RTC 300

4921250069E

Rudder/azimuth angle CAN transmitter

Data sheet

DEIF Improve Tomorrow

1. RTC 300

1.1 About

The RTC 300 is a robust angle sensor intended for marine applications, for example, high-accuracy rudder, azimuth, or pitch angle measurements. You can also use the RTC as angle feedback units in control systems.

The sensor has a CAN bus interface that supports CANopen. You can measure an angle of ±180° with 16-bit data resolution and it is easy to make zero, clockwise (CW), and counterclockwise (CCW) adjustments.

For a rudder or azimuth indicator system, combine the RTC with either traditional XL indicators or XDi indicators to form a complete MED-approved (wheel marked) system.

It is easy to install and use the RTC 300 sensor. Built into a standard Ø50 mm housing with a 6 mm axle, the sensor is compatible with a number of angle encoders and potentiometers on the market. This makes it easy to upgrade an existing system with the new high-accuracy RTC 300.

The sensor is based on a no-touch measuring principle. This ensures a long life without degradation of performance or accuracy due to wear and tear of electro-mechanical components.

1.2 Applications - rudder and azimuth systems

For more detailed information on how to use the DEIF angle transmitters and illuminated indicators in rudder or azimuth applications, please refer to the related application notes that can be downloaded from www.deif.com.

2. Technical specifications

2.1 Electrical specifications

Type	CAN angle transmitter
Interface	1 CANopen interface ISO/DIS 11898-2
CAN NodeID	Programmable by wire: Default NodeID: 1,2,3,4,5,6,7,8 Use CAN to change the node ID
CANopen communication	Standard DS-301 rev. 4.02
CANopen device profile	DSP-406 rev. 3.1 encoder class C2
Bit rate	125 kbps
Auto start on CAN	Yes (use CAN to change this)
Output	TPDO 1, 16-bit resolution (byte 0,1)
Operating voltage (VCC)	18 to 31.2 V_{dc}
Current	≤30 mA
Output short-circuit protection	To GND and VCC
Reverse aux. voltage protection	Yes
Measuring angle electrical	0 to 360°
Rotation direction	Default: clockwise (CW) Use wires to change to counterclockwise (CCW)
Zero point	Programmable within 360°
Linearity Angle span up to +/-180 deg.	Better than: ±0.25°
Update rate	Default: 20 Hz
Hysteresis and repeatability	<0.1°
Temperature coefficient	<25 ppm
Programming with wires	4 wires: S1, S2, S3, and S4
Programming wire short-circuit protection	To VCC and GND
Torque (start/rotate)	<0.25 Nm
Shaft load (axial/radial)	100 N/75 N

2.2 Environmental specifications

Protection	IP67
Temperature	Operating: -25 to +80 °C Storage: -40 to +80 °C
Material	Housing: Aluminium Shaft: Stainless steel
Vibration	4 g, 2 to 2000 Hz all axes
Shock	50 g, half sine, 10 to 15 ms, 50 cycles
Connection	2 m shielded cable, 8 wires (4 wires are used for programming only)

Insulation	Wire to housing: 500 V_{eff}, 50 Hz, 1 min.
Weight	0.35 kg
Approvals	Please refer to www.deif.com for an updated list of certificates

2.3 Driving capability

The CANopen driver in the RTC angle transmitters is capable of driving a CAN bus line with up to 50 physical nodes. In practice, this number may be slightly higher or lower, depending on the actual installation, cable length and architecture of the physical network. But for normal rudder or azimuth indicator systems, the number of nodes should not be a limitation.

However, it is very important to terminate the CAN bus cable in both ends with a 120 Ω resistor. The angle transmitter is often positioned in one end of the CAN network, and therefore a 120 Ω termination resistor is included with the RTC package.

2.4 Rudder system, MED approval

All DEIF rudder/azimuth transmitters and rudder/azimuth indicators are MED approved as a system according to ISO 20 673. See www.deif.com for approval status and certificates.

DEIF's traditional illuminated indicators, like the XL series or the display-based XDi indicator series, are all available with CANopen interface, and, used in combination with an RTC angle transmitter, they provide a high-performance MED approved rudder/azimuth system.

