

Inowafe / Inocont / Inoving / Inosis

Performance

Innovation

Quality



KFG Level AG

Level Control

Instrumentation



Vibration fork level switches type INOVING R-400 / R-500

General description

KFG Level has revamped the popular Inoving range of Vibrating Forks for an even higher performance and for a greater flexibility of use. The reengineered extreme short fork section enables applications in tight spaces and also on pipes. The 6 times increased excitation frequency will ensure interface-free operation if used on vibrating structures.

Media: The Inoving can be used in almost all media like explosive and non-explosive liquids, aggressive liquids (acids, solvents), high viscosity liquids; unaffected by foam, turbulence, gas content.

It can also be used on light and medium density free flowing granulates and powders.

Application: The Inoving covers a large variety of level detection applications and more...; high / low fail safe limit switch, overflow or dry run protection, pump controls, dry / wet indication in pipes.

Highlights of the Inoving:

- Fit and forget device; simple installation -no maintenance.
- Switching performance does not depend on the change of liquid conductivity, dielectric constant, viscosity, pressure and temperature.
- Probe extension up to 3m length.
- Flange or sliding sleeve options.
- ECTFE (HALAR®) coated versions for aggressive or sticky media.
- Hygienic versions with various process connections and 0,5 micron fine polishing.
- high or low fail-safe mode, as well as the medium density is field programmable on most models.
- operation test of installed units can be performed with the help of a test magnet on some of the models.

General

NOVING RF-400 or RF-500 is the "Standard" version with paint coated, robust Aluminium or plastic housing; visible, large bicolour output state indication LED; 1 or 2 power relay output and universal AC/DC power supply.



NOVING RC-400 is the "Mini" version incorporating a stainless steel tube housing, visible bicolour output state indication LED, and 2-wire AC, 2-wire DC or 3-wire PNP/NPN transistor output.



INOSWITCH JDT-131 Ex the CENELEC approved 2-wire RC-400 Ex vibration forks requires an intrinsically safe remote switching unit containing the intrinsically safe barrier and a potential free output.



APPLICATION AND INSTALLATION

Application on liquids

In applications on liquids with

- low viscosity (without risk of remaining material on the fork-tines) any of the mounting shown beside is possible,
- high viscosity (due to risk of remaining material on the fork-tines) only vertical (top) mounting can be suggested. In applications with side mounting take care of the positioning mark.



WHG

Vibration fork level switches type INOVING R-400 / R-500

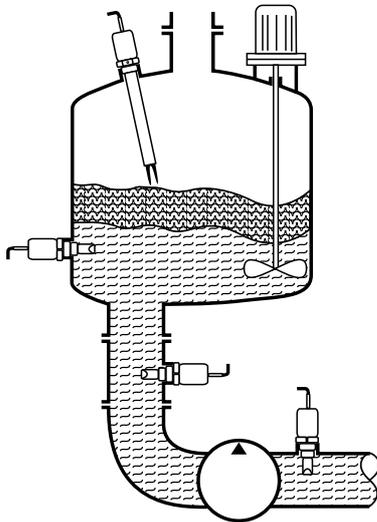
APPLICATION AND INSTALLATION

Application on liquids

In applications on liquids with

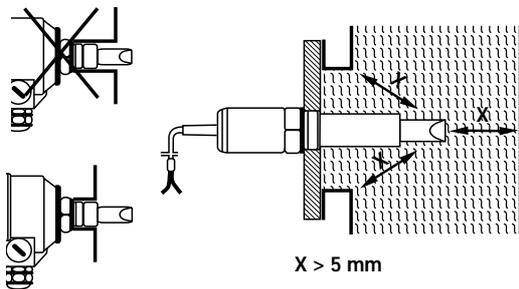
- low viscosity (without risk of remaining material on the fork-tines) any of the mounting shown beside is possible,
- high viscosity (due to risk of remaining material on the fork-tines) only vertical (top) mounting can be suggested.

In applications with side mounting take care of the positioning mark.

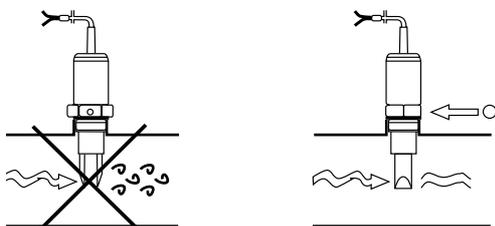


Use always HIGH density setting ($\rho \geq 0.7 \text{ kg/dm}^3$) for application on liquids!

Installation on liquids

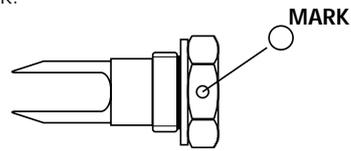


For dry/wet detection, fork-tines must be parallel to the direction of flow

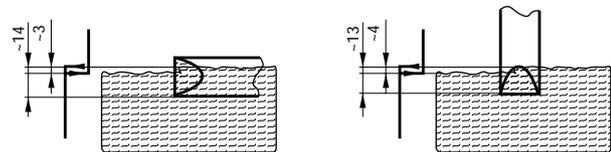


Positioning and switching point

For positioning the fork-tines, use the marking on the hexagon neck.



Use a TEFLON (PTFE) tape to aid the positioning of the fork-tines. If the fork-tine position is irrelevant, use the sealing ring provided.



Values are for water at 25°C

Liquids: switching point as well as the switch differential slightly depends on liquid density and mounting position.

Solids: switching point as well as the switch differential slightly depends on material quality and mounting position.

Electrical connections

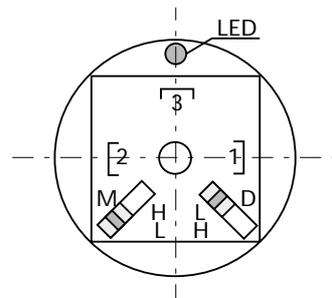
«MINI» models in stainless steel housing

⇒ 3-wire DC versions with PNP/NPN transistor output, to drive relays, PLC-s

Connector output version R □ □ - 4 □ □ - 3

Top view with removed connector:

All models expect the «SHORTY»



«M» - Operation mode

«H» - High - level limit switch

«L» - Low - level limit switch

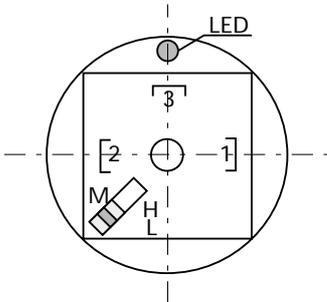
«D» - Density

«H» - High

«L» - Low

Vibration fork level switches type INOVING R-400 / R-500

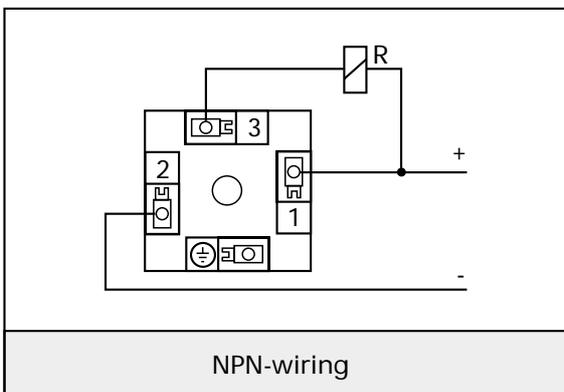
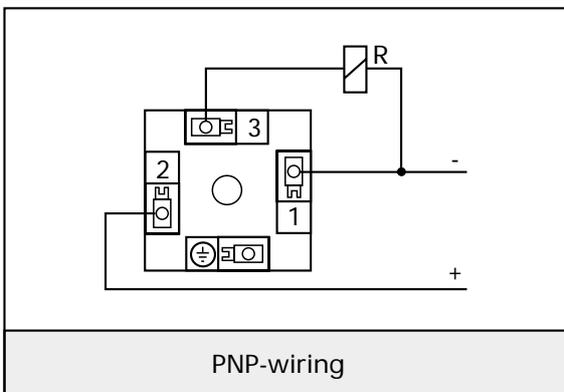
The «SHORTY» models for liquid only



- «M» - Operation mode
- «H» - High - level limit switch
- «L» - Low - level limit switch

Density setting

- HIGH density Liquids: $\rho \geq 0,7 \text{ kg/dm}^3$
- Solids: $\rho \geq 0,5 \text{ kg/dm}^3$
- LOW density Solids: $\rho < 0,5 \text{ kg/dm}^3$

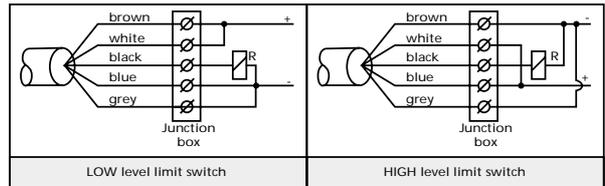


Integral cable output version R □ □ - 4 □ □ - 4

PNP mode

HIGH density

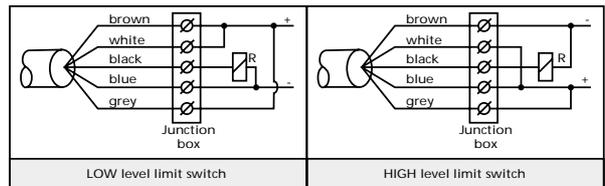
(liquids $\rho \geq 0,7 \text{ kg/dm}^3$, Solids $\rho \geq 0,5 \text{ kg/dm}^3$)



PNP mode

LOW density

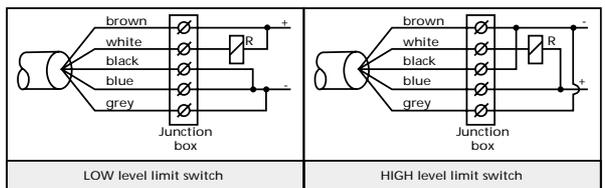
(Solids $\rho < 0,5 \text{ kg/dm}^3$)



