Installation guide  
Roof reflector

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# Table of Contents

1 Introduction ........................................................................................................................................... 4  
   1.1 General precautions ....................................................................................................................... 4  

2 Unpacking ........................................................................................................................................... 5  
   2.1 Storage ......................................................................................................................................... 5  
   2.2 Inspection ..................................................................................................................................... 5  

3 Installation .......................................................................................................................................... 6  
   3.1 Alignment of template ................................................................................................................... 8  
   3.2 Determine holes for mounting blocks ............................................................................................ 8  
   3.3 Placing the mounting blocks ......................................................................................................... 9  
   3.4 Mounting Roof reflector .............................................................................................................. 9  
   3.5 Roof reflector glued on roof ........................................................................................................ 10  

4 Related publications ............................................................................................................................ 11
Preface

This installation guide describes the installation of the Enraf SmartRadar Roof reflector on inner floating roof tanks.

For commissioning and service of the SmartRadar, please refer to the Installation guides of the Antenna, Antenna Unit and Control Unit, and to the Instruction manual of the SmartRadar. Refer also to the list of related publications in chapter 4.

Safety and prevention of damage

The technician must have basic technical knowledge to be able to safely install the equipment. It is also required that when the SmartRadar and its reflector is installed in a hazardous area, the technician works in accordance with the (local) requirements for electrical equipment in hazardous areas.

“Warnings”, “Cautions”, and “Notes” have been used throughout the installation guide to bring special matters to the immediate attention of the reader.

- A **Warning** concerns danger to the safety of the technician or user;
- A **Caution** draws the attention to an action which may damage the equipment;
- A **Note** points out a statement deserving more emphasis than the general text, but does not deserve a “Warning” or “Caution”.

Legal aspects

The information in this installation guide is copyright property of Enraf B.V., The Netherlands. Enraf B.V. disclaims any responsibility for personal injury or damage to the equipment caused by:

- Deviation from any of the prescribed procedures;
- Execution of activities that are not prescribed;
- Negligence of the general safety precautions for handling tools and use of electricity.

Additional information

Please do not hesitate to contact Enraf B.V. or its representative if you require more information.
1 Introduction

The Enraf SmartRadar is a radar based level gauge.

The design of the SmartRadar is modular, consisting of the following three parts:

- Control Unit with local display;
- Antenna Unit with HF electronics;
- Antenna with tank separator and roof reflector.

For a more detailed description of the radar system configuration, refer to the Instruction manual SmartRadar.

This installation guide describes the installation of the inner floating roof reflector.

On tanks with an internal floating roof and with a free space antenna, a roof reflector is required. The roof reflector is installed on the internal floating roof below the antenna. Installation of the roof reflector should be done prior to the antenna installation. The function of the roof reflector is to ensure that signal is received by the antenna under all circumstances. Even in the case when the roof is not horizontal during product movements.

1.1 General precautions

The entire installation procedure shall be in accordance with national, local and company regulations.

**Health aspect:**

The emitted microwave energy is far below the accepted limits for exposure of the human body to microwave radiation. Safety regulations state a maximum value of 5 - 8 mW/cm² (IRPA and ANSI guidelines).

Depending on the type of antenna, a maximum radiation of 0.03 mW/cm² (with an 4" antenna) to 0.008 mW/cm² (with an 8" antenna) is generated.
2 Unpacking

2.1 Storage

There are no special requirements for storage of the reflector. Keep the reflector in its original packing till it is used for installation.

2.2 Inspection

Inspect the package on arrival and notify the transporter or sales representative if there is any damage. Don’t throw away the packing. It will be of use when further transport on site is needed.

Inventory checklist:

- Roof reflector
- Three mounting blocks with screws (M8 x 16), bolts (M8 x 35) and nuts (M8)
- Installation guide SmartRadar Roof reflector
- Template (one per ten reflectors)
3 Installation

Installation of the Roof reflector requires access to the internal floating roof of the tank.

The reflector must be installed in a vertical line below the free space planar antenna and be fixed on the internal floating roof. There is an offset from the perpendicular of the radar nozzle centre to the centre of the antenna (and thus the reflector). This offset is 95 mm (3 3/4"). Refer to figure A template is delivered for easy alignment of the three mounting blocks including the 95 mm offset. The offset is directed towards the tank centre.

Refer to the Installation guide 873 SmartRadar 8" Free Space Planar Antenna for mounting details of the planar antenna.

The Roof reflector can be secured on the internal floating roof by means of bolts and nuts through the roof and mounting blocks. This method is described in chapters 3.1 till 3.4.

Another method is to glue the mounting blocks onto the floating roof. A two compound epoxy adhesive should be used which is resistant against the product and product vapours. The adhesive is not included. This installation method is described in chapter 3.5.
3.1  Alignment of template

Refer to figure

1) Make a plumbline from the radar nozzle centre downwards to the surface of the inner floating roof.

2) Align template with hole ‘A’ under the plumbline.

3) Direct template towards tank centre as indicated in fig. 3.3.

3.2  Determine holes for mounting blocks

Refer to figure

1) Mark the three holes ‘B’ on the floating roof.

3) Remove template.

4) Make 3 holes as marked: Ø 9 mm (Ø 3/8").
3.3 Placing the mounting blocks

Refer to figure

1) Place the mounting blocks over the holes as indicated in figure.
   The outer holes of the blocks covers the holes in the roof.

2) Place the aluminium washers M8 on the bolts M8 x 35 and insert the bolts from below the roof. Turn the bolts in the mounting blocks and turn on the nuts. Do not jet fix the mounting blocks.

3.4 Mounting Roof reflector

Refer to figure

1) Place the Roof reflector onto the mounting blocks. Position of corners is not relevant. If required, move the mounting blocks in the correct position.

2) Secure the reflector with the M8 x 16 screws and lock washers. Use Allen key 6 mm.

3) Secure the bolts and nuts of the mounting blocks.
3.5 Roof reflector glued on roof

Refer to chapter 3.1

1) Carry out the steps 1 to 3 as given in chapter 3.1.

2) Mark the three holes ‘B’ and hole ‘C’ on the floating roof.

3) Remove template.

4) Place the mounting blocks as indicated in figure and secure them with the delivered M8 x 16 screws and lock washers on the reflector. Use Allen key 6 mm.

5) Apply two compound epoxy adhesive to the bottom side of the mounting blocks and the three ‘B’ marked places on the floating roof. Follow the instructions given by the adhesive.

6) Hold the Roof reflector just above the roof, while positioning the mounting blocks of the reflector on the marked and glued spots ‘B’, and centring on the circle marked ‘C’. Place the Roof reflector on the floating roof; position of corners is not relevant.
# Related publications

<table>
<thead>
<tr>
<th>Title</th>
<th>Part no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation guide SmartRadar Antennas</td>
<td>4416.642</td>
</tr>
<tr>
<td>Instruction manual 873 SmartRadar</td>
<td>4416.571</td>
</tr>
<tr>
<td>Instruction manual 973 Smartradar</td>
<td>4416.632</td>
</tr>
<tr>
<td>Instruction manual 971 Smartradar</td>
<td>4416.716</td>
</tr>
<tr>
<td>Instruction manual 970 Smartradar</td>
<td>4416.718</td>
</tr>
</tbody>
</table>

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