

TRI-2

Panorama rudder indicator

User's manual



Improve
Tomorrow



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1. General information

1.1 Disclaimer

1.1.1 Disclaimer

DEIF A/S reserves the right to change any of the contents of this document without prior notice.

The English version of this document always contains the most recent and up-to-date information about the product. DEIF does not take responsibility for the accuracy of translations, and translations might not be updated at the same time as the English document. If there is any discrepancy, the English version prevails.

1.2 Product presentation

1.2.1 TRI-2 and TRI-2 CAN

The rudder angle indicator type TRI-2 and TRI-2 CAN is used for the indication of the rudder position on the bridge. The light intensity can be changed by means of a built-in dimmer accessible on the rear plate of the indicator. Optional remote dimming from a control panel can be used.

2. Before using the product

2.1 Initial steps

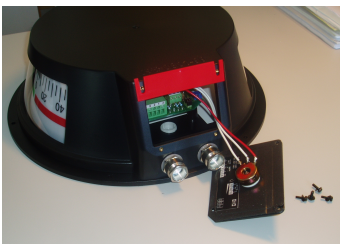
2.1.1 Remove transport lock

Transport lock mounted



The transport lock (bright red plastic) is mounted to prevent the pointers from being damaged under heavy vibration and shock (transportation). The transport lock must be removed before connecting the indicator!

Removal of rear plate



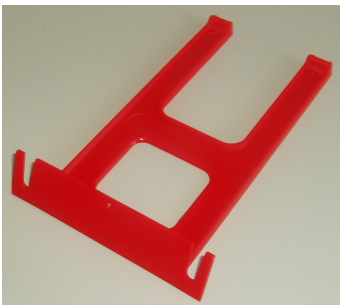
Remove the rear plate (4 screws).

Removal of transport lock



Gently draw the transport lock out with a hand. When inserting the transport lock again, gently insert it between the scale guide (white plastic part inside) and the housing (black part).

Transport lock view



Please keep the transport lock in case you need to ship the indicator after system test, or in case you need to return the indicator to DEIF for service!

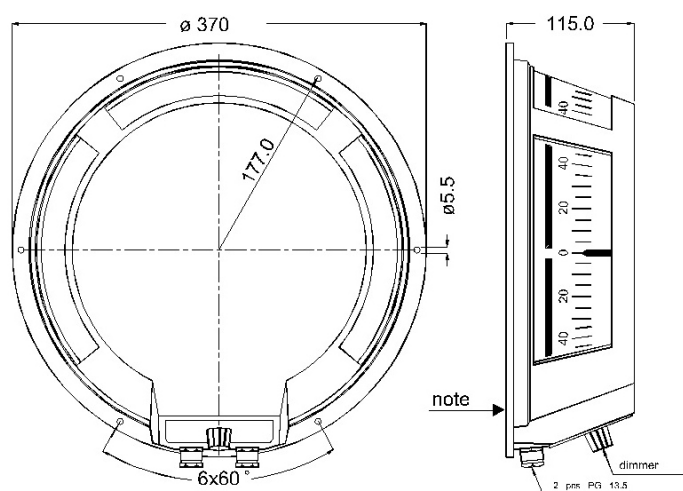
Mounting the rear plate

Tighten the screws only by hand and with a maximum at 0.5 nM torque to avoid overtighten the screws.



2.1.2 Mounting

TRI-2 and TRI-2 CAN have been designed for mounting on the ceiling of the bridge. The cables are connected through the rear panel or through the ceiling.



Weight: Approx. 1.5 kg.

Make sure that the instrument is mounted on an even surface to prevent the instrument housing from deforming.

3. Setting up TRI-2

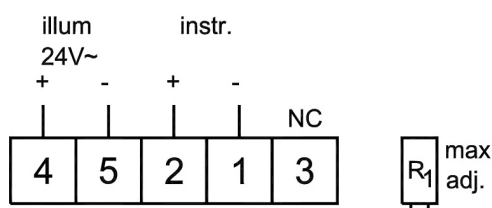
3.1 Connection

Depending on the ordered version of TRI-2 analogue or CAN version, different connections and settings apply. The analogue versions of the TRI-2 allow only small adjustments whereas it is possible to make more adjustments on the CAN version.

3.2 Connection of analogue version

3.2.1 TRI-2

After removing the rear panel, the connection terminals are visible. Cable dimensions between 0.2 and 2.5 mm² can be used for the terminals.



For general current/voltage

3.2.2 Current input

Terminal 1	Terminal 2	Pointer response (TRI-2 mounted in the ceiling)
- current out	+ current in	
	0/4 mA	Max. left
	10/12 mA	Zero
	20 mA	Max. right



INFO

Not possible to make adjustments on TRI-2 with current input.