Calibration accuracy when this rudder transmitter is used in a rudder system, shaft to output:

Example 1

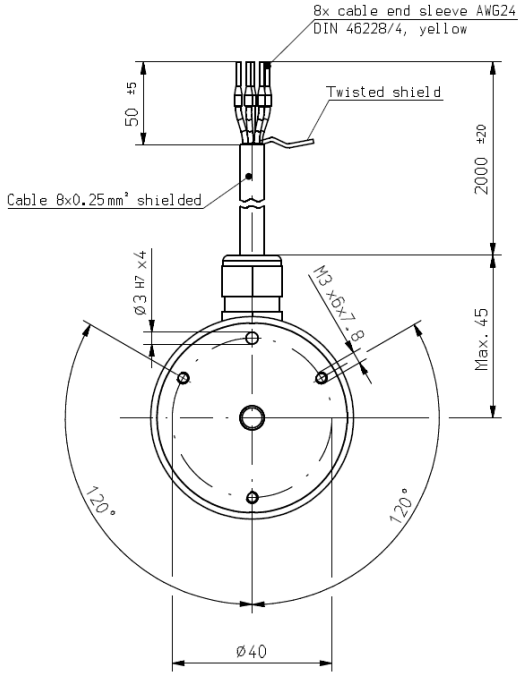
In a rudder indication system with a +/-45 deg. scale, the rudder transmitter calibration accuracy is better than: +/-0.6 %.

Example 2

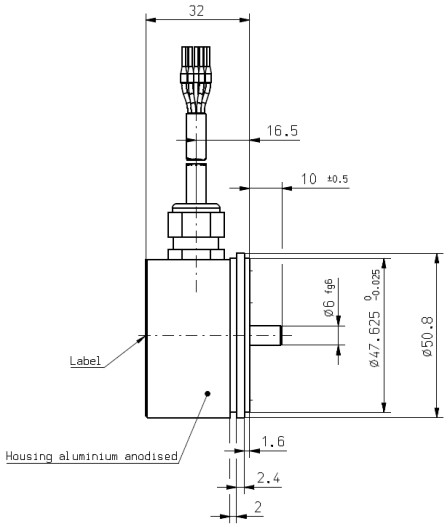
In a rudder indication system with a +/-70 deg. scale, the rudder transmitter calibration accuracy is better than: +/-0.5 %.

2.5 RTC 300 dimensions in mm

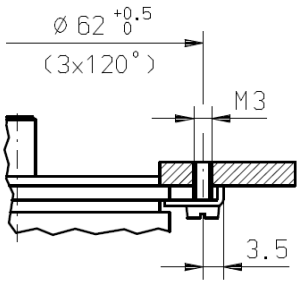
Front view - RTC 300



Side view - RTC 300



Fixation clip - RTC 300



2.6 RTC 300 wiring

Wire	Marking	Signal	Remark
Blue	0 V	Supply voltage	18 to 32 V DC at max. 60 mA.
Red	24 V DC	Supply voltage	18 to 32 V DC at max. 60 mA.
Green	CAN high	CAN bus	Remember to terminate the CAN bus.
Yellow	CAN low	CAN bus	Remember to terminate the CAN bus.
White	S1	Setup	Normal operation: **All** four setup wires must be connected to 0 V (blue).
Grey	S2	Setup	
Pink	S3	Setup	
Brown	S4	Setup	

More information
See the **RTC 300 Quick guide** for how to set up the RTC 300.

3. Ordering information

3.1 Available variant

Type	Variant no.	Description	Item no.	Note
RTC 300	05	Rudder/azimuth Transmitter CANopen	2951860010-05	Standard Ø50 mm housing and 6 mm axle

3.2 Order specifications and disclaimer

3.2.1 Order specifications

Variants

Mandatory information			Additional options to the standard variant		
Item no.	Type	Variant no.	Option	Option	Option

Example

Mandatory information			Additional options to the standard variant		
Item no.	Type	Variant no.	Option	Option	Option
2951860010-05	RTC 300	05	None		

3.2.2 Disclaimer

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