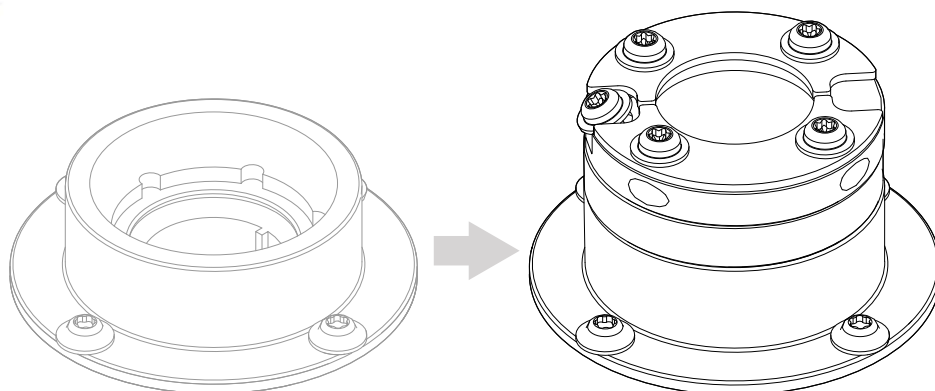




## CA11 To CA200 Upgrade Instruction



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# Table of Contents

|                                                             |    |
|-------------------------------------------------------------|----|
| 1. Introduction .....                                       | 1  |
| 1.1. About This Manual .....                                | 1  |
| 1.2. Manufacturer .....                                     | 1  |
| 1.3. Additional Documentation .....                         | 1  |
| 2. Safety Information .....                                 | 2  |
| 2.1. Introduction .....                                     | 2  |
| 2.2. Definitions of Alert Levels .....                      | 2  |
| 2.3. Explanation of Safety Symbols Used In the Manual ..... | 2  |
| 2.4. Safety Instructions .....                              | 3  |
| 3. Prerequisites .....                                      | 4  |
| 3.1. Tools .....                                            | 4  |
| 3.2. Parts And Material .....                               | 4  |
| 4. Instruction .....                                        | 6  |
| 4.1. Preparation .....                                      | 6  |
| 4.2. Remove The CA11 Clamp Ring .....                       | 6  |
| 4.3. Mount The CA200 Clamp Ring And Top Flange .....        | 10 |

## List of Tables

|                                         |   |
|-----------------------------------------|---|
| 1. Additional Documentation .....       | 1 |
| 2. Safety Symbols in This Manual .....  | 2 |
| 3. Tools .....                          | 4 |
| 4. Parts And Material .....             | 4 |
| 5. Conversion Kit Components .....      | 4 |
| 6. Conversion Tool Kit Components ..... | 5 |

# 1. Introduction

## 1.1. About This Manual

This document contains instructions for how to upgrade the magnetron high voltage receptacle, from a CA11/CA11 brass to a CA200 high voltage connection system receptacle. The illustrations show CA11, but the same procedure is valid for CA11 brass. For instructions on how to connect the CA200 HV cable to the receptacle, refer to *CA200 Installation and Oil Filling Instructions (DOC-020150)*.

The high voltage connection system CA200 has been specifically developed for pulsed power applications for magnetron modulators. The oil-filled construction gives a favourable voltage field distribution with low partial discharge and long service life.

The reader is expected to be familiar with, and comply to, local regulations about electrical work.

Before performing this procedure, make sure to read and understand this manual.

Cables and connectors that are not relevant for this replacement procedure may be omitted from the illustrations for clarity.

In some illustrations, symbols with the following meanings are used:

 = Correct, do this     = Wrong, do not do this

If you have any suggestions about how this manual can be improved, please let us know. Send an email to [techdoc@scandinovasystems.com](mailto:techdoc@scandinovasystems.com), clearly stating the following information:

- The name, document number and edition of the manual.
- The proposed change including information about affected page/chapter/figure.

Keep the manual for future reference.

