Magnetic Sonde

Operator and Service Manual

Type: 108-010.NG001 E01
Type: 108-010.NG002 E01
Type: 108-010.NG003 E01
Type: 108-010.NG004 E01
Copyright


Änderungen dieses Dokuments und dessen Inhalt bleiben vorbehalten.

This document and its content are copyright protected. Distribution, reproduction and storage as well as translation and exploitation of this document and its content, in whole or in parts and regardless of what form, are prohibited without prior express written permission. Offenders will be held liable for the payment of damages.

Changes and modification to this document and its content reserved.
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Figures</td>
<td>III</td>
</tr>
<tr>
<td>List of Tables</td>
<td>V</td>
</tr>
<tr>
<td>List of Abbreviations</td>
<td>VII</td>
</tr>
<tr>
<td><strong>1 Introduction</strong></td>
<td>1</td>
</tr>
<tr>
<td>1.1 Preliminary Remarks</td>
<td>1</td>
</tr>
<tr>
<td><strong>2 Safety</strong></td>
<td>2</td>
</tr>
<tr>
<td>2.1 General Safety Regulations</td>
<td>2</td>
</tr>
<tr>
<td>2.2 General Safety Instructions</td>
<td>2</td>
</tr>
<tr>
<td>2.3 Electrostatic Sensitive Devices</td>
<td>3</td>
</tr>
<tr>
<td><strong>3 List of Annex Drawings</strong></td>
<td>5</td>
</tr>
<tr>
<td><strong>4 Description</strong></td>
<td>6</td>
</tr>
<tr>
<td>4.1 Purpose</td>
<td>6</td>
</tr>
<tr>
<td>4.2 Hardware Breakdown of the System / Equipment</td>
<td>6</td>
</tr>
<tr>
<td>4.3 Labeling Position</td>
<td>6</td>
</tr>
<tr>
<td>4.4 Technical Data</td>
<td>7</td>
</tr>
<tr>
<td>4.5 Technical Description</td>
<td>7</td>
</tr>
<tr>
<td>4.6 Operating Elements and Indicators</td>
<td>8</td>
</tr>
<tr>
<td>4.7 Functional Description</td>
<td>8</td>
</tr>
<tr>
<td>4.7.1 Normal Operation</td>
<td>8</td>
</tr>
<tr>
<td>4.7.2 Emergency Operation</td>
<td>8</td>
</tr>
<tr>
<td>4.8 Outfit and Accessories</td>
<td>8</td>
</tr>
<tr>
<td><strong>5 Operation</strong></td>
<td>9</td>
</tr>
<tr>
<td>5.1 Safety Instructions for Operation</td>
<td>9</td>
</tr>
<tr>
<td>5.2 Setting Into Operation</td>
<td>9</td>
</tr>
<tr>
<td>5.2.1 Pre-Operation Procedures</td>
<td>9</td>
</tr>
<tr>
<td>5.2.2 Pre-Operation Procedures After Longer Time Setting Out of Operation</td>
<td>9</td>
</tr>
<tr>
<td>5.2.3 Setting Into Operation Procedures</td>
<td>9</td>
</tr>
<tr>
<td>5.3 Normal Operation Procedures</td>
<td>9</td>
</tr>
<tr>
<td>5.4 Setting Out of Operation</td>
<td>9</td>
</tr>
<tr>
<td>5.4.1 Setting Out of Operation Procedures</td>
<td>10</td>
</tr>
<tr>
<td>5.4.2 Post-Operation Procedures</td>
<td>10</td>
</tr>
<tr>
<td>5.4.3 Procedures for Longer Time Setting Out of Operation</td>
<td>10</td>
</tr>
<tr>
<td>5.5 Emergency Operation Procedures</td>
<td>10</td>
</tr>
<tr>
<td><strong>6 Troubleshooting</strong></td>
<td>11</td>
</tr>
<tr>
<td>6.1 Troubleshooting Table</td>
<td>11</td>
</tr>
<tr>
<td><strong>7 Installation and Maintenance</strong></td>
<td>12</td>
</tr>
<tr>
<td>7.1 Safety Instructions for Installation and Maintenance</td>
<td>12</td>
</tr>
<tr>
<td>7.2 General Information</td>
<td>12</td>
</tr>
<tr>
<td>7.2.1 Reference to ISPC</td>
<td>12</td>
</tr>
<tr>
<td>7.2.2 Special Tools, Measurement and Test Equipment</td>
<td>13</td>
</tr>
<tr>
<td>7.2.3 List of Consumables</td>
<td>13</td>
</tr>
<tr>
<td>7.3 Installation</td>
<td>13</td>
</tr>
</tbody>
</table>
7.3.1 Install Magnetic Sonde.................................................................................................................. 13
7.3.2 Install Junction Box..........................................................................................................................15
7.3.3 Connect the Magnetic Sonde to the Related System or Equipment.............................................18
7.3.4 Change Sense of Rotation..................................................................................................................19
7.3.5 Adjust Magnetic Sonde....................................................................................................................21
7.4 Repair......................................................................................................................................................23
7.4.1 Replace Junction Box.......................................................................................................................23
7.4.2 Remove Magnetic Sonde...................................................................................................................25
7.4.3 Replace Magnetic Sondes................................................................................................................27
  7.4.3.1 Replace Magnetic Sonde 108-010.NG001 E01........................................................................27
  7.4.3.2 Replace Magnetic Sonde 108-010.NG002 E01........................................................................28
  7.4.3.3 Replace Magnetic Sonde 108-010.NG003 E01........................................................................28
  7.4.3.4 Replace Magnetic Sonde 108-010.NG004 E01........................................................................29
7.4.4 Replace Holders of Magnetic Sonde...............................................................................................30
  7.4.4.1 Replace Holder for 108-010.NG001, 108-010.NG002 and 108-010.NG004..........................30
  7.4.4.2 Replace Holder for 108-010.NG003.......................................................................................32
  7.4.4.3 Replace Holder for 108-010.NG001 E01, 108-010.NG002 E01 and 108-010.NG004
       E01........................................................................................................................................35
  7.4.4.4 Replace Holder for 108-010.NG003 E01.............................................................................37
  7.4.4.5 Install Holder..........................................................................................................................39
8 Transport and Storage..................................................................................................................................42
  8.1 Preservation, Packing and Storage.......................................................................................................42
  8.2 Transport.................................................................................................................................................42
## List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fig. 1</td>
<td>Electrostatic Sensitive Device, Protected Area</td>
<td>3</td>
</tr>
<tr>
<td>Fig. 2</td>
<td>Hardware Breakdown of the System/Equipment</td>
<td>6</td>
</tr>
<tr>
<td>Fig. 3</td>
<td>Magnetic Sonde, Labeling Position</td>
<td>7</td>
</tr>
<tr>
<td>Fig. 4</td>
<td>Install Magnetic Sonde</td>
<td>14</td>
</tr>
<tr>
<td>Fig. 5</td>
<td>Install Junction Box</td>
<td>16</td>
</tr>
<tr>
<td>Fig. 6</td>
<td>Drilling Scheme, Junction Box</td>
<td>17</td>
</tr>
<tr>
<td>Fig. 7</td>
<td>Terminal Assignments of Junction Box CP 500JB</td>
<td>17</td>
</tr>
<tr>
<td>Fig. 8</td>
<td>Change Sense of Rotation</td>
<td>20</td>
</tr>
<tr>
<td>Fig. 9</td>
<td>Adjust Magnetic Sonde</td>
<td>22</td>
</tr>
<tr>
<td>Fig. 10</td>
<td>Replace Junction Box</td>
<td>24</td>
</tr>
<tr>
<td>Fig. 11</td>
<td>Terminal Assignments of Junction Box CP 500JB</td>
<td>25</td>
</tr>
<tr>
<td>Fig. 12</td>
<td>Remove Holder with Magnetic Sonde</td>
<td>26</td>
</tr>
<tr>
<td>Fig. 13</td>
<td>Replace Holder for 108-010.NG001, 108-010.NG002 and 108-010.NG004</td>
<td>31</td>
</tr>
<tr>
<td>Fig. 14</td>
<td>Replace Holder for 108-010.NG003</td>
<td>33</td>
</tr>
<tr>
<td>Fig. 15</td>
<td>Replace Holder for 108-010.NG001 E01, 108-010.NG002 E01 and 108-010.NG004 E01</td>
<td>36</td>
</tr>
<tr>
<td>Fig. 16</td>
<td>Replace Holder for 108-010.NG003 E01</td>
<td>38</td>
</tr>
<tr>
<td>Fig. 17</td>
<td>Install Holder</td>
<td>40</td>
</tr>
</tbody>
</table>
List of Tables

