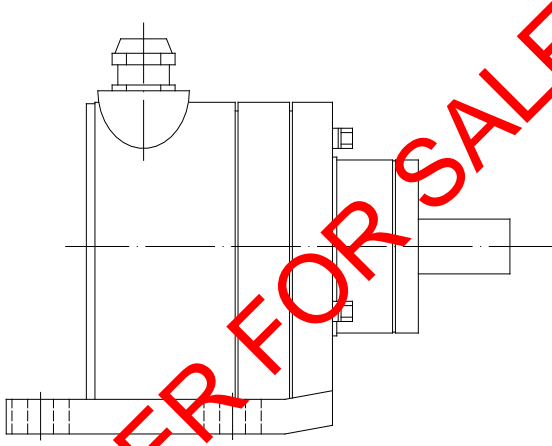
Installation instructions

Angle position transmitter
Type RT-2

Marine bridge instrumentation

4189350013C (UK)



- *Analogue output*
  for direct connection of one or more indicators
- *Measuring output:*
  DC current signal 0..20mA or 4..20mA
- *Potentiometer for adjusting span and zero*
- *Angle position 0..90° or 0..140°*
- *Continuous shaft rotation*

CE

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DEIF A/S

1. Brief description

The RT-2 converts the position angle of a shaft into a load-independent direct current signal, proportional to the angle position.

2. Technical data

Measuring input 0..90° or 0..140° (span adjustment –30/+5% of full scale)

Measuring output

Output variable I_A: Load-independent DC current, proportional to the input angle.

Standard ranges: 4...20mA, 2 wire connection or
0...20mA, 3 or 4-wire connection adjustable with potentiometer

a) External voltage: (load voltage)
referring to DEIF illuminated instruments
(e.g. VTR-3, TRI-2 and others)
without electric isolation:
$H[V] > [\sum Load_{inst} V + 12V + (Loop_{res.} * I_A)V]$

Example:
System consists of 2 DLQ-ph, 1 VTR-3 and 1 TRI-2

	voltage drop		
DLQ-ph	0.6V x 2	=	1.2V
VTR-3	0.6V x 1	=	0.6V
TRI-2	3.0V x 1	=	3.0V
$\Sigma Load_{inst}$		=	4.8V

$Loop_{res.}$ Cable resistance ≤ 200Ω

I_A System wired as 0...20mA.
This means I_A = 20mA.

$H[V] > 4.8V + 12V + 0.02A \times 200\Omega$

⇓

$H[V] \geq 20.8V$ DC

b) External resistance: (load resistance)
without electric isolation

$$R_{ext.} \text{ max. } [k\Omega] = \frac{H[V] - 12V}{I_A [mA]}$$

I_A = Output signal end value
H[V] = Supply voltage (max. 33V DC)
$Load_{inst}$ = Voltage drop in the instrument
$Load_{res}$ = The total resistance of cable in the loop.

Accuracy

Reference value: Measuring range
Basic accuracy: Limit of error ≤ 0.5%

Power supply H

DC voltage:	12...33V (Polarity reversal protection. The voltage must not fall below 12V.)
Max. residual ripple:	10% p.p.
Max. current consumption:	Approx. 5mA + I_A

Mechanical withstand

Permissible vibration:	0...200Hz, 10 g continuous, 15 g for 2 h 200...500Hz, 5 g continuous, 10 g for 2 h
Shock:	3 x 50 g every 10 impulses in all 3 axes
Permissible static load on the shaft:	Max. 1000N (radial) Max. 500N (axial) If subjected to vibration the shaft load should be as low as possible to ensure optimum life of the bearing.
Mounting position:	Any

Material

Housing (main part):	Steel Finish QPC (nitro-carbonated)
Rear (cover):	Metal (aluminium)
Cable glands:	Metal

Regulations

Test voltage:	500Veff, 50Hz, 1 min. all electrical connections against housing
Housing protection:	IP66 acc. to EN 60 529

Environmental conditions

Climatic rating:	Temperature –25 to + 70°C Annual mean relative humidity ≤ 90%
Transportation and storage temperature:	-40 to 80°C

3. Mounting

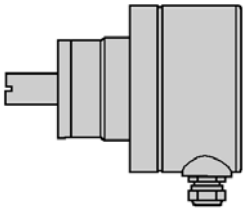
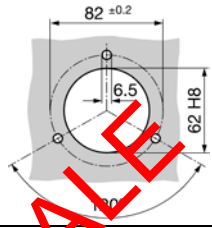
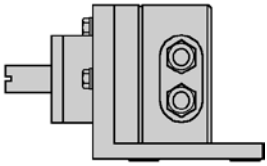
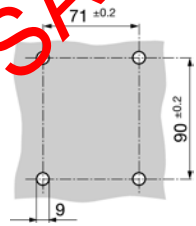
Transmitter	Drilling and cut-out diagrams for mounting transmitters	
	directly	
	...with a bracket	

Table 1

The M6 screws are needed for the "directly" mounted version and four M8 nuts and bolts for transmitter "with a bracket". The screws, respectively nuts and bolts 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 "Technical data" are not exceeded.

