

HANDBOOK & OPERATING
INSTRUCTIONS FOR
SHAFT EARTHING EQUIPMENT
&
PROPELLER SHAFT
MONITORING EQUIPMENT



**PROPELLER SHAFT GROUNDING AND MONITORING
ASSEMBLY**

INSTRUCTION MANUAL

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1.0 SLIPRING ASSEMBLY

A turning propeller shaft on a ship becomes electrically insulated from the hull by the lubricating oil film in the bearings and by the use of non-metallic bearing materials in the tail shaft. When the shaft is insulated in this way an electrical potential can be measured between the shaft and the hull and this can accelerate corrosion in the ship. If the ship has a system of cathodic protection, whether it is sacrificial anodes or an impressed current system, the shaft insulation will prevent the propeller and the boss from receiving protection.

The electrical potential between the shaft and the hull can also cause a heavy current to flow in bearings when the oil film breaks down or is contaminated with seawater. This current can cause deep pitting of the bearing surface. Excessive wear on the shaft bearings can often be traced to this cause.

Trouble can be avoided and cathodic protection extended to the propeller if the shaft is properly earthed with a propeller slipring. The effectiveness of the shaft earthing system should encourage a maximum contact resistance of no greater than 0.001 ohms for a water filled bearing and 0.01 ohms for an oil filled bearing.

Our own tests indicate that high silver content brushes running on a silver track have repeatable low conductivity that can maintain these limits and ensure a low resistance contact is maintained even under dirty conditions.

The shaft earthing assembly comprises a pair of high silver content/graphite compound brushes mounted in a balanced brush holder, running on a copper slipring with a solid silver inlay track.

Each brush holder has an adjustable spring tensioner with 5 settings, which is supplied preset to the minimum, and result in a pressure of 450 grams on each brush.

At this pressure the expected life of the brushes is in excess of one year.

2.0 SHAFT EARTHING INSTALLATION

The shaft slipring is supplied as a complete unit with copper/silver band and clamping arrangement, which can be easily installed by competent ship's engineering personnel, in the following order:

- (a) Select a suitable position on the shaft to install the slipring which should be close to a pedestal or convenient piece of ships structure where the brush holder can be installed.

Then thoroughly clean the shaft in the area where the slipring is to be fitted ensuring that all grease, dirt and impurities on the shaft are removed.

- (b) The sliprings are manufactured slightly oversized to allow for a small variation in shaft diameter so when installing, the excess material should be removed by filing or cutting joint faces before securing the clamping arrangements.
- (c) After removing the excess material the two band clamps are tightened so that the copper/silver strip is a close tight fit around the shaft.
- (d) Remove any excess banding strip from the assembly and ensure that this strip is cut back to the housing.
- (e) Fill the join between the two sliprings and soft solder to ensure a smooth surface.
- (f) Install a 20mm diameter rod (brush holder spigot) on a convenient piece of ships structure or pedestal bearing so that it is centre parallel to the shaft centre in both planes. (The mounting bracket and rod are ship or shipyard supply items.)
- (g) It is essential that the complete brush holder assembly should provide a good electrical contact between the shaft and the hull, therefore the brush holder spigot support, should either be welded to the ships structure or if bolted, a short length of 70mm² bonding cable should be connected between the brush holder and ships structure.
- (h) The brush holder should be clamped in this rod and aligned centrally over the silver track.

- (i) Install the silver graphite brushes and the brush holder and check that the clearance between the silver track and the brush holder is approximately 3mm.
- (j) After checking this dimension tighten the brush holder into position.
- (k) Connect the silver graphite brushes to their connections and check all bolts and nuts for tightness and that the brush pressure is set at 50g/kw.

NOTE

TO PREVENT BUSH 'BOUNCE' AND ENSURE MAXIMUM UTILISATION OF THE SILVER GRAPHITE BRUSHES, IT IS ESSENTIAL THAT THE JOINTS FORM A SMOOTH, FLUSH PROFILE OVER THE FULL EXTENT OF THE SLIPRINGS.

DRAWING No. AM1041 - DETAIL OF BAND CLAMP ASSEMBLY REFERS.

3.0 SLIPRING INSTALLATION CHECKS

- | | | |
|----|---|--------|
| 1. | Confirm slipring and brush gear are installed as per drawing No 1041. | |
| 2. | Is assembly clean and free from oil and grease? | YES/NO |
| 3. | Is slipring a tight fit to the shaft over its whole length?
Ensure no bumps or indentations can be felt over the whole of the working surface. | YES/NO |
| 4. | Are joints a good fit with no gap? | YES/NO |
| 5. | Is brush holder secure on its shaft? | YES/NO |
| 6. | Confirm that brush holder and its mounting are solid and that it will not be affected by vibration? | YES/NO |
| 7. | Confirm that brush faces are tangential to slipring. | YES/NO |
| 8. | Confirm that brushes are free to move in their holders. | YES/NO |
| 9. | Is there electrical continuity between tail shaft and hull? | YES/NO |

4.0 SLIPRING MAINTENANCE