Tab. 1: Dimensional Drawings.............................................................................................................................5
Tab. 2: Wiring Drawings.........................................................................................................................................5
Tab. 3: Special Tools, Measurement and Test Equipment..................................................................................13
Tab. 4: Consumables............................................................................................................................................13
List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPA</td>
<td>ESD Protected Area</td>
</tr>
<tr>
<td>ESD</td>
<td>Electrostatic Sensitive Device</td>
</tr>
<tr>
<td>ISPC</td>
<td>Illustrated Spare Parts Catalog</td>
</tr>
</tbody>
</table>
1 Introduction

1.1 Preliminary Remarks

The present manual is a description and reference book only. It is intended to answer questions and to solve problems in the quickest possible manner.

Read and follow the instructions and notes in this manual before operating the equipment.

For this purpose, refer to the table of contents and read the corresponding chapters thoroughly.

If you have any further questions, contact us under the following address:

Raytheon Anschütz GmbH
Zeyestr. 16 - 24
D-24106 Kiel
Germany

Tel. +49 431 / 3019 - 0
Fax +49 431 / 3019 - 291
Email: service@raykiel.com
www.raytheon-anschuetz.com

All rights reserved. It is not allowed to copy any part of this manual, neither mechanically, electronically, magnetically, manually nor otherwise. It is not allowed to store it in a database, or distribute or forward it without written permission of Raytheon Anschütz GmbH.

Copyright:
Raytheon Anschütz GmbH
Zeyestr. 16 - 24
D-24106 Kiel
Germany

Errors can hardly be avoided in the documentation despite all efforts. Therefore, we appreciate any remarks and suggestions.

Subject to alterations.
2 Safety

2.1 General Safety Regulations

The following safety symbols are used in this manual:

**WARNING!**
Warning statements indicate a hazardous situation that, if not avoided, could result in minor, moderate or serious injury, or death

**Consequence**
- Preventive action

**CAUTION!**
Caution statements indicate a hazardous situation that, if not avoided, could result in material damage

**Consequence**
- Preventive action

**Note**
Notes indicate information considered important but not hazard-related.

2.2 General Safety Instructions

**WARNING!**
Danger due to nonadherence to general rules and regulations

**Risk of death or serious injury and material damage**
- Observe all national and regional rules and regulations.
- Observe all general rules and regulations that are specified for the work area.
- Observe all instructions that are placed on the components or described in related documentation.

**WARNING!**
Danger due to improper operation and use for other than the intended purpose

**Risk of serious injury and material damage**
- Use the product only for the intended purpose.
- Perform operation steps according to this manual.
- Do not make any product modifications without authorization.
2 Safety

WARNING!

Danger due to voltage-regulated devices
Risk of death or serious injury that is caused by electrical shock
• Switch off voltage supply if the wires have damaged insulation.
• Only skilled electricians must perform work on the electric system.
• Keep moisture away from live parts.
• Keep the system closed.
• Do not attempt to bypass or disable fuses.

