RIL330

TRASMETTITORI DI LIVELLO AD ULTRASUONI

LIVELLO

- For continuous level measurement of liquids (even if polluted), mash and paste materials in open or closed vessels, sumps, open channels,
- drains, etc.
- Variants of level meter with adjustment by two buttons, or by magnetic pen
- "Xi" version for usage in explosive areas
- State indication by two LEDs
- Current output (4 ... 20 mA), voltage output (0 ... 10 V) or RS-485 Modbus output
- Wide choice of electric connection via connectors, cable glands or protective conductor
- While used with horn adapter can be measured also some difficult media (foamy levels, bulk solids, etc.)

The RIL330 ultrasonic level meters are compact measurement devices containing an ultrasonic transmitter and an electronic module.
Using an transmitter, level meters transmit the series of ultrasonic pulses that spread towards the level surface. The transmitter recuperates reflected acoustic waves that are subsequently processed in the electronic module. Based on the period during which the individual pulses spread towards the level and back, this period is averaged by the electronics that performs temperature compensation and subsequently a conversion to an output current 4 -20 mA, voltage 0 - 10 V or output RS-485 Modbus.

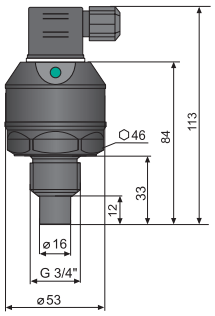
The RIL330 ultrasonic level meters are suitable for continuous non-contact level measurement of liquids (water solutions, sewerage water, etc.), mash and paste materials (sediments, sticks, resins etc.) in closed or open vessels, sumps, reservoirs and open channels.
In case the level of bulk-solid materials is measured, the measurement range is reduced.

All setting-up is done using two buttons positioned in the upper part of the sensor. The level meter is equipped with optical state indication (STATE) and with a setting-up process (MENU).
The level meter can output current or voltage signals.
They are manufactured in model versions for non-explosive areas (N) and explosive areas (Xi).

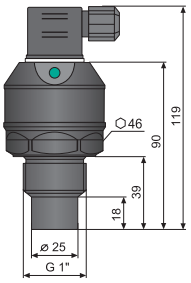
Model	Variants of sensors
RIL330-53_-01-_	Measuring range from 0.1m to 1m, plastic PVDF transmitter and plastic body (PP+HDPE),process connection with thread G ¾"
RIL330-53_-02-_	Measuring range from 0.2 m to 2m, plastic PVDF transmitter and plastic body (PP+HDPE), process connection with thread G 1"
RIL330-53_-06-_	Measuring range from 0.2m to 6m, plastic PVDF transmitter and plastic body (PP+HDPE), process connection with thread G 1 ½
RIL330-53_-10-_	Measuring range from 0.4m to 10m, plastic PVDF transmitter and plastic body (PP+HDPE), process connection with thread G 2 ¼"
RIL330-53_-20-_	Measuring range from 0.5m to 20m, with plastic PVDF transmitter and plastic body (PP+HDPE), aluminium alloy flange.

Sensor part	Type variant	Standard material
Case	all	Plastic PP
Electro-acoustic transducer	all	Plastic PVDF
Flange	RIL330-53_-20	aluminium with surface fnish (powder coating)
Cable grand	all	Plastic PA

