

- For continuous level measurement of liquids (even if polluted), mash and paste materials in open or closed vessel, sumps, open channel, drains, etc.
- Quick view measured values on the display
- Easy adjustment without measured material
- Elimination of false echoes
- Zone temperature compensation
- Possibility of using in explosive areas (version X)
- Current output (4...20mA) with HART[®] protocol or output RS-485 Modbus
- Copying of level meter configuration using display module
- While used with horn adapter can be measured also some difficult media (foamy, levels, bulk solids, etc.)



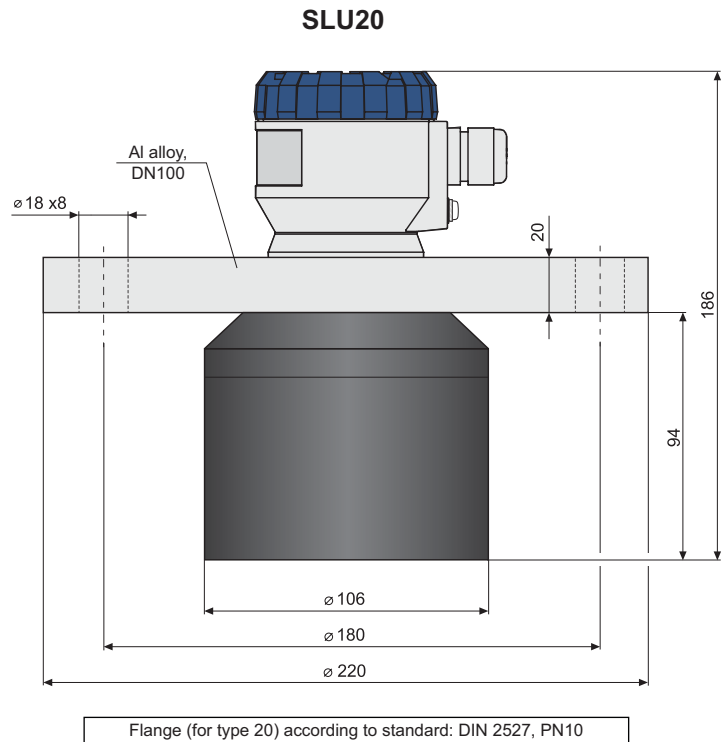
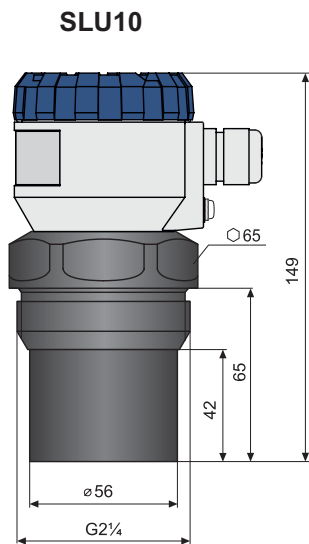
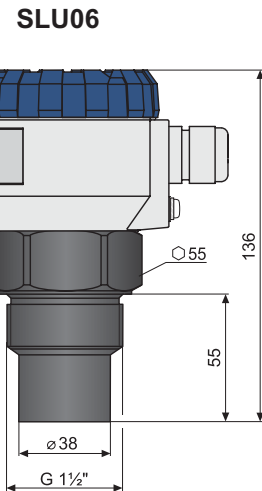
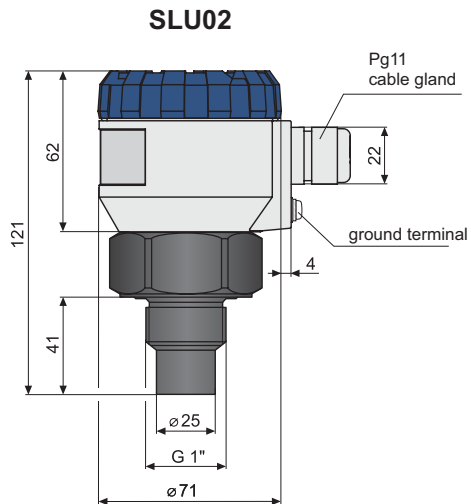
The SLU Ultrasonic level meters are compact measurement devices containing an ultrasonic transmitter and an electronic module. The transducer generates ultrasonic pulses that travel at the speed of sound toward the target medium. These sound waves are reflected off the surface of the medium and are received by the transducer system. The "time of flight" between the transducer and the surface and then back to the transducer is measured. Based on the time period during which the individual pulses spread towards the level and back, this period is averaged by the electronics (that also performs temperature compensation) and subsequently are converted to an output current 4...20mA with HART protocol or output RS-485 Modbus and the measured value is displayed on the display.