2.3 Electrostatic Sensitive Devices

Fig. 1: Electrostatic Sensitive Device, Protected Area

1 Table Mat
2 Ground Cord
3 Dissipative Shoes
4 Floor Mat
5 Wrist Band
6 Wrist Strap
7 Common Ground
8 Ground Point

Any product which is labeled as shown is electrostatic sensitive.

If proper Electrostatic Sensitive Device (ESD) precautions are not taken, handling or working on this product results in damage. Every action must be done under ESD protection.
The product and all electronic parts of the product are susceptible to ESD. The product must be handled with ESD protection especially when removing the covers, touching the connectors or handling the product components.

All ESD sensitive parts must be packed in metallized protective bags during shipping and handling outside any ESD Protected Area (EPA). ESD protected spare parts packages must not be opened / closed out of an EPA.

All necessary equipment for these protective measures can be supplied (on special order) by Raytheon Anschütz.
# 3 List of Annex Drawings

Tab. 1: Dimensional Drawings

<table>
<thead>
<tr>
<th>Drawing No.</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>108-010.HP005</td>
<td>MAGNETIC SONDE (Single)</td>
</tr>
<tr>
<td>108-010.HP026</td>
<td>MAGNETIC SONDE (Double)</td>
</tr>
<tr>
<td>108-010.HP028</td>
<td>VORLAGE (Centering mask)</td>
</tr>
</tbody>
</table>

Tab. 2: Wiring Drawings

<table>
<thead>
<tr>
<th>Drawing No.</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>108-010.HP007</td>
<td>MAGNETIC SONDE</td>
</tr>
</tbody>
</table>
4 Description

4.1 Purpose
The magnetic sonde converts the visual display of the magnetic compass into an electrical signal.

4.2 Hardware Breakdown of the System / Equipment

Fig. 2: Hardware Breakdown of the System/Equipment

1  108-010.NG001 E01
2  108-010.NG002 E01
3  108-010.NG003 E01
4  108-010.NG004 E01
4.3 Labeling Position

Fig. 3: Magnetic Sonde, Labeling Position

4.4 Technical Data

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>29.5 mm</td>
</tr>
<tr>
<td>Width</td>
<td>58.5 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>58.5 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.16 kg</td>
</tr>
<tr>
<td>Protection Class</td>
<td>IP 65</td>
</tr>
<tr>
<td>Voltage Supply</td>
<td>acc. to the connected equipment</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>n/a</td>
</tr>
<tr>
<td>Operation Temperature</td>
<td>-25 °C to +55 °C</td>
</tr>
</tbody>
</table>

4.5 Technical Description

The magnetic sonde consists of a halfround aluminum body with a screened connection cable.

It receives the power supply via the connection cable. The magnetic sonde signal is transmitted via the connection cable.

**Type 108-010. NG001 E01**

Type 108-010. NG001 E01 has a connection cable with a 7-pole connector. It has to be connected to the related equipment via a junction box Type 134-089.
4.6 Operating Elements and Indicators
This system or equipment has no operating elements and indicators.

4.7 Functional Description

4.7.1 Normal Operation
The magnetic sonde scans the angular position of the magnetic field of the magnetic compass and converts it into a 3-phase course reference signal. This 3-phase signal is used by the connected system or equipment to generate a digital heading value.

4.7.2 Emergency Operation
This system or equipment has no emergency operation function.

4.8 Outfit and Accessories
This system or equipment comprises no outfit or accessories.
5 Operation

5.1 Safety Instructions for Operation

**WARNING!**
Danger due to improper operation and purpose
Risk of serious injury and material damage
- Use product only for the intended purpose.
- Perform operation steps according to this manual.

**WARNING!**
Danger due to operation by unskilled personnel
Risk of serious injury and material damage
- Keep all unskilled personnel away from the operation area.
- Perform all operation only by skilled personnel.

5.2 Setting Into Operation

5.2.1 Pre-Operation Procedures

Procedure
1. Switch on the power supply of the connected system or equipment.

5.2.2 Pre-Operation Procedures After Longer Time Setting Out of Operation

This system or equipment requires no special pre-operation procedures after longer time setting out of operation.

5.2.3 Setting Into Operation Procedures

The magnetic sonde is not a stand-alone system.
The setting into operation is performed via the connected system or equipment.

5.3 Normal Operation Procedures

The magnetic sonde is not a stand-alone system.
The normal operation is performed via the connected system or equipment.
5.4 Setting Out of Operation

5.4.1 Setting Out of Operation Procedures
The magnetic sonde is not a stand-alone system.
The setting out of operation is performed via the connected system or equipment.

5.4.2 Post-Operation Procedures
Procedure
1. Switch off the power supply of the connected system or equipment.

5.4.3 Procedures for Longer Time Setting Out of Operation
This system or equipment requires no special procedures for longer time setting out of operation.

5.5 Emergency Operation Procedures
This system or equipment has no emergency operation function.
## 6 Troubleshooting

### 6.1 Troubleshooting Table

<table>
<thead>
<tr>
<th>No.</th>
<th>Failure</th>
<th>Possible Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The connected system or equipment receives no data.</td>
<td>Connected system or equipment is switched off.</td>
<td>Set the connected system or equipment into operation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cable connection between the junction box and the connected system or equipment is interrupted.</td>
<td>Check the cable connection between junction box and the connected system or equipment. If required, establish a proper electrical connection.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cable of the magnetic sonde is damaged.</td>
<td>Replace magnetic sonde, see chapter 7.4.3.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Magnetic sonde is defective.</td>
<td>Replace magnetic sonde, see chapter 7.4.3.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Junction box is defective.</td>
<td>Replace the junction box, see chapter 7.4.1.</td>
</tr>
<tr>
<td>2</td>
<td>The course indication of the connected system or equipment does not match the course on the magnetic compass card.</td>
<td>Magnetic sonde is not adjusted.</td>
<td>Adjust the magnetic sonde, see chapter 7.3.5.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sense of rotation is wrong.</td>
<td>Change the sense of rotation, see chapter 7.3.4.</td>
</tr>
</tbody>
</table>
7 Installation and Maintenance

7.1 Safety Instructions for Installation and Maintenance

**WARNING!**

Danger due to maintenance and service by unskilled personnel
- Risk of serious injury and material damage
- Keep all unskilled personnel away from the working area.
- Perform all maintenance and service only by skilled personnel.