## 1.2. Manufacturer

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## 1.3. Additional Documentation

Table 1. Additional Documentation

| Document Name                                   | Document Number |
|-------------------------------------------------|-----------------|
| CA200 Installation and Oil Filling Instructions | DOC-020150      |

## 2. Safety Information

### 2.1. Introduction

This section contains important information for your safety and prevention of injury. Make sure to read and understand this information and to comply with it when handling the Modulator. The information in this manual shall however in no way take precedence over individual responsibilities or local regulations. During operation and other work with a machine it is always the responsibility of the individual to consider:

- The safety of all persons concerned.
- The safety of the machine and other property.
- The protection of the environment.

### 2.2. Definitions Of Alert Levels

The following alert levels are used in ScandiNova's manuals:



#### Warning

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. When applicable, the nature of the hazard is specified using one of the symbols described in [Section 2.3: Explanation of Safety Symbols Used In the Manual](#).



#### Caution

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or equipment damage. When applicable, the nature of the hazard is specified using one of the symbols described in [Section 2.3: Explanation of Safety Symbols Used In the Manual](#).



#### Note

Additional information or tips on how to perform a procedure.

### 2.3. Explanation Of Safety Symbols Used In The Manual

The following safety symbols may occur in ScandiNova's manuals:

Table 2. Safety Symbols in This Manual

| Symbol | Description                                        | Symbol | Description             |
|--------|----------------------------------------------------|--------|-------------------------|
|        | General warning, refer to the text for information |        | Risk of X-ray radiation |
|        | Electrical hazard                                  |        | Toxic material          |
|        | Risk of RF radiation                               |        |                         |

## 2.4. Safety Instructions



### **Warning - Electrical Hazard**

Before performing this task, switch off both the single-phase and three-phase power and wait for 5 minutes (minimum) to allow all voltages to decay to safe levels. Touching a live electrical wire or component can result in electric shock.



### **Warning - Electrical Hazard**

Before installation, make sure that there are no damages on the HV pulse cable.

## 3. Prerequisites

### 3.1. Tools

Table 3. Tools

| Tool                                                      | Size     |
|-----------------------------------------------------------|----------|
| Torx screwdriver                                          | T20, T25 |
| Allen key                                                 | 1.5 mm   |
| Open end torque wrench (15 Nm)/fixed or adjustable wrench | 36 mm    |
| Fixed or adjustable wrench                                | 21 mm    |
| Cloth                                                     | -        |

### 3.2. Parts And Material

Table 4. Parts And Material

| Item                | Qty | Specification  | Comment             |
|---------------------|-----|----------------|---------------------|
| Conversion kit      | 1   | Art. no 027511 | Only for CA11       |
| Conversion kit      | 1   | Art. no 028045 | Only for CA11 brass |
| Conversion tool kit | 1   | Art. no 027512 | -                   |
| Oil                 | -   | -              | -                   |