Make the cut-out or 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 electrical zero and the zero of the item being measured coincide.

The holes in the mounting bracket are elongated for this purpose and permit the transmitter to be rotated in order to adjust the electrical zero to coincide with the zero of the measured device.

Similarly, it is advisable to elongate the three holes (6.5 mm diam.) drilled for "directly" mounted version (see upper drilling and cut-out diagram in Table 1).

The electrical zero of the transmitter is marked on the end of the shaft and on the outside of the casing (see Fig. 1):

- left for rotation transmitters with the range of 0 to 90º (-30%/+5%) or
  0 to 140º (-30%/+5%)

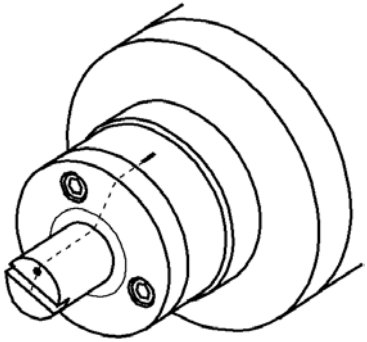


Fig. 1

4. Electrical connections

The cable glands are provided for making the electrical connections to the transmitter.

Note that, ...

... the data required to carry out the prescribed measurement must correspond to those marked on the nameplate (Fig. 2) of RT-2 (measuring input, measuring output, power supply)!

... the total voltage drop do not exceed the supply voltage H[V], see “Measuring output” a) in section 2 “Technical data” for maximum values of supply voltage H[V].

... the total loop resistance connected to the output (receiver plus leads) does not exceed the maximum permissible value R_{ext}! See “Measuring output” b) in Section 2 “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!

⚠ ▣ |0.5|	Type: RT – 2
	→ ○ 12-33 V DC ⊕ 0-90° ◁
0.5	⊖→ 0/4-20 mA
GL CE	
	No. 000/041644/010/001
DEIF A/S, Frisenborgvej, DK–7800 Skive, Denmark	

Fig. 2 Example of a nameplate.

5. Connecting transmitter with screw terminals and cable glands

The transmitter is fitted with screw terminals and cable glands. There are 4 screw terminals (4.1) plus 1 ground terminal (4.2) which are accessible after removing the cover (3.1) (see Fig. 3). The maximum wire gauge the terminals can accept is 1.5 mm^2.

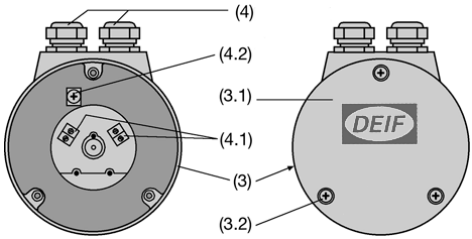


Fig. 3
Rear (3) with terminals (4.1) and (4.2)
and cable glands (4).
Right: Cover (3.1) closed.
Left: Exposed.

Remove the 3 screws (3.2) and take off the cover (3.1).

Undo the gland nut and remove the pinch ring and seal from the gland opening. Place these parts over the cable in the correct order and pass the end of the cable through the gland hole into the rear of the transmitter.

Strip the insulation to a suitable length of the leads and connect them to the terminals (4.1) and (4.2) according to the wiring diagram (Fig. 3).

Then fit the gland seal, pinch ring and nut. Tighten the gland nut and replace the cover.

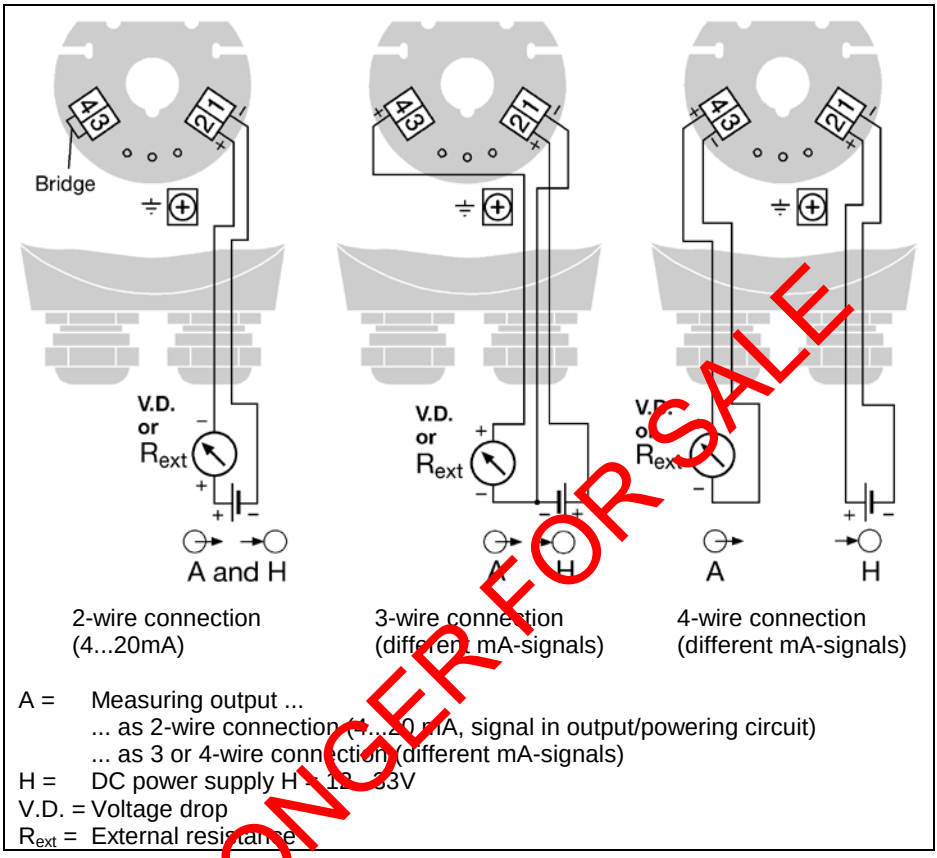


Fig. 4 Connection diagrams for 2, 3 or 4-wire connection, DC power supply.

6. 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 3 “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).

First, switch on the power supply to the transmitter.

Remove the 3 screws (3.2) and the cover (3.1) (Fig 3).

Place the measured devide at its zero position, i.e. the position at which the RT-2 should produce 0 mA (three or four-wire connection), respectively 4 mA (two-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 3 “Mounting”.

Then adjust the “ZERO” potentiometer (Fig. 5) using a watchmaker’s screwdriver (2.3 mm diam.) so that the desired output current flows.

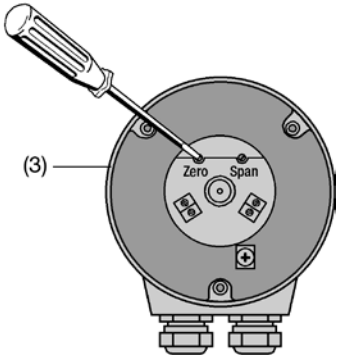


Fig. 5 Rear of the transmitter with the adjustments “ZERO” “SPAN”

Now rotate the measured device to its opposite limit position, i.e. the position at which the RT-2 should produce 20 mA DC.

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

Then recheck the zero point and correct on the ZERO potentiometer if necessary. Check the full-scale value again. Repeat both adjustments until both zero point and full-scale value are precise.

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

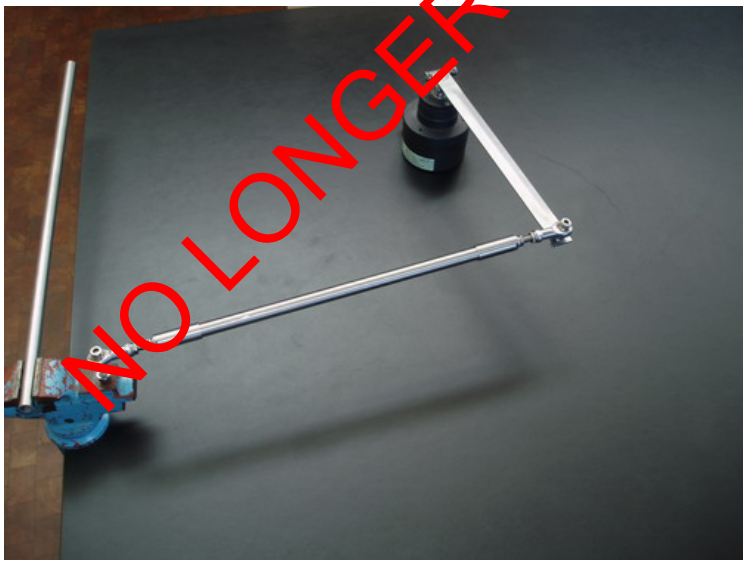
If, however, a transmitter be changed from one to the other (see wiring diagrams in Fig. 4), the beginning and end of the measuring range must be readjusted.

8. Mechanical connection

Mounting of linkage on the RT-2.

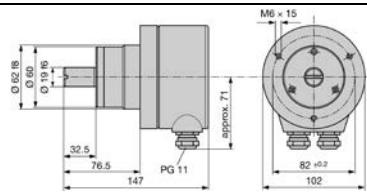
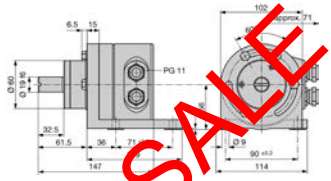
Mounting of ball joint.

Cutting the length of the adjustable lever.



After adjusting the length (shorten when necessary), fix using mechanical means (welding, gluing, pinning).

9. Dimensional drawings

RT-2 with screw terminals and glands. Without bracket	
RT-2 with screw terminals and glands. With bracket.	

Errors and changes excepted