**WARNING!**

Danger due to electrical current
- Risk of death or serious injury that is caused by electrical shock
- Switch off voltage supply before starting work.
- Secure against switching on again.
- Perform work on the electric system only by skilled electricians.

**CAUTION!**

Hazard due to wrong disposal of harmful substances
- Risk of environmental damage that is caused by wrong disposal
- Adhere all national and regional disposal rules and regulations.
- Adhere all disposal instructions that are placed on the components or described in related documentation.

7.2 General Information

7.2.1 Reference to ISPC

All maintenance tasks comprise information about the support equipment, consumables and spare parts that are used in this task.

Besides the designation and the quantity, a reference to the is given. The format of the reference is as follows:

```
aa-aaaa bb
```

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>aa-aaaa</td>
<td>Reference to the illustration in the ISPC</td>
</tr>
<tr>
<td>bb</td>
<td>Position No. on the illustration in the ISPC</td>
</tr>
</tbody>
</table>
7.2.2 Special Tools, Measurement and Test Equipment

Tab. 3: Special Tools, Measurement and Test Equipment

<table>
<thead>
<tr>
<th>Designation</th>
<th>Reference to ISPC</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool, operating</td>
<td>05-0000 02</td>
<td>1</td>
</tr>
<tr>
<td>Mask, centering</td>
<td>05-0000 03</td>
<td>1</td>
</tr>
</tbody>
</table>

7.2.3 List of Consumables

Tab. 4: Consumables

<table>
<thead>
<tr>
<th>Designation</th>
<th>Reference to ISPC</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loctite 648</td>
<td>06-0000 02</td>
<td>As required</td>
</tr>
<tr>
<td>Loctite 243</td>
<td>06-0000 03</td>
<td>As required</td>
</tr>
<tr>
<td>Tie, cable</td>
<td>06-0000 04</td>
<td>As required</td>
</tr>
</tbody>
</table>

7.3 Installation

7.3.1 Install Magnetic Sonde

Requirements

Required Conditions
No conditions

Required Persons
1 Maintainer 1.5 h
1 Assistant 1.5 h

Support Equipment

Mask, centering 05-0000 03 1 EA

Consumables, Materials and Expendables

Tie, cable 06-0000 04 As required
Safety Conditions

**WARNING!**

Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage
- Observe all general safety instructions.
- Observe all safety instructions for maintenance.

**CAUTION!**

Hazard due to magnetic mounting material on the magnetic compass
Risk of differing course display of the magnetic compass
- Use only nonmagnetic materials.

Procedure

Fig. 4: Install Magnetic Sonde

1. Glass Pane
2. Centering Mask
3. Adhesive Rings
4. Magnetic Sonde

1. Turn the magnetic compass upside down, see related documentation.
2. Protect the magnetic compass from turning back.
3. Clean and degrease the glass pane (Fig. 4/1) of the magnetic compass with a suitable agent.
4. Cut out the centering mask (Fig. 4/2) and use it to mark the center of the glass pane.
5. Remove the protective papers (Fig. 4/3) from the adhesive rings.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not touch the adhesive surface with your fingers.</td>
</tr>
</tbody>
</table>

6. Install the magnetic sonde (Fig. 4/4) exactly to the marked center of the glass pane.

7. Press for 15 s.

<table>
<thead>
<tr>
<th>CAUTION!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard due to premature strain of the adhesive bond</td>
</tr>
<tr>
<td>Risk of material damage</td>
</tr>
<tr>
<td>• Do not strain the adhesive bond during the first 24 hours excessively.</td>
</tr>
</tbody>
</table>

8. Fix the connecting cable for traction relief with a cable tie.

<table>
<thead>
<tr>
<th>CAUTION!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard due to buckling the connecting cable</td>
</tr>
<tr>
<td>Risk of material damage</td>
</tr>
<tr>
<td>• Install the connecting cable without buckling.</td>
</tr>
</tbody>
</table>

Close Up
1. Connect the magnetic sonde to the related system or equipment, see chapter 7.3.3.

**7.3.2 Install Junction Box**

**Requirements**

**Required Conditions**
No conditions

**Required Persons**
1 Maintainer  1.5 h

**Support Equipment**
No support equipment

**Consumables, Materials and Expendables**
No consumables, materials and expendables

**Spares**
No spares
Safety Conditions

**WARNING!**

Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage
- Observe all general safety instructions.
- Observe all safety instructions for maintenance.

Procedure

![Diagram of Junction Box]

**Fig. 5: Install Junction Box**

1. Drill 2 holes (M4 thread or 4.5 mm) to the installation position in accordance to the drilling scheme.
2. Loosen the 4 screws (Fig. 6/3).
3. Remove the cover (Fig. 6/2).
4. Install the junction box (Fig. 5/1) with 2 suitable screws.
5. Connect the cable of the responding system or equipment to the terminal strip, see attached wiring diagram.

Fig. 7: Terminal Assignments of Junction Box CP 500JB
**Note**
The terminal assignment of the vessel cable connection in the junction box depends on the connection diagrams of the responding system or equipment.

6. Install the cover.
7. Tighten the 4 screws.

**Close Up**
1. Connect magnetic sonde to responding system or equipment, see chapter 7.3.3.

### 7.3.3 Connect the Magnetic Sonde to the Related System or Equipment

**Requirements**

**Required Conditions**
1. The magnetic sonde is installed, see chapter 7.3.1.
2. The junction box is installed, see chapter 7.3.2.