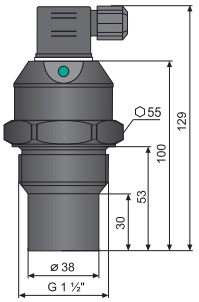
RIL330_–53_–01–_



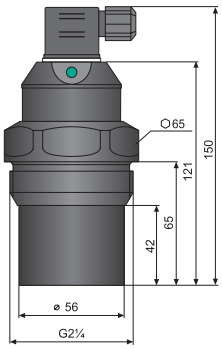
RIL330_–53_–02–_



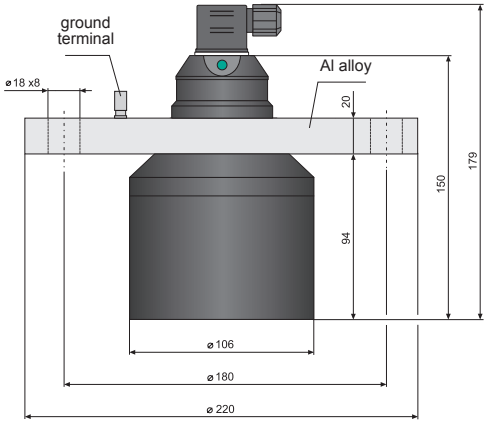
RIL330_–53_–06–_



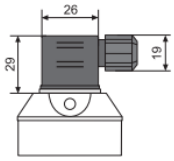
RIL330_–53_–10–_



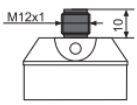
RIL330_–53_–20–_



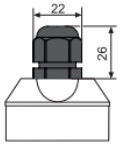
Variant "G" with connector ISO



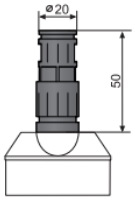
Variant "C" with connector M12



Variant "B" with cable outlet PG11



Variant "H" with outlet for protective conductor



Technical specifcations	Model	Features
Measuring range	RIL330_–01–_ RIL330_–02–_ RIL330_–06–_ RIL330_–10–_ RIL330_–20–_	0.1 ... 1 m 0.2 ... 2 m 0.2 ... 6 m 0.4 ... 10 m 0.5 ... 20 m
Supply voltage	RIL330N–__–_ RIL330Xi–__–I	18÷36V DC 18÷30V DC
Current supply	RIL330–N(Xi)–__–I RIL330–N–__–U RIL330–N–__–M	4÷20 mA / max. 22 mA Max. 12 mA Max. 20 mA
Current output Voltage output Modbus output	RIL330–_–__–I RIL330–N–__–U RIL330–N–__–M	4÷20 mA (limit values 3.9 ... 20,5 mA) 0÷10 V (limit values 0 ... 10.2 V) Modbus RTU protocol
Resolution	< 1 mm	
Accuracy (within the total range)	RIL330_–01 in area 0,1–0,2 m/0,2–1,0 m RIL330_–02;–06 RIL330_–10;–20	0,3 % / 0,2% 0,15% 0,2%
Temperature error	Max. 0,04% / K	
Beamwidth (-3 dB)	RIL330_–01–_;02–_;10–_ RIL330_–06–_ RIL330_–20–_	10° 14° 12°
Ambient temperature range	RIL330–01–_; 02–_; 06–_ RIL330_–10–_; 20–_	-30 ... +70°C -30 ... +60°C
Measuring period	RIL330_–01–_; 02–_ RIL330_–06–_; 10–_ RIL330_–20–_ RIL330_–__–M	0,5 s 1,2 s 5,0 s adjustable via Modbus RTU
Short time temperature stress resistance	+90°C / 1 hod.	
Max. operation overpressure (on transmission surface)	0,1 MPa	
Max. internal values[2] (for the Xi version only)	Ui=30VDC; Ii=132mA; Pi=0,99W; Ci=370nF; Li=0,9mH	
Failure indication	echo failure – basic mode echo failure – inverse mode level in dead zone – basic mode level in dead zone – inverse mode	3,75 mA (0 V) 22 mA (10,5 V) 22 mA (10,5 V) 3,75 mA (0 V)
Protection class	RIL330_-__-_-_-_- T RIL330_-__-_-_- G-M, L	IP67
	RIL330_-__-_-_- C-M, L	IP67[3]
	RIL330_-__-_-_- B-M, L RIL330_-__-_-_- H-M, L	IP68
Recommended cable	PVC 2 x 0,75 mm2 (3 x 0,5 mm2)	
Maximal current output load resistance	a U = 24 V DC a U = 22 V DC a U = 20 V DC	Rmax= 270 Ω Rmax=180 Ω Rmax= 90 Ω
Minimal voltage output load resistance	Rmin > 1 kΩ	
Delay between supply power rise time and first measurement	RIL330–01–_;02–_;06–_ RIL330_–10–_;20–_	5 s 9 s
Process connection	RIL330_–01–_ RIL330_–02–_ RIL330_–06–_ RIL330_–10–_ RIL330_–20–_	thread G ¾“ thread G 1“ thread G 1½“ thread G 2¼“ aluminium alloy flange
Weight	RIL330–53_–01–_ RIL330–53_–02–_ RIL330–53_–06–_ RIL330–53_–10–_ RIL330–53_–20–_	0,20 kg 0,20 kg 0,25 kg 0,65 kg 2,80 kg