#### 3.2.1. Conversion Kit Components

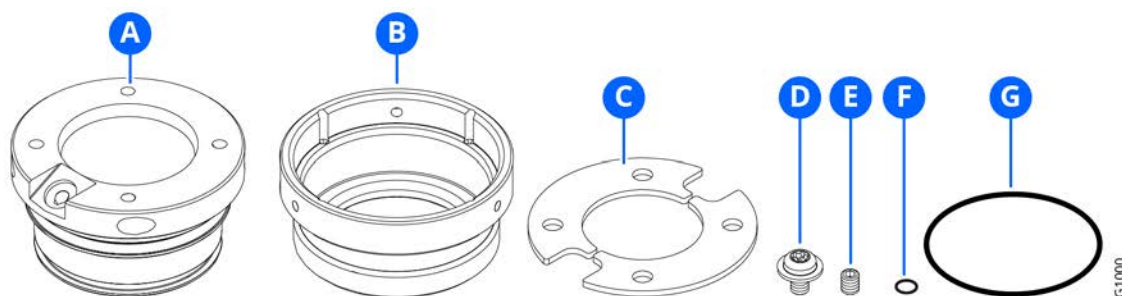


Figure 1. Conversion Kit Components

Table 5. Conversion Kit Components

| Pos | Name              | Qty    | Comment                                   |
|-----|-------------------|--------|-------------------------------------------|
| A   | Top flange CA200  | 1      |                                           |
| B   | Clamp ring CA200  | 1      |                                           |
| C   | Lock plate        | 2      |                                           |
| D   | Screw             | 5      |                                           |
| E   | Grub screw        | 3      |                                           |
| F   | O-ring            | 1      | For screw in vent opening                 |
| G   | O-ring            | 2      | For top flange CA200 and clamp ring CA200 |
| -   | Disposable gloves | 1 pair |                                           |

### 3.2.2. Conversion Tool Kit Components

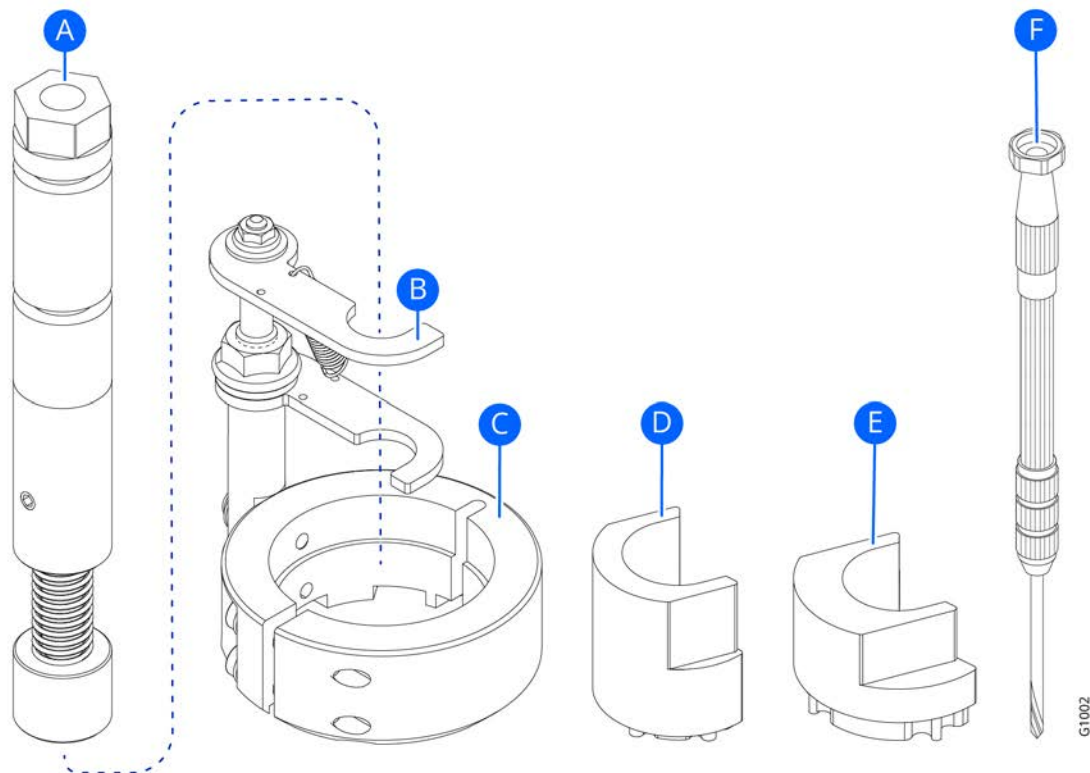


Figure 2.

Table 6. Conversion Tool Kit Components

| Pos | Name               | Qty |
|-----|--------------------|-----|
| A   | Pressure cylinder  | 1   |
| B   | Lock plate         | 2   |
| C   | Clamp ring         | 1   |
| D   | Socket tool, CA11  | 1   |
| E   | Socket tool, CA200 | 1   |
| F   | Reamer (2.16 mm)   | 1   |



## 4. Instruction



### Caution - Risk Of Equipment Damage

Make sure that the tank unit is placed upright, with the HV receptacle facing upwards, during the entire upgrade. If the tank unit is placed in any other direction there is a risk of air leaking into the system, or oil leaking out of it.