**Required Persons**
1 Maintainer 1.0 h

**Support Equipment**
No support equipment

**Consumables, Materials and Expendables**
No consumables, materials and expendables

**Spares**
No spares

**Safety Conditions**

**WARNING!**
Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage
- Observe all general safety instructions.
- Observe all safety instructions for maintenance.

**CAUTION!**
Hazard due to magnetic mounting material on the magnetic compass
Risk of differing course display of the magnetic compass
- Use only nonmagnetic materials.

**Procedure**
1. Connect the connecting cable of the magnetic sonde...
a) 108-010.NG001 E01 - Connect the connecting cable of the magnetic sonde to junction box Type 134-089.

b) 108-010.NG002 E01 - Connect the connecting cable of the magnetic sonde directly to the related system or equipment.

c) 108-010.NG003 E01 - Connect the connecting cable of the magnetic sondes to junction box Type CP 500JB.

**CAUTION!**

Hazard due to interchange the cable connection of the magnetic sondes

Risk of false course display at the connected system or equipment

- Observe the correct installation of the cables.

**Note**

The upper magnetic sonde is mirror-inverted to the lower magnetic sonde. Due to the opposed sense of rotation of the lower magnetic sonde, the Signals S1 and S3 must be interchanged, see chapter 7.3.4.

d) 108-010.NG004 E01 - Connect the connecting cable of the magnetic sonde to junction box Type CP 500JB.

2. Install the connecting cable without buckling.

**CAUTION!**

Hazard due to buckling the connecting cable

Risk of material damage

- Install the connecting cable without buckling.

**Close Up**

1. Adjust the magnetic sonde, see chapter 7.3.5.

**7.3.4 Change Sense of Rotation**

**Requirements**

**Required Conditions**

No conditions

**Required Persons**

1 Maintainer 1.0 h

**Support Equipment**

No support equipment

**Consumables, Materials and Expendables**

No consumables, materials and expendables

**Spares**

No spares
Safety Conditions

**WARNING!**

Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage

- Observe all general safety instructions.
- Observe all safety instructions for maintenance.

Procedure

Fig. 8: Change Sense of Rotation

1. Loosen the 4 screws (Fig. 8/1).
2. Remove the cover (Fig. 8/2).
3. Loosen the screws number 2 and number 4 of terminal strip (Fig. 8/3).
4. Interchange wires of terminal strip number 2 (Signal S3) and number 4 (Signal S1).
5. Tighten the screws number 2 and number 4 of terminal strip.
6. Install the cover.
7. Tighten the 4 screws.

**Close Up**

No close up
7.3.5 Adjust Magnetic Sonde

Requirements

Required Conditions
1. The magnetic sonde is connected to the related system or equipment.

Required Persons
1 Maintainer 1.0 h
1 Assistant 1.0 h

Support Equipment
Label, AHEAD 05-0000 04 1 EA

Consumables, Materials and Expendables
Loctite 243 06-0000 03 As required

Spares
No spares

Safety Conditions

WARNING!
Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage
• Observe all general safety instructions.
• Observe all safety instructions for maintenance.

Note
The adjustment of the magnetic sonde is only possible if it is installed on a magnetic compass.
**Procedure**

1. Switch the course indication on the gyro operator unit to **Uncorrected Heading**, see related documentation.

2. Loosen the 3 screws (Fig. 9/1) slightly.

3. Check the sense of rotation.
   a) Turn the magnetic sonde (Fig. 9/2) slowly towards increasing angular degree value on the magnetic compass card.

   **Note**
   The display of the connected system or equipment must show the increasing angular degree value as well.

   b) If the sense of rotation is not correct, interchange the phases S1 and S3 of magnetic sonde, see chapter 7.3.4.

4. Turn the magnetic sonde slowly until the course indication of the connected system or equipment matches the course indication of the magnetic compass.

   **Note**
   Repeat the procedure 3 to 4 times so the highest accuracy is achieved.

5. Deflect the magnetic compass, e.g with an iron key and check the course.
   - The course indication of the connected system or equipment must match the course indication of the magnetic compass.
Note

Repeat the deflection of the magnetic compass and check the course 3 to 4 times.

6. Tighten the 3 screws carefully.
7. Check that the course indication of the connected system or equipment still matches the course indication of the magnetic compass.
8. Secure the screws with Loctite 243.
9. Install the label "AHEAD" (Fig. 9/3) to the magnetic sonde in the vessels ahead direction.

Note

Adjust the double magnetic sonde like the single magnetic sonde.

Close Up
No close up

7.4 Repair

7.4.1 Replace Junction Box

Requirements

Required Conditions
1. The junction box is defective.

Required Persons
1 Maintainer 1.0 h

Support Equipment
No support equipment

Consumables, Materials and Expendables
No consumables, materials and expendables

Spares
Box, junction 04-0000 02 1 EA

Safety Conditions

WARNING!

Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage
- Observe all general safety instructions.
- Observe all safety instructions for maintenance.
Procedure

Fig. 10: Replace Junction Box

1. Disconnect the junction box (Fig. 10/1) from the magnetic sonde and the connected system or equipment.
2. Loosen the 4 screws (Fig. 10/3).
3. Remove the cover (Fig. 10/2).
4. Remove the 2 screws fixing the junction box.
5. Remove the junction box (Fig. 10/1).
6. Provide a new junction box.
7. Dispose of the defective junction box.
8. Loosen the 4 screws (Fig. 10/3) of the new junction box.
9. Remove the cover (Fig. 10/2).
10. Install the junction box with 2 suitable screws.
11. Connect the magnetic sonde to the new junction box.
12. Connect the cable of the responding system or equipment to the terminal strip, see attached wiring diagram.