NPN mode

HIGH density

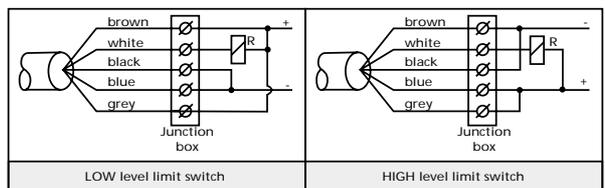
(liquids $\rho \geq 0,7 \text{ kg/dm}^3$, Solids $\rho \geq 0,5 \text{ kg/dm}^3$)



NPN mode

LOW density

(Solids $\rho < 0,5 \text{ kg/dm}^3$)

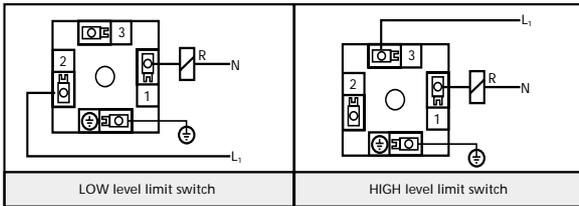


Vibration fork level switches type INOVING R-400 / R-500

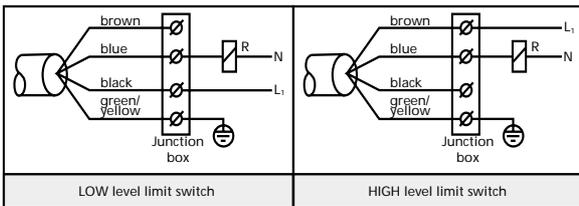
⇒ 2-wire AC versions to drive relays, PCL-s

Do not power up 2 wire AC devices without a load connected in series with the unit and without grounding it!

Connector output version R □ □ - 4 □ □ - 1



Integral cable output version R □ □ - 4 □ □ - 2



Please note the 2-wire AC versions can not be programmed for medium density. The units are manufactured with fixed HIGH Density setting.

⇒ 2-wire DC versions to drive controllers with current sensitive input

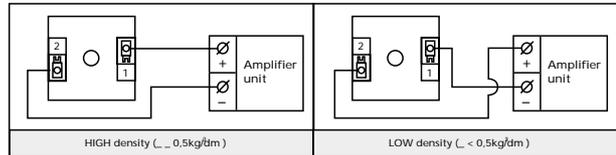
Two-wire loop powered devices, operate according to the DC diagram beside.

Please note, that the 2-wire DC versions can not be programmed for HIGH or LOW FAILSAFE on the device itself.

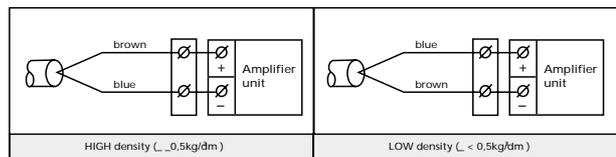
Operating diagram

Fork	Status LED	Output
Immersed	RED	14 ± 1 mA
Free	GREEN	9 ± 1 mA

Connector output version R □ □ - 4 □ □ - 6



Integral cable output version R □ □ - 4 □ □ - 7

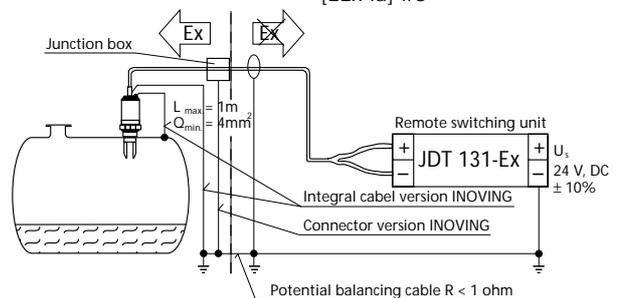


⇒ Ex versions

An intrinsically safe, CENELEC Ex approved system, consists of the following:

Intrinsically safe vibration fork
«INO Ving R-400-8,9»
 EEx ia IIC T4...T6

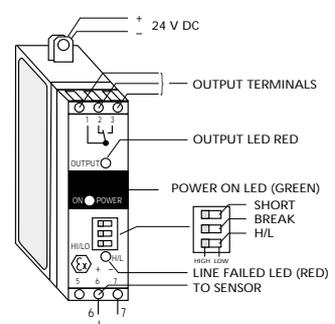
Intrinsically safe remote switching unit
«INO Ving JDT-131 Ex»
 [EEx ia] IIC



The Ex level limit switch is powered by the remote switching unit JDT-131 Ex. The remote switching unit receives the switch signal through a current loop. The remote switching unit provides for a potentialfree power relay output.

High or low-fail safe mode is programmable by switch on the remote switching unit, while switching sensitivity is programmed via changing the polarity of the 2-wire output of the level sensor

Temperature classification according to the Ex certificate:

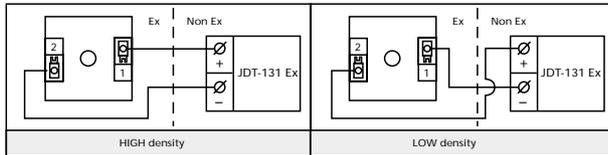


	T6	T5	T4
T _{Ambient} [°C]	60	60	60
T _{Medium} [°C]	80	95	130

Vibration fork level switches type INOVING R-400 / R-500

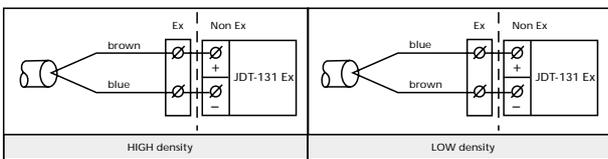
Connector output version

R □ □ - 4 □ □ - 8



Integral cable output version

R □ □ - 4 □ □ - 4



«STANDARD» models in Alu cast/plastic housing

⇒ Relay output versions

R □ □ - 4 □ □ - 0

R □ □ - 4 □ □ - A

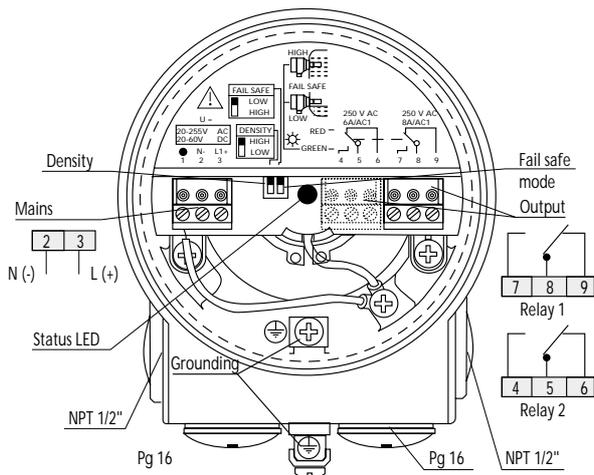
R □ □ - 5 □ □ - 0

R □ □ - 5 □ □ - A

Top view with removed housing cover:
Density setting:

HIGH density Liquids: $\rho \geq 0,7 \text{ kg/dm}^3$
Solids: $\rho \geq 0,5 \text{ kg/dm}^3$

LOW density Solids: $\rho < 0,5 \text{ kg/dm}^3$



Use 8 ... 15 mm outer diameter circular cables, and tighten cable glands as well as housing cover after installation, to ensure an IP 65 protection.

Technical Data

GENERAL SPECIFICATION

Model

Probe material

Non-coated

1.4571 (X 6 CrNiMoTi 17122)

Process connection

material

1.4571 (X 6 CrNiMoTi 17122)

Probe extension material

1.4571 (X 6 CrNiMoTi 17122)

Maximum pressure

40 bar, for derating see

Derating diagrams below

Medium temperature

range

-40°C to +130°C

Ambient temperature

range

Standard models in Alu-cast/plastic housing with relay

output: -30°C to +70°C;

"Mini" models in stainless

steel housing with electronic

output: -40°C to +70°C

Ex version: -20°C to +60°C

Sealing material

VITON

Probe length

69 to 3000 mm

Medium

density Liquids

$\geq 0.7 \text{ kg/dm}^3$

Solids

$\geq 0.05 \text{ kg/dm}^3$

Liquid viscosity

$\leq 10000 \text{ mm}^2/\text{s}$ (cSt) (see

Derating diagrams)

Response time

When immersed 0.5 sec

When free $\leq 1 \text{ sec}$ at high density setting

($\rho \geq 0.5 \text{ kg/dm}^3$)

$\leq 2 \text{ sec}$ at low density setting

($\rho < 0.5 \text{ kg/dm}^3$) (see

Derating diagrams)

Output mode indicator

Bi-colour Status LED on

outside of housing

Vibration fork level switches type INOVING R-400 / R-500

Model	ECTFE (HALAR) coated
Probe material	1.4404 (X 2 CrNiMo 17132); ECTFE coated
Process connection material	Polypropylene flange (max.: 6 bar) ECTFE coated st.st. flange.
Probe extension material	PFA coated st.st.
Maximum pressure	PP flange: 6 bar, - St.st. flange: 40 bar, for derating see Derating diagrams
Medium temperature range	-PP flange: -20°C to +90°C ECTFE coated st.st flange: -40°C to +120°C *
Ambient temperature range	Standard models in Alu-cast/plastic housing with relay output: -30 ∞C to +70 ∞C; "Mini" models in stainless steel housing with electronic output: -40 ∞C to +70 ∞C Ex version: -20 °C to +60 °C
Sealing material	VITON
Probe length	69 to 3000 mm
Medium density	Liquids ≥ 0.7 kg/dm ³ Solids ≥ 0.05 kg/dm ³
Liquid viscosity	≤ 10000 mm ² /s (cSt) (see Derating diagrams)
Response time	
When immersed	0.5 sec
When free	> 1 sec at high density setting (ρ ≥ 0.5 kg/dm ³) ≤ 2 sec at low density setting (ρ < 0.5 kg/dm ³) (see Derating diagrams)
Output mode indicator	Bi-colour Staus LED on outside of housing

* Please note, that temperature difference between inner and outer surface of ECTFE coated flanges must not exceed 60 °C. If necessary, insulate outer surface of flange.

