



## **Rate-of-Turn Indicator Equipment**

**consisting of:**

**Rate Gyro, Type 410 - 026**  
**Operator Unit, Type 430 - 009**

## **OPERATOR MANUAL**

Weitergabe sowie Vervielfältigung dieser Unterlage, Verwertung und Mitteilung ihres Inhaltes nicht gestattet, soweit nicht ausdrücklich zugestanden. Zuwiderhandlungen verpflichten zu Schadenersatz.

*Toute communication ou reproduction de ce document, toute exploitation ou communication de son contenu sont interdites, sauf autorisation expresse. Tout manquement à cette règle est illicite et expose son auteur au versement de dommages et intérêts.*

*Copying of this document, and giving it to others and the use or communication of the contents thereof, are forbidden without express authority. Offenders are liable to the payment of damages.*

*Sin nuestra expresa autorización, queda terminantemente prohibida la reproducción total o parcial de este documento, así como su uso indebido y/o su exhibición o comunicación a terceros. De los infractores se exigirá el correspondiente resarcimiento de daños y perjuicios.*

**RATE-OF-TURN INDICATOR EQUIPMENT  
OPERATOR MANUAL**



Rate-of-Turn  
Indicator

---

<b><u>CONTENTS</u></b>		<b><u>Page</u></b>
<b>1</b>	<b>General .....</b>	<b>1</b>
<b>2</b>	<b>Notes on the Operating Instructions .....</b>	<b>2</b>
<b>3</b>	<b>Switching-on and off .....</b>	<b>3</b>
3.1	Switching-on .....	3
3.2	Switching-off .....	3
<b>4</b>	<b>Operator Involvement during Operation .....</b>	<b>4</b>
4.1	Indicator Damping .....	4
4.2	Brightness Control .....	4
4.3	Equipment Test .....	4
<b>5</b>	<b>Fault Operation .....</b>	<b>5</b>

**RATE-OF-TURN INDICATOR EQUIPMENT  
OPERATOR MANUAL**

---

1

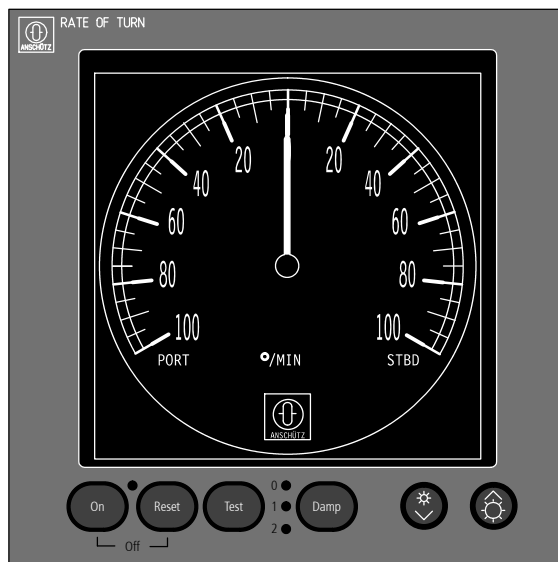
**General**

**Equipment Overview**

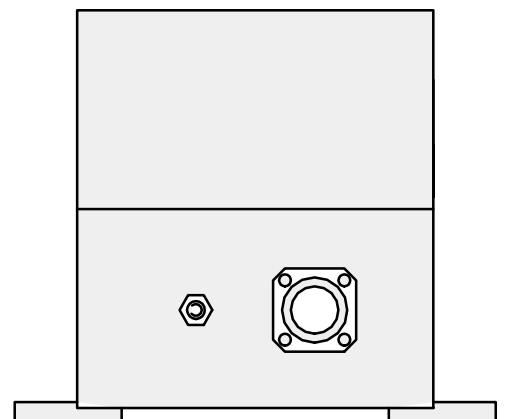
The rate-of-turn indicator equipment is a navigational aid intended to indicate the ship's tendency and rate of turn.

The rate-of-turn indicator equipment is composed of:

- Rate Gyro, Type 410-026
- Operator Unit, Type 430-009
- Connection Cable



Operator Unit, Type 430-009



Rate Gyro, Type 410-026

**Operator Manual**

This operator manual contains the operating instructions as well as a survey of possible warnings and alarms indicated on the operator unit.

