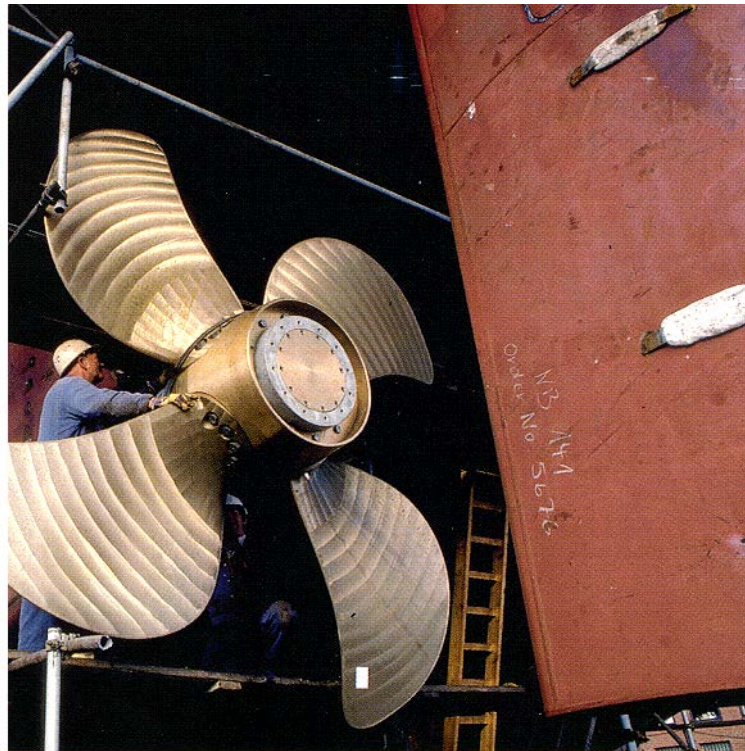


# MANUAL FOR



BAC CORROSION CONTROL A/S

## SHAFT GROUNDING SYSTEM WITH mV- METER FOR MONITORING



BAC ORDER NO: 539500 Copyright: BAC Corrosion Control A/S

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## 1 GENERAL DESCRIPTION

### 1.1 With mV-meter for monitoring

This system is a precautionary measure installed, in order to reduce the electrical potential between the propeller shaft and hull to below 80 mV, and thus prevent spark erosion damage to the main bearings and journals of the main engine. (A reading between 5 and 50 mV is considered as normal).



Controlbox with Voltmeter

## **1. The system consists of the following main components:**

- A.** A silver alloy slip ring is mounted on the intermediate shaft.
- B.** Brush holders with silver/graphite brushes.
- C.** Grounding wire and grounding plate.
- D.** Monitoring box with mV-meter and alarm output (optional).
- E.** Resistivity of the silver should be less than  $0.1\mu \text{ Ohm} \times \text{m}$ .

The total resistance from the shaft to hull must not exceed 0,01 Ohm.

- F.** The total resistance of the cable from the brush holder to the hull, must not exceed 0.005 Ohm. Indication of less than 5mV can occur at low resistance.

Indication of less than 5 mV can occur at low resistance.

The silver/graphite brushes are running on the slip ring. The two earthing brushes are connected to the hull through the grounding wire and the grounding plate welded to the hull. The monitoring brush is connected to the monitoring box.

## **2. Functioning and checking of the earthing/measuring device.**

The meter normally reads 150 mV at full scale. If readings are above 150 mV, push the button on the front of the meter. The meter will now read 1500 mV at full scale.

The meter will read "0" when the shaft is at rest. When the shaft is turning at sea, a reading of between 5 and 80 mV indicates proper grounding, although readings below 50 mV should be obtained with clean and properly contoured brushes. Readings of "0" when the shaft is turning at sea, indicates a defective mV-meter or loose or broken cable connections.