SPECIFICATION

«Standard» Model	Relay output version
	R □ □ - 4 □ □ - 0 R □ □ - 5 □ □ - A
Housing material	Paint coated Aluminium (RF-400) or plastic (RF-500)
Selection of High/low fail safe	By switch
Density programming	By switch
Output	Up to 2 SPDT relay
Output rating	Relay 1: 250 V AC, 8 A, AC1 Relay 2: 250 V AC, 6A, AC1
Electric connections (wire cross section)	2 x Pg 16 for ø 8 to 15 mm cables (0.75 to 2.5 mm ²)
Supply voltage	20 to 255 V AC and 20 to .60 V DC
Consumption	AC: 1,2 ... 17 VA ;DC: < 3W
Electrical protection	Class I.
Mechanical protection	IP 67 (NEMA 6)
Weight (threaded versions)	Alu housing: 1.3 kg + 1.2kg/m Plastic housing: 0.95 + 1.2 kg/m
Remote switching unit	
Model	(for Ex forks) JDT-131-Ex
Input	9 ±1 mA to 14 ±1 mA
Max. serial inductivity	5 mH
Max. parallel capacitance	0.04 µF
High/low mode selection	by switch
Output	SPDT relay
Output rating	AC: 100 VA (250 V or 5 A); DC: 100 W (24 V or 5 A)
Supply voltage/ consumption	24 V DC ± 10 %; max. 100 mA
Sensor voltage	16 to 26 V DC
Electrical protection	Class III.
Ex protection mark	[EEx ia] IIC
Ambient temperature	0°C to +45°C
Mounting	NS 15, 35/75, 35/15, 32 DIN rail
Housing material	PA
Enclosure	IP 30
Weight	0,1kg

Vibration fork level switches type INOVING R-400 / R-500

«MINI» Models»

2-wire AC

R □ □ - 4 □ □ - 1

Electric connections (wire cross section)	Connector
Mechanical protection	IP65
Selection of HIGH/LOW fail safe mode	Within the connector
Density programming	Liquids fixed to $\rho \geq 0,7\text{kg/dm}^3$ Solids fixed to $\rho \geq 0,5\text{kg/dm}^3$
Output	2-wire AC, in serial connection with the load
Supply voltage	20...255V AC, 50/60 Hz
Consumption	Depending on load
Voltage drop (switched-on state)	< 10,5 V
Electrical protection	Class I.
Current load	
max. continuous	350 mA AC13
min. continuous	10mA/255V AC, 25mA/24V AC
max. impulse	1,5 A / 40 ms
Residual current (switched-off state)	< 6mA
Function test	Optional test magnet (Order code: RPS-101)
Weight (threaded version)	0,5kg + 0,1kg / 100mm

2-wire AC

R □ □ - 4 □ □ - 2

Electric connections (wire cross section)	integral cable (4x0,75mm ²)
Mechanical protection	IP68
Selection of HIGH/LOW fail safe mode	With wiring
Density programming	Liquids fixed to $\rho \geq 0,7\text{kg/dm}^3$ Solids fixed to $\rho \geq 0,5\text{kg/dm}^3$
Output	2-wire AC, in serial connection with the load
Supply voltage	20...255V AC, 50/60 Hz
Consumption	Depending on load
Voltage drop (switched-on state)	< 10,5 V
Electrical protection	Class I.
Current load	
max. continuous	350 mA AC13
min. continuous	10mA/255V AC, 25mA/24V AC
max. impulse	1,5 A / 40 ms
Residual current (switched-off state)	< 6mA
Function test	Optional test magnet (Order code: RPS-101)
Weight (threaded version)	0,5kg + 0,1kg / 100mm

3-wire DC PNP/NPN transistor output

R □ □ - 4 □ □ - 3

Electric connections (wire cross section)	Connector
Mechanical protection	IP65
Selection of HIGH/LOW fail safe mode	By switch
Density programming	By switch
Output	PNP/NPN transistor; field selectable
Output protection	Reverse polarity, over current and overload protection
Supply voltage	12...55V DC
Consumption	0,6 W
Voltage drop (switched-on state)	< 4,5 V
Electrical protection	Class III.
Current load	
max. continuous	350 mA / 55V DC
Residual current (switched-off state)	< 100µA
Function test	Optional test magnet (Order code: RPS-101)
Weight (threaded version)	0,5kg + 0,1kg / 100mm

3-wire DC PNP/NPN transistor output

R □ □ - 4 □ □ - 4

Electric connections (wire cross section)	Integral cable (5x0,5mm ²)
Mechanical protection	IP68
Selection of HIGH/LOW fail safe mode	With wiring
Density programming	With wiring
Output	Galvanically isolated PNP/NPN transistor; field selectable
Output protection	Reverse polarity, over current and overload protection
Supply voltage	12...55V DC
Consumption	0,6 W
Voltage drop (switched-on state)	< 4,5 V
Electrical protection	Class III.
Current load	
max. continuous	350 mA / 55V DC
Residual current (switched-off state)	< 100µA
Function test	Optional test magnet (Order code: RPS-101)
Weight (threaded version)	0,5kg + 0,1kg / 100mm

Vibration fork level switches type INOVING R-400 / R-500

«MINI» Models»

2-wire Ex

R □ □ - 4 □ □ - 8

Electric connections (wire cross section)	Connector
Mecanical protection	IP65
Selection of HIGH/LOW fail safe mode	By switch on the Inoving JDT-131-Ex
Sensitivity programming	With wiring
Output Type	2-wire DC
Data	When free: $9\pm 1\text{mA}$; when immersed; $14\pm 1\text{mA}$
Supply voltage	Powered by Inoving JDT-131-Ex
Consumption	$< 0,5 \text{ W}$
Electrical protection	Class III. intrinsically safe
Ex rating	EEx ia IIC T4...T6
Intrinsically safe data	$U_{\text{max}} 26,5\text{V DC}$, $I_{\text{max}} 100\text{mA}$, $P_{\text{max}} 1,4 \text{ W}$, $\text{LEQ}=0$; $C_{\text{eq,max}}=7\text{nF}$
Weight (threaded version)	$0,5\text{kg} + 0,1\text{kg} / 100\text{mm}$

2-wire Ex

R □ □ - 4 □ □ - 9

Electric connections (wire cross section)	Integral shielded cable ($2 \times 0,5\text{mm}^2$)
Mecanical protection	IP68
Selection of HIGH/LOW fail safe mode	By switch on the Inoving JDT-131-Ex
Sensitivity programming	With wiring
Output Type	2-wire DC
Data	When free: $9\pm 1\text{mA}$; when immersed; $14\pm 1\text{mA}$
Supply voltage	Powered by Inoving JDT-131-Ex
Consumption	$< 0,5 \text{ W}$
Electrical protection	Class III. intrinsically safe
Ex rating	EEx ia IIC T4...T6
Intrinsically safe data	$U_{\text{max}} 26,5\text{V DC}$, $I_{\text{max}} 100\text{mA}$, $P_{\text{max}} 1,4 \text{ W}$, $\text{LEQ}=0$; $C_{\text{eq,max}}=7\text{nF}$
Weight (threaded version)	$0,5\text{kg} + 0,1\text{kg} / 100\text{mm}$

