
- Mounting thread M 10		4
- Mounting thread 7/16-20 UNF		6
non-wetted parts material		
Process flange screw	Electronic housing	
Stainless steel	Die-cast aluminium	2
Stainless steel	St. Steel precision casting	3
Design for remote seals		
Standard version		
International version (available soon), english lable inscriptions, documentation in 5 languages on CD		
Explosion protection		
without explosion protection		
with explosion protection (CENELEC)		
- Type of protection "Intrinsic safty" (EEx ia)		
- Type of protection "explosion-proof" (EEx d) 4)		
- Type of protection "Intrinsic safety and explosion-proof (EEx ia+EEx d) 4)(planned)		
Use in zone 2 (planned)		
with explosion protection (FM und CSA) (in planned)		
- intrinsic safety and explosion-proof (is+xp) ⁴⁾		
Electric connection/cable inlet		
Screwd gland PG 13,5 ⁵⁾		
Female thread M20 x 1,5		
Female thread 1/2-14 NPT		
Han 7D plug ⁵⁾		
Indicator		
Without indicator (digital display hidden, setting: mA)		
With indicator (digital display visible, setting: mA)		
With indicator (digital display visible, setting as specified) order code Y21 required		

Further designs

Please add "Z" to Order No. and specify Order code(s)	INT 433 - - Z
Transmitter with mounting bracket made of	
- Steel	A01
- Stainless steel	A02
Instead of FPM (Viton®*), process flange O-ring	
- PTFE	A20
- FEP (with silicon-core, approved for food)	A21
- FFPM (Kalrez®*)	A22
- NBR (Buna N)	A23
Han 7D plug (metal, gray)	A30
Han 8U plug (instead of Han 7D)	A31
Sealing screws (1/4-18 NPT) with valve in material of process flange	A40
Rating plate inscription (instead of German)	
- English	B11
Profibus address setting, specify in plain text:	B12
Y25:.....	B13
- Italian	B14
Rating plate inscription in english, pressure units in H ₂ O resp. psi	B21
Manufacturer's test certificate M to DIN 55 350, Part 18 and to ISO 8402	C11
Acceptance test certificate B to DIN 50 049 / EN 10 204-3.1 B	C12
Factory certificate to DIN 50 049-2.2 / EN 10 204-2.2	C14
Certificate for use in safety plants acc. IEC 61508	C20
Setting of upper limit of output signal to 22,0 mA	D05
Acid gas version to NACE only together with seal diaphragm made of Hastelloy and process screws made of stainless steel)	D07
IP 68 (not together with Han 7D/Han 8U plug, Pg 13.5 screwed gland	D12
with one pressure cover for chemical seal	D19
with two pressure covers for chemical seals	D20
For use in zone 20/21	E01
Use in zone 0 (basic unit EEx ia)	E02
Over-filling safety device for flammable and non-flammable liquids (max. PN 32) (basic unit EEx ia) (planned)	E08
Oxygen application (max. 160 bar with oxygen measurement and inert filling liquid)	E10
Interchanging of process connection side (high-pressure side: left, low-pressure side: right)	H01
Vent on side for gas measurements	H02
Stainless steel process flanges for vertical differential pressure (not together with K01 or K02)	H03
Process flange made of:	
- Hastelloy	K01
- Monel	K02
Measuring range to be set, specify in plain text:	
- with linear characteristic: Y01: ... to ... mbar, bar, kPa, MPa, ...	Y01
- with square-rooted characteristic: Y02: 0 bis ... mbar, bar, kPa, MPa, ...	Y02
Measuring-point number/identification (max. 16 characters) specify in plain text: Y15:.....	Y15
Measuring-point text (max. 27 characters), specify in plain text: Y16:.....	Y16
Setting for digital display, specify in plain text: Y21: mbar, bar, kPa, MPa, ...	Y21
Setting for digital display in non-pressure units, specify in plain text: (measuring range in pressure units (Y01 or Y02) mandatory) Y22: to l/min, m ³ /h, m ...	Y22¹⁾ + Y01 or Y02

¹⁾ not for Over-filling safety device for flammable and non-flammable liquids (additional order code "E08")

Only the settings for "Y01", "Y02", "Y21", "Y22" and "D05" can be made in the factory.

*Viton® and Kalrez® are trademarks of DuPont Performance Elastomer LLC.