Fig. 10: Replace Junction Box

1. Junction Box
2. Cover
3. Screw
Fig. 11: Terminal Assignments of Junction Box CP 500JB

**Note**
The terminal assignment of the vessel cable connection in the junction box depends on the connection diagrams of the responding system or equipment.

13. Install the cover.
14. Tighten the 4 screws.

**Close Up**
No close up

### 7.4.2 Remove Magnetic Sonde

**Requirements**

**Required Persons**
1 Maintainer 1.0 h

**Support Equipment**

Tool, operating 05-0000 02 1 EA

**Consumables, Materials and Expendables**
No consumables, materials and expendables

**Spares**
No spares
**Safety Conditions**

**WARNING!**

Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage
- Observe all general safety instructions.
- Observe all safety instructions for maintenance.

**Procedure**

![Diagram of a device with labels: 1. Gap, 2. Glass Pane, 3. Holder Plate.]

Fig. 12: Remove Holder with Magnetic Sonde

1. Turn the magnetic compass upside down, see related documentation.
2. Protect the magnetic compass from turning back.
3. Disconnect the magnetic sonde from the related system or equipment.
4. Position the operating tool to the gap (Fig. 12/1) between glass pane (Fig. 12/2) and holder plate (Fig. 12/3).

**CAUTION!**

Hazard due to too much pressure on the glass pane
Risk of material damage
- Avoid too much pressure to the glass pane.
5. Remove the holder from the glass pane by moving the operating tool carefully towards the center of the magnetic compass.

7.4.3 Replace Magnetic Sondes

7.4.3.1 Replace Magnetic Sonde 108-010.NG001 E01

Requirements

Required Conditions
No conditions

Required Persons
1 Maintainer 0.1 h

Support Equipment
No support equipment

Consumables, Materials and Expendables
No consumables, materials and expendables

Spares
Sonde, magnetic 01-0000 02 1 EA

Safety Conditions

WARNING!
Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage
• Observe all general safety instructions.
• Observe all safety instructions for maintenance.

Procedure
1. Provide a new magnetic sonde.
2. Remove the magnetic sonde, see chapter 7.4.2.

Close Up
1. Install the magnetic sonde, see chapter 7.3.1.
7.4.3.2  Replace Magnetic Sonde 108-010.NG002 E01

Requirements

Required Conditions
No conditions

Required Persons
1 Maintainer 0.1 h

Support Equipment
No support equipment

Consumables, Materials and Expendables
No consumables, materials and expendables

Spares
Sonde, magnetic 01-0000 03 1 EA

Safety Conditions

WARNING!
Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage
• Observe all general safety instructions.
• Observe all safety instructions for maintenance.

Procedure
1. Provide a new magnetic sonde.
2. Remove the magnetic sonde, see chapter 7.4.2.

Close Up
1. Install the magnetic sonde, see chapter 7.3.1.

7.4.3.3  Replace Magnetic Sonde 108-010.NG003 E01

Requirements

Required Conditions
No conditions

Required Persons
1 Maintainer 0.1 h

Support Equipment
No support equipment
Consumables, Materials and Expendables
No consumables, materials and expendables

Spares
Sonde, magnetic 01-0000 04 1 EA

Safety Conditions

WARNING!

Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage
• Observe all general safety instructions.
• Observe all safety instructions for maintenance.

Procedure
1. Provide a new magnetic sonde.
2. Remove the magnetic sonde, see chapter 7.4.2.

Close Up
1. Install the magnetic sonde, see chapter 7.3.1.

7.4.3.4 Replace Magnetic Sonde 108-010.NG004 E01

Requirements

Required Conditions
No conditions

Required Persons
1 Maintainer 0.1 h

Support Equipment
No support equipment

Consumables, Materials and Expendables
No consumables, materials and expendables

Spares
Sonde, magnetic 01-0000 05 1 EA
Safety Conditions

WARNING!

Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage
- Observe all general safety instructions.
- Observe all safety instructions for maintenance.

Procedure
1. Provide a new magnetic sonde.
2. Remove the magnetic sonde, see chapter 7.4.2.

Close Up
1. Install the magnetic sonde, see chapter 7.3.1.

7.4.4 Replace Holders of Magnetic Sonde

7.4.4.1 Replace Holder for 108-010.NG001, 108-010.NG002 and 108-010.NG004

Requirements

Required Conditions
1. The holder with the magnetic sonde is removed from the magnetic compass, see chapter 7.4.2.

Required Persons
1 Maintainer  1.0 h

Support Equipment
No support equipment

Consumables, Materials and Expendables

<table>
<thead>
<tr>
<th>Material</th>
<th>Code</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loctite 648</td>
<td>06-0000 02</td>
<td>As required</td>
</tr>
<tr>
<td>Loctite 243</td>
<td>06-0000 03</td>
<td>As required</td>
</tr>
</tbody>
</table>

Spares

<table>
<thead>
<tr>
<th>Item</th>
<th>Code</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holder</td>
<td>02-0000 02</td>
<td>1 EA</td>
</tr>
<tr>
<td>Kit, installation</td>
<td>03-0000 01</td>
<td>1 SE</td>
</tr>
</tbody>
</table>
Safety Conditions

**WARNING!**

Danger due to nonadherence to safety instructions

Risk of death or serious injury and material damage

- Observe all general safety instructions.
- Observe all safety instructions for maintenance.

Procedure

Fig. 13: Replace Holder for 108-010.NG001, 108-010.NG002 and 108-010.NG004

1. Measure and note the distance between the plate (Fig. 13/1) and the ground plate (Fig. 13/2).
2. Remove the 3 screws (Fig. 13/3) with washers (Fig. 13/4).
3. Remove the magnetic sonde (Fig. 13/5).
4. Provide a new holder.
5. Dispose of the defective holder.
6. Check the distance between the plate (Fig. 13/1) and the ground plate of the new holder.
7. If necessary, correct the length with the installation kit.
   a) Remove the 3 nuts (Fig. 13/6) with washers (Fig. 13/7).
   b) Remove the plate (Fig. 13/1).
   c) Correct the length with the spacers (Fig. 13/8) and the thread bars (Fig. 13/9) from the installation kit.