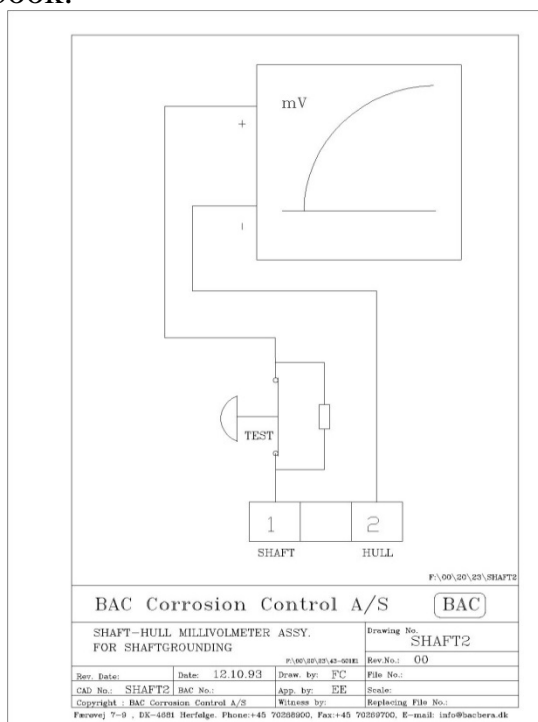
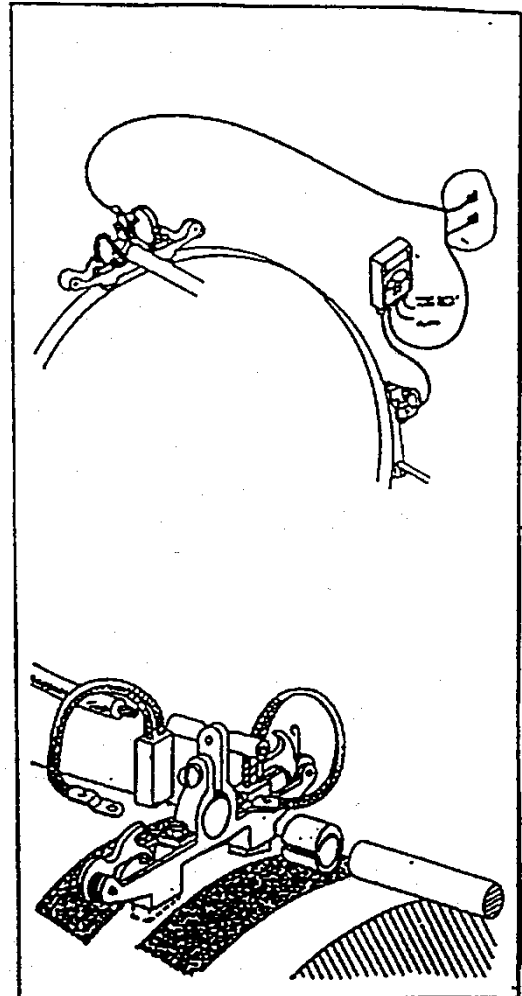
Checking the earthing device must be done when the shaft is rotating at sea and should be carried out once a month.

Release the earthing brushes from their contact with the slip ring; this should give high pulsating voltages of 100-400 mV reading on the meter. This indicates that the measuring circuit is in order. When the brushes are brought back to contact with the slip ring, the reading should fall below the 80mV limit. You can also read the result on the computer.

It is important that the silver/graphite brushes are moving correctly in the brush holders with a spring load of 500-600 gr.

In some cases the copper lead on the brush will corrode, so it is recommendable to coat this lead with grease.

It is recommended that the readings of the mV-meter be recorded once a day in the engine logbook.



## 2 INSTALLATION INSTRUCTION

### 2.1

The slip ring usually located about 450 mm in front of the shaft coupling



### 2.2

Sand the area on the shaft between the two straps, until a bright steel surface appears.



### 2.3

Clean the grinded area, Use metal cleaner, spray or liquid, see datasheet. (BAC does not supply this)







#### 2.4

Starting with the 45° end, warp the silver band around the shaft so that the excess overlaps the 45° angle. Mark the edges, scribe a line between them



#### 2.5

Cut the silverband



2.6

Lightly smooth skive joint with fine file to eliminate any roughness



2.7

Apply presavation oil on the shaft,  
See datasheet. (BAC does not supply this)





2.8

Apply el-tape in 3 strips on the silver band



2.9

Assemble the 3 stainless steel band straps and apply the silver band with one band on the middle tape