The central processor evaluates and blocks out interfering signals, performs temperature compensation, compares the cleaned received signal with the false reflection map (e.g. from mixers, ladders, reinforcement etc.) and selects a suitable reflection (echo).

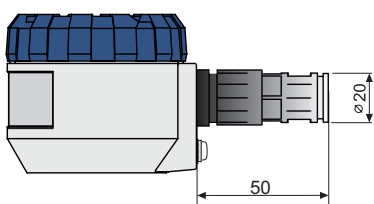
The SLU ultrasonic level meters are suitable for continuous non-contact level measurement of liquids (water solutions, waste water sewage), mash and paste materials (sediments, sticks, resins etc.) in closed or open vessels, sumps, reservoirs and open channels (volume of flow in Parshall flumes). In the case of bulk-solid materials, the measuring range is reduced, but can be amplified or compensated by using the horn accessory.

Variant of Sensor

- **SLU-02** - Measuring range from **0.15m - 2m** plastic PVDF transmitter and plastic body (PP+HDPE), process connection with thread G 1"
- **SLU-06** - Measuring range from **0.25m - 6m** plastic PVDF transmitter and plastic body (PP+HDPE), process connection with thread G 1.1/2"
- **SLU-10** - Measuring range from **0.4m - 10m** plastic PVDF transmitter and plastic body (PP+HDPE), process connection with thread G 2.1/4"
- **SLU-20** - Measuring range from **0.5m - 20m** plastic PVDF transmitter and plastic body (PP+HDPE), aluminum alloy flange



Variant SLU with protective condutor



Level meter		
Measuring range ¹⁾	SLU-02	0.15 ... 2 m
	SLU-06	0.25 ... 6 m
	SLU-10	0.4 ... 10 m
	SLU-20	0.5 ... 20 m
Adjustable measuring range (SPAN)		Min. 200 mm
Supply voltage	SLU(02/06/10/20)-N	18 ... 36 V DC
	SLU(02/06/10/20)-X	18 ... 30 V DC
Output	SLU(02/06/10/20)-C SLU(02/06/10/20)-M	4 ... 20mA (Limit values 3.9 ... 20.5 mA), HART® RS-485 with protocol Modbus RTU
Current consumption	SLU-C SLU-M	4 ... 20 mA / Max. 22 mA Max. 20 mA
Resolution	SLU02 ; 10	< 1 mm
	SLU06	< 2 mm
	SLU20	< 2,5 mm
Accuracy (within the total range)		0.15 %
Temperature error		Max. 0.04% / K
Operating frequency	SLU02	120 kHz
	SLU06	75 kHz
	SLU10	50 kHz
	SLU20	30 kHz
Beamwidth (-3 dB)	SLU02 ; 10	10°
	SLU06	14°
	SLU20	12°
Ambient temperature range	SLU02 ; 06	-30 ... +70°C
	SLU10 ; 20	-30 ... +60°C
Short-time temperature stress resistance		+90°C / 1 h.
Max. operation overpressure (on transmission surface)		0.1 MPa
Sensitivity		3 Settings (low – medium – high)
Damping		0 ... 99 s
Measuring period		1 ... 4 s
Rise time		cca. 30 s
Additional technical data for Ex proof - Max. internal values		$U_i=30V$ DC; $I_i=132mA$; $P_i=0.99W$ $C_i=370nF$ $L_i=0.9mH$
Failure indication (echo loss, level in dead zone ³⁾ , internal failure)		Adjustable in modes: 3.75mA; 22mA; Last measured value
Protection class		IP67
Mechanical connection	SLU02	thread G 1" (Optimal Horn adapter)
	SLU06	thread G 1.1/2" (Optional Horn adapter)
	SLU10	thread G 2.1/4" (Optional Horn adapter)
	SLU20	Aluminium alloy flange
Recommended cable	SLU(02/06/10/20)-C	PVC 2 x 0.75mm ²
	SLU(02/06/10/20)-M	PVC 2 x 2 x 0.25mm ² (twisted pair, shielded)
Maximal resistance of current output load	U = 24 V DC	$R_{max} = 270 \Omega$ ²⁾
	U = 22 V DC	$R_{max} = 180 \Omega$
	U = 20 V DC	$R_{max} = 90 \Omega$
Weight	SLU02	0.3 kg
	SLU06	0.4 kg
	SLU10	0.7 kg
	SLU20	3.1 kg

¹⁾ In case the level of bulk-solid materials is measured, the measurement range is reduced.