### Caution - Risk Of Equipment Damage

In this instruction, a reamer is used for removing corrosion from the receptacle sockets. The reamer can come loose from the handle and get stuck in a socket. To avoid this, make sure to use the reamer with a twisting motion – do not push it into the sockets with force.



### Caution - Risk Of Equipment Damage

In this instruction, a converter tool with a pressure cylinder is used to ensure constant pressure. If the pressure cylinder is tilted, there is a risk of air leaking into the system, or oil leaking out of it. Do not tilt the pressure cylinder in any direction - it must be kept vertical until removed.



### Note

In this instruction, the magnetron HV receptacle is upgraded. The placement of the magnetron HV receptacle differs depending on if the Modulator is equipped with an E-gun output or not. Pay attention to the markings on the Modulator, as the magnetron and E-gun HV receptacles look similar.

## 4.1. Preparation

The following preparations must be made before the upgrade is performed.

1. Turn off the Modulator.
2. Switch of the single-phase and three-phase power.
3. Disconnect the existing CA11 magnetron HV cable from the Modulator.

## 4.2. Remove The CA11 Clamp Ring

1. Place the Tank Unit with the HV receptacle facing upwards.

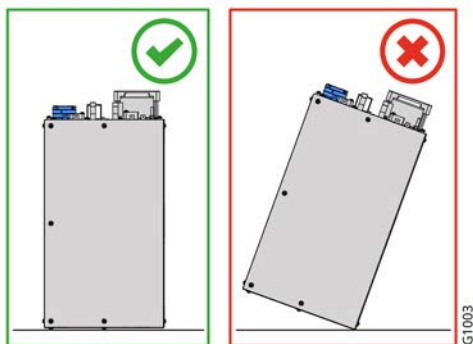


Figure 3.

2. If the Tank Unit is equipped with an E-gun HV output, the oil pump can be in the way during the upgrade. If preferred, remove the oil pump to ease access:
  - a. Disconnect the oil pump connector.
  - b. Remove the two screws and the bracket holding the oil pump using a T20 screwdriver.
  - c. Remove the oil pump.

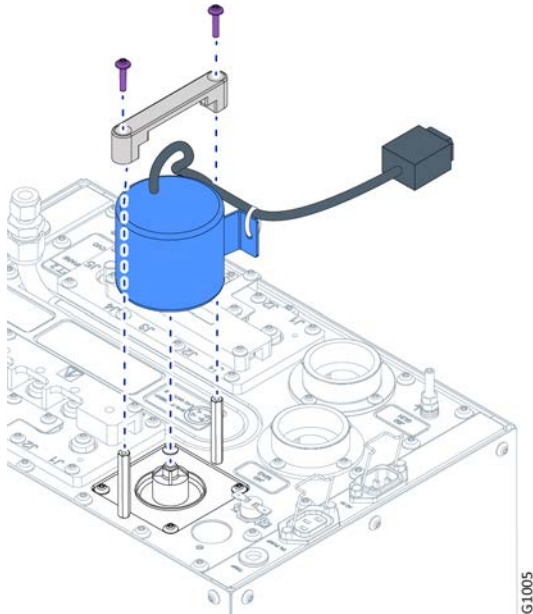


Figure 4.

3. In the magnetron HV receptacle (marked **MAGNETRON** or **MAG**), inspect the receptacle sockets for corrosion. Carefully remove any existing corrosion using the reamer.