2.10

Assemble the 2 other stainless steel band



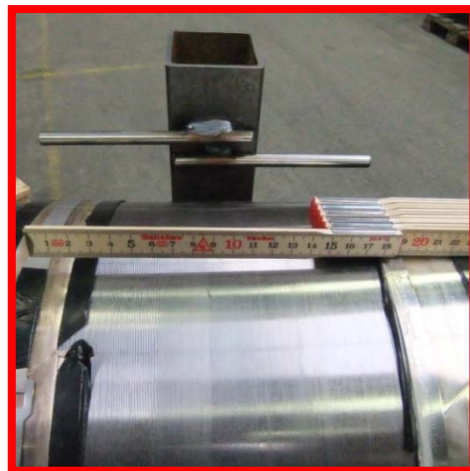
### 2.11

Remove the middle stainless steel band and remove el-tape



### 2.12

Now strap 2 can be mounted, as strap 1, distance between the straps must be 100 – 200 mm



### 2.13

Clean for oil and dirt before applying Silicon and tape.  
(metal cleaner, see datasheet)



2.14

Apply silicone longitudinal on the edge of the silver band in both sides



2.15

Seal the silicone with a wet finger all the way around in both sides



2.16

Wrap sensitive tape on one of the steel bands to make it absolutely tight



### 2.17

Wrap sensitive tape on other steel bands to make it absolutely tight



### 2.18

Cut the sensitive band so you can see the silverband between the two steel bands



### 2.19

The finish mounting of the shaft grounding before finishing the silver band





2.20

Cut app. 2 mm of the edge of the glass brush



2.21

Clean the silver band with glass brush



2.22

Grounding plate must be welded as close as possible, in order for the wires to be as short as possible.





2.23

Ø12mm shaft are welded on the stand



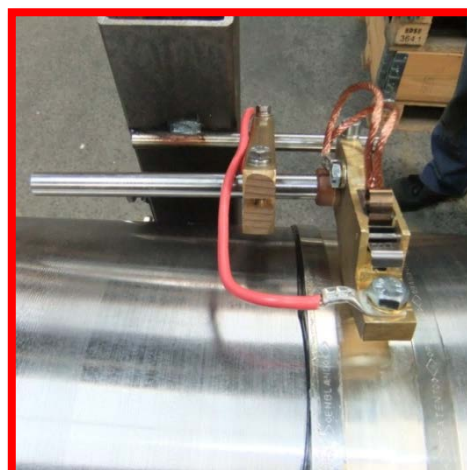
2.24

Mount the shaft holder



2.25

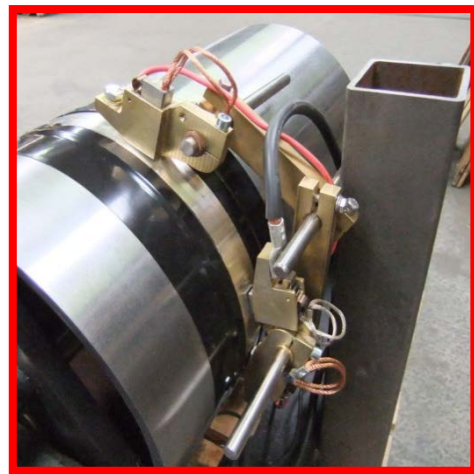
Mount the shaft holder



2.26  
Done



2.27  
Done



### 3 GENERAL DATA

#### 3.1 Components

##### 539171

Control box with  
M.Voltmeter for shaft-  
hull potential difference  
without amplifier for  
alarm



##### 539170

Slip ring. Silver alloy  
band, 63,5 mm wide and  
approx. 100 mm longer  
than the circumference of  
the shaft.