2-wire DC

R □ □ - 4 □ □ - 6

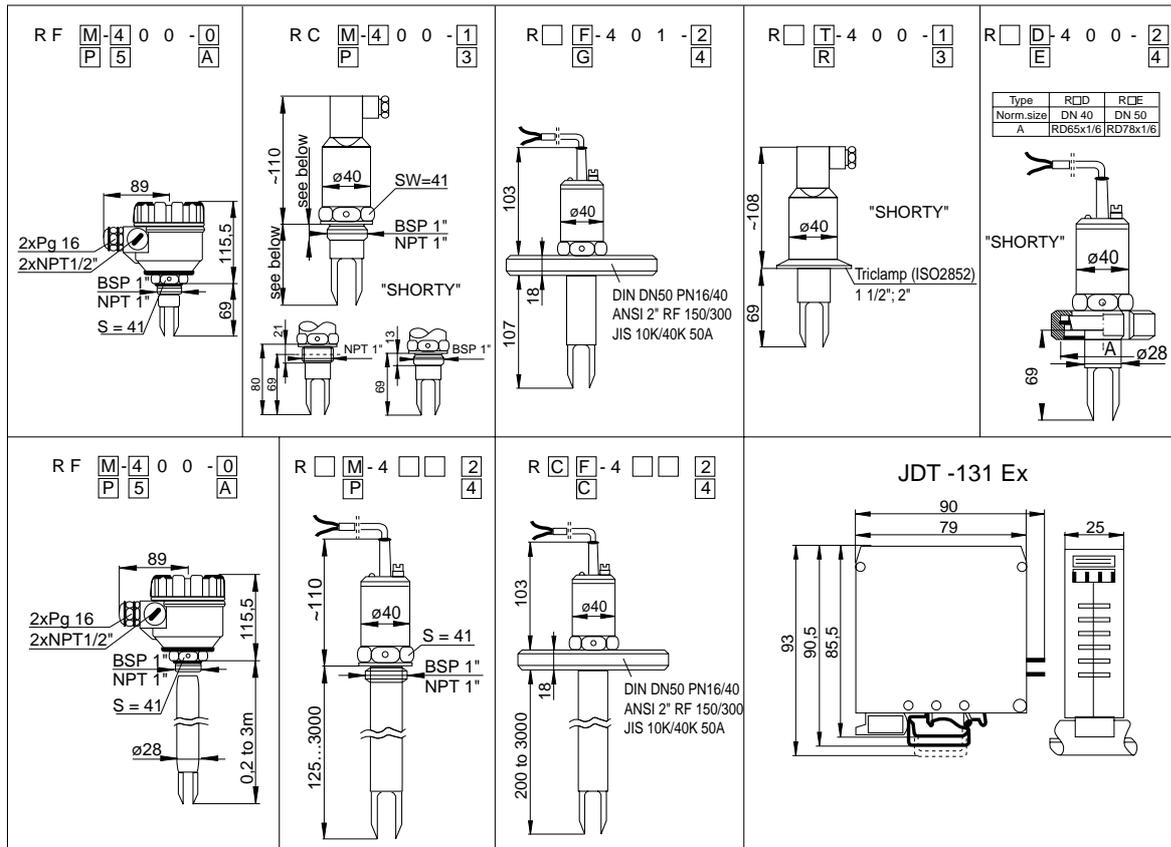
Electric connections (wire cross section)	Connector
Mecanical protection	IP65
Selection of HIGH/LOW fail safe mode	At the signal processing end
Sensitivity programming	With wiring
Output Type	2-wire DC
Data	When free: $9\pm 1\text{mA}$; when immersed; $14\pm 1\text{mA}$
Supply voltage	$15 \text{ to } 27\text{V DC}$
Consumption	$< 0,5 \text{ W}$
Electrical protection	Class III.
Weight (threaded version)	$0,5\text{kg} + 0,1\text{kg} / 100\text{mm}$

2-wire DC

R □ □ - 4 □ □ - 7

Electric connections (wire cross section)	Integral cable ($2 \times 0,5\text{mm}^2$)
Mecanical protection	IP68
Selection of HIGH/LOW fail safe mode	At the signal processing end
Sensitivity programming	With wiring
Output Type	2-wire DC
Data	When free: $9\pm 1\text{mA}$; when immersed; $14\pm 1\text{mA}$
Supply voltage	$15 \text{ to } 27\text{V DC}$
Consumption	$< 0,5 \text{ W}$
Electrical protection	Class III.
Weight (threaded version)	$0,5\text{kg} + 0,1\text{kg} / 100\text{mm}$

Vibration fork level switches type INOVING R-400 / R-500



TYPE CODE KEY

INOVING «STANDARD» models in Alu-cast / plastic housing:

INOVING R [] [] - [] [] [] - [] [] []

Fork	Code	Connections	Code	Housing	Code	Length	Code	Output	Code
ECTFE coated	D	1" BSP thread	M	Alu. cast	4	Short (69mm)**	00	1 Relay	0
Standard	F	1" NPT thread	P	Plastic	5	Standard (125mm)	01	2 Relay	A
		DIN DN 50PN40 st.st.flange**	G			0,2 to 3m	02..30		
		2" ANSI st. st. flange**	B						
		50A JIS st. st. flange**	K						
		DIN DN50PN16 PP flange**	F						
		2" ANSI PP flange**	A						
		50A JIS PP flange**	J						

* The short versions are not applicable for solids
 ** Flanges are screw-in types as standard, please indicate welded flange requirement

INOVING «MINI» models in stainless steel tube housing:

INOVING R [] [] - 4 [] [] - [] [] []

Fork	Code	Connections	Code	Length	Code	Output	Code
ECTFE coated	A	1" BSP thread	M	Short (69mm)**	00	2-wire AC with connector	1
Standard	C	1" NPT thread	P	Standard (125mm)	01	2-wire AC with cable	2
Highly polished	G	DIN DN 50PN40 st.st.flange**	G	0,2 to 3m	02..30	2-wire NPN with connector	3
		2" ANSI st. st. flange**	B			2-wire NPN with cable	4
		50A JIS st. st. flange**	K			2-wire DC with connector	6
		DIN DN50PN16 PP flange**	F			2-wire DC with cable	7
		2" ANSI PP flange**	A			2-wire Ex with connector	8
		50A JIS PP flange**	J			2-wire Ex with cable	9
		1 1/2" Triclamp (ISO2852)	T				
		2" Triclamp (ISO2852)	R				
		DN40 Pipe coupling (DIN11851)	D				
		DN50 Pipe coupling (DIN11851)	E				

* The short versions are not applicable for solids
 ** Flanges versions as standard come with flanges screwed on the 1" process connection.

Vibration rod level switches type INOCOCONT R-300 / R-400

General description

Advantages such as robustness, self-cleaning for most mediums by vibration, pressure and corrosion resistance offered by vibration rods make them the optimal solution for single point level switching in free flowing solids. Correct installation promises a low-cost, reliable and long-life level detection in bins and silos containing bulk materials.

Applied to granular materials lump size must not exceed 10 mm. Only mediums with sufficient internal friction can be detected.

If applied as low level switch, utmost care should be taken to prevent damaging the probe by the pressure of the medium.

The vibration rod is a mechanical resonant system excited and kept in resonance by an electronic circuit. When covered by material the damping of the vibration will be detected by the electronic which, after a built in time delay initiate the switching of the output relay.

The electronics using highly reliable SMT components is completely potted, eliminating environmental impacts such as moisture, vibration etc.

MODEL SELECTION

Standard length

Used for high failsafe in bins or for hopper low failsafe

Pipe extended

Can be used for both high or low failsafe. If used for low failsafe in mediums of great internal friction, consider that the moving medium may bend and damage the probe.

Cable extended

Usually used for both high or low failsafe. Can not be used with mediums of large granular size. Abrasive mediums may damage the cable.

Custom extended

Advantageously applied if switching point can not be determined in advance. Extension pipe (max. 2m) has to be supplied / manufactured by the customer.

TYPICAL APPLICATIONS

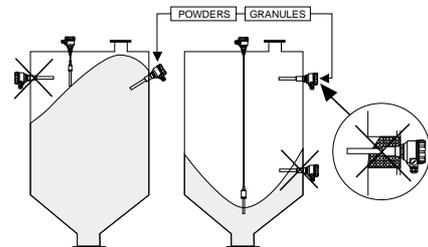
- **Plastic processing:**
powders, pellets, granulates
- **Chemical industries:**
powders, pills, crystals
- **Agriculture/Food industries:**
grains, rice, cereals, feed, flour
- **Paper and Pulp industries:**
crushed cellulose, shavings
- **Recycling:**
paper cuts, ground plastic
- **Power generation:**
fly ash, lime, carbon black
- **Mining and quarry:**
coal, stone powder
- **Construction:**
cement, sand, clay



INSTALLATION

- Determining mounting location the caving or arching of the material should be considered.
- Cable extended version for low-level alarm is suggested to mount above the outlet of the tank/silo.
- Side mounted device in powder applications should be installed with an inclination exceeding the angle of repose, to enable efficient self-cleaning of the rod.
- Avoid mounting device in a recess.
- Prior to the installation, it is advised to test the switching function of the unit on a sample quantity of material and to set "Density" switch according to the density of medium.
- Screw in the device by its hexagon neck. After screwing tight the process connection, the housing can be rotated (max. 300°), to adjust the cable glands to the required position.

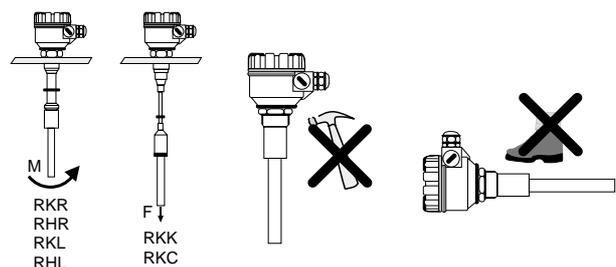
	High level	Low level*
Standard	Side mount	Side or bottom mount
Pipe extended	Top mount	Side or bottom mount
Cable extended	Top mount	Top mount



* The NIVOCONT is not suggested to be used for low level detection in high density materials

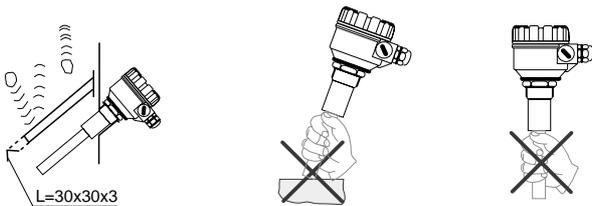
- Limits for bending or pulling force and torque should be considered.

Standard	Pipe extended	Cable extended
F = 445 N	—	F = 45 kN
(M = 85 Nm)	M = 85 Nm	—



Vibration rod level switches type INOCONT R-300 / R-400

- Handle the device with great care, especially the sensing probe. A larger impact on the sensing probe may ruin its resonance system.
- Probes exposed to falling material or mechanical loads should be protected.



SETTING UP TO THE PROCESS

Adjustment will be carried out by three switches by selecting (high/low) fail-safe mode, switching delay and density.

HIGH/LOW fail-safe mode (Switch C)

- De-energised status of the relay or open state of solid state output is preferred to be used for fail-safe alarm, thus a power breakdown will also be considered as alarm (see Operation diagram).

Time delay (Switch B)

- Standard (switching delay: approx. 5 sec) or fast response (switching delay: approx. 2 sec) can be selected.