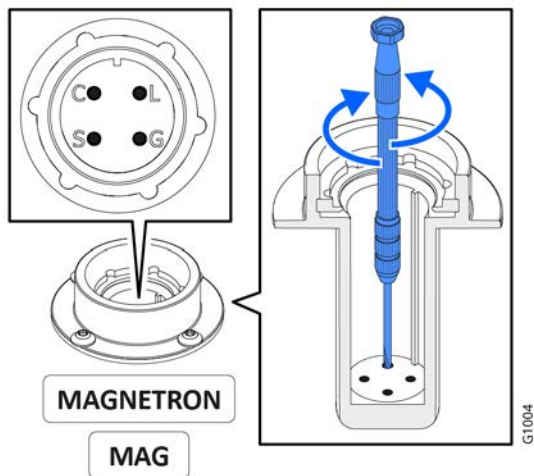


Figure 5.

4. Remove any metal shavings and dust from the receptacle using compressed air or a cloth.

5. Place the clamp ring of the converter tool on the magnetron HV receptacle (marked **MAGNETRON** or **MAG**).

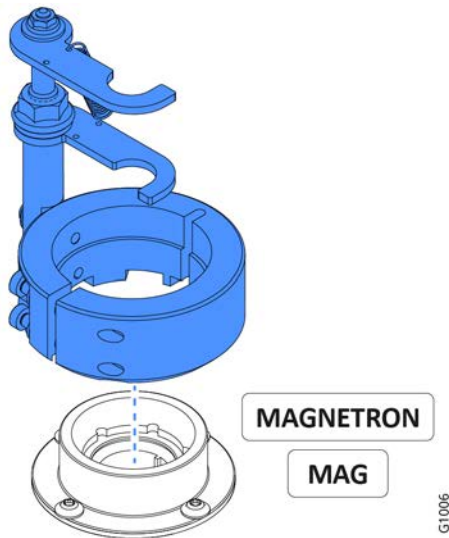


Figure 6.

6. Tighten the two screws at the side of the clamp ring using a T25 screwdriver.

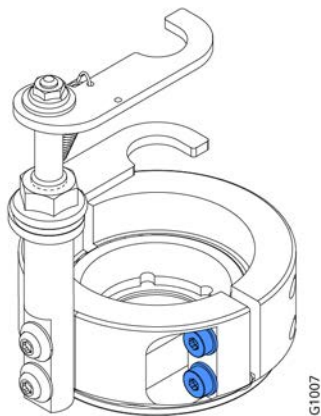


Figure 7.

7. Mount the pressure cylinder:
  - a. Insert the pressure cylinder into the clamp ring and align it with the key in the socket.
  - b. Push the pressure cylinder down until it reaches the bottom of the socket, and the marking on the cylinder is aligned with the top surface of the clamp ring.
  - c. Secure the pressure cylinder with the lock plates.

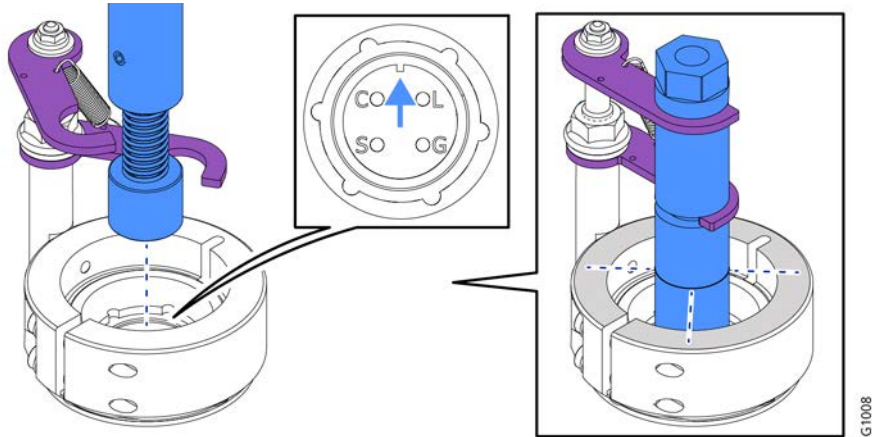


Figure 8.

8. Loosen the CA11 clamp ring from the receptacle using the CA11 socket tool and a 36 mm wrench. Make sure that the pressure cylinder does not rotate with the clamp ring - if necessary, hold the pressure cylinder in place with a 21 mm wrench.