**CAUTION!**

Hazard due to thread bars protrude through the ground plate
Risk of damaging the glass pane of magnetic compass
   • Ensure the thread bars do not protrude through the ground plate.

d) Secure the spacers with Loctite 648.
8. Install the plate.
9. Install the 3 nuts with washers.
10. Secure the 3 nuts with Loctite 243.
11. Install the holder to the magnetic compass, see Fig. 13.
12. Remove the 3 screws (Fig. 13/3) with washers (Fig. 13/4).
13. Place the magnetic sonde in the new holder.
14. Install the 3 screws with washers.

**Close Up**
1. Connect magnetic sonde to responding system or equipment, see chapter 7.3.3.

### 7.4.4.2 Replace Holder for 108-010.NG003

**Requirements**

**Required Conditions**
1. The holder with the magnetic sonde is removed from the magnetic compass, see chapter 7.4.2.

**Required Persons**
1 Maintainer 1.0 h

**Support Equipment**
No support equipment

**Consumables, Materials and Expendables**

<table>
<thead>
<tr>
<th>Item</th>
<th>Code</th>
<th>Quantity</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loctite 648</td>
<td>06-0000 02</td>
<td></td>
<td>As required</td>
</tr>
<tr>
<td>Loctite 243</td>
<td>06-0000 03</td>
<td></td>
<td>As required</td>
</tr>
</tbody>
</table>
Spares

<table>
<thead>
<tr>
<th>Item</th>
<th>Code</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holder</td>
<td>02-0000 03</td>
<td>1 EA</td>
</tr>
<tr>
<td>Kit, installation</td>
<td>03-0000 01</td>
<td>1 SE</td>
</tr>
</tbody>
</table>

Safety Conditions

**WARNING!**

Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage
- Observe all general safety instructions.
- Observe all safety instructions for maintenance.

Procedure

![Diagram of Holder replacement](image)

Fig. 14: Replace Holder for 108-010.NG003

1. Lower Plate
2. Ground Plate
3. Screw
4. Washer
5. Upper Magnetic Sonde
6. Screw
7. Washer
8. Lower Magnetic Sonde
9. Nut
1. Measure and note the distance between the lower plate (Fig. 14/1) and the ground plate (Fig. 14/2).

2. Remove the 3 screws (Fig. 14/3) with washers (Fig. 14/4).

3. Remove the upper magnetic sonde (Fig. 14/5).

4. Remove the 3 nuts (Fig. 14/9) with washers (Fig. 14/10).

5. Remove the upper plate (Fig. 14/11).

6. Remove the lower plate (Fig. 14/1).

7. Remove the 3 screws (Fig. 14/6) with washers (Fig. 14/7).

8. Remove the lower magnetic sonde (Fig. 14/8).


10. Dispose of the defective holder.

11. Check the distance between the lower plate (Fig. 14/1) and the ground plate (Fig. 14/2) of the new holder.

12. If necessary, correct the length with the installation kit.
   a) Remove the 3 nuts (Fig. 14/9) with washers (Fig. 14/10).
   b) Remove the upper plate (Fig. 14/11).
   c) Remove the lower plate (Fig. 14/1).
   d) Correct the length with the spacers (Fig. 14/12) and the thread bars (Fig. 14/13) from the installation kit.

   e) Secure the spacers with Loctite 648.

13. Remove the 3 screws (Fig. 14/6) with washers (Fig. 14/7).

14. Place the lower magnetic sonde (Fig. 14/8) on the lower plate (Fig. 14/1).

15. Install the 3 screws (Fig. 14/6) with washers (Fig. 14/7).

16. Install the lower plate (Fig. 14/1).

17. Install the upper plate (Fig. 14/11).

18. Install the 3 nuts (Fig. 14/9) with washers (Fig. 14/10).


20. Install the holder to the magnetic compass (see Fig. 14).

21. Remove the 3 screws (Fig. 14/3) with washers (Fig. 14/4).

22. Place the upper magnetic sonde (Fig. 14/5) in the holder.

23. Install the 3 screws (Fig. 14/3) with washers (Fig. 14/4).

**Close Up**

1. Connect magnetic sondes to responding system or equipment, see chapter 7.3.3.
7.4.4.3 Replace Holder for 108-010.NG001 E01, 108-010.NG002 E01 and 108-010.NG004 E01

Requirements

Required Conditions
1. The holder with the magnetic sonde is removed from the magnetic compass, see chapter 7.4.2.

Required Persons
1 Maintainer

1.0h

Support Equipment
No support equipment

Consumables, Materials and Expendables
No consumables, materials and expendables

Spares

| Holder       | 02-0000 04 | 1 EA |

Safety Conditions

<table>
<thead>
<tr>
<th>WARNING!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danger due to nonadherence to safety instructions</td>
</tr>
<tr>
<td>Risk of death or serious injury and material damage</td>
</tr>
<tr>
<td>• Observe all general safety instructions.</td>
</tr>
<tr>
<td>• Observe all safety instructions for maintenance.</td>
</tr>
</tbody>
</table>
Procedure

Fig. 15: Replace Holder for 108-010.NG001 E01, 108-010.NG002 E01 and 108-010.NG004 E01

1. Remove the 3 screws (Fig. 15/1) with washers (Fig. 15/2).
2. Remove the plate (Fig. 15/3).
3. Remove the magnetic sonde (Fig. 15/4).
4. Provide a new holder.
5. Dispose of the defective holder.
6. Install new holder to magnetic compass, see Fig. 15.
7. Remove the 3 screws (Fig. 15/1) with washers (Fig. 15/2).
8. Remove the plate (Fig. 15/3).
9. Place the magnetic sonde in the holder.
10. Install the plate.
11. Replace the 3 screws with washers.