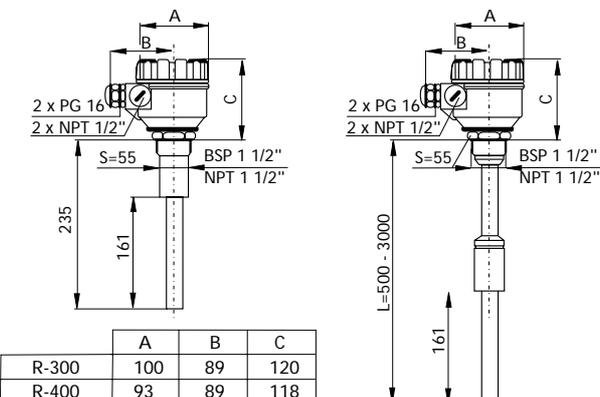
DENSITY (Sensitivity) adjustment (Switch A)

- LOW position, recommended for loose and light materials with density around and below 0.1 kg/dm³ represents low energy and amplitude of vibration as well as great sensitivity of detection.
- HIGH position, recommended for (thick and heavy) materials with density over 0.1 kg/dm³ represents vibration with high energy and amplitude and small sensitivity of detection.

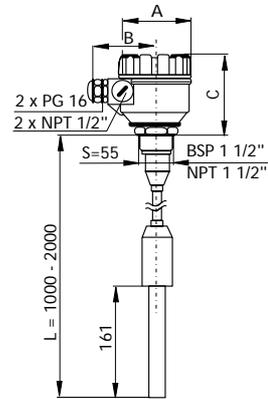
DIMENSIONS

Standard version

Pipe extended version

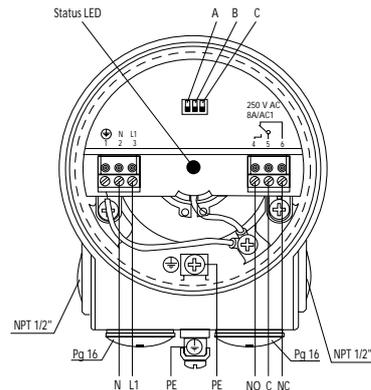


Cable extended version



ELECTRICAL CONNECTION

Relay output version



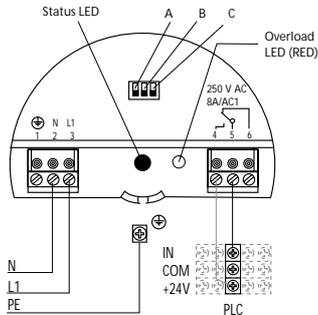
Switch	Adjustment
A	DENSITY
B	DELAY
C	FAIL SAFE mode

Operating diagram

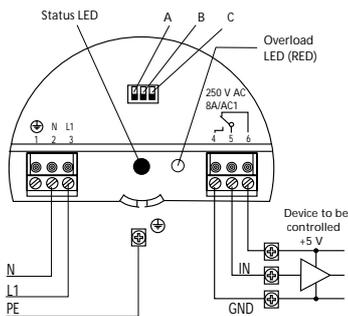
Power	Probe	Fail-safe mode	Status LED	RELAY	SOLID STATE OUTPUT
	Not vibrating (covered)	LOW	GREEN	5-4-6 Energised	6-2.7k-5 4-ON-5
		HIGH	RED	5-4-6 De-energised	6-2.7k-5 4-OFF-5
	Vibrating (free)	LOW	RED	5-4-6 De-energised	6-2.7k-5 4-OFF-5
		HIGH	GREEN	5-4-6 Energised	6-2.7k-5 4-ON-5
Fails		LOW OR HIGH	NOT LIT	5-4-6 De-energised	6-2.7k-5 4-OFF-5

Vibration rod level switches type INOCONT R-300 / R-400

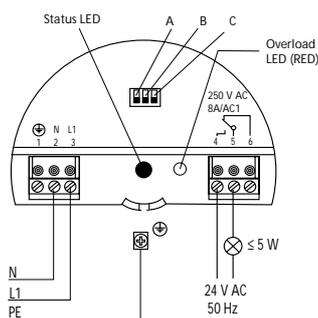
Solid state output versions



Electrical connection of a optocoupled sink input



Electrical connection of a logical voltage input



Electrical connection of a load

Technical Data

General specification

Model

standard

RKH, RKN, RHH, RHN

Probe length

235 mm

Parts protruding into tank

1.4571 (SS316Ti)

Housing material

Aluminium, Powder paint coated (R-300 Series)
Plastic PBT fibre-glass reinforced, flame-retardant (DuPont®) (R-400 Series)

Process connection

1 1/2" BSP or 1 1/2" NPT

Temperature ranges see

Derating diagram

Process

RK: -30°C to + 110°C

RH: -30°C to + 160°C

Ambient. temp.

-30°C to + 60°C

Max. pressure (absolute)

25 bar (2,5 MPa)

Minimum medium density*

0,05 kg/dm³ (max. granular size: 10mm)

Response time (selectable)

When covered

< 1,8 sec. or ± 1,5 sec.

When free

< 2 sec. or ± 1,5 sec.

Supply voltage

Voltage version I:

16...40V AC (50/60 Hz)

19...55V DC

Voltage version II:

85...265V AC (50/60 Hz)

120...375V DC

Power consumption

Voltage version I:

≤ 2,5 VA, 1,2 W

Voltage version II:

≤ 2,5 VA, 1,3 W

Electrical connections

2 x PG 16 for ø 8 to 15 mm

cables and 2 x 1/2" NPT, max.

1,5 mm² wire cross section

Mechanical protection

IP67 (Nema 6)

Electrical protection

Class I. (to be grounded)

Explosion proof

protection mark

Ex II D I T6 IP67 (Zone 20)**

(except RKE, RHE, RKF, RHF

and versions in plastic housing)

Max. mechanical load

on rod

F = 445 N

M = 85 Nm

Weight (with extension)

plastic housing

1,56 kg

alu housing

1,94 kg

* may depend on friction and granular size of the medium

**Pending

Vibration rod level switches type INOCONT R-300 / R-400

Model	Pipe extended
	RKR, RKL, RHR, RHL RKE, RKF, RHE, RHF
Probe length	0,3 to 3m
Parts protruding into tank	1.4571 (SS316Ti)
Housing material	Aluminium, Powder paint coated (R-300 Series) Plastic PBT fibre-glass reinforced, flame-retardant (DuPont®) (R-400 Series)
Process connection	1 1/2" BSP or 1 1/2" NPT (see dimensions)
Temperature ranges see Derating diagram	
Process	RK: -30°C to + 110°C RH: -30°C to + 160°C
Ambient. temp.	-30°C to + 60°C
Max. pressure (absolute)	25 bar (2,5 MPa)
Minimum medium density*	0,05 kg/dm ³ (max. granular size: 10mm)
Response time (selectable)	
When covered	< 1,8 sec. or ± 1,5 sec.
When free	< 2 sec. or ± 1,5 sec.
Supply voltage	Voltage version I: 16...40V AC (50/60 Hz) 19...55V DC Voltage version II: 85...265V AC (50/60 Hz) 120...375V DC
Power consumption	Voltage version I: ≤ 2,5 VA, 1,2 W Voltage version II: ≤ 2,5 VA, 1,3 W
Electrical connections	2 x PG 16 for ø 8 to 15 mm cables and 2 x 1/2" NPT, max. 1,5 mm ² wire cross section
Mechanical protection	IP67 (Nema 6)
Electrical protection	Class I. (to be grounded)
Explosion proof protection mark	Ex II D I T6 IP67 (Zone 20)** (except RKE, RHE, RKF, RHF and versions in plastic housing)
Max. mechanical load on rod	M = 85 Nm
Weight (with extension)	
plastic housing	1,56 kg (+ 1,4 kg/m)
alu housing	1,94 kg (+ 1,4 kg/m)

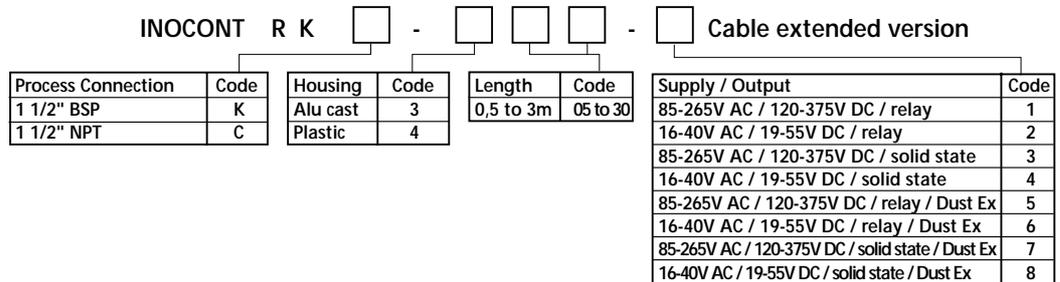
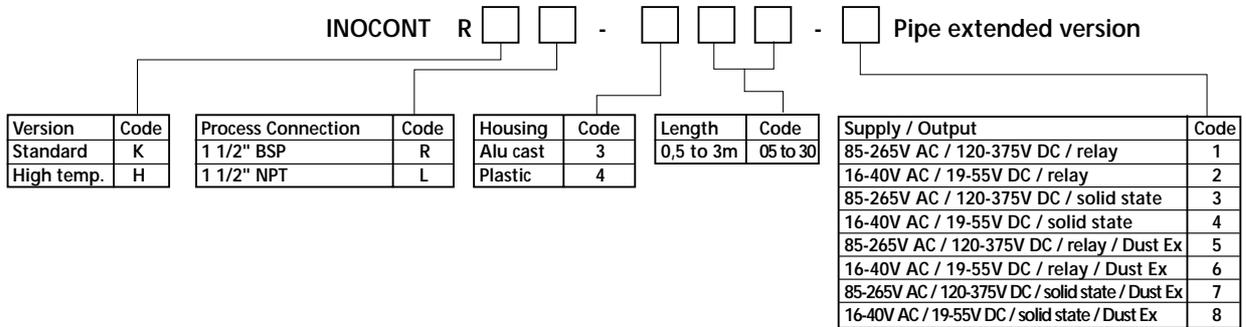
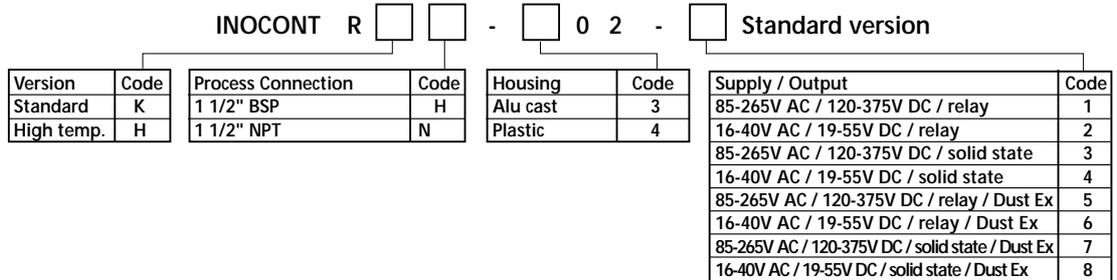
* may depend on friction and granular size of the medium
**Pending

