



Flotation Cell Level Indicator

MODEL FLT450/300

The Outotec range of Flotation Cell Level indicators was developed to satisfy the most stringent requirements for accurate measurement of pulp level in flotation cells.

Outotec
More out of ore

Flotation Cell Level Indicator

MODEL FLT450/300 - The stainless steel construction of the housing and pantograph style mechanism, in conjunction with a polypropylene float mounted on an adjustable solid fibreglass rod or stainless steel tube, make the Outotec FLT450/300 cell level indicator ideal for the rugged environment in which the units will operate.

Once installed these units will only require minimal maintenance and servicing. For applications that may result in excessive build up of material on the arms, tubular arms are available as an option.

Principle of Operation

Changes in pulp level cause corresponding changes in float position. This is converted into an angular change by the pantograph system which moves the angle transmitter and converts this position into a 4-20mA signal.

Transmitted levels will vary only slightly with variations in pulp density therefore delivering accurate and repeatable results even during times of plant upsets, start up or shutdown.

Features

- Maintains precise level indication (+/-5mm)
- Can be installed on any make of flotation cell
- Easily installed, pre-calibrated
- Contactless transducer is virtually maintenance free
- 4-20mA output
- Low sensitivity to SG variations
- 316 stainless steel construction for long life
- Rugged construction.

Specifications

- **Measuring Range:**
FLT450=450mm
FLT300=300mm
Other ranges are available on request
- **Output signal:**
4-20mA loop powered
Other signals are available on request
- **External Load:**
2 wire connection 4-20mA
600 ohm max at 24 V.D.C.

■ Action

Direct acting (4mA = low level)
Reverse acting on request

■ Power Supply:

24-36 V.D.C.

■ IP Rating:

IP 67

Data subject to change without notice

The set-up information for the Outotec Flotation Cell Level Indicator Model FLT 450/300 follows. The first typed page gives some simplified tips for setup. Please use these in conjunction with the suppliers information.

Set-up guidelines

Use as a guide and refer to manual.

1. Line the electrical zero position up with the mechanical zero position to which the transmitter is being attached. I.e. Line groove up to the zero position when the level ball float is at the lowest position.
2. Electrical Connections: See the 'two wire' connection diagram page 5.3-4.
3. Zero Span adjustment: The level ball float is set into zero position (fully lowered). In this position a 4 mA output should be read. If the read-out differs from 4 by 0.05 mA then turn the potentiometer (P1) until readout is 4 mA.
4. Span Adjustment: Raise the ball to its highest position. The read-out should be 20 mA. Adjust using the potentiometer (P2) to read exactly 20 mA.
5. Recalibration: Recheck the above limits.

4. Specification and ordering information

Significance of the digits 1. to 4.

Order Code 708 –					
		↑	↑	↑	↑
1. Version of the transmitter (with standard drive shaft at front only , Ø 2 mm, length 6 mm, see “Note”)					
Standard, Measuring output non intrinsically safe	1				
EEx ia IIC T6, Measuring output intrinsically safe	2				
Customized, Measuring output intrinsically safe	5				
(Japan), (on request)					
Ex ia IIC T6, Measuring output intrinsically safe	6				
FTZU (Czech republic),					
EEx ia IIC T6, Measuring output intrinsically safe	7				
BKI (Hungary)					
2. Sense of rotation					
Calibrated for sense of rotation clockwise	1				
Calibrated for sense of rotation counterclockwise	2				
V characteristic	3				
Calibrated for both senses of rotation and marked	4				
3. Measuring range (measuring input) \ominus					
0 ... 10 \angle°	1				
0 ... 30 \angle°	2				
0 ... 60 \angle°	3				
0 ... 90 \angle°	4				
0 ... 180 \angle°	5				
0 ... 270 \angle°	6				
Non-standard 0 ... ≥ 5 to 0 ... $< 270 \angle^\circ$	9				
V characteristic	A				
4. Output signal (measuring output) $\ominus \rightarrow$ / connection mode (Power supply 12...33 V DC resp. 12... 30 V DC with Ex version)					
0 ... 1 mA / 3- or 4-wire connection	A				
0 ... 5 mA / 3- or 4-wire connection	B				
0 ... 10 mA / 3- or 4-wire connection	C				
4 ... 20 mA / 2-wire connection	D				
or					
0 ... 20 mA / 3- or 4-wire connection					
4 ... 20 mA / 3- or 4-wire connection	E				
Non-standard / 3- or 4-wire connection	Z				
0 ... > 1.00 to 0 ... < 20 mA					
Note The remaining order code digits concern special features, e.g. the drive shaft special, see Fig. 1.					

5. Technical data

Measuring input \ominus	
Measuring ranges:	0... ≥ 5 to 0... $\leq 270 \angle^\circ$ Preferred ranges 0...10, 0...30, 0...60, 0...90, 0...180 or 0...270 \angle°
Measuring output $\ominus \rightarrow$	
Output variable I_A :	Load-independent DC current, proportional to the input angle
Standard ranges:	0...1 mA, 3- or 4-wire connection 0...5 mA, 3- or 4-wire connection 0...10 mA, 3- or 4-wire connection 4...20 mA, 2-wire connection or 0...20 mA, 3- or 4-wire connection adjustable with potentiometer 4...20 mA, 3- or 4-wire connection
Non-standard ranges:	0... > 1.00 to 0... < 20 mA 3- or 4-wire connection
External resistance: (load)	$R_{\text{ext max.}} [\text{k}\Omega] = \frac{H [\text{V}] - 12 \text{ V}}{I_A [\text{mA}]}$ H = Power supply I_A = Output signal end value
Accuracy	
Reference value:	Measuring range
Basic accuracy:	Limit of error $\leq 0.5\%$ for ranges 0... $\leq 150 \angle^\circ$ Limit of error $\leq 1.5\%$ for ranges from 0... > 150 to 0...270 \angle°
Power supply H $\rightarrow \bigcirc$	
DC voltage ¹ :	12...33 V (possible with standard version, non Ex) 12...30 V (necessary with Ex version, type of protection “Intrinsic safety” EEx ia IIC T6)
Max. residual ripple:	10% p.p.
Max. current consumption:	Approx. 5 mA + I_A

Material

Housing (main part): Metal (aluminium)
Surface chromated

Mechanical withstand

Permissible vibrations: 5 g every 2 h in 3 directions
 $f \leq 200 \text{ Hz}$
Shock: 3 \times 50 g
10 shocks each in 3 directions

Admissible static
loading of shaft:

Sense	Drive shafts dia.	
	2 mm	6 mm resp. 1/4"
radial max.	16 N	83 N
axial max.	25 N	130 N

Mounting position: Any

Regulations

Test voltage: 500 Veff, 50 Hz, 1 min.
all electrical connections
against housing

Housing protection: IP 50 acc. to EN 60 529

Environmental conditions

Climatic rating: **Standard version**
Temperature – 25 to + 70 °C
Annual mean relative humidity $\leq 90\%$
or
Version with improved climatic rating
Temperature – 40 to + 70 °C
Annual mean relative humidity $\leq 95\%$
Ex version
Temperature – 40 to + 60 °C at T6
resp. – 40 to + 75 °C at T5

Transportation and
storage temperature: – 40 to 80 °C

¹ Polarity reversal protection. The voltage must not fall below 12 V.

6. Mounting

All six versions of the transmitter (Fig. 1) which differ in appearance by the type of shaft can be mounted either **directly** or by means of **3 mounting clips** to the item being measured. Both methods of mounting and the relevant drilling and cut-out plans can be seen from Table 1.

Table 1:

Mounting versions ¹		Drilling and cut-out diagrams for mounting transmitters
directly		

¹ For the example of KINAX 3W2 with standard drive shaft at front only, \varnothing 2 mm, length 6 mm.

Three **M3** screws are needed for the “**directly**” mounted versions and three **M4** screws for those “**with clamps**”. The screws are not supplied, because the required length varies according to the thickness of the mounting surface.



When deciding where to install the transmitter (measuring location), take care that the “**Ambient conditions**” given in Section “5. Technical data” are **not exceeded**.

Make the cut-out and drill the holes in the item onto which the transmitter is to be mounted according to the **corresponding** drilling and cut-out diagram given in Table 1 and then fit the transmitter.

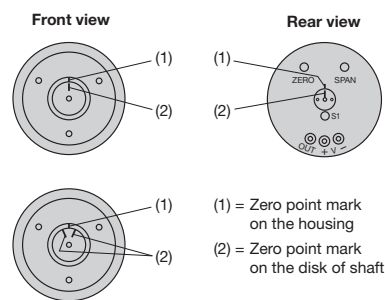


Pay attention when aligning and tightening the transmitter that the **transmitter zero** and the **zero** of the item being measured **coincide**. Alignment is achieved by rotating the transmitter.

To facilitate alignment in the case of “**direct**” mounting, it is recommended to elongate the 3 mounting holes (diam. 3.2 mm).

When using **mounting clips**, the clips permit the transmitter to be rotated to the correct position.

The **electrical zero** of angular transmitters with measuring ranges **0 to ...** \angle° is marked on both the front and the back (see upper illustration). It is only marked on the front, however, in the case of angular transmitters with ranges having a **V characteristic** and at instruments with both senses of rotation, see lower illustration.



7. Electrical connections

There are 3 soldering posts (3) on the back of the transmitter for attaching the electrical connections (see Fig. 4). The soldering posts suffice Protection Class IP 00 according to EN 60 529.

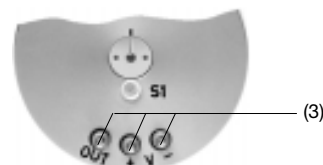


Fig. 4



Note that, ...

... the data required to carry out the prescribed measurement must correspond to those marked on the nameplate of the KINAX 3W2 (Range, Output, Supply voltage)!

... the total loop resistance connected to the output (receiver plus leads) **does not** exceed the maximum permissible value R_{ext} ! See “**Measuring output**” in Section “5. Technical data” for the maximum values of R_{ext} .

... twisted cores must be used for the measured variable input and output leads and routed as far away as possible from power cables!

In all other respects, observe all local regulations when selecting the type of electrical cable and installing them!

In the case of “**Intrinsically safe**” explosion-proof versions with I.S. measuring output, the supplementary information given on the Ex approval and also local regulations applicable to electrical installations in explosion hazard areas must be taken into account!

KINAX 3W2	Supply	Range: 0...30°	Camille Bauer AG Aargauerstr. 7 CH-5610 Wohlen Switzerland
Type: 708-112D 0	Voltage	Output: 0/4...20 mA	
Ord: 999/888888/776/997	12...33V	Rotation Sense CW/CCW: >>	

Fig. 5. Example of a nameplate.

Solder the connections as shown in the corresponding wiring diagram (Fig. 6).



Do not **excessively heat** the soldering posts (3)!
Solder using a **small** pencil bit soldering iron!

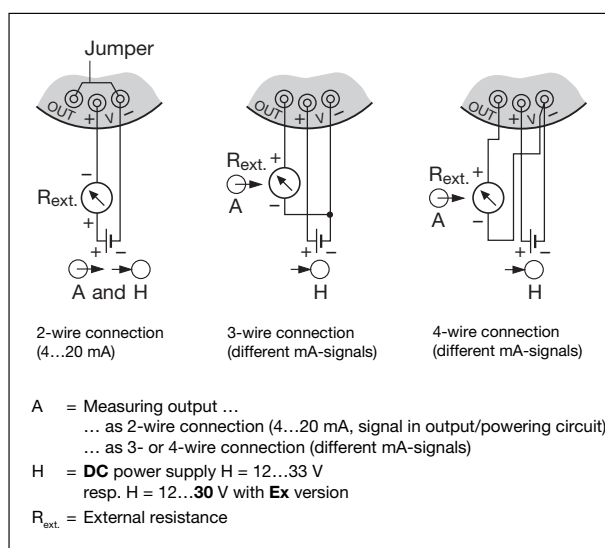


Fig. 6. Connection diagrams for 2-, 3- or 4-wire connection.

8. Setting the beginning and end of the measuring range

The coarse adjustment of the beginning of the measuring range consists in aligning the zero of the measured device with the external zero mark on the transmitter. The procedure was described in Section "6. Mounting". This Section concerns the **fine adjustment** not only of the beginning of the range (ZERO), but also of the end of the scale (SPAN).

Firstly, switch on the power supply to the transmitter.

Remove the ZERO/SPAN sealing plug (4) (Fig. 7, left). Place the measured device at its **zero position**, i.e. the position at which the KINAX 3W2 should produce 0 mA (3- or 4-wire connection) resp. 4 mA (2-wire connection) at its output.

Should the output current differ by more than 2% from its initial value, repeat the coarse zero setting procedure described in Section "6. Mounting".

Then adjust the "ZERO" potentiometer (Fig. 7, right) using a watchmaker's screwdriver (2.3 mm diam.) so that the desired output current flows.

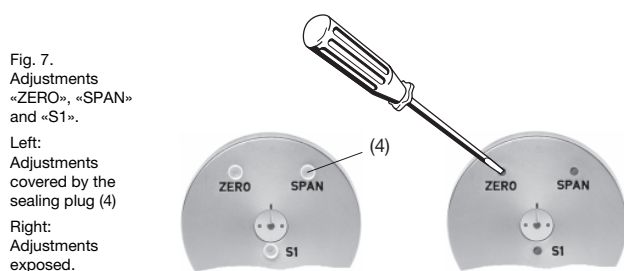


Fig. 7.
Adjustments
«ZERO», «SPAN»
and «S1».

Left:
Adjustments
covered by the
sealing plug (4)

Right:
Adjustments
exposed.

Now rotate the measured device to its opposite limite position, i.e. the position at which the KINAX 3W2 should produce the prescribed full-scale output current (see rating plate).

Adjust the "SPAN" potentiometer with the screwdriver as before until precisely the prescribed full-scale output current is measured at the output.

Now recheck the zero value and readjust on the ZERO potentiometer and then recheck the full-scale value.

9. Adaptation from 2-wire connection to 3- or 4-wire connection and vice versa

Transmitters with the ordering code 708 – ...D (see Section "4. Specification and ordering information") are designed for either a 2-wire connection with an output range of 4...20 mA or a 3- or 4-wire connection with an output range of 0...20 mA.

If, however, a transmitter be changed from one to the other (see wiring diagrams in Fig. 6), the beginning and end of the measuring range must be readjusted.

10. Reversing the rotation for instruments with measuring ranges > 150 °

A switch is provided on angular transmitters with a measuring range > 150 ° for reversing the direction of rotation. It is marked S1 and can be operated through the opening in the rear part of the transmitter (Fig. 7).

To reverse the direction of rotation, remove the sealing plug (4) covering the switch S1. Change the position of the switch using a watchmaker's screwdriver (2.3 mm diam.) and readjust the beginning and end of the measuring range.

11. Dimensional drawings

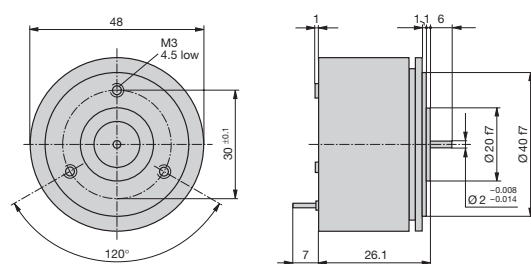


Fig. 8. KINAX 3W2 with standard drive shaft at front **only**,
Ø 2 mm, length 6 mm.

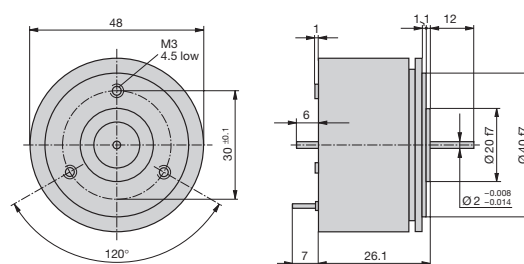


Fig. 9. KINAX 3W2 with special drive shaft at front **and** at rear.
At front: Ø 2 mm, length 12 mm. At rear: Ø 2 mm, length 6 mm.

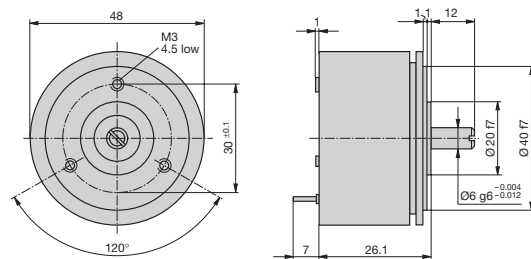


Fig. 10. KINAX 3W2 with special drive shaft at front **only**,
Ø 6 mm, length 12 mm.

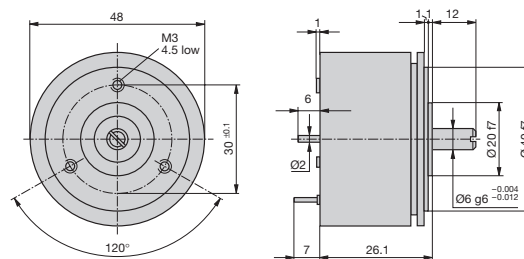


Fig. 11. KINAX 3W2 with special drive shaft at front **and** at rear.
At front: Ø 6 mm, length 12 mm. At rear: Ø 2 mm, length 6 mm.

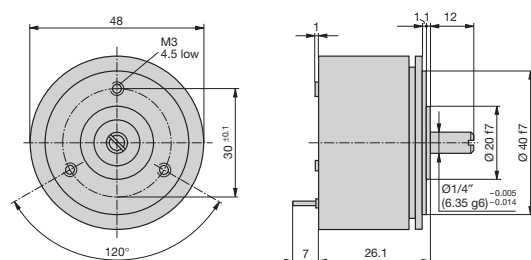


Fig. 12. KINAX 3W2 with special drive shaft at front **only**,
Ø 1/4", length 12 mm.

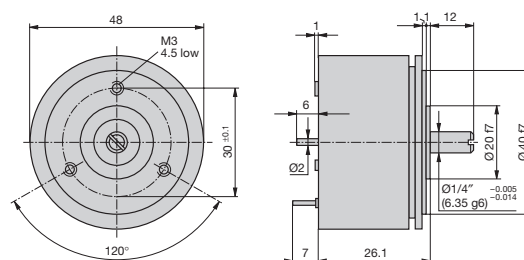


Fig. 13. KINAX 3W2 with special drive shaft at front **and** at rear.
At front: Ø 1/4", length 12 mm. At rear: Ø 2 mm, length 6 mm.

Outotec is a worldwide technology leader providing innovative and environmentally sound solutions for a wide variety of customers in minerals and metals processing as well as related process industries. Outotec Oyj is listed on the OMX Nordic Exchange Helsinki.

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