Close Up

1. Connect magnetic sonde to responding system or equipment, see chapter 7.3.3.
7.4.4.4 Replace Holder for 108-010.NG003 E01

Requirements

Required Conditions
1. The holder with the magnetic sonde is removed from the magnetic compass, see chapter 7.4.2.

Required Persons
1 Maintainer 1.0 h

Support Equipment
No support equipment

Consumables, Materials and Expendables
Loctite 243 06-0000 03 As required

Spares
Holder 02-0000 05 1 EA

Safety Conditions

WARNING!

Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage
• Observe all general safety instructions.
• Observe all safety instructions for maintenance.
Procedure

1. Remove the 3 screws (Fig. 16/1) with washers (Fig. 16/2).
2. Remove the upper plate (Fig. 16/3).
3. Remove the upper magnetic sonde (Fig. 16/4).
4. Remove the 3 nuts (Fig. 16/5) with washers (Fig. 16/6).
5. Remove the plate (Fig. 16/7).
6. Remove the 3 screws (Fig. 16/8) with washers (Fig. 16/9).
7. Remove the lower plate (Fig. 16/10).
8. Remove the lower magnetic sonde (Fig. 16/11).
10. Dispose of the defective holder.
11. Remove the 3 nuts (Fig. 16/5) with washers (Fig. 16/6).
12. Remove the plate (Fig. 16/7).
13. Remove the 3 screws (Fig. 16/8) with washers (Fig. 16/9).
14. Remove the lower plate (Fig. 16/10).
15. Place the lower magnetic sonde (Fig. 16/11) on the plate (Fig. 16/7).
16. Install the lower plate (Fig. 16/10).
17. Install the 3 screws (Fig. 16/8) with washers (Fig. 16/9).
18. Install the plate (Fig. 16/7).
19. Install the 3 nuts (Fig. 16/5) with washers (Fig. 16/6).
20. Secure the 3 nuts with Logtite 243.
21. Install the new holder to the magnetic compass, see Fig. 16.
22. Remove the 3 screws (Fig. 16/1) with washers (Fig. 16/2).
23. Remove the upper plate (Fig. 16/3).
24. Place the upper magnetic sonde (Fig. 16/4) in the holder.
25. Install the upper plate (Fig. 16/3).
26. Install the 3 screws (Fig. 16/1) with washers (Fig. 16/2).

Close Up
1. Connect magnetic sonde to responding system or equipment, see chapter 7.3.3.

7.4.4.5 Install Holder

Requirements

Required Conditions
No conditions

Required Persons
1 Maintainer 0.5 h
1 Assistant 0.5 h

Support Equipment

Mask, centering 05-0000 03 1 EA

Consumables, Materials and Expendables
No consumables, materials and expendables

Spares
No spares
Safety Conditions

**WARNING!**

Danger due to nonadherence to safety instructions
Risk of death or serious injury and material damage
- Observe all general safety instructions.
- Observe all safety instructions for maintenance.

**CAUTION!**

Hazard due to magnetic mounting material on the magnetic compass
Risk of differing course display of the magnetic compass
- Use only nonmagnetic materials.

Procedure

![Fig. 17: Install Holder](image)

1. Glass Pane
2. Centering Mask
3. Adhesive Rings
4. Holder

1. Turn the magnetic compass upside down, see related documentation.
2. Protect the magnetic compass from turning back.
3. Clean and degrease the glass pane (#/1) of the magnetic compass with a suitable agent.
4. Cut out the centering mask (#/2) and use it to mark the center of the glass pane.
5. Remove the protective paper (#/3) from the adhesive rings.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not touch the adhesive surface with your fingers.</td>
</tr>
</tbody>
</table>

6. Install the holder (#/4) exactly to the marked center of the glass pane.

7. Press for 15 s.

<table>
<thead>
<tr>
<th><strong>CAUTION!</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard due to premature strain of the adhesive bond</td>
</tr>
<tr>
<td>Risk of material damage</td>
</tr>
<tr>
<td>• Do not strain the adhesive bond during the first 24 hours excessively.</td>
</tr>
</tbody>
</table>

**Close Up**

No close up
8 Transport and Storage

8.1 Preservation, Packing and Storage

Preservation
All components / devices require no special preservation procedures.

Packing
All components / devices are packable in customary packing. Take special care when packing electrostatic sensitive devices.

<table>
<thead>
<tr>
<th>CAUTION!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard to electrostatic sensitive device</td>
</tr>
<tr>
<td>Risk of material damage</td>
</tr>
<tr>
<td>• Take protective measures during installation and/or calibration.</td>
</tr>
<tr>
<td>• Pack device in suitable ESD packing for storage and transport.</td>
</tr>
</tbody>
</table>

Storage
During the storage of the components / devices, the following conditions have to be met:

- Store the equipment dry and dirt-/dust-free
- Protect the equipment by corresponding packing material against damage
- Do not stack the components / devices
- No special storage regulations are applicable
- Adhere the following environmental conditions:

| Storage temperature | −30 °C to +70 °C |
| Humidity            | <80% relative humidity, noncondensing |
| Atmospheric pressure| 600 hPa to 1.400 hPa |

8.2 Transport

During the transport of the components / devices, the following regulations have to be met:

- Protect the equipment by corresponding packing material against damage.
- Protect the equipment against dirt and dust by suitable means.
- Handle the equipment carefully by suitable means.
- Adhere the following environmental conditions:

| Transport temperature | −30 °C to +70 °C |
| Humidity              | <80% relative humidity, noncondensing |
| Atmospheric pressure  | 600 hPa to 1.400 hPa |

- No special transport regulations are applicable.