RTC 300/RTC 600
Installation instructions



sCAN

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1. sCAN

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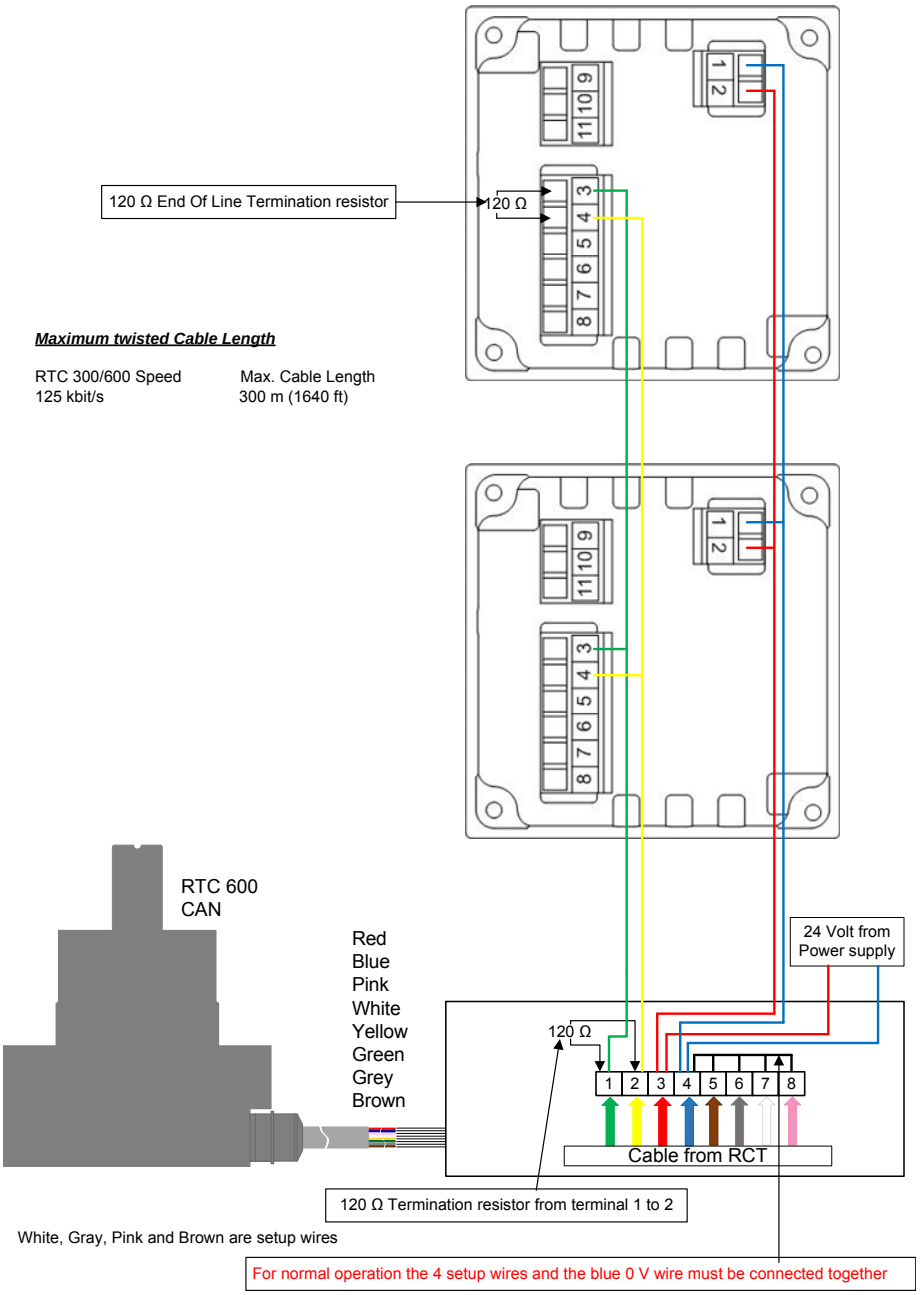
1.1 Introduction

The RTC 300 and RTC 600 are 16 bit angle transmitters with CAN bus interface, supporting CANopen.They are electrically alike, but are supplied in different housing sizes. Below is a connection diagram of 2 XL sCAN (16 bit) indicators and one RTC 300/600