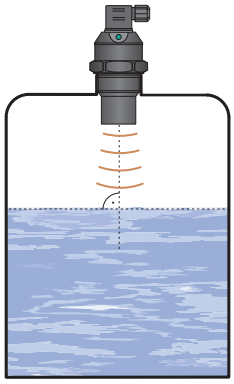
1) In case the level of bulk-solid materials is measured, the measurement range is reduced.
2) Allowed pressure range in the zone 0: 80 ... 110 kPa

Model	Area classifcation (according to EN 60079-10 and EN 60079-14)
RIL330_N–_ _–_	Performance for non-explosive areas
RIL330_Xi–01–I RIL330_Xi–02–I RIL330_Xi–06–I	Explosive proof – suitable for explosive areas (combustible gases or vapours) II 1/2G Ex ia IIB T5 Ga/Gb with isolating repeater (IRU–420) the whole level meter – zone 1, front head part – zone 0
RIL330_Xi–10–I	Explosive proof – suitable for explosive areas (combustible gases or vapours) II 1/2G Ex ia IIA T5 Ga/Gb with isolating repeater (IRU–420) the whole level meter – zone 1, front head part – zone 0
RIL330_Xi–20–I	Explosive proof – suitable for explosive areas (combustible gases or vapours) II 2G Ex ia IIA T5 Gb with isolating repeater (IRU–420) the whole level meter – zone 1

Installation

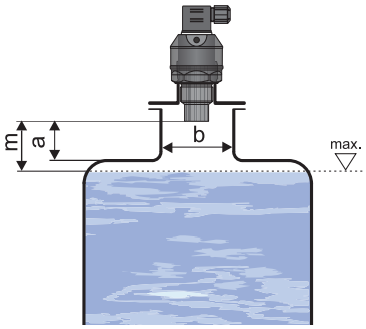
Level meter is installed into the upper lid of the tank (vessel), using a fxing nut or a flange.
If installed in an open channel (sumps, reservoirs, etc.), install the level meter as closest as you can to the maximum level expected.
The front of the level meter must run in parallel to the measured level.
Emitted acoustic signal must not be affected by near objects (stiffeners, ladders, mixers, unevenness, etc.), stream of flling, air flow, etc.
Foam on the level absorbs the acoustic wave reflection which might cause malfunction of the level meter. If possible select the location where the foaming is as low as possible. Protect the level meter against direct sunlight.

Mounting recommendation



Recommended installation

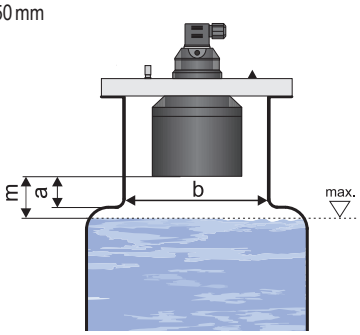
RIL330–53–01; 02; 06	a < 3 b b > 100 mm
RIL330–53–10	a < 1,5 b b > 100 mm
RIL330–53–20	a < 1,5 b b > 150 mm



