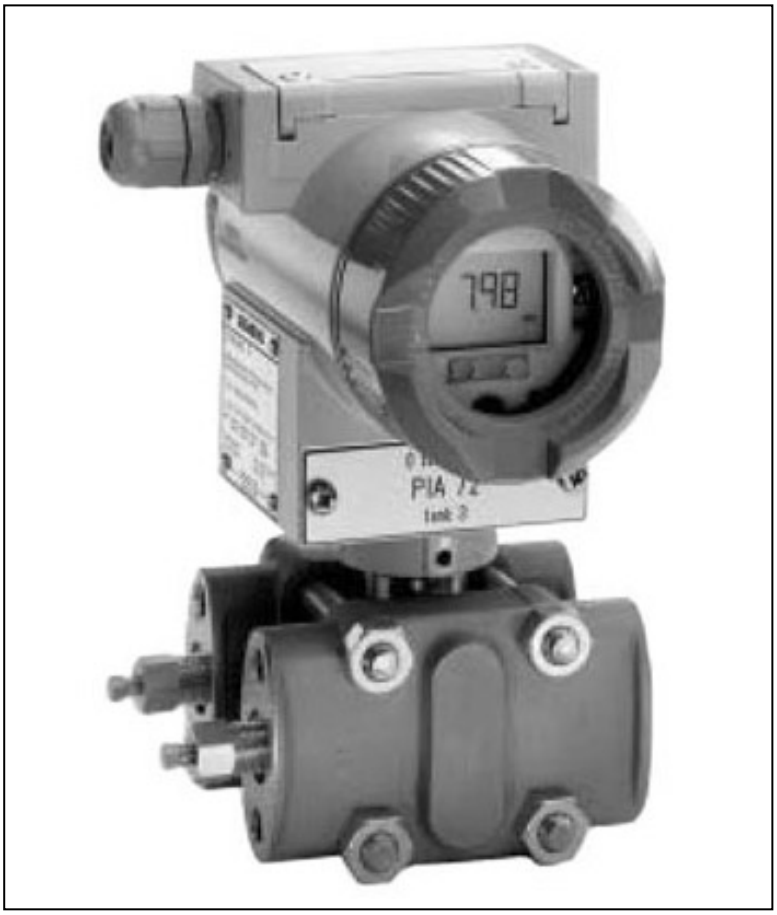
INTRA-AUTOMATION GmbH

elektronische Meß- und Regelinstrumente

MESS- UND REGELINSTRUMENTE

Transmitter for differential pressure and flow

Type: INT-433



Technical Information

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Application

Various versions of the transmitter INT, 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 (zone1) or zone 0. The transmitters are provided with an EU prototype test certificate and comply with the corresponding hamonized 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 usch as the measurement of highly viscous substances.

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

Elements for arametrization of the 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, actual dimension	●	●
Characteristic (linear, square-rooted)	●[2])	●[2])
Diagnostics - Event counter - Slave pointer - Maintenance timer - Simulation functions		●

[1]) Cancel apart from write protection
[2]) Only differential pressure

● possible

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 ~ $\sqrt{dp}$ (together with a primary differential pressure device)

Spans are possible from 1 mbar to 30 bar.

Pressure limit of medium for differntial pressure and flow transmitters

Span	Upper pressure limit of medium (nominal pressure) PN (INT-433)
1,0 to 20 mbar	32
1,0 to 30 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

Technical Data

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 % of max. span or 30 mbar (absolute)
Accuracy:	
Reference conditions:	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling and room temperature (25 °C) r = max. span/set span = span ratio
Error in measurement witzh fixed-point setting (including hystersis and repeatability)	
- <u>linear characteristic:</u>	
r ≤ 10	
10 < r ≤ 30	
30 < t ≤ 100	≤ (0,005 * r + 0,05 %)
- <u>square-root characteristic:</u>	
Flow > 50 %	≤ 0,1 % @ r ≤ 10
	≤ 0,2 % @ 10 < r ≤ 30
Flow 25 to 50 %	≤ 0,2 % @ r ≤ 10
	≤ 0,4 % @ 10 < r ≤ 30

- Repeatability:	included in error in measurement
- Hysteresis:	included in error in measurement
- Response time:	Approx. 0,2 s, approx. 0,3 s withn 20 and
(T_{63}, without electric damping)	60 mbar-Measuring cell
- Long-term drift per 12 months:	$\leq$ (0,1 * r) %

Medium conditions:

Process temperature:	
- Measuring cess 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
Pocess pressure limits:	Nominal pressure (PN)

Ordering information

Code	Description
INT-433	**Transmitter for differential pressure and flow, two wire system, Series DS III, PN32/160**

Code	Measuring cell filling	Measuring cell cleaning
1	Silicone oil	normal
3	Inert filling liquid	grease-free

Code	Span (@ PN32/160)
B	1 to 20 mbar
C	1 to 60 mbar
D	2,5 to 250 mbar
E	6 to 600 mbar
F	16 to 1.600 mbar
G	50 to 5.000 mbar
H	300 to 30.000 mbar

Wetted parts material (process flanges made of stainless steel)

Code	Seal diaphragm	Measuring cell parts
A	Stainless steel	Stainless steel
B	Hastelloy	Stainless steel
C	Hastelloy	Hastelloy
E	Tantalum	Tantalum
H	Monel	Monel
L	Gold	Gold
Y	Design for remote seals	

Process connection

Female thread ¼-18 NPT and flange connection acc. to DIN 19 213

Code	Sealing screws opposite process connection
0	Mounting thread M10
2	Mounting thread 7/16-20 UNF
	Sealing screw at side on process flange
4	Mounting thread M10
6	Mounting thread 7/16-20 UNF

Code	Non-wetted parts material	
	Process flange screw	Electronic housing
2	Stainless steel	Die-cast aluminium
3	Stainless steel	Stainless steel precision casting

Code	Design for remote seals
1	Standard version
2	International version (available soon) English lable inscriptions, documentation in 5 languages on CD-ROM

Code	Explosion protection
A	Without explosion protextion
B	“Intrinsic safe“ (EExia)
D	„explosion-proof“ (EExd)
P	“Intrinsic safe“ and „explosion proof“ EExia+EExd) (planned)
E	Use in Zone 2 (planned)
NC	intrinsic safe + explosion proof (is+xp)

Code	Electric connection / cable inlet
A	screwed PG 13,5
B	Female thread M20x1,5
C	Female thread ½-14 NPT
D	Han 7D plug

Code	Indicator
1	without indicator
6	with indication, setting: mA
7	with indication, setting as specified

INT-433										-	Z...

(see next page)

Ergänzende Bestellcodierung

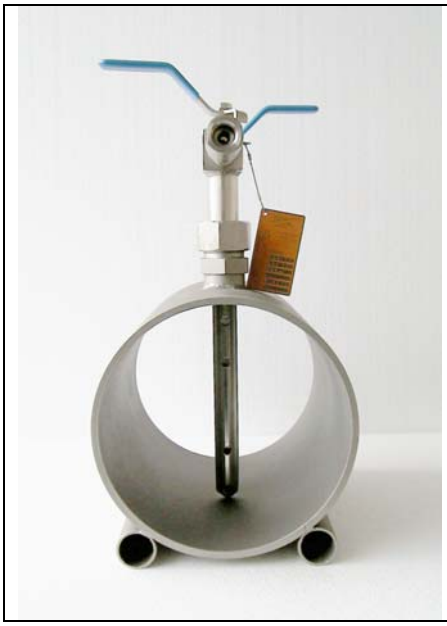
Please add “Z” to order no. and specify order code(s).

Description	Code
Transmitter with mounting bracket made of	
- Steel	**A01**
- Stainless steel	**A02**
Instead of FPM (Viton®*), process flange O-ring	
- PTFE	**A20**
- FEP (with silicone core, approved for food)	**A21**
- FFPM (Kalrez®*)	**A22**
- NBR (Buna N)	**A23**
Han 7D (metal, grey)-plug	**A30**
Han 8U plug (instead of Han 7D)	**A31**
Sealing screws (1/4-18NPT) with valve in material of process flange	**A40**
Rating plate inscription (instead of German)	
- English	**B11**
- French	**B12**
- Spanish	**B13**
- Italian	**B14**
Rating plate inscription in English, pressure units in H_2O resp. psi	**B21**
Manufacturer’s test certificate M acc. to DIN 55350, part 18 and acc. to ISO 8402	**C11**
Acceptance test certificate B acc. to DIN 50049 / EN 10204 3.1 B	**C12**
Factory certificate acc. to DIN 50049-2.2 / EN 10204 2.2	**C14**
Certificate for use in safety plants acc. to IEC 61508	**C20**
Setting of upper limit of output signal to 22,0 mA	**D05**
Acid gas version acc. 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 and PG13,5 screwed gland)	**D12**
with one pressure cover for chemical seal	**D19**
with two pressure cover for chemical seal	**D20**
For use in Zone 20/21	**E01**
For use in Zone 0 (basic unit EEx ia)	**E02**
Over-filling safety device for flammable and non-flammable liquids (max. PN 32), (basic unti 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 measurement	**H02**
Stainless steel process flanges for vertical differential pressure (not together with K01 or K02)	**H03**
Process flanges made of:	
- Hastelloy	**K01**
- Monel	**K02**
Measuring range to be set,m specify in plain text: - with linearer characteristic: Y01: ...to ... mbar, bar, kPa, MPa,.....	**Y01**
- with square root characteristic Y02: 0 to ... 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 displays in non-pressure units, specify in plain text (measuring range in pressure units (**Y01** or **Y02**) mandatory) Y22: ... bis .... l/min, m³/h, m, ...	**Y22 + Y01 or Y02**