1.2 Set up and adjust the RTC

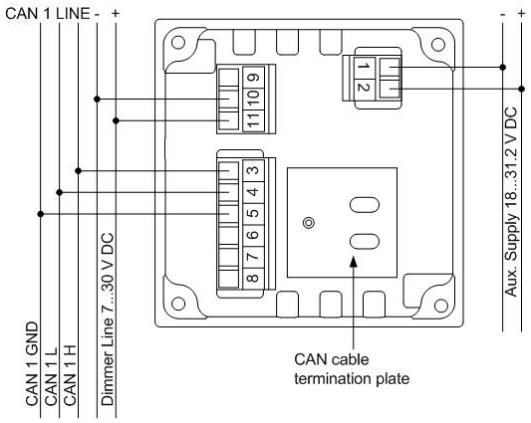
The RTC is a 360 deg. angle measuring device (encoder). It measures the full +/-180 deg. represented by a 16 bit signed value transmitted on the CAN bus. The 16 bit data value is placed in bytes 0 and 1 in TPDO1 of the CAN node ID selected for the RTC (COB-ID: 0x180+NodeID).

Default settings:

1. Node ID 1 = angle data is transmitted in TPDO with COBID 0x181.
2. Direction is clockwise (CW) - turning the shaft right will increase the measured angle value, and turning the shaft left will decrease the angle value.

XL sCAN Indicator connection

Pin number	Function		Note
1.	Supply voltage	0 V	Consumption max 150 mA.
2.		24 V	
3.	CAN connection	CAN 1 H input	CAN 1 line (sCAN line).
4.		CAN 1 L input	
5.		CAN 1 GND	
6.		Not used	Used for setting of min/ zero/max with external switch (pin 7-8).
7.		Switch/button	
8.		GND	
9.	Illumination analogue dimmer	NC	Dimmer input. Dimmer range 7 to 30 V DC. Consumption max. 30 mA.
10.		Illumination GND	
11		Illumination +	



XL

Please note that only two terminations can be installed at a time on a CAN bus network.

CAN 1 GND is a common wire specified in CANopen. It is not a cable shield!! If the CAN bus cable does not contain a CAN common wire, then do not connect the CAN 1 GND.

1.3 Wiring of RTC 300/RTC 600

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

1.4 Changing node ID by wire

The CAN node ID may be changed between 1 and 8, using the four setup wires in the cable.
To change the CAN node ID, follow these steps:

1. Remove the 24 V power supply.
2. For the CAN node ID, connect the wires marked (X) in the table below.
Example: CAN node ID 3 (S1 + S2 + 0 V must be connected).

Node ID	S1 White	S2 Grey	S3 Pink	S4 Brown	0 V Blue
1	X	-	-	-	X
2	-	X	-	-	X
3	X	X	-	-	X
4	-	-	X	-	X
5	X	-	X	-	X
6	-	X	X	-	X
7	X	X	X	-	X
8	-	-	-	-	X
Normal operation!	X	X	X	X	X

3. Make sure that S4, brown wire, is open (not connected).
4. Apply 24 V power to the RTC and wait 5 seconds (3 to 30 sec).
5. Connect brown wire (S4) to the blue wire (0 V) for 5 seconds (3 to 10 sec).
6. Disconnect brown wire for >1 second, the new CAN node ID is selected and stored.
7. Connect all four setup wires to 0 V (blue), and the RTC will run in normal operation mode.

Make sure that the 24 V supply is not interrupted during the last steps in the setup procedure where data is stored, as this might damage the RTC.

1.5 Zero setting by wire

During normal operation, it is possible to change the angular zero position to be the present angle of the shaft by following these steps:

1. Set the rudder or azimuth transmitter in the physical zero position.
2. Disconnect all four setup wires, white (S1), grey (S2), pink (S3) and brown (S4) from the blue (0 V) wire.
3. Connect the white (S1) and the brown (S4) wire to the blue (0 V) wire for 5 seconds (3 to 10 sec).
4. When both wires white (S1) and brown (S4) are released, the new zero is set.
5. Connect all four setup wires to the blue (0 V) wire, and the RTC will run in normal operation mode.

Make sure that the 24 V supply is not interrupted during the last steps in the setup procedure where data is stored, as this might damage the RTC.

1.6 Changing direction CW/CCW by wire

During normal operation, it is possible to change the measuring direction from CW clockwise (default) to CCW counterclockwise.

CCW counterclockwise. Follow these steps:

1. Disconnect all four setup wires from 0 V (blue wire).
2. Connect the pink and the brown wire to 0 V (blue wire) for 5 seconds (3 to 10 sec).
3. When both wires (pink and brown) are released, the encoder is in CCW mode.
4. Connect all four setup wires to 0 V (blue), and the RTC will run in normal operation mode.