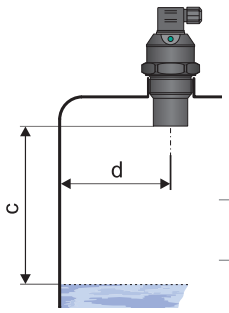
a - neck height

b - neck width

m - dead zone



Possible installation through the neck

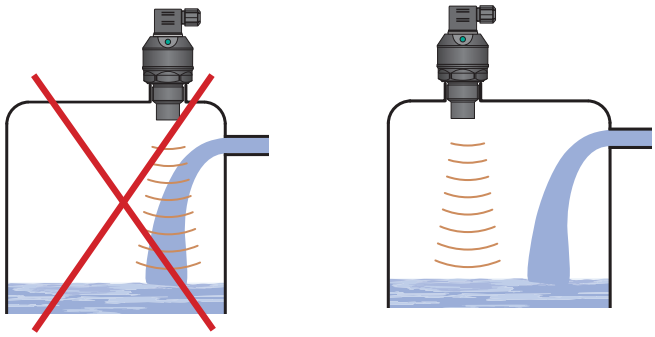


c - Maximum reach of the level meter

d - Minimum distance from tank wall

RIL330–53– 01; 02; 10	d > 1/12 c *(min. 200 mm)*
RIL330–53–06	d > 1/8 c *(min. 200 mm)*
RIL330–53–20	d > 1/10 c *(min. 200 mm)*

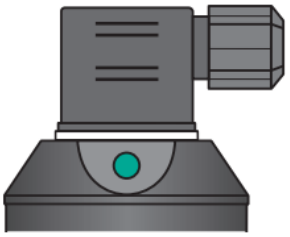
Installation distance from the tank wall



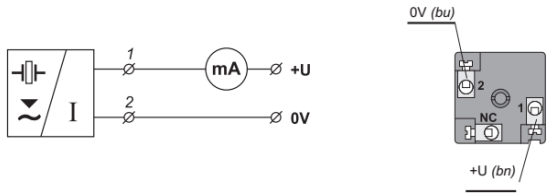
Level meter installation outside the influence of filling circulation

Connection through ISO connector

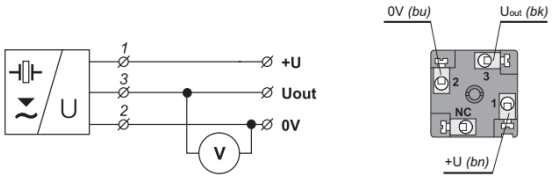
The RIL330 level meter with a G type cable gland are connected to processing (display) units by means of a cable with an outer diameter of 6 to 8 mm (recommended wire cross-section 0.5 to 0.75 mm²), via a detachable ISO connector with inner screw terminals, which is part of the delivery. The connection diagram and the inner view of the connector are shown in Figures on the right. Non-detachable connector IP67 with PVC cable 5 m long can be supplied as an extra optional.



View of the connector ISO



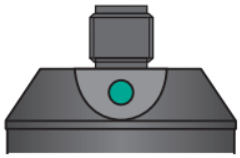
Connection diagram of the RIL level meter (variant –I) and inside view of the connector



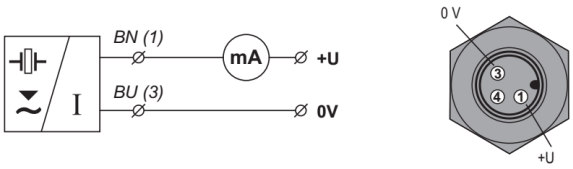
Connection diagram of the RIL level meter (variant –U) and inside view of the connector

Connection through M12 connector

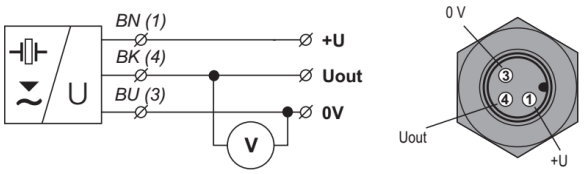
The RIL330 level meter with a C type cable gland are connected to processing (display) units by means of a cable with an outer diameter of 4 to 6 mm (recommended wire cross-section 0.5 to 0.75 mm2), via a connector socket with a moulded cable (2 or 5 m long) or via a detachable connector socket without a cable (see accessories). In this case connect the cable to the inner socket pins under fgures on the right.