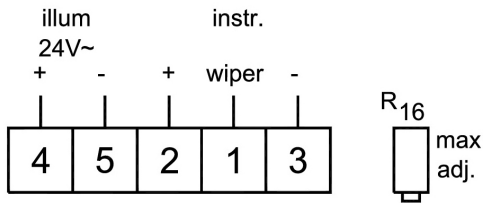
3.2.3 Voltage input

Terminal 1	Terminal 2	Pointer response (TRI-2 mounted in the ceiling)
+/- V in	0 V in	
-10 V		Max. left
0 V		Zero
+10 V		Max. right
0 V	+V in	
	0 V	Max. left
	5 V	Zero
	10 V	Max. right

**INFO**

The voltage for illumination may be either 24 V AC or 24 V DC.

3.2.4 Voltage input 3-wire



Potentiometer R1 can be used to adjust the deflection of the instrument within +/-10% of full scale to fit the scaling of the indicator to the existing installation.

3.3 Adjustment and setup

When the instrument has been properly connected to the analogue rudder transmitter, it can be adjusted to ensure that alignment is in correct position with the rudders. Mechanical zero adjustment is placed in the bottom of the instrument. It is adjusted to zero with the rudder in position zero.

The rudder is now turned to maximum position. The instrument indication should be the same as the rudder angle. **NOTE:** No zero adjustment on 0 to 20 mA and 4 to 20 mA versions. Potentiometer R1 can be adjusted if the instrument indication is not the same as the rudder angle. Potentiometer R1 is placed on the left side of the three blue potentiometers.

Remember to remount the rear plate with all 4 screws to ensure the IP54 protection of the instrument.

3.3.1 Voltage versions

When the mechanical zero position has been adjusted, it is possible to make adjustments to the maximum position. The rudder must be turned to the maximum position. Adjusting the potentiometer R3 will move the pointer of the TRI-2.

When adjusting the 3-wire version, the same procedure is used. But to adjust the maximum, the potentiometer R15 should be used to adjust the maximum deflection.

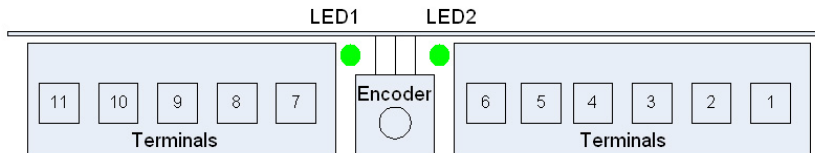
The maximum range of the maximum deflection is 10 % of the input value.

4. Setting up TRI-2 CAN

4.1 Connection and setup

4.1.1 TRI-2 CAN

On the CAN version, the connection terminals are also located under the rear plate on the analogue versions. To make adjustment on sCAN and dual CAN versions, an encoder is used. The encoder (integrated push-button/rotating encoder) is located between the two sets of connectors. The encoder is used for the entire set-up together with the two LEDs marked 1 and 2 located on each side of it.

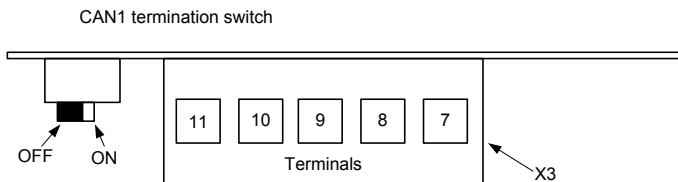


INFO

Notice that the terminals have been numbered from right to left.

A CAN termination switch is placed on the left side of terminal 11. This switch terminates the CAN1 line with 120 Ohm when set to ON (switch is pushed to the right, towards connector X3). Normal position will be OFF = no termination (switch is pushed to the left).

Note that only CAN1 has this termination possibility!



5. Connections of CAN version

5.1 Connections

Pin no.	Function	CANopen	Note
1	Supply voltage	+12 V to 24 V DC	Consumption 12 V 300 mA/24 V 150 mA
2		0 V DC	"
3	CAN connection	CAN 2 H input	CAN 2 line
4		CAN 2 L input	"
5		CAN 2 GND	"
6		NC	"
7		CAN 1 H input	CAN 1 line
8		CAN 1 L input	"
9		CAN 1 GND	"
10	Illumination	Dimmer wiper	Dimmer control via 1 kohm 2 W potentiometer
11		Dimmer ref.	"

The label is located under the lid with the dimmer potentiometer.

5.2 Single CAN setup

The table describes the different settings which can be made for the sCAN version.

Depending on the selected operation, it is possible to make changes or see the factory settings of the TRI-2.