**539184 & 539185**  
EL-tape + pressure  
sensitive tape



**539182 & 539182**  
Holding straps. The  
permanent holding straps  
are made of Stainless  
Steel.



**539264**  
St. Steel shaft Ø12,0 x  
180 mm



**539265**  
Brass shaft holder



**539263 & 539262**  
ISO and Brass bushing  
for shaft





### 3.2 List of components

POS.	BAC PART No.	CLIENT PART No.	Q'ty	DESCRIPTION	CHECK
1	539171		1 pcs.	Voltmeter for shaft-hull potential difference without amplifier for alarm.	
3	539170		1 pcs.	Silver alloy band for shaft (90% silver and 10% copper)	
4	539184		1 roll	El tape 33+	
5	539185		1 roll	Pressure sensitive tape	
6	539180		3 pcs.	Permanent holding straps in St. steel, 12,5mm x 0,7mm x (shaft) O.D.	
7	539182		3 pcs.	Bandtightener in St. steel,	
8	539264		4 pcs.	St. steel shaft $\varnothing$ 12.0 x 180mm	
9	539265		2 pcs.	Brass shaft holder	
10	539262		1 pcs.	Brass bushing for shaft	
11	539263		1 pcs.	ISO bushing for shaft	
12	539465		3 pcs.	Brush box	
13	539105		3 pcs.	Silver graphite brush (85% Ag)	
14	539230		1 pcs.	Grounding plate.	
15	523502		2 pcs.	Cable 35 <sup>□</sup> L=3m.	
16	526354		2 pcs.	35mm <sup>□</sup> cable socket with 10mm hole.	
17	526352		2 pcs.	35mm <sup>□</sup> cable socket with 8mm hole.	
18	520600		2 pcs.	Cable 6 <sup>□</sup> L=3m.	
19	526060		2 pcs.	6mm <sup>□</sup> cable socket with 8mm hole.	
20	539105		3 pcs.	Spare silver graphite brush (85% Ag) Recommend spare parts (option)	
21	539305		25 pcs.	Logside	
22	539125		1 pcs.	Glass brush	
24	539301		3 pcs.	Manual without amplifier	
25	94116		1 pcs.	Silicone Sealant	
26	94118		1 pcs.	Preservations Oil (buy locally, BAC does not supply)	
27	94119		1 pcs.	Metal Cleaner (buy locally, BAC does not supply)	

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BAC

PART-LIST FOR  
SHAFT-GROUNDING

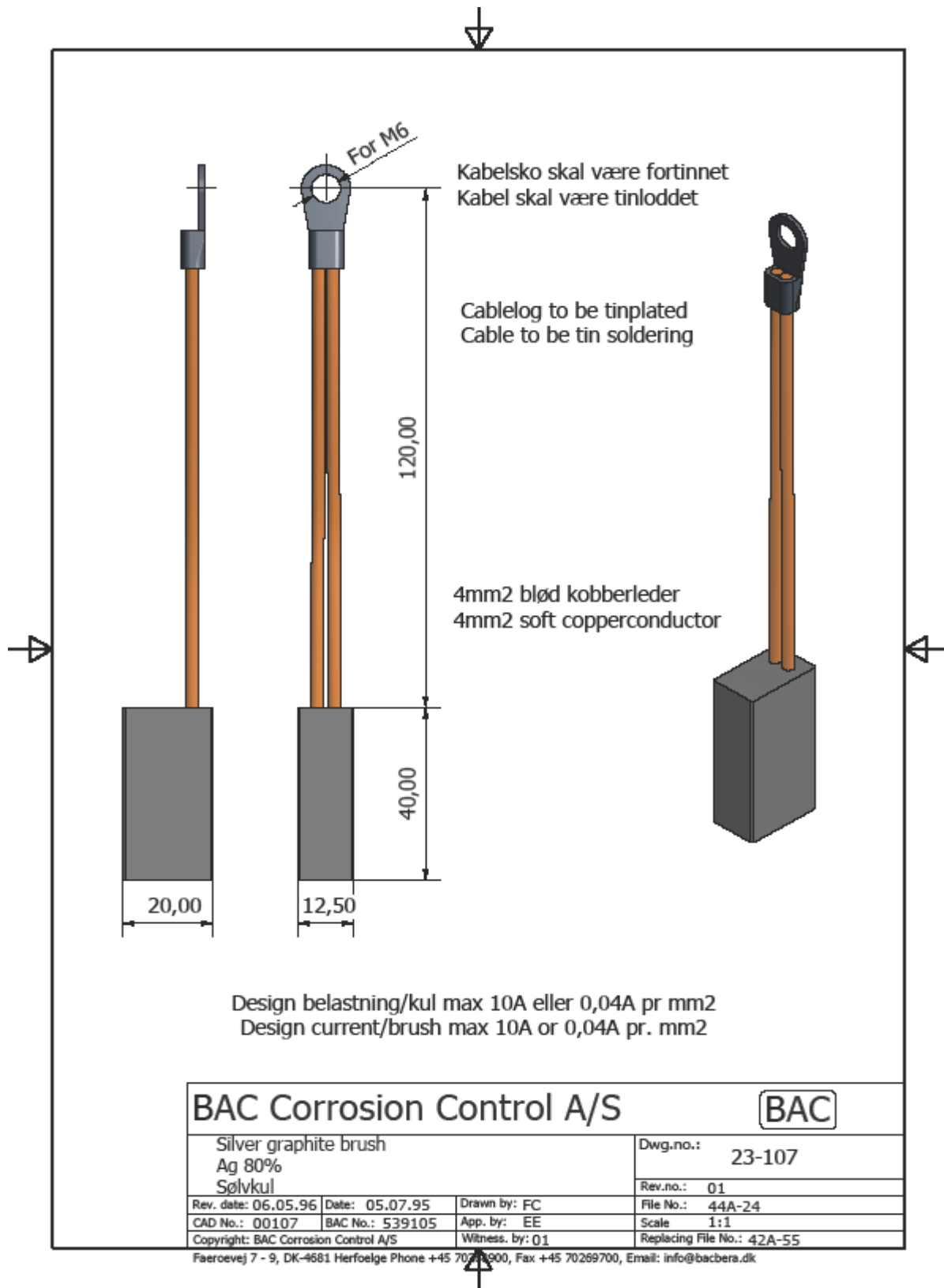
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23-103-539500