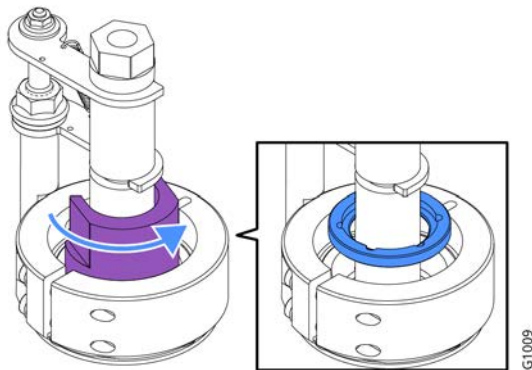


Figure 9.

9. Remove the CA11 clamp ring from the pressure cylinder by passing it through one lock plate at a time. Do not open both lock plates at the same time - the closed lock plate ensures constant pressure.

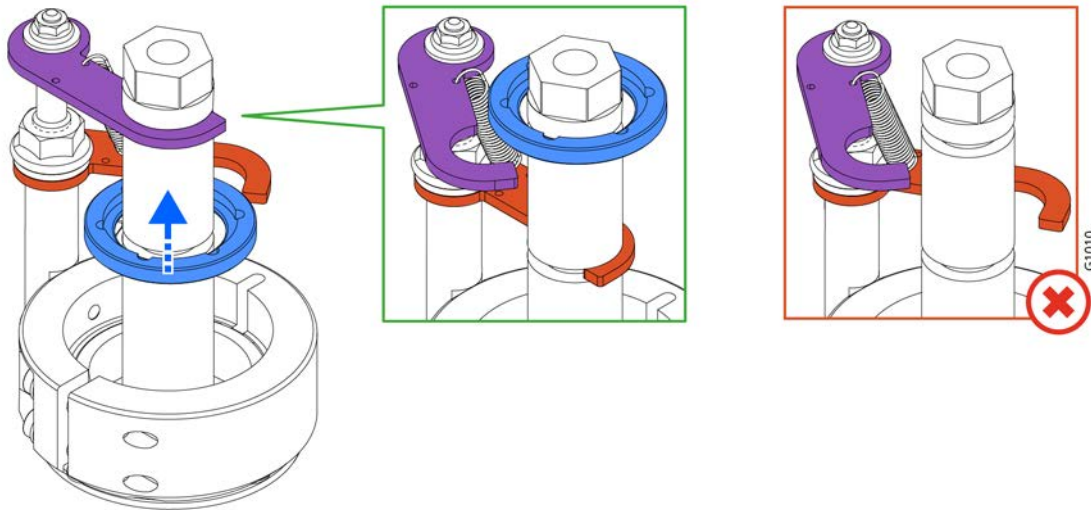


Figure 10.

#### 4.3. Mount The CA200 Clamp Ring And Top Flange

1. Lubricate an O-ring with oil and place it in the dedicated groove at the bottom of the CA200 clamp ring.

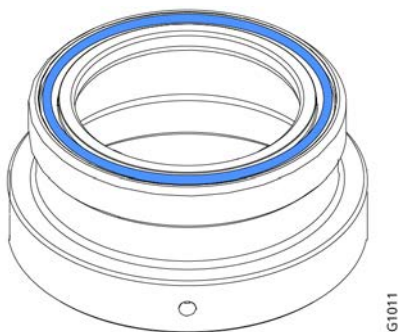


Figure 11.

2. Bring the CA200 clamp ring down over the pressure cylinder with the O-ring facing downwards, through one lock plate at a time.