Setup sCAN		Mode Sequence			Encoder	Indicators		
	Mode No	Button Press <1 sec	Button Press >5 sec	Button Press >10 sec			LED 1	LED 2
Normal operation (Mode 100)								
CAN bus NOT detected	100	NA	200	NA				OFF
CAN bus detected NO data	100	NA	200	NA				OFF
CAN data OK	100	NA	200	NA				OFF
Installation Setup (Mode 200)								
Zero adjust	200	NA	100 (Save)	NA	Turn encoder left or right to adjust pointer to zero scale position			
Max adjust	201	NA	100 (Save)	NA				
Reset	202	NA	100 (Reset and save)	NA				
Advanced	203	200	NA	300				
Advanced Setup (Mode 300)								
Reverse pointer movement	300							
Offset to COB ID Details see description	301	302	100 (Save)	NA	Turn encoder left or right to set desired offset to COB ID. Offset 0 to 7.			0: OFF 1: 2: 3: 4: 5: 6: 7:
Dimmer group	302	303	100 (Save)	NA	Turn encoder left or right to set dimmer group. Dimmer group 0 to 9.			0: Analogue dimmer 1: 2: 3: 4: 5: 6: 7: 8: 9:
CAN Protocol Set	303	304	100	NA	Show active CAN protocol			
Backlight Color	304		100 (Save)		Turn encoder left or right to yellow, Red or Auto shift			

Time-out: if a mode is entered and no changes made, a time-out of 5 minutes will ensure that the TRI-2 will return to normal operation.

When a setting has been changed, save command must be used to save the change. This is done by pressing the mode button for more than 5 seconds until the TRI-2 returns back to normal operation. If multiple changes are to be made, the save command must be used after each change.

5.2.1 Setup example

In normal operation, a single flash on LED1 indicates that CAN protocol "Single CAN" is in use. If in doubt whether the TRI-2 is ordered to the right protocol, this can be seen in menu 304 (303).

**INFO**

Be aware that the protocol can only be set in the TRI-2 order process.

Going from normal operation mode (100) to installation mode (200), press the encoder for 5 seconds. Afterwards, in mode 200, presses of 1 seconds will result in jumps from mode 200 to 201 - 202 - 203 - 200. To save the settings, press the encoder for 5 seconds. Notice that settings must be saved before entering the next mode. For example, a zero adjustment performed in mode 200 must be saved before going to mode 201 for maximum adjustment.

If the advanced setup is needed, if for example the pointer direction has to be changed from CW to CCW, then go to mode 203 and press the encoder for 10 seconds to activate mode 301. Afterwards, every press of 1 second will result in jumps from mode 301 to 302 - 303 - 304 - 305 - 301. Notice that settings must be saved (press 5 seconds) before entering the next mode. To leave advanced setup, press the encoder for 5 seconds.

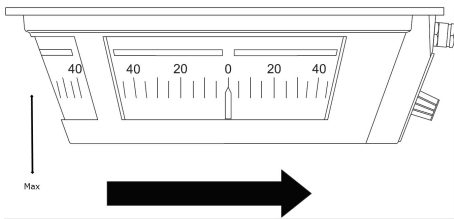
During setup, the input value (if available) is indicated on the instrument.

Time-out: after 5 minutes without any change, the unit will return to normal operation without saving.

5.2.2 Make max. adjustment

Adjustment of the TRI-2 can be set for max. and zero. The TRI-2 will then internally make a linear adjustment from minimum to zero and to maximum.

Max. is defined on the left side of the TRI-2, opposite the cable input; see picture below:



TRI-2 clockwise rotation

When the rotation of the TRI-2 is set to clockwise, the rudder must be positioned at port side when making the max. adjustment. If the rotation counter is clockwise, the rudder must be positioned at starboard when adjusting max. The procedure to adjust maximum is described below:

1. Set rudder at port side maximum
2. Enter installation setup
3. Press the tumble wheel once, and both LEDs will be yellow
4. Turn the tumble wheel until the pointer moves to the right position on the scale
5. Save the value by pressing the tumble wheel for more than 5 seconds. The TRI-2 returns to normal mode.

5.3 Dual CAN setup

	Mode No	Button Press <1 sec	Button Press >5 sec	Button Press >10 sec		LED 1	LED 2
Normal Operation (Mode 100)						See note	
CAN bus NOT detected on CAN 1 or 2	100	NA	200	NA	NA		
CAN bus detected on CAN 1 and CAN 2 NO data	100	NA	200	NA	NA		
Data available on CAN 1 – NO connection on CAN 2	100	NA	200	NA	NA		
Data available on CAN 2 – connection OK CAN 1	100	NA	200	NA	NA		
Data available on CAN 1 – connection OK CAN 2	100	NA	200	NA	NA		
Installation Setup (Mode 200)							
Zero adjust	200	NA	100 (Save)	NA	Turn encoder left or right to adjust pointer to zero scale position		
Max adjust	201	NA	100 (Save)	NA			
Reset	202	NA	100 (Reset and save)	NA			
Advanced	203	200	NA	300			
Advanced Setup (Mode 300)							
Reverse pointer movement	301						
Offset to COB ID Details see description	302	302	100 (Save)	NA	Turn encoder left or right to set desired offset to COB ID. Offset 0 to 7.		0: OFF 1: 2: 3: 4: 5: 6: 7:
Dimmer group	303	303	100 (Save)	NA	Turn encoder left or right to set dimmer group. Dimmer group 0 to 9.		0: Analogue dimmer 1: 2: 3: 4: 5: 6: 7: 8: 9:
CAN Protocol Set	304	304		NA	Show active CAN protocol. <i>Can't be changed</i>		
Backlight Color	305				Turn encoder left or right to yellow, Red or Auto shift		