View of the connector M12



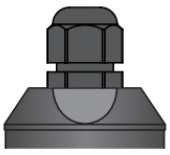
Connection diagram of the RIL level meter (variant –I) and inside view of the connector



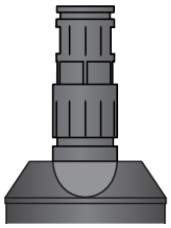
Connection diagram of the RIL level meter (variant –U) and inside view of the connector

Connection via PG 11 gland or gland for protective hoses

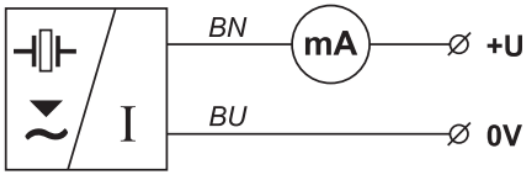
The RIL330 level meter sensor with a B or H type cable gland are connected to processing (display) units by means f a fxed PVC cable 5 m long. PG 11 (B) or plastic bushings with a thread for protective hoses (H) can be used as a cable gland.
Connection diagrams are shown in Figures on the right.



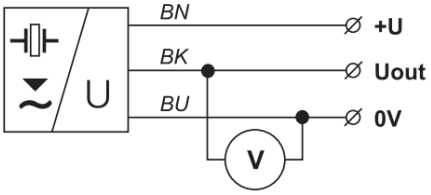
View of the cable gland PG11



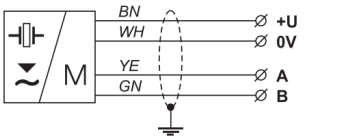
View of the cable gland for protective hose



Connection diagram of the RIL330 level meter (variant –I) and inside view of the connector



Connection diagram of the RIL330 level meter (variant –U) and inside view of the connector



legend:

BK – black WH – white
BU – blue YE – yellow
BN – brown GN – green

Connection diagram of the level meter with an RS–485 output (variant –M)

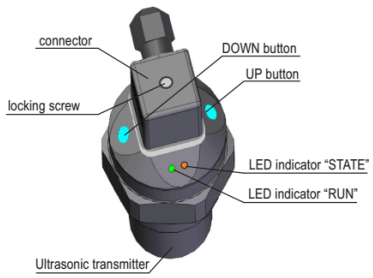
Wiring operations shall only be carried out without voltage!
Taking into account the potential occurrence of electrostatic discharge on non-conducting parts of the level meter, it is necessary to ground the flange of level meters RIL330–53Xi–20–F, located in an explosive atmosphere, using a ground terminal!

It is also necessary to design and take measures to reduce the effects of static electricity to a safe level in the wiring.
Installation in explosive atmospheres needs to be carried out in compliance with CSN EN 60079-14 (Electrical installations for explosive gaseous atmospheres – Part 14: Electrical installations in dangerous areas other than mining) and possibly also in compliance with other standards relating to the area concerned.

The supply source should be preferably designed as a stabilized source of safe voltage 18 V to 36 V DC (max. 30 V DC for version Xi), which is part of the downstream processing or display system.
In case of strong ambient electromagnetic disturbance, parallel run of the input cable with the power line or its length exceeding 30 m, we recommend using a shielded cable.