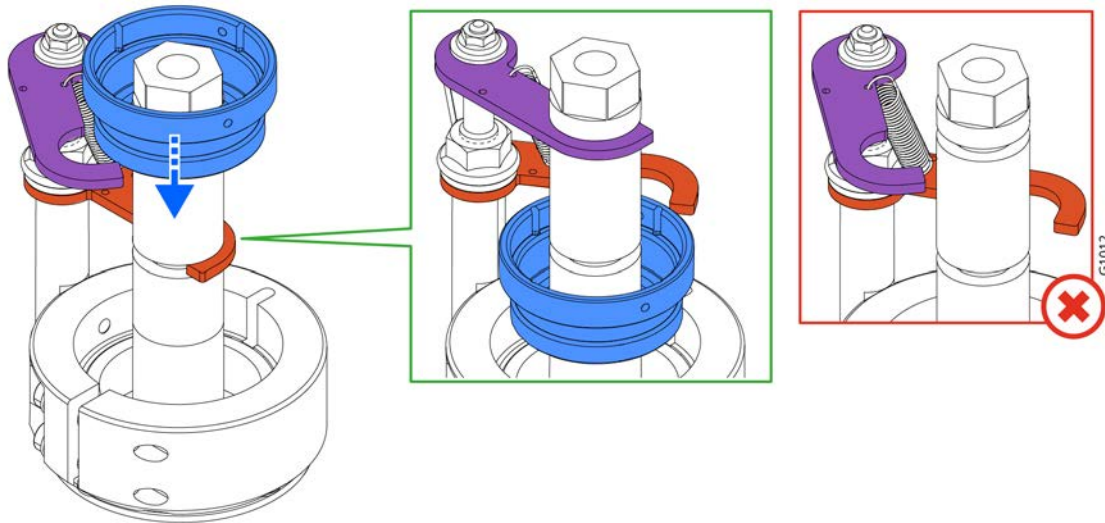


Figure 12.

3. Mount the CA200 clamp ring on the receptacle using the CA200 socket tool and a 36 mm open end torque wrench. Tighten the clamp ring to 15 Nm. Make sure that the O-ring stays in the groove and that the pressure cylinder does not rotate with the clamp ring - if necessary, hold the pressure cylinder in place with a 21 mm wrench.

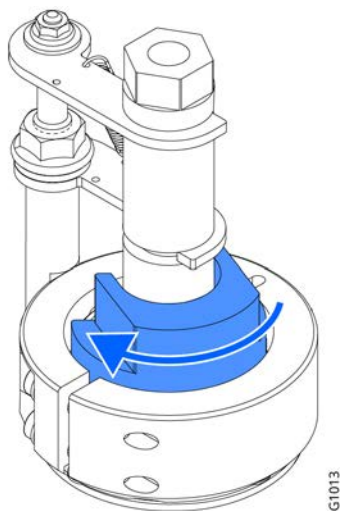


Figure 13.

4. Remove the pressure cylinder, socket tool and clamp ring (loosen the screws first) from the receptacle.

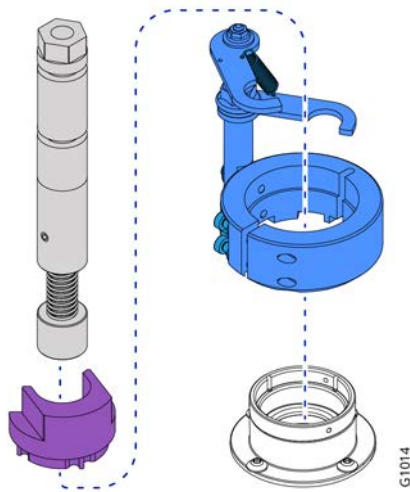


Figure 14.

5. Mount an O-ring in the dedicated groove at the bottom of the top flange.

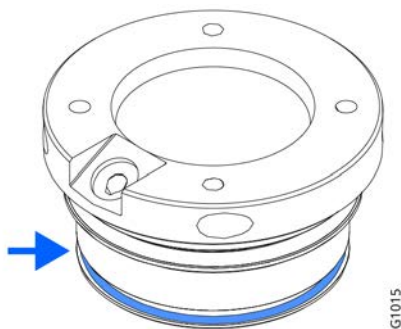


Figure 15.