Rev. No.: 04

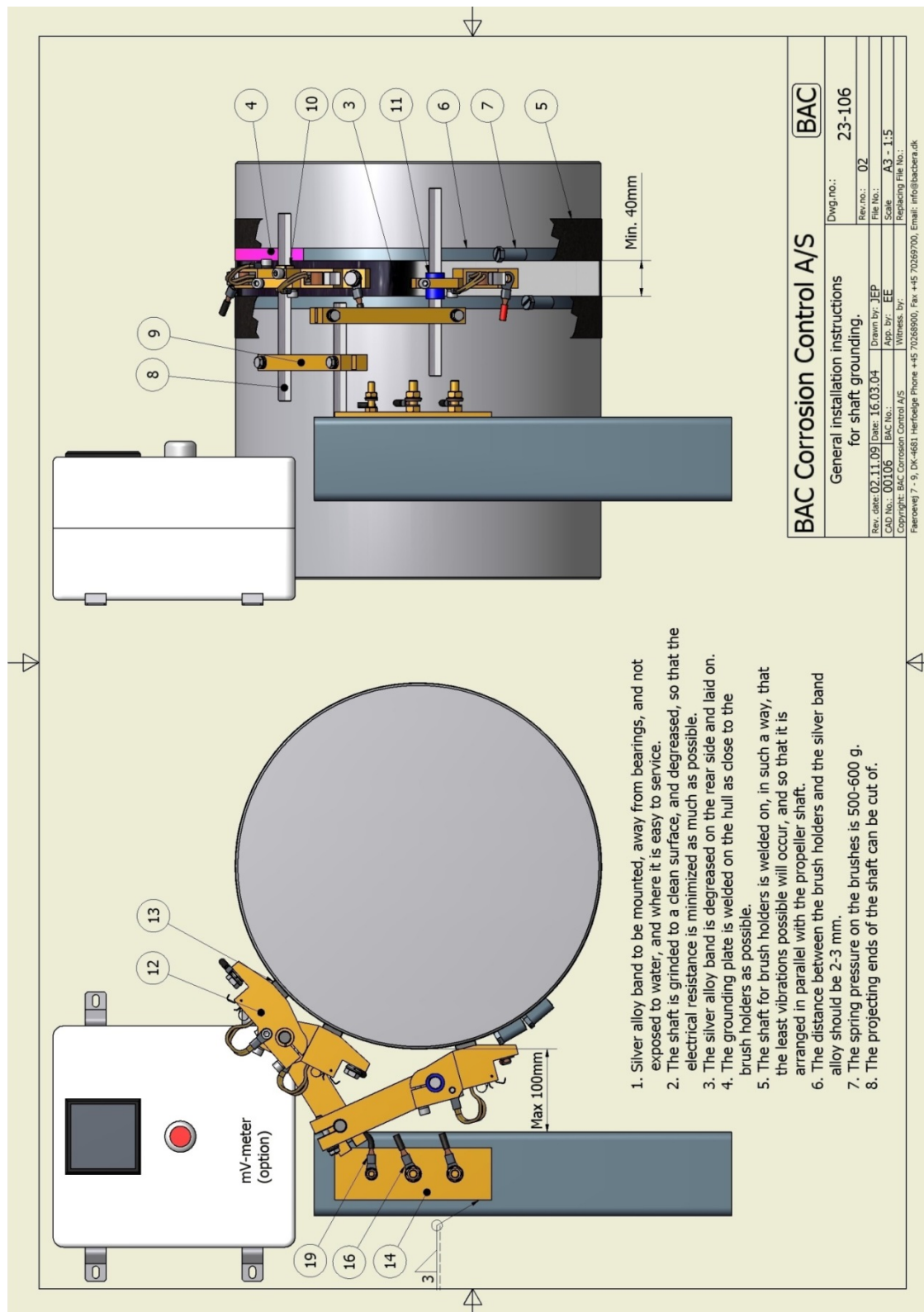
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Copyright: BAC Corrosion Control A/S	Witness. by:	Replacing File No.:	