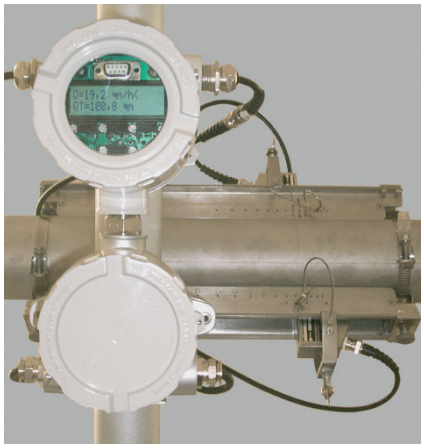
Y22 not together with E08
Only the settings for Y01; Y02, Y21, Y22 and D05 can be made in the factory.
**Viton® and Kalrez® are trademarks of DuPont Performance Elastomer LLC.*

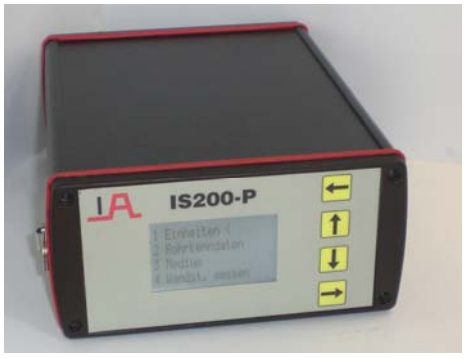
Neben den Produkten, die in dieser Broschüre beschrieben sind, produziert Intra-Automation GmbH auch noch andere Geräte für industrielle Messanwendungen in hoher Güte und von bester Präzision. Für weitergehende Informationen wenden Sie sich bitte an uns (Kontaktdetails rückseitig).

Durchflussmessung



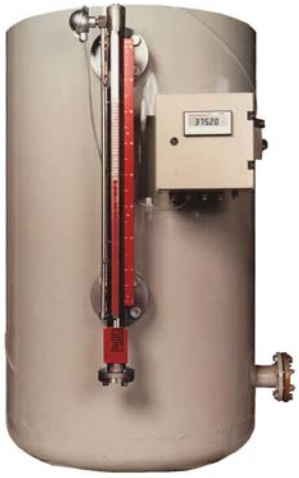
Itabar® - Durchflusssonden





IntraSonic IS200 Ultraschall-Durchflussmesser

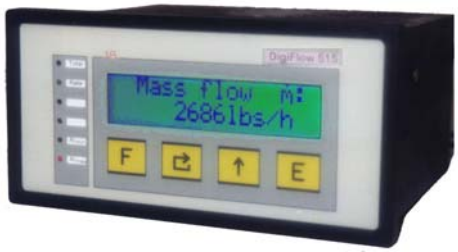
Niveaustandmessung



ITA - mag. Niveaustandanzeiger

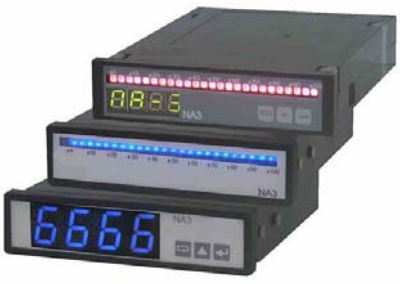
MAGLINK Füllstandmesser

Andere Messaufgaben:



DigiFlow Durchfluss- und Niveaurechner

IntraCont digitale Regler



IntraGraph Bargraphanzeiger

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