Model	Cable extended
	RKK, RKC
Probe length	1 to 20m
Parts protruding into tank	Probe 1.4571 (SS316Ti) Cable: PE coated
Housing material	Aluminium, Powder paint coated (R-300 Series) Plastic PBT fibre-glass reinforced, flame-retardant (DuPont®) (R-400 Series)
Process connection	1 1/2" BSP or 1 1/2" NPT (see dimensions)
Temperature ranges see Derating diagram	
Process	RK: -25°C to + 90°C
Ambient. temp.	-30°C to + 60°C
Max. pressure (absolute)	6 bar (0,6 MPa)
Minimum medium density*	0,05 kg/dm ³ (max. granular size: 10mm)
Response time (selectable)	
When covered	< 1,8 sec. or ± 1,5 sec.
When free	< 2 sec. or ± 1,5 sec.
Supply voltage	Voltage version I: 16...40V AC (50/60 Hz) 19...55V DC Voltage version II: 85...265V AC (50/60 Hz) 120...375V DC
Power consumption	Voltage version I: ≤ 2,5 VA, 1,2 W Voltage version II: ≤ 2,5 VA, 1,3 W
Electrical connections	2 x PG 16 for ø 8 to 15 mm cables and 2 x 1/2" NPT, max. 1,5 mm ² wire cross section
Mechanical protection	IP67 (Nema 6)
Electrical protection	Class I. (to be grounded)
Explosion proof protection mark	Ex II D I T6 IP67 (Zone 20)** (except RKE, RHE, RKF, RHF and versions in plastic housing)
Max. mechanical load on rod	F = 45 kN
Weight (with extension)	
plastic housing	1,56 kg (0,6 kg/m)
alu housing	1,94 kg (0,6 kg/m)

* may depend on friction and granular size of the medium
**Pending

Vibration rod level switches type INOCONT R-300 / R-400

TYPE CODE KEY



Ultrasonic level indicator type INOWAFE

General description

KFG's two decades of experience with ultrasonic level metering is an asset we gladly share with our customers. A specialised team of experts is working day by day to convert this experience obtained by tens of thousands of applications world-wide.

The state-of-the-art, narrow-beam angle sensor and the QUEST+™ (Qualified Echo Suppressing Technique) featuring advanced, process adaptive digital signal processing provide the basis for the solution of the most demanding applications in the process control world.

Fields of Application

Ultrasonic Level Meters offer excellent tools for liquid level and volume measurements in tanks or reservoirs and for open channel flow measurement.

Level measurement technology based on the non-contacting ultrasonic principle is especially suited for applications where, for any reason, no physical contact can be established with the surface of the material to be measured.

Such reasons may include corrosive attack by the process medium of the measuring device material (acids), possible contamination (sewage) or particles of the process medium adhering to the measuring device (adhesive materials).

Principle of Operation

Ultrasonic level metering is based on the principle of measuring the time required for the ultrasound pulses to make a round trip from the sensor to the surface of the liquid and back. An ultrasonic sensor installed above the liquid to be measured emits an ultrasonic pulse train and receives the echoes reflected from the liquid surface. Intelligent electronics process the received signal by selecting the echo reflected by the liquid surface and calculate from the time of flight, the distance to the liquid surface.



The Measuring System

Compact Transmitters

Standalone devices with sensor and transmitter in one unit.

Measuring Range

The measuring range or more exactly the distance the ultrasonic unit can measure depends on the ambient conditions (e.g. closed tank or open vessel). Proper care has to be taken intensive air movements in open-air applications, since wind or storm may "blow away" the ultrasound at high distances, thereby reducing effective range.

There are a few other phenomenon such as foam, waves and vapour can also reduce the max. distance which can be measured.

Therefore in such applications higher power transducers with a lower frequency (greater penetration) have to be selected for optimum results.

Transducer Material

KFG offers a wide range of transducer materials for its ultrasonic units to suit the varied requirements of liquid level metering applications:

- Polypropylene (PP) - Resists most caustics, acids and bases
- Solef (PVDF) - Resists acids and most solvents
- Teflon (PTFE) - Resists acids and most solvents
Accepted in hygienic application.
- Stainless steel (DIN1.4571, AISI SS316Ti) - Ultimate resistance against solvents
Accepted in hygienic applications, withstands CIP cleaning up to 120°C

Temperature

All KFG ultrasonic devices have built in temperature compensation over the entire measuring range.

For outdoor applications the use of a weather-protect unit is recommended.

Pressure

Because of the physical characteristics of ultrasound, ultrasonic measurement is limited in vacuum and high pressure applications.

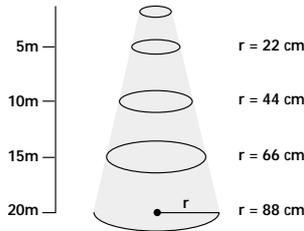
The operating pressure range is between 0.3 bar and 6 bar (Absolute).

Sonic Cone

Most of KFG's transducers have a 5°- 7° total beam angle at -3 dB, ensuring a reliable measurement in narrow silos with uneven side walls as well as in process tanks with various protruding objects. Furthermore, as a result of the narrow beam angle the emitted ultrasonic signals have an outstanding focusing and good penetration through gases, vapour and foam is ensured.

Ultrasonic level indicator type INOWAFE

Diameters corresponding to 5° beam angle.



Selection

We offer the widest range of ultrasonic level measurement solutions involving standalone devices systems, sensors of different materials and with many different working frequencies.

Since the main selection aspects mentioned above (see "Measuring Range") form only part of the application know-how, please contact your local KFG distributor to assist you in selecting your optimal ultrasonic system.

Compact Transmitters

Standalone devices with transducer and transmitter in one unit.

INOWAFE

KFG's next generation of SMART compact ultrasonic level transmitters, using SenSonic™ transducer technology and KFG's latest QUEST+™ software with advanced, process adaptive digital signal processing.

The flexibility of its programming makes the INOWAFE the ideal level metering tool for basic applications requiring only a level proportional output (excl. open reservoirs) as well as for complex applications requiring linearisation, relay action, fixed target suppression (excl. agitated process tanks containing heavily fuming chemicals). INOWAFE is offered with Polypropylene or PVDF transducers as well as Teflon (PTFE) and stainless steel flush flange mounting versions.

Programming options for INOWAFE

Touch-Magnet programming (magnetic key supplied): A cost-effective solution for simple and easy applications.

The plug-in programming module: To access and program all features provided by this smart device

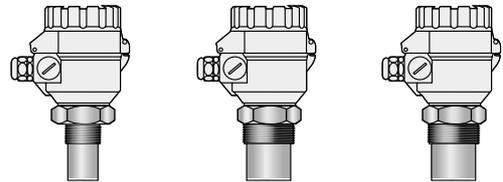
Remote: For remote programming and data acquisition, INOWAFE transmitters support MODBUS and HART protocol options (under development).

LEVEL - VOLUME - FLOW measurement

INOWAFE in standard form incorporates a current output and a fully programmable power relay that can be used for various alarm and control functions. Over 10 pre-programmed tank shapes for volume calculation as well as 32-point linearisation are also provided.

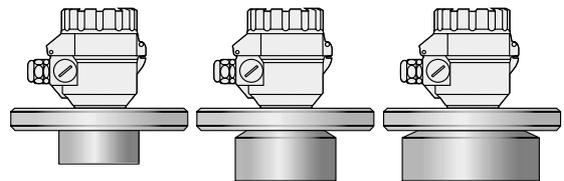
FLOW metering: INOWAFE can also be used as a smart flow transmitter on open channel applications with more than 20 pre-programmed flume and weir flow formulas. It also has two independent volume flow totalizers and a relay that can be used as a volume flow counter.