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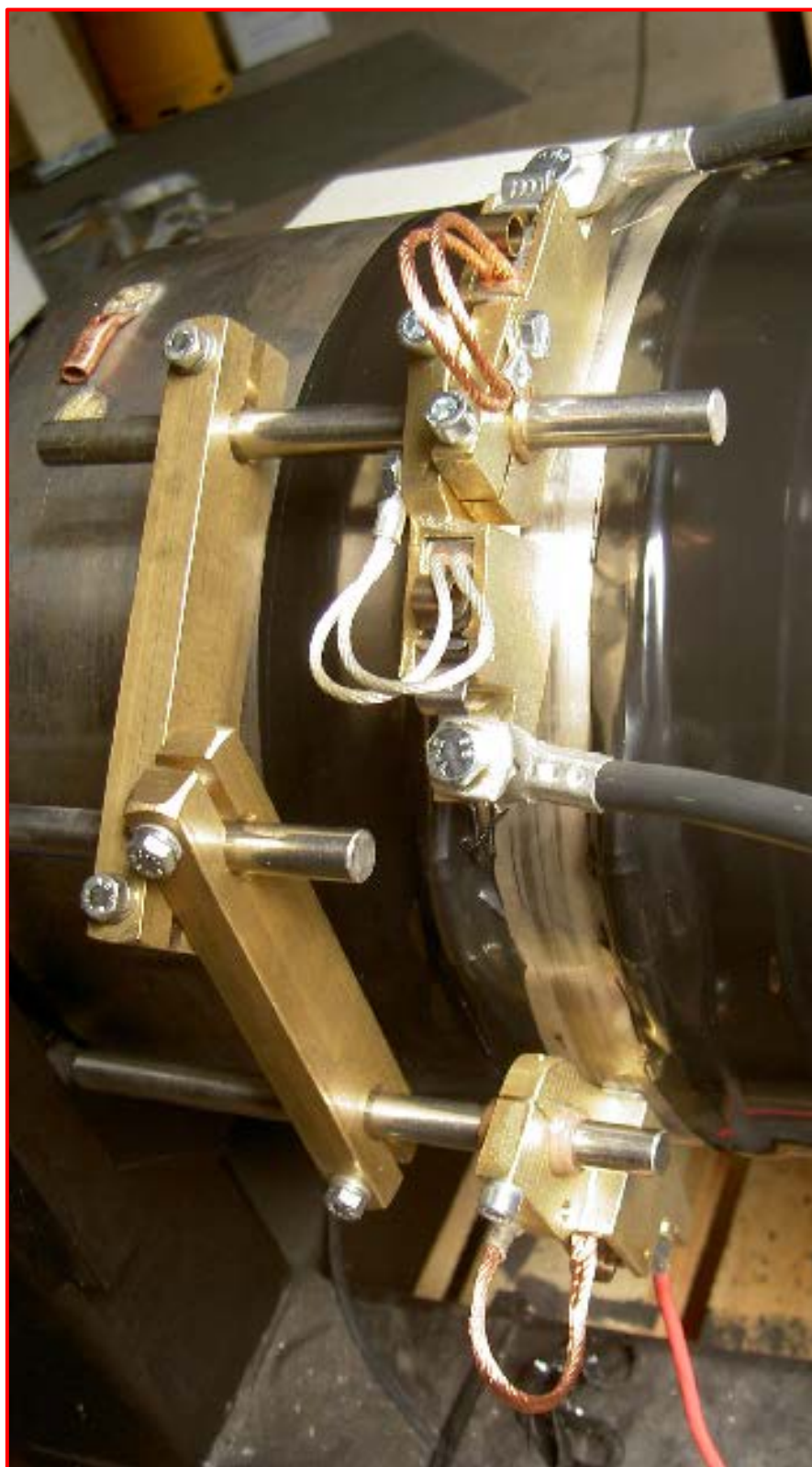
### 3.3 Silver brush drawing