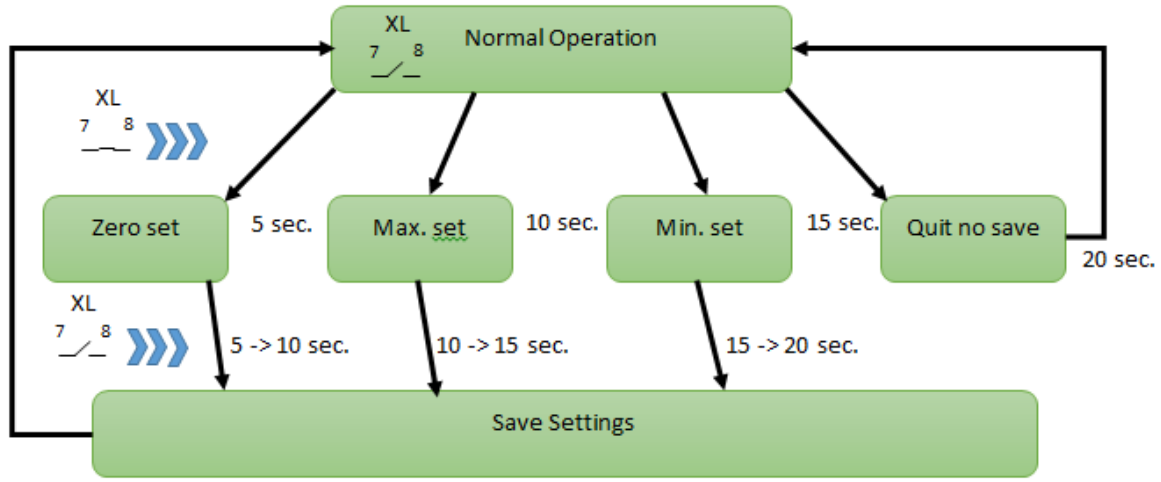
Make sure that the 24 V supply is not interrupted during the last steps in the setup procedure where data is stored, as this might damage the RTC.

CW clockwise. Follow these steps:

1. Disconnect all four setup wires from the blue wire (0 V).
2. Connect the grey and the brown wire to the blue wire (0 V) for 5 seconds (3 to 10 sec).
3. When both wires (grey and brown) are released, the encoder is in CW mode.
4. Connect all four setup wires to the blue wire (0 V), and the RTC will run in normal operation mode.

Make sure that the 24 V supply is not interrupted during the last steps in the setup procedure where data is stored, as this might damage the RTC.

1.7 Setup procedure for XL indicators with scales <360° (for example RPM, Pitch, Rudder)



Clockwise rotation = CW

XL order configuration

CAN id = 1
Scale curve = 240°
Angle = ±45°
Deflection = CCW
Electrical Mid = 6
Min. = -8191
Zero = 0
Max. = 8191

The above data is for the XL (Rudder) used in this document.

The indicator scale will be considered as two linear sections, respectively minimum to zero and zero to maximum.

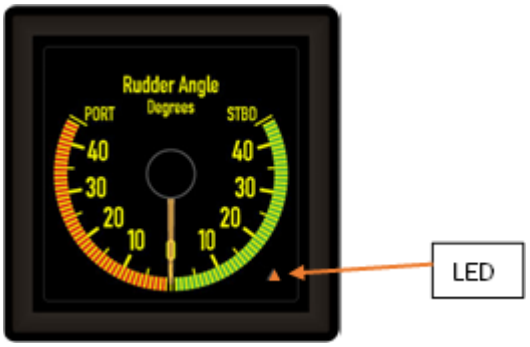
Step 1: Zero set

1. Position the rudder transmitter desired zero value

2. The set-up switch on the indicator, must be closed (pin 7 and 8 on the XL).

3. After 5 seconds, the indicator pointer will move to 0 degree (just check, no action)

4. Between 5 and 10 seconds, the new zero scale value is stored when setup switch is opened (the LED will flash once for verification).



If no new value was stored (switch still closed), wait until >20 seconds. Then the calibration sequence will be terminated without storing a new setting and the indicator pointer will move back to the scale position given by the present rudder transmitter value (normal mode).