INOWAFE S-300



Type	ST/KB39	ST/KB38	ST/KB37
Main applic. field	Small tanks, where dead band is critical	Small process tanks with 2" process connection	
Mounting	1 1/2" BSP / NPT	2" BSP or NPT	
Frequency	80 kHz		60 kHz
Penetration through fume/vapour, foam	X		XX

X= weak; xxxx=excellent



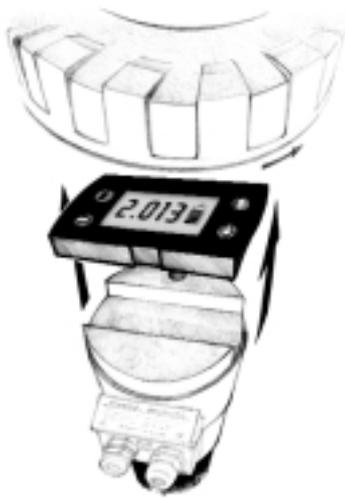
Type	ST/KB36	ST/KB34	ST/KB32
Main applic. field	Small process tanks with flanges	Medium process tanks	Medium to large process tanks
Mounting	DN 80	DN 125	DN 150
Frequency	60 kHz	40 kHz	20 kHz
Penetration through fume/vapour, foam	XX	XXX	XXXX

X= weak; xxxx=excellent

Ultrasonic level indicator type INOWAFE

The SAP-100 Plug-in Programming Module / Field Indicator

The SAP-100 module is used for programming and/or displaying measurement values. Using the SAP-100 for programming, operators can choose between menu driven "QUICKSET" or full parameter programming to access all features of this smart device, matching performance levels of Two-Part systems. In case of multi-vessel installations, using a single SAP-100 programming module, any number of INOWAFE devices can be set up. Acting as a field indicator permanently plugged into the INOWAFE, measurement values are displayed in 6-digits of selected metric or US engineering units as well as on a bargraph.

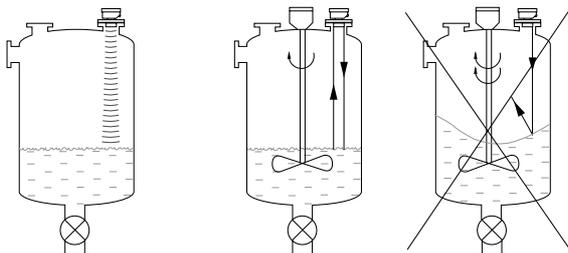


SAP-100 module

Installation

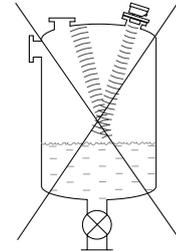
POSITION

The optimal position of the INOWAFE is between $\frac{1}{2}$ radius and $\frac{2}{3}$ diameter of the (cylindrical) tank / silo.



SENSOR ALIGNMENT

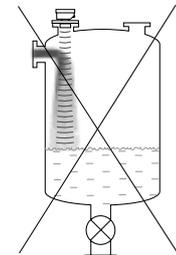
The sensor face has to be parallel to the surface of the liquid within $\pm 2 - 3^\circ$.



OBSTACLES

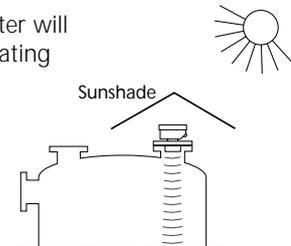
Make sure that no in-flow path or objects (e.g. cooling pipes, ladders, bracing strut, thermometers, etc) or no uneven tank wall surfaces (welding seam) protrude into the sensing cone of the ultrasonic beam.

Up to two fix objects in the tank / silo that disturb the measurement can be blocked out by the appropriate programming of the INOWAFE.



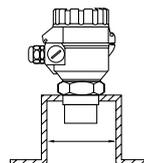
TEMPERATURE

Make sure that the transmitter will be protected against overheating by direct sunshine.

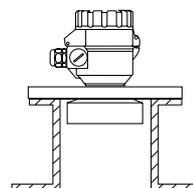


STAND-OFF PIPE FOR THE INOWAFE

The structure of the stand off pipe should be rigid, the inner rim where the ultrasonic beam leaves the pipe should be rounded.



L	D _{min}		
	S _{...39}	S _{...38}	S _{...37}
150	50	60	60
200	50	60	75
250	65	65	90
300	80	75	105
350	95	85	120



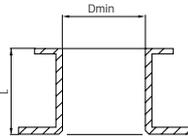
	D _{min}	
	S _{...39}	S _{...38}
90	80	*
200	80	*
350	85	*
500	90	*

*for values consult your distributor

Ultrasonic level indicator type INOWAFE

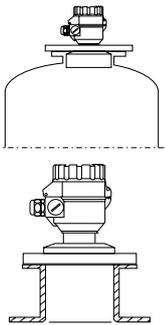
STAND-OFF PIPE FOR SENSORAR

The structure of the stand off pipe should be rigid, the inner rim where the ultrasonic beam leaves the pipe should be rounded.



L[mm]	D _{minimum} [mm]				
	S-39	S-38/37	S-36	S-34	S-32
500	100	125	150	200	300
300	85	100	125	175	200
200	60	100	125	150	175

S-32 models with plastic transducer must not be installed in stand-off pipes since the transducer face has to protrude into the tank.



	D _{min}		
	S_ S -36_	S_ S -34_	S_ S -37_
320	80	-	-
440	-	125	-
800	-	-	150

FOAM

In case of foam above the liquid, exceeding 1-2 cm, ultrasonic devices with lower measuring frequency (40, 20 kHz) are recommended. Ideally a location should be found, where only minimal foaming occurs. Locate unit as far as possible from liquid inflow or install in a stilling pipe.

Fume/Vapour

In case of closed tanks containing chemicals or other liquids creating fumes/gases above the liquid surface, especially outdoor tanks exposed to the sun, a strong reduction of the nominal measuring range of the unit must be taken into consideration. Units with lower measuring frequency (40, 20 kHz) are recommended depending on the range.

WIND/STORM

An intensive movement of air (gas) in the vicinity of the ultrasonic cone is to be avoided. A strong wind or storm may "blow away" the ultrasound. Units with lower measuring frequency (40, 20 kHz) are recommended.

Technical Data, standalone units

INOWAFE Compact Transmitters

General Specifications

Product name	INOWAFE ST/SB-300 series
Product description	Compact type ultrasonic level transmitter
Transducer materials	Polypropylene (PP) Kynar (PVDF) / Teflon (PTFE) Stainless steel (DIN1,4571, AISI SS316Ti)
Housing material	Plastic, PBT fibre-glass reinforced, flame retardant (DuPont) Aluminium: Powder paint coated
Process temperature	PP, PVDF and PTFE versions: -30°C...+90°C Stainless steel versions: -30°C...+100°C (CIP 120°C for max. 2 hours)
Ambient temperature	-30°C...+60°C with SAP-100 progr. module -25°C...+60°C (if necessary protect the device from over heating by direct sunshine)
Pressure (absolute)	0,3...3 bar (0,03...0,3MPa) Stainless steel versions 0,9...1,1 bar (0,09...0,11MPa)
Seals	PP transducer:EPDM All other transducer versions FKM (Viton)
Mechanical protection	Sensor: IP68 (submersible) Housing: IP67 (Nema 6)
Power supply / Consumption	High voltage versions: 85...255V AC / 6VA Low voltage versions: 10,5...40V DC / 3,6W, 10,5...28V AC / 4VA
Accuracy*	±(0,2% of measured distance +0,05% of range)
Resolution	Depending on distance to be measured < 2m: 1mm, 2...5m: 2mm, 5...10m: 5mm, >10m:10mm
Outputs	Analogue:4/20 mA, 600 Ohm, galvanically isolated, secondary lightning protection Contact: SPDT (NO/NC); 250V AC, 3A Interface: RS 485 (optional) HART (optional) Display (SAP-100): 6 Digits, icons and bargraph, Custom LCD
Electrical connections	2 x PG16 or 2 x 1/2" NPT wire cross section: 0,5...2,5mm ²
Electrical protection	Class I. with aluminium housing and Class II. with plastic housing

Ultrasonic level indicator type INOWAFE

Special Data of INOWAFE for liquids with PP, PVDF and PTFE transducers

Type	PP / PVDF transducers
	ST □ - 3 9 □ - □ SB □ - 3 9 □ - □
	PTFE transducers
	STT - 3 9 □ - □ SBT - 3 9 □ - □

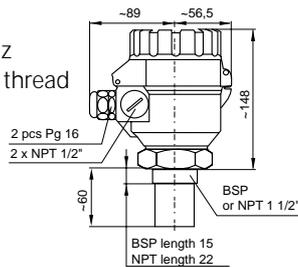
Transducer materials PP, PVDF or PTFE
 Maximum measuring distance* (m / ft) 4 / 13 (PP / PVDF)
 3 / 10 (PTFE)

Min. measuring distance* (dead band) (m / ft) 0,2 / 0,65

Total beam angle (-3dB) 6°

Measuring frequency 80 kHz

Process connection 1 1/2" thread



Type	PP / PVDF transducers
	ST □ - 3 8 □ - □ SB □ - 3 8 □ - □
	PTFE transducers
	STT - 3 8 □ - □ SBT - 3 8 □ - □

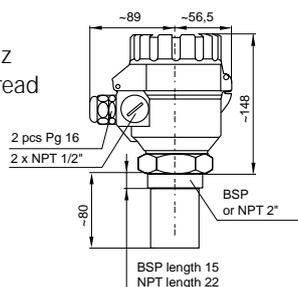
Transducer materials PP, PVDF or PTFE
 Maximum measuring distance* (m / ft) 6 / 20 (PP / PVDF)
 5 / 16 (PTFE)

Min. measuring distance* (dead band) (m / ft) 0,25 / 0,82

Total beam angle (-3dB) 5°

Measuring frequency 80 kHz

Process connection 2" thread



Type	PP / PVDF transducers
	ST □ - 3 7 □ - □ SB □ - 3 7 □ - □
	PTFE transducers
	STT - 3 7 □ - □ SBT - 3 7 □ - □