### 3.4 Installation instruction



### 3.5 Installation instruction picture





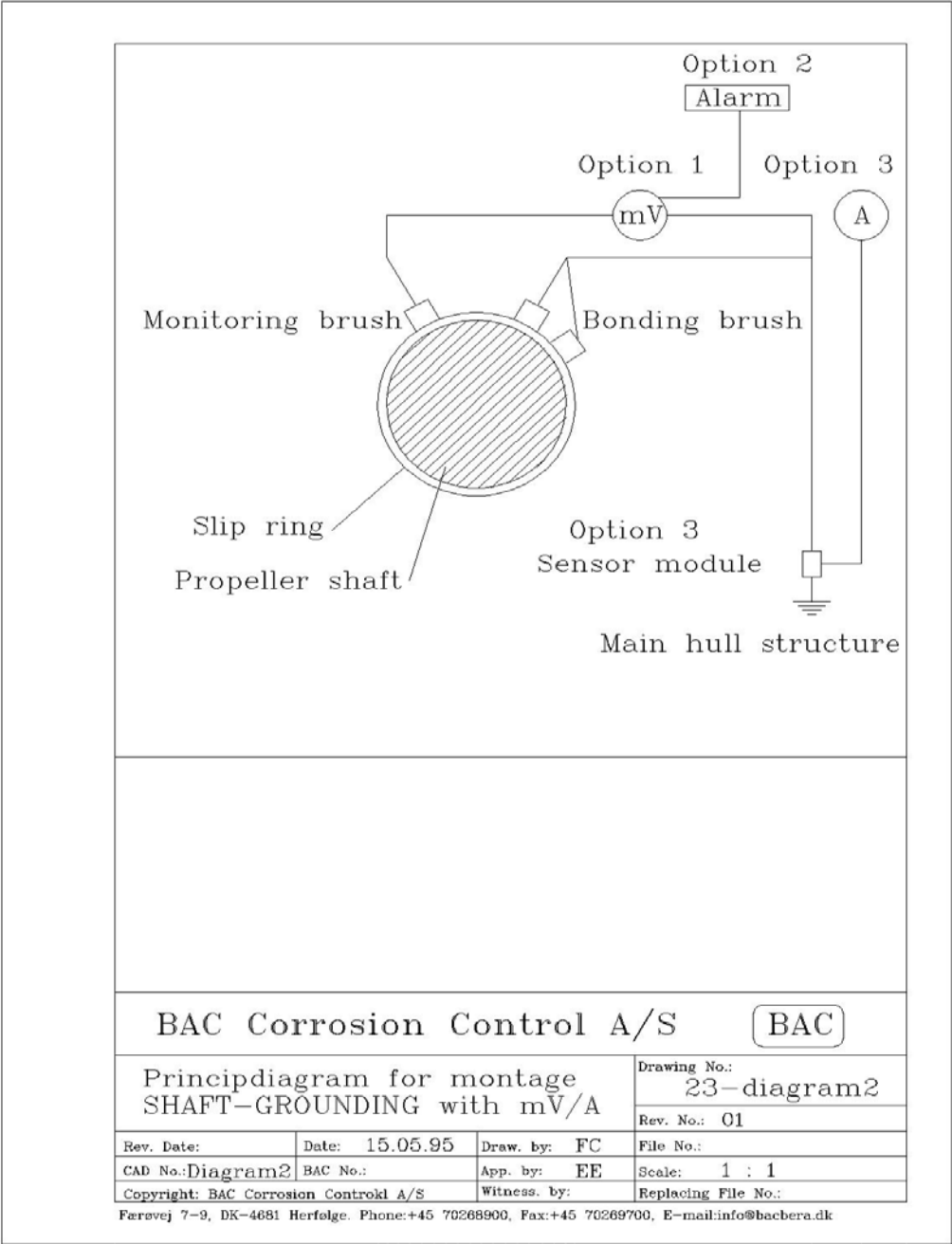
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**Principle Diagram for mounting of Shaft Grounding.**