6. Place the top flange on top of the clamp ring and press it down.

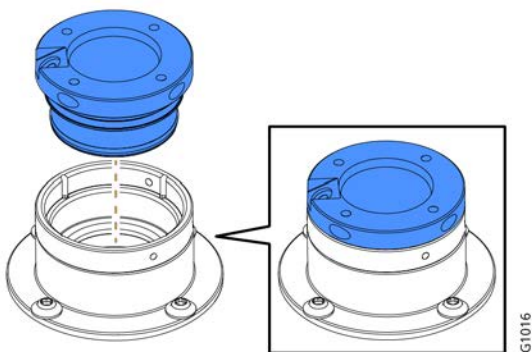


Figure 16.

7. Mount the three grub screws using an 1.5 mm Allen key, but do not tighten them fully.

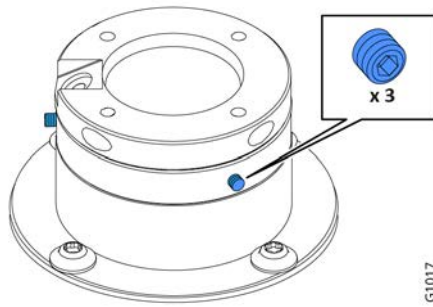


Figure 17.

8. Optional: Mount the small O-ring on one of the screws, and insert the screw into the vent opening. Tighten the screw a few turns.



**Note**

If the CA200 HV cable shall be installed immediately, it is not necessary to mount the screw, O-ring or lock plates yet. They shall all be temporarily removed before installation of the cable.

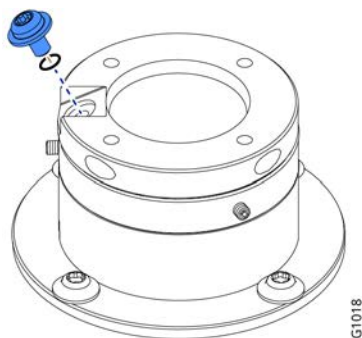


Figure 18.

9. Optional: Mount the lock plates on the top flange with the remaining screws.

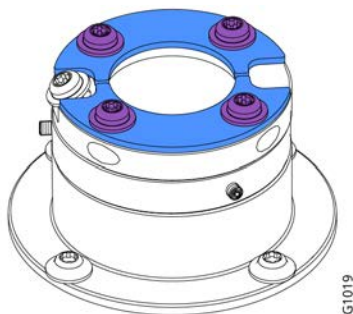


Figure 19.



10. If applicable, mount the oil pump:
- Put the oil pump in place.
  - Mount the bracket with the two screws.
  - Connect the oil pump connector and secure it.

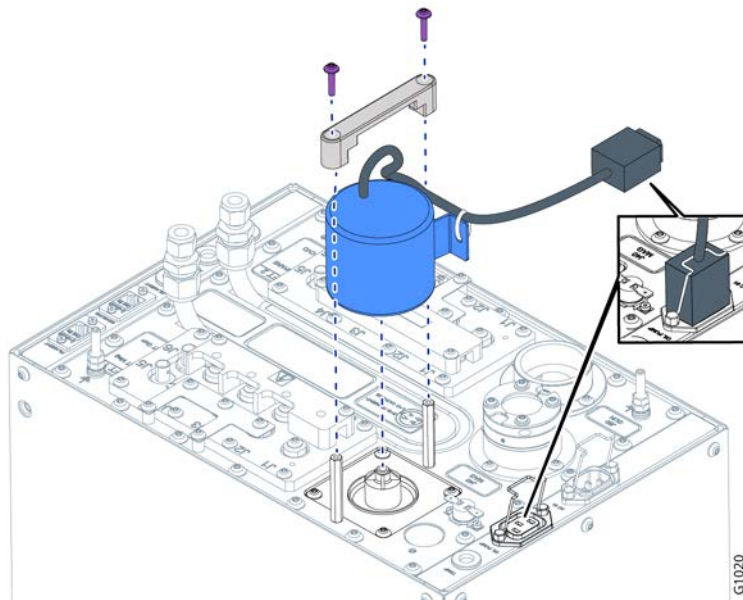


Figure 20.