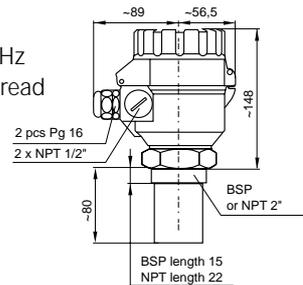
Transducer materials PP, PVDF or PTFE
 Maximum measuring distance* (m / ft) 8 / 26 (PP / PVDF)
 6 / 20 (PTFE)

Min. measuring distance* (dead band) (m / ft) 0,35 / 1,2

Total beam angle (-3dB) 7°

Measuring frequency 50 kHz

Process connection 2" thread



Type	PP / PVDF transducers
	ST □ - 3 6 □ - □ SB □ - 3 6 □ - □

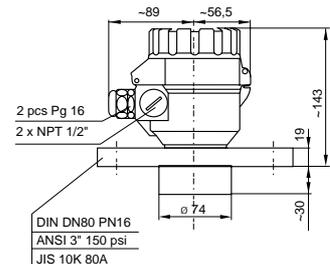
Transducer materials PP or PVDF
 Maximum measuring distance* (m / ft) 10 / 33

Min. measuring distance* (dead band) (m / ft) 0,35 / 1,2

Total beam angle (-3dB) 5°

Measuring frequency 60 kHz

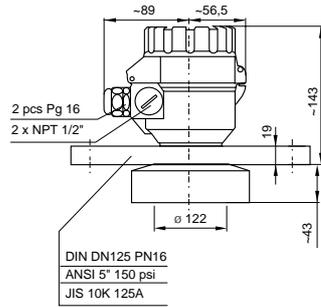
Process connection Flange



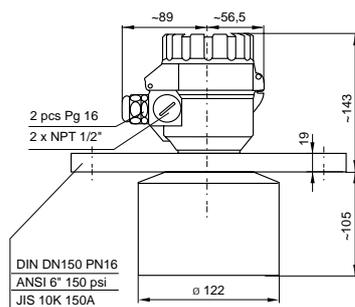
Ultrasonic level indicator type INOWAFE

Special Data of INOWAFE for liquids with PP and PVDF transducers

Type	PP / PVDF transducers
	ST □ - 3 4 □ - □
	SB □ - 3 4 □ - □
Transducer materials	PP or PVDF
Maximum measuring distance* (m / ft)	15 / 49
Min. measuring distance* (dead band) (m / ft)	0,45 / 1,5
Total beam angle (-3dB)	5°
Measuring frequency	40 kHz
Process connection	Flange

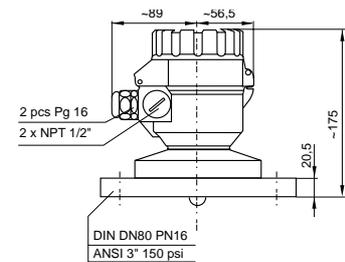


Type	PP / PVDF transducers
	ST □ - 3 2 □ - □
	SB □ - 3 2 □ - □
Transducer materials	PP or PVDF
Maximum measuring distance* (m / ft)	25 / 82
Min. measuring distance* (dead band) (m / ft)	0,6 / 2
Total beam angle (-3dB)	7°
Measuring frequency	20 kHz
Process connection	Flange

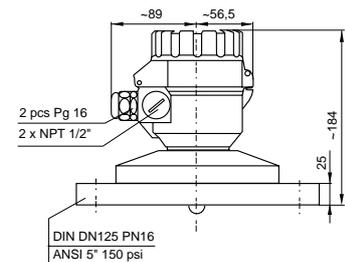


Special Data of INOWAFE for liquids with PTFE and Stainless Steel transducers

Type	PTFE st.st. transducers
	STS - 3 6 □ - □
	SBS - 3 6 □ - □
Transducer materials	stainless steel
Maximum measuring distance* (m / ft)	7 / 23
Min. measuring distance* (dead band) (m / ft)	0,4 / 1,3
Total beam angle (-3dB)	5°
Measuring frequency	60 kHz
Process connection	Flush flange



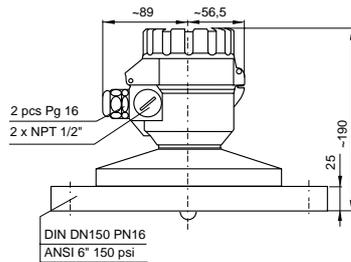
Type	PTFE st.st. transducers
	STS - 3 4 □ - □
	SBS - 3 4 □ - □
Transducer materials	stainless steel
Maximum measuring distance* (m / ft)	12 / 39
Min. measuring distance* (dead band) (m / ft)	0,55 / 1,8
Total beam angle (-3dB)	5°
Measuring frequency	40 kHz
Process connection	Flush flange



Ultrasonic level indicator type INOWAVE

Type PTFE st.st. transducers
S T S - 3 2 □ - □
S B S - 3 2 □ - □

Transducer materials stainless steel
 Maximum measuring distance* (m / ft) 15 / 49
 Min. measuring distance* (dead band) (m / ft) 0,65 / 2,2
 Total beam angle (-3dB) 7°
 Measuring frequency 20 kHz
 Process connection Flush flange



Type SAP-100 programming module

Field indication 6 digits, icons and bargraph,
 Custom LCD
 Ambient temperature -25°C...+60°C
 Housing material PBT fibre-glass reinforced plastic,
 flame retardant (DuPont®)

TYPE CODE KEY

INOWAVE S □ □ - 3 □ □ - □

Type	Code
Transmitter	T
with indicator	B

Housing	Code
PP / ALU	A
PVDF / ALU	B
PTFE / ALU	T
St. St. / ALU	S
PP / Plastic	P
PVDF / Plastic	V
PTFE / Plastic	F
St. St. / Plastic	M

Range	Code
25 Meter	2
15 Meter	4
10 Meter	6
8 Meter	7
6 Meter	8
4 Meter	9

Mounting	Code
BSP Thread	0
NPT Thread	N
DN 80	2
DN 100	3
DN 125	4
DN 150	5
DN 200	6

Supply & Output	Code
85...265V AC	
4...20mA + Relay	1
4...20mA + Hart + Relay	3
RS 485 + Relay	5
10,5...40V DC	
4...20mA + Relay	2
4...20mA + Hart + Relay	4
RS 485 + Relay	6

INOSIS PM-300 Series

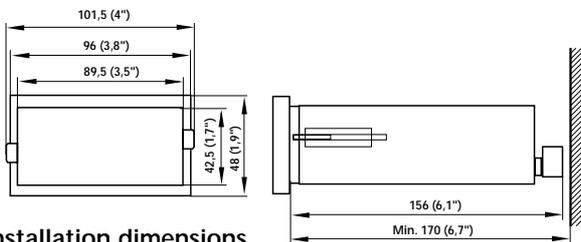
General description

Today's market place confronts the user with a variety of different makes with very little to choose between them. KFG's INOSIS PM-300 series of panel indicators and controllers with its attractive price brings a fresh approach to this static market.

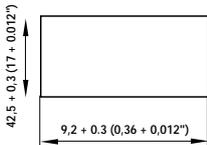
The new INOSIS PM-300 series incorporates features such as 2 universal input, 4 relays, (1000 alarm functions), more than 1000.000 process configuration possibilities transmitter power supply, Modbus, Autotuning, 32 point linearisation and differential calculation, formerly only found on higher priced general purpose controllers. Its modular design guarantees short delivery times for the entire range. Front dimensions: 96x48 mm. Mechanical protection: IP65.



Dimensions



Installation dimensions



TYPE CODE KEY

INOSIS P M - 3 -

Mechanical design	Code
Standard	M
Lockable cover	Z

Input	Code
IN1	1
IN1 and IN2	2
IN1 + 32 point linearisation	3
IN1 + IN2 + 32 point linearisation	4

Outputs	Code
SPDT1, SPDT2-relays, L _{out1}	1
SPDT1, SPDT2-relays, L _{out1} , L _{out2} , U _i	2
SPDT1, SPDT2-relays, L _{out1} , SPST3, SPST4	3
SPDT1, SPDT2-relays, L _{out1} , L _{out2} , RS 485, SPST3, SPST4, U _i	4
SSR1, SSR2 drive, L _{out1}	5
SSR1, SSR2 drive, L _{out1} , U _i , L _{out2}	6
SSR1, SSR2 drive, L _{out1} , AL3, AL4	7
SSR1, SSR2 drive, L _{out1} , U _i , L _{out2} , RS 485, AL3, AL4	8

Power Supply	Code
85...265V AC / 120...375V DC	1
16-24V AC / 16...32V DC	2

Technical Data

Input

Current	0...20mA / 4...20mA
Voltage	5...20mV / 0...100mV / 0...500mV
Termocouple	K, J, E, L, U
Termocouple	N, R, S, B, M, A, C
Resistance thermometer	Pt 100, Pt 500, Pt 1000, Cu 100, Ni 100
Resistance	0...500 Ω / 0...2000 Ω
Potentiometer	0...500 Ω / 0...2000 Ω

Output

2 relays	250V AC, 5A
2 alarm relays	250V AC, 5A
SSR driver	15...250V AC, 1...5A
2 current outputs	0/4...20mA
Transmitter power supply	24V DC, 100mA
RS 485 MODBUS	

Features

- 2 line, 4 digit bicolour display
- User definable rounding of the display values
- Status indication
- 32 point linearisation
- Variable switch different (pump control)
- Window comparator differential metering
- High and low alarm

Algorithm

- ON / OFF, P, PI, PID
- Control of heating or cooling
- Control of motor driven valves
- Manual valve control
- Autotuning
- Programmed control
- Sequence control

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Innovation

Quality



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Quality



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