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Rev.no.:	03
File No.:	23-101
Scale:	1:1
Rev. date:	02.11.09
Drawn by:	JEP
App. by:	EE
CAD No.:	00101
BAC No.:	
Copyright:	BAC Corrosion Control A/S
Partenøer:	7-9, DK-4681 Herfølge Phone +45 70269700, Fax +45 70269700, E-mail: info@bacera.dk



3.7 Principdiagram for montage



## FR-9/PRS-ARGE-4.2.3/REV0



Side 25

BAC Corrosion Control A/S

January 29<sup>th</sup>, 2016

## **MANUFACTURER'S DECLARATION**

*This declaration is to certify that the enclosure products described below, distributed by Fibox Oy Ab, Finland, conform to the following product characteristics and standards.*

### **CAB MS series**

#### **Materials Used :**

Body of enclosure : Painted Mild Steel  
Door of enclosure : Painted Mild Steel  
Mounting plate of enclosure : Galvanised Steel  
Gasket : Polyurethane foam gasket

#### **Temperature range**

In continuous use      -40°C - +80°C  
Short term use            -40°C - +120°C

**Ingress Protection : IP 65**

**Impact Strength : IK 10**

*The products conform to the following standards:*

*EN/IEC 62208, Empty enclosures for low-voltage switchgear and controlgear assemblies*



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## **5 MAINTENANCE OF SHAFT-GROUNDING SYSTEMS**

- 1.** Always keep the system clear of dust, grease and water.
- 2.** When cleaning the silver bands of grease and dust, a Metal cleaner should be used.
- 3.** When polishing the silver bands, use the glass brush, which is delivered with the system.

Never use abrasive cloth, file or other abrasives.

- 4.** Once a month (or when needed) clean the brushes and brush boxes of dust, because the dust can cause the brushes to stick in the brush box and thereby cause a bad connection between the silver band and the brush.
- 5.** The spring pressure of the brushes should be 500-600 gr.
- 6.** Make sure that there is always a good electrical contact at all screw- and bolt connections.
- 7.** Make sure that the earthing plate is in welded connection with the hull all the times.

## **6 BAC SHAFT GROUNDING DEVICES**

BAC NO: 539525

### **STANDARD SHAFT GROUNDING ASSEMBLY**

This system forms connection between shaft and hull without any kind of monitoring, which means that there is no possibility of knowing if the connection and safety of the system is functioning correctly.

BAC NO: 539500

### **SHAFT GROUNDING ASSEMBLY WITH mV- METER FOR MONITORING**

This system is identically with BAC Shaft Grounding for computer control, though this system consists of a steel box with instrument for monitoring.

**BAC recommends this system as the most sold and versatile solution on the market.**

BAC NO: 539600

### **SHAFT GROUNDING ASSEMBLY WITH mV- METER AND AMPLIFIER FOR ALARM OUTPUTS**

This system is identically with BAC Shaft Grounding assembly with mV-meter for monitoring, though this system is extended with an isolation amplifier. This makes it possible to connect the system directly to the alarm computer in the ship with a signal on 4-20 mA or it can be used with a signal on 0-20 mA.

BAC NO: 539800

### **SHAFT GROUNDING ASSEMBLY FOR MAN ENGINE**

With reference to specification from MAN, info no. 300155, Ident no. 0792182-1. Shaftline earthing device.



Please note following:

When you order a BAC Shaft Grounding system the price of the silver band is depending on the size of the shaft, and therefore the cost of the silver band will be quoted separately. Please contact BAC; we can help you with commercial terms and calculations.

It is very important that the Shaft Grounding system is equipped with a kind of measuring instrument, which can show the function of the system.

BAC is able to update the different BAC Shaft Grounding systems. For instance with a mV-meter for monitoring or amplifier for alarm output giving you a better and precisely measure of the system.

BAC can further more offer you an alarm system to ensure that the connection between the shaft and hull is according to BAC standard specifications.

## **7 DOCUMENTATION ON CD**

## **8 Data sheet**