Step 2: Maximum value set

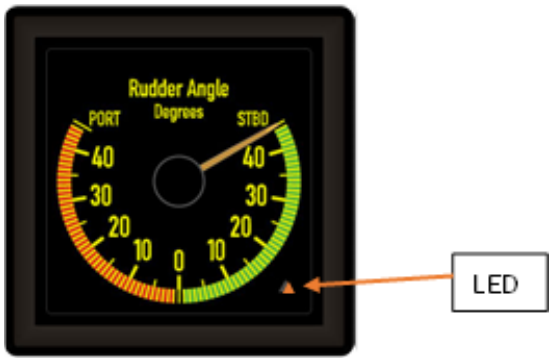
1. Position the rudder transmitter desired maximum value.

2. The setup switch on the indicator must be closed (pin 7 and 8 on the XL).

3. After 5 seconds, the indicator pointer will move to scale zero (just check, no action).

4. After 10 seconds, it will move to maximum scale value (check, no action)

5. Between 10 and 15 seconds, the new maximum scale value is stored when setup switch is opened (the LED will flash once for verification)



Step 3: Minimum value set

1. Position the rudder transmitter desired maximum value

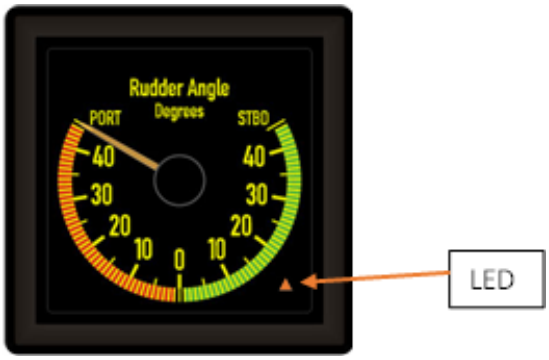
2. The setup switch on the indicator must be closed (pin 7 and 8 on the XL).

3. After 5 seconds, the indicator pointer will move to scale zero (just check, no action).

4. After 10 seconds, it will move to maximum scale value (check, no action).

5. After 15 seconds, it will move to minimum scale value (check, no action).

6. Between 10 and 15 seconds, the new maximum scale value is stored when setup switch is opened (the LED will flash once for verification)

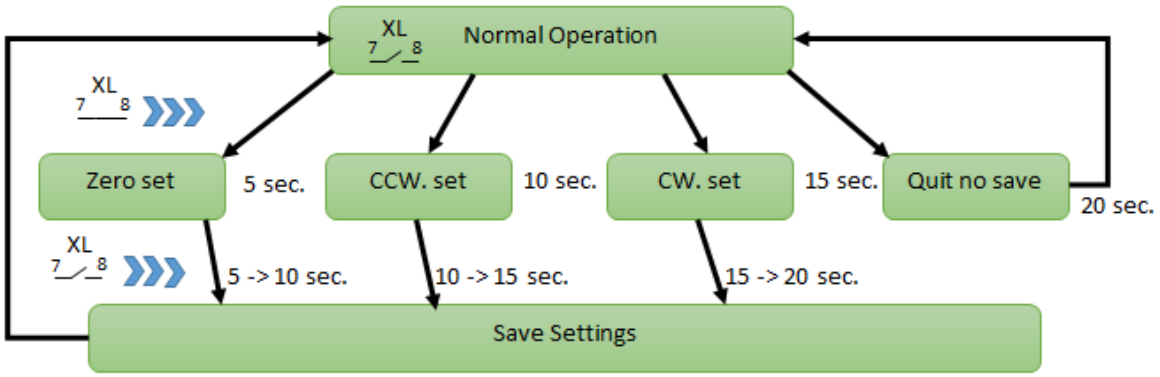


If no new value was stored (switch still closed), wait until >20 seconds. Then the calibration sequence will be terminated without storing a new setting and the indicator pointer will move back to the scale position given by the present rudder transmitter value (normal mode).

Changing pointer rotation:
If it is necessary to change the pointer rotation from the default CW to CCW, this can be done by placing the rudder transmitter maximum value at scale minimum and the rudder transmitter minimum value at scale maximum. This could be relevant on for example rudder indicators where the pointer is “hanging” as shown above, and in systems where they are used together with the “standing” pointer as shown previously. On both indicators, the shown rudder angle 45 degree PORT side (red) is set up as maximum value. This will give the “standing” type CW pointer rotation and the “hanging” CCW pointer rotation.

1.8 Setup procedure for indicators with scales = 360° (azimuth)

Setup procedure for indicators with scales = 360° (azimuth)



XL order configuration

CAN id = 1
Scale Curve = 360°
Angle = ±180°
Deflection = CW
Electrical Mid = 12
Min. = -32767
Zero = 0
Max. = 32767

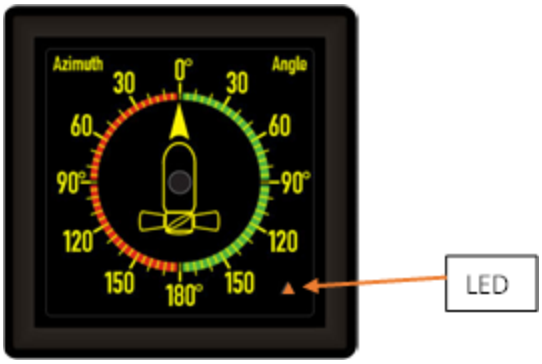
The above data is for the XL (azimuth) used in this document.

Clockwise rotation = CW

The indicator scale will be considered as two linear sections, respectively minimum to zero and zero to maximum.

Step 1: Zero set

1. Position the rudder transmitter desired zero value.
2. The setup switch on the indicator, must be closed (pin 7 and 8 on XL).
3. After 5 seconds, the indicator pointer will move to 0 degree (just check, no action).
4. Between 5 and 10 seconds, the new zero scale value is stored when setup switch is opened (the LED will flash once for verification)



If no new value was stored (switch still closed), wait until >20 seconds. Then the calibration sequence will be terminated without storing a new setting and the indicator pointer will move back to the scale position given by the present azimuth transmitter value (normal mode).

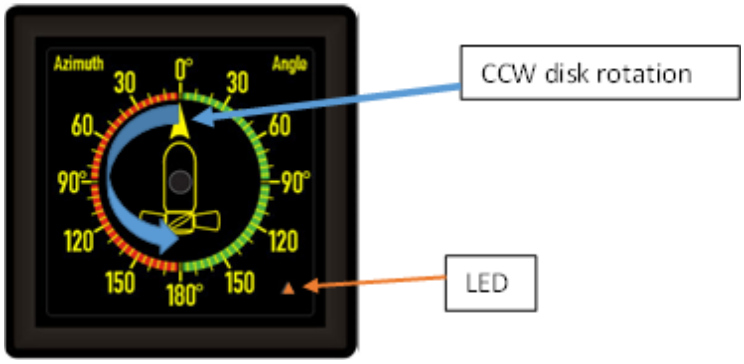
Step 2: pointer CCW rotation set

1. The setup switch on the indicator must be closed (pin 7 and 8 on the XL).

2. After 5 seconds, the indicator pointer will move to scale zero (just check, no action).

3. After 10 seconds, it will move to maximum scale value (check, no action).

4. Between 10 and 15 seconds, the new maximum scale value is stored when setup switch is opened (the LED will flash once for verification)



If no new value was stored (switch still closed), wait until >20 seconds. Then the calibration sequence will be terminated without storing a new setting and the indicator pointer will move back to the scale position given by the present azimuth transmitter value (normal mode).

Step 3: Pointer CW rotation set (default setting)

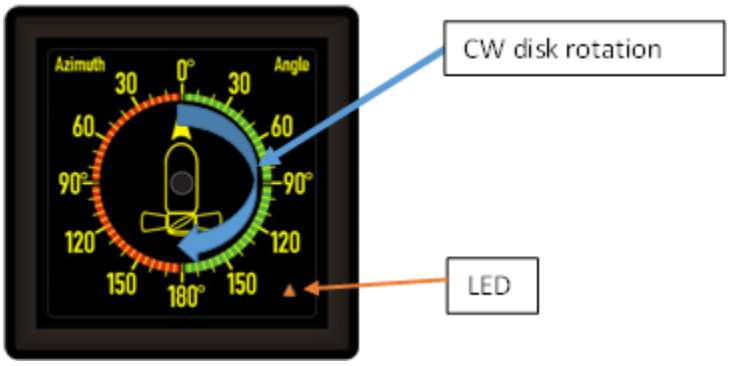
1. The setup switch on the indicator must be closed (pin 7 and 8 on the XL).

2. After 5 seconds, the indicator pointer will move to scale zero (just check, no action).

3. After 10 seconds, the pointer will present input values as CCW.

4. After 15 seconds, the pointer will present input values as CW.

5. Between 15 and 20 seconds, CW rotation value is stored when setup switch is opened (the LED will flash once for verification).



If no new value was stored (switch still closed), wait until >20 seconds. Then the calibration sequence will be terminated without storing a new setting and the indicator pointer will move back to the scale position given by the present azimuth transmitter value (normal mode).