In normal operation, a double flash on LED 1 and 2 indicates that CAN protocol "Dual CANopen" is in use. If the CAN bus is not detected, wrong writing or wrong protocol may have been ordered.

Enter "Advanced mode 304" to see which protocol has been ordered. Note that the shown CAN protocol can't be changed from the menu.

If a TRI-2 needs another protocol, a new indicator must be ordered.

Time-out: after 5 minutes without any change, the unit will return to normal operation without saving.

5.4 Remote dimmer

5.4.1 TRI-2 and TRI-2 CAN remote dimmer

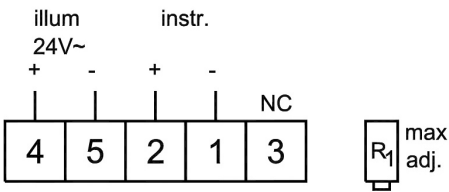
If remote dimmer is preferred, the built-in dimmer potentiometer can be removed from the indicator (after dismantling the rear plate) and mounted e.g. in a control panel. A plug to seal the hole in the rear plate is included on delivery.

The following example is for the TRI-2 with analogue input, but it is similar for the TRI-2 CAN version (however, only 2 wires to the potentiometer is needed).

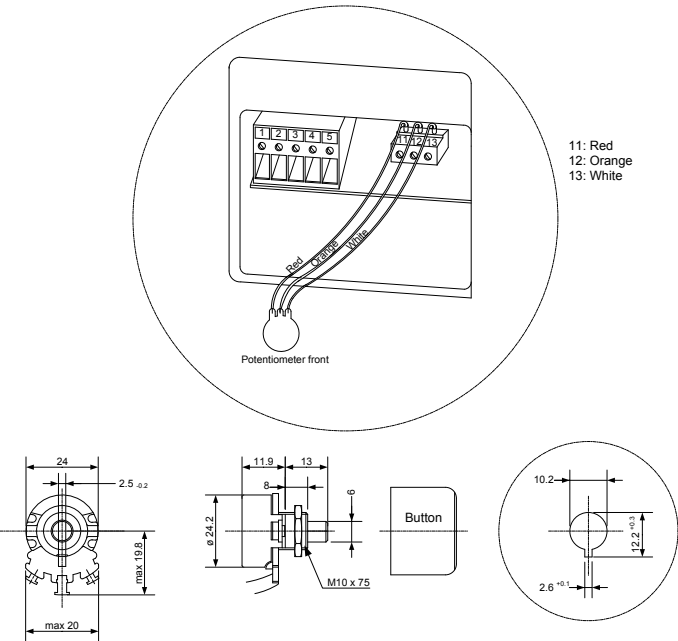
NOTICE

Connecting the wiper (centre pin) on the dimmer potentiometer to a wrong terminal in the TRI-2 may destroy the illumination circuit!

Exercise care and connect the wire coming from the wiper (centre pin on the potentiometer) to the terminal marked 1 (wiper) in TRI-2 (see drawing below). (This only applies for TRI-2, not TRI-2 CAN).



For general current/voltage



6. Technical information

6.1 Specifications

6.1.1 TRI-2 and TRI-2 CAN

Key specifications	
Compass safety distance	1 metre
Auxiliary voltage:	
TRI-2	24 V AC/DC $\pm 25\%$ (illumination only)
TRI-2 CAN	12 to 24 V DC $-25/+30\%$ (note: DC only!)
Consumption:	
TRI-2	Max. 3 W
TRI-2 CAN	Max. 4 W
Cable dimensions	0.2 to 2.5 mm ²
Cable entries	Via two PG 13.5 cable glands
Cable outer diameter	6-12 mm
Error indications TRI-2 CAN	<p>Pointer totally CCW indicates no aux. voltage connected to the instrument</p> <p>Pointer totally CW indicates no CAN data received</p> <p>Pointer totally CCW or CW can also indicate internal processor error or CAN data out of range</p> <p>CAN bus problems can be diagnosed using the colour sequence of the two LEDs behind the rear plate (see setup tables).</p> <p>NOTE:</p> <p>TRI-2 with analogue input, no special error indications are available</p>