²⁾ Including 250R resistor in case of HART connection.

Display module	
Display type	Matrix OLED
Resolution	128 x 64 pixel
Character height / Number of digits measured value	9 mm / 5 Digits
Display colour	Yellow
Buttons	Membrane switch panel
Ambient temperature range	-30 ... +70 °C
Weight	46 g

Area classification (according to EN 60079-10 and EN 60079-14)	
SLU(02/06/10/20)-N	Performance for non-explosive areas
SLU02-X SLU06-X	Explosive proof - suitable for explosive areas (combustible gases or vapours) ⊕ II 1/2G Ex ia IIB T5 Ga/Gb with isolation repeater (SIR-420), the whole level meter - zone 1, front head part - zone 0
SLU10-X	Explosive proof - suitable for explosive areas (combustible gases or vapours) ⊕ II 1/2G Ex ia IIA T5 Ga/Gb with isolation repeater (SIR-420), the whole level meter - zone 1, front head part - zone 0
SLU20-X	Explosive proof - suitable for explosive areas (combustible gases or vapours) ⊕ II 1/2G Ex ia IIA T5 Gb with isolation repeater (SIR-420), the whole level meter - zone 1

Installation

Level meter is installed into the upper lid of the tank (vessel), using a fixing 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.

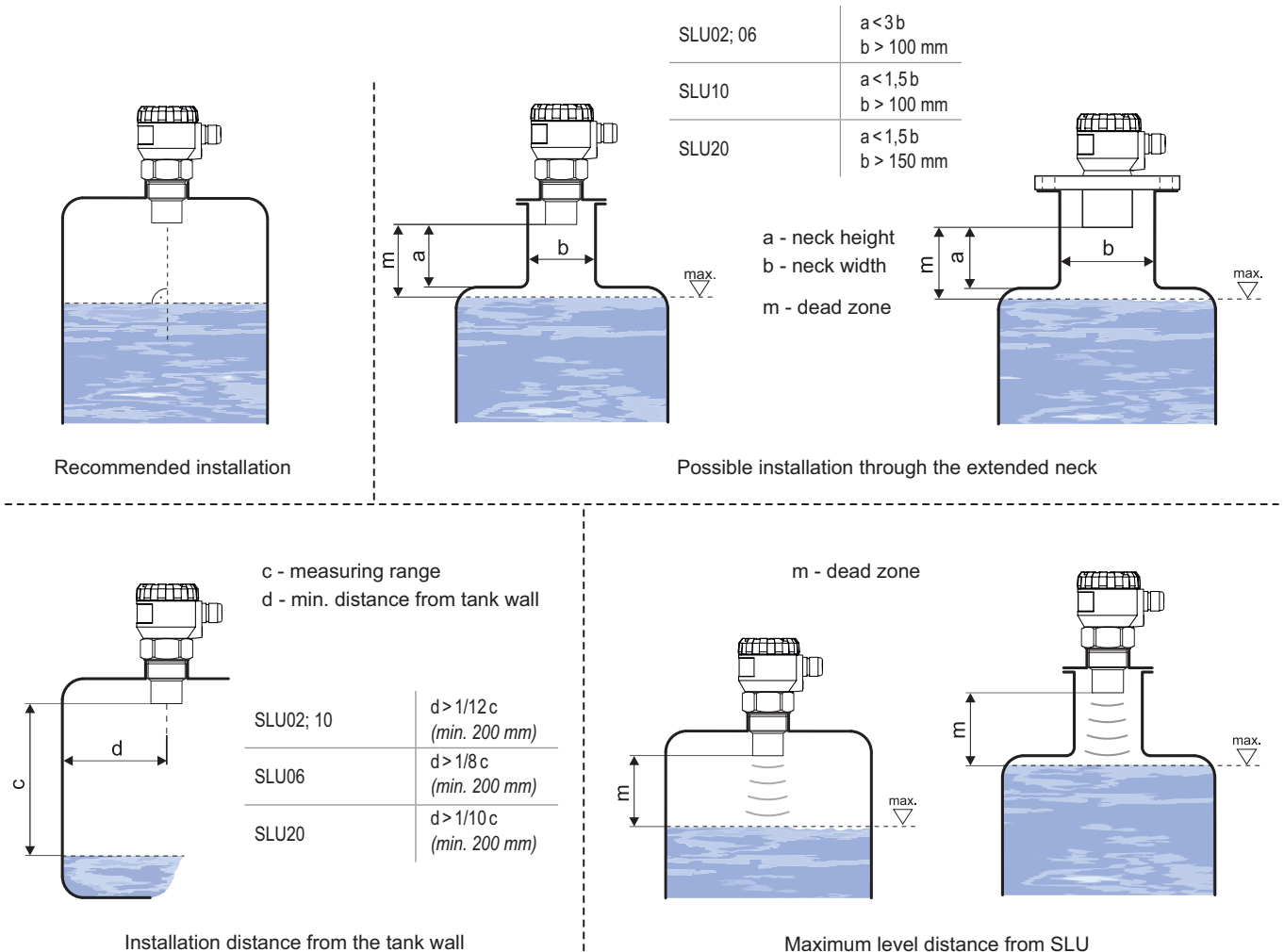
The front of the level meter must be vertically to the measured level.