**Service Manual**

In addition to the operator manual a service manual is available. It contains:

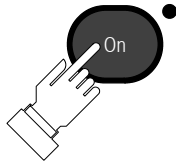
- information about installation and first putting into operation
- information about care, maintenance and repair
- a description of the rate-of-turn indicator equipment

# RATE-OF-TURN INDICATOR EQUIPMENT OPERATOR MANUAL

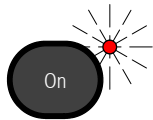
---

## 2 Notes on the Operating Instructions

Explanation of symbols:



Key operation



LED *flashing*



LED *out*



LED *on* (red)



LED *on* (yellow)



LED *on* (green)







Audible signal *on*




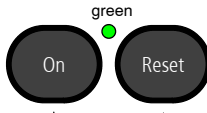
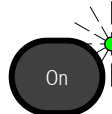

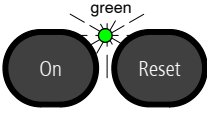

Audible signal *off*

**3 Switching-on and off**

**3.1 Switching-on**

	Indications	Comments/Notes
	 yellow	The rate gyro runs up.
	 green	As soon as the rate gyro has reached its rated speed (after approx. 2 minutes).









**3.2 Switching-off**

	Indications	Comments/Notes
 On Reset ┌ Off ┐ simultaneously until ...	 green  .....	
 On Reset ┌ Off ┐ release	Lamps and LEDs out. 	Equipment out. The rate gyro runs down.




# RATE-OF-TURN INDICATOR EQUIPMENT OPERATOR MANUAL

## 4 Operator Involvement during Operation



### 4.1 Indicator Damping

	Indications	Comments/Notes
	0 ● 1 ●  2 ●	No damping.
0 ● 1 ●  2 ●	0 ● 1 ●  2 ●	Damping: time constant 2 seconds.
0 ● 1 ●  2 ●	0 ● 1 ●  2 ●	Damping: time constant 5 or 10 seconds (adjustable, see service manual).
0 ● 1 ●  2 ●	0 ● 1 ●  2 ●	No damping.

### 4.2 Brightness Control

	Indications	Comments/Notes
	Reduces the brightness of all LEDs and lamps.	
	Increases the brightness of all LEDs and lamps.	

### 4.3 Equipment Test

	Indications	Comments/Notes
	<ul style="list-style-type: none"> <li>- all LEDs are alight</li> <li>- full deflection of indicator to STB</li> <li>- audible alarm (continuous sound)</li> </ul>	The test is continued as long as the key is being pressed. Indicator deflection with run-up gyro only.

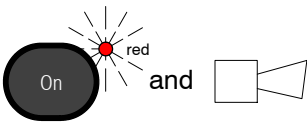

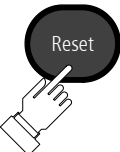


5

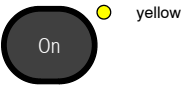

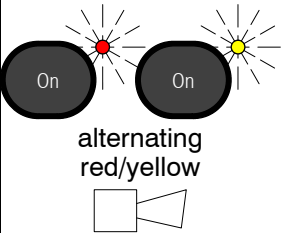
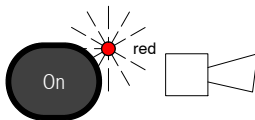
**Fault Operation**

The following survey shows warnings and alarms and their possible causes.

**Acknowledging an alarm:**

- Occurrence of an alarm:  and 
- Acknowledge the alarm:  (audible alarm ceases, LED shows continuous light as long as fault is not removed)

**Survey of possible warnings and alarms:**

No.	Indication	Signification	Possible Cause	Effect on Operation	Measure
1	Operator unit dark	Ship's mains failure	<ul style="list-style-type: none"> <li>- Ship's mains switched off</li> <li>- Connection cable faulty</li> </ul>	No rate of turn signal available	<ul style="list-style-type: none"> <li>- Check ship's mains</li> <li>- Check ship's mains on the operator unit: L1.1 against L1.2 (L): 24V DC (18V to 36V DC)</li> </ul>
2	 yellow	Equipment runs up after a ships mains failure during operation	<ul style="list-style-type: none"> <li>- Ship's mains failure during operation</li> </ul>	Rate of turn signal inaccurate	<ul style="list-style-type: none"> <li>- None. As soon as the ship's mains recovers, the equipment runs up without further operation. Wait until gyro has run up. LED emits green light if gyro has run up</li> </ul>
3	 yellow	Gyro speed out of tolerance		Rate of turn signal inaccurate	<ul style="list-style-type: none"> <li>- None. Wait until gyro has run up</li> </ul>
4	 alternating red/yellow	Rate gyro failure	<ul style="list-style-type: none"> <li>- Rate gyro supply voltage failure</li> <li>- Bearing failure</li> </ul>	No rate of turn signal available	<ul style="list-style-type: none"> <li>- Check connection cable between rate gyro and operator unit</li> <li>- Exchange operator unit</li> <li>- Exchange rate gyro</li> </ul>
5	 red	Operator unit failure	<ul style="list-style-type: none"> <li>- Internal power supply failure</li> </ul>	No rate of turn signal available	<ul style="list-style-type: none"> <li>- Exchange operator unit</li> </ul>

**RATE-OF-TURN INDICATOR EQUIPMENT  
OPERATOR MANUAL**

---