Device type with setting using buttons

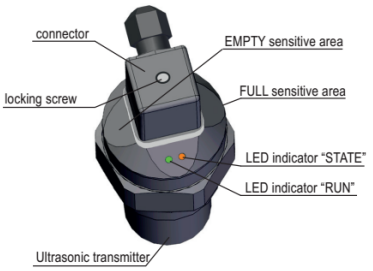
The measuring range is setup by means of two buttons "DOWN" and "UP".The "DOWN" button is used to enter to the setting mode (setting the 4mA or 0V limit) and to decrease the ouwtput current or voltage.
The "UP" button as an opposite function (setting the 20mA or 10V limit and increasing the output current or voltage).Values are confrmed by simultaneous pressing of both buttons for about 1sec.The setting process is indicated by yellow "STATE" LED indicator.
For detailed information please read at the instructions manual.



Key parts of the measuring device (version with buttons)

Device type with setting using a magnetic pen

The measuring range is setup by touching of the magnetic pen to sensitive spots "EMPTY" and "FULL" .The "EMPTY" spot is used to enter to the setting mode (setting the 4mA or 0V limit) and to decrease the output current or voltage.The "FULL" spot as an opposite function (setting the 20mA or 10V limit and increasing the output current or voltage). Values are confrmed by touching of the magnetic pen to the sensitive spot for about 3sec.
The setting process is indicated by yellow "STATE" LED indicator.
For detailed information please read at the instructions manual.



Key parts of the measuring device (version with Hall probes)

LED Indicator	Colour	Function
"RUN"	Green	**short flashing** (repeated depending on the measurement interval approx. 1 ... 2 s) - correct function, receipt of signal (echo) reflected from the measured surface **fast flashing** – the measured surface is in the dead zone of the level meter or the ultrasound transducer is dirty off – the level meter is not capable of receiving the echo. Incorrect installation or malfunction
"STATE"	Orange	**RIL330:** slow flashing – 4 mA (0 V) threshold setting indication fast flashing – 20 mA (10 V) threshold setting indication 3 short flashes – setting confrmation **RIL330-53 variant "M" with Modbus communication** fast flashing – communication under way on line RS-485

Standard accessories

- 1x seal (for RIL330_–53_– 01; 02; 06, 10)
- 1x connector with IP67 coverage (for versions with an ISO connector)
- 1x magnetic pen MP–8 (for device type adjusted with a magnetic pen)
- free-to-download programme Basic Scada Level (for the Modbus version)

Optional accessories

- stainless steel or plastic fastening nuts G ¾'', G1", G1 ½" and G2 ¼
- stainless steel or plastic lugs G ¾'', G1'', G1 ½'' and G2 ¼
- horn adapter ST–G1 (thread G1"), ST–G1,5 and ST–G2,25
- socket ELWIKA 4012 K PG7
- connector with IP67 coverage (type GAN-DADE 7A) with 5m cable (for current output and ISO type connector)
- connector with IP67 coverage (type GAN-DAEE 7A) with 5m cable (for voltage output and ISO type connector)
- converter URC-485 (for the Modbus version)

ORDER CODE RIL330							
RIL330							
PERFORMANCE							
N	non-explosive atmosphere						
Xi	Xi – explosive atmosphere						
		MAXIMUM RANGE					
		01	0,10...1m				
		02	0,20...2m				
		06	0,20...6m				
		10	0,4...10m				
		20	0,5...20m				
			PROCESS CONNECTION				
			G	pipe thread			
			F	flange			
				OUTPUT TYPE			
				I	current output (4 ... 20 mA)		
				U	voltage output (0 ... 10 V)		
				M	RS-485 line with Modbus RTU communication		
					CONNECTION METHOD		
					G	ISO connector	
					C	M12 connector	
					B	short cable gland PG11	
					H	cable gland for protective hose	
						CONTROL UNITS	
						T	setting using buttons
						M	setting using a magnetic pen (MP8)
						L	no setting controls and LED
RIL330	**N**	**02**	**G**	**I**	**C**	**T**	**Example: RIL330-N-02-G-I-C-T**