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.

In the case of uncertainty we recommend to consult the application with the Sitron

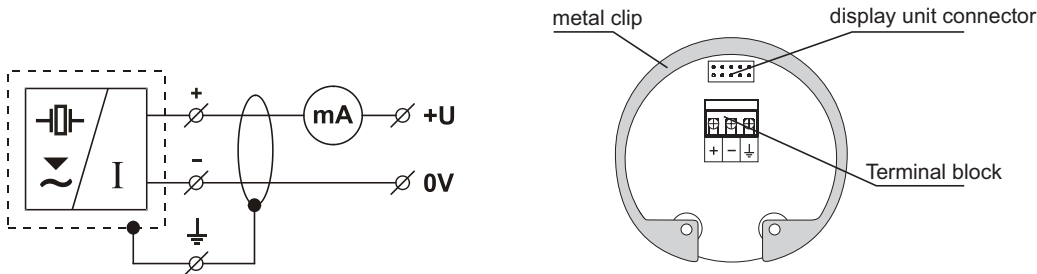
Mounting Recommendation



Electrical Connections

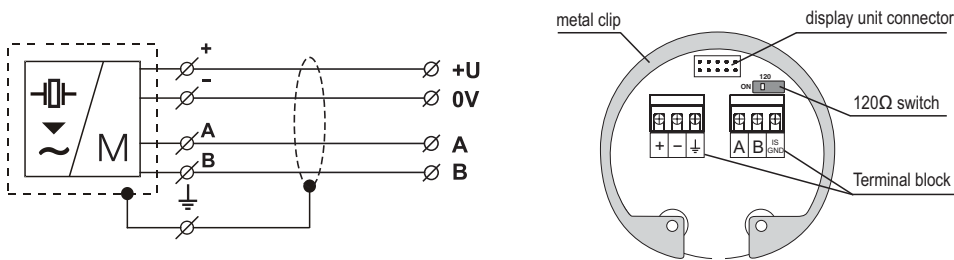
The level meter is connected to consequential (evaluating) device with a suitable cable with the outer diameter of 6 to 8mm using screw terminals located under the display module. The recommended cross section of cores for the current version 2 x 0.5 / 0.75 mm² and for the version with Modbus communication 2 x 2 x 0.25mm² (twisted pair, shielded). Plus pole (+U) is connected to the terminal (+), minus pole (0 V) to the terminal (-) and the shielding (only for shielded cables) to the terminal (\perp). Communication wires A and B of the line RS-485 (for version «M» - Modbus) are connected to the terminal A and B.

Wiring diagram of the level meter with current output SLU(02/06/10/20)-C



Inside view of screw terminals of the level meter with current output SLU(02/06/10/20)-C

Wiring diagram of the level meter with Modbus SLU(02/06/10/20)-M



Inside view of screw terminals of the level meter with Modbus SLU(02/06/10/20)-M

Electrical connection must be done in de-energized state!

The supply voltage source should be preferably realized as a stabilized power supply unit with safe voltage from 18 to 36 V DC (18 to 30 V DC for X version), which can be a part of the evaluation or display device.

With case of strong electromagnetic interferences (EMI), parallel cable ducting with power lines, or when cable length exceeds 30 m we recommended to use shielded cable.

Level meter setting

Set the level meter using 3 buttons placed on the display module. All settings are accessible in the SLU set-up mode access. For detailed information please read at the instruction manual.

Button

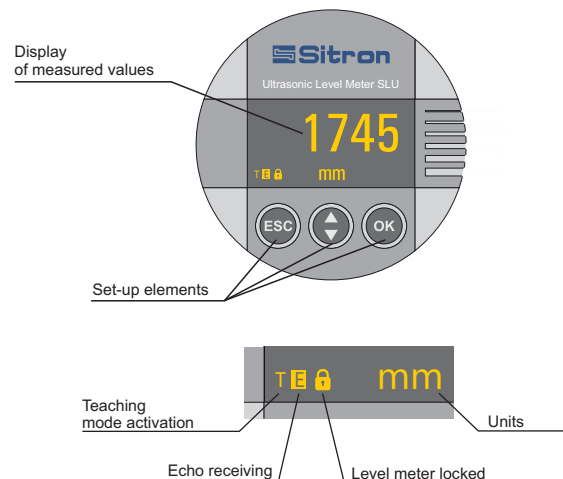
- Set-up mode access
- Confirmation of selected item in the menu
- Move the cursor in the line
- Saving of set-up data

Button

- Move in the menu
- Change of values

Button

- Cancelling of carried out changes
- Shift one level up



* Slow flashing while the reflected signal (echo) is received from the measured level

Range of Applications

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. We recommend to consult the use with the manufacturer

Safe, Protection, Compatibility and Explosion Proof

The level meter SLU is equipped with protection against reverse polarity and output current overload Protection against dangerous contact is secured by low safety voltage compiles with EN 33 2000-4-41.

Electromagnetic compatibility according to EN 55022/B, EN 61326/Z1 and EN 61000-4-2 to 6.

Explosion proof of SLU-X type compiles with the following standards: EN 60079-0 : 2007;

EN 60079-11 : 2007 ; EN 60079-26 : 2007

Special Conditions for Safe use SLU-X

The device is designed for connection to the isolating repeater SIR-420. When the other approved supply units is used, whose output parameters satisfy above mentioned output parameters, its is necessary to have a galvanic separation or, if supply unit without galvanic separation is used (Zener barriers), it is necessary provide potential equalization between sensor and point of barrier earthing.

For application in zone 0 the present explosive atmosphere- mixture of air with flammable gases, vapour or mists must comply: 0,8 bar < p < 1,1 bar. The device must be installed in such a way, to prevent mechanical damage of sensor face. It is necessary carried out erathing by screw wich is placed on head of level meter

Accessories

Standard - incl. in the price of the level sensor

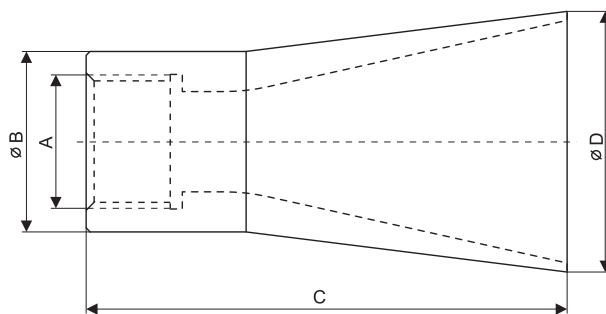
- 1 pc of Seal (for SLU-02-C, 06-C)
- **for version with Modbus software**
Basic Scada Level is possible to download

Optional - for extra charge

- Fixing nuts G1" and G1 1/2"
- Horn adapter ST-G1 and ST-G1,5
- **for version with Modbus Convertor SMC-485**

Horn Adapter ST

For increases the radiation directivity ultrasonic waves, improves reception of weak echoes (unstable level surfaces, solids materials, etc.), and reduces the risk of false rejections



Type	For level meters	A	B(mm)	C (mm)	D (mm)	Material
ST -G1	SLU-02	G1"	45	120	65	PP (Polypropylene)
ST- G1.5	SLU-06	G1 1/2"	56	160	100	PP (Polypropylene)

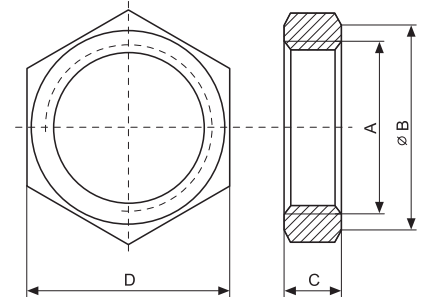
Fixing Nuts - Stainless Steel (SS), Plastic (P)

For mechanical fixing sensors in the cases when the use of weld flanges is not possible

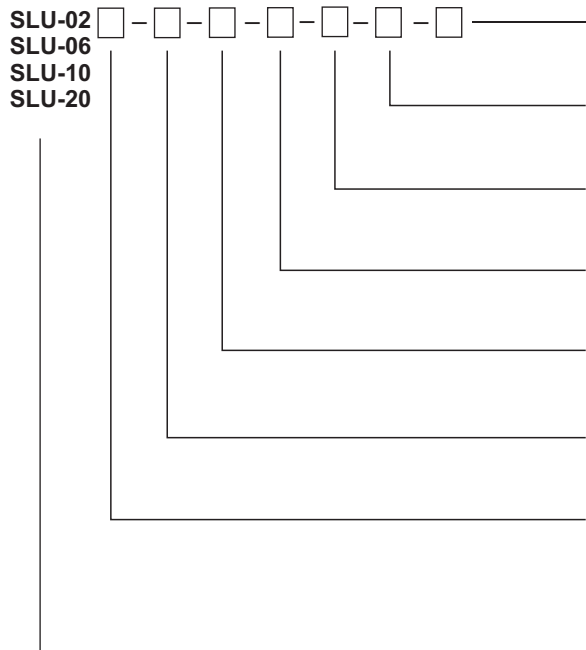
Material: SS - (AISI 304)
P - PP (Polypropylene) + GF30 Glass fiber



Type	For sensors	A	B (mm)	C (mm)	D (mm)
SS-G1	SLU-02	G1"	45.4	12	46
SS-G1.5	SLU-06	G1 1/2"	54	14	55
P-G1	SLU-02	G1"	45.4	12	46
P-G1	SLU-02	G1 1/2"	54,8	14	55



Order Code



- Accessories: – None
H – Horn Adaptador
- Set-Up via: **D** – Digital Display
L – No Display / Metal Lid
- Electrical connection: **B** – Short Cable Conduit
H – Cable Gland w/ Protective Hose
- Output: **C** – 4...20mA with HART
M – RS-485 (Modbus RTU)
- Performance: **N** – General Area Use
X – Ex-Proof/ For Explosive Areas
- Process Connection Type: **B** – Thread
F – Flange
X – Other specify
- Size: **5** – 1"
6 – 1 1/2"
7.5 – 2 1/4"
Q – 4"
- Maximum reach: **02** – 0.15 ... 2 m
06 – 0.25 ... 6 m
10 – 0.4 ... 10 m
20 – 0.5 ... 20 m

Correct specification examples

SLU-02-5-B-N-C-B-D-
SLU-06-6-B-X-C-H-D-H

SLU-10-7.5-B-X-M-B-D-H
SLU-20-_-F-X-C-B-D-_-

- The SLU02 has a measuring range from 0.15m to 2m with plastic PVDF transmitter and plastic body (PP+HDPE), process connection of G1" thread.
- The SLU06 has a measuring range from 0.25m to 6m with plastic PVDF transmitter and plastic body (PP+HDPE), process connection of G1 1/2" thread.
- The SLU10 has a measuring range from 0.4m to 10m with plastic PVDF transmitter and plastic body (PP+HDPE), process connection of G2 1/4" thread.
- The SLU20 has a measuring range from 0.5m to 20m with plastic PVDF transmitter and plastic body (PP+HDPE), process connection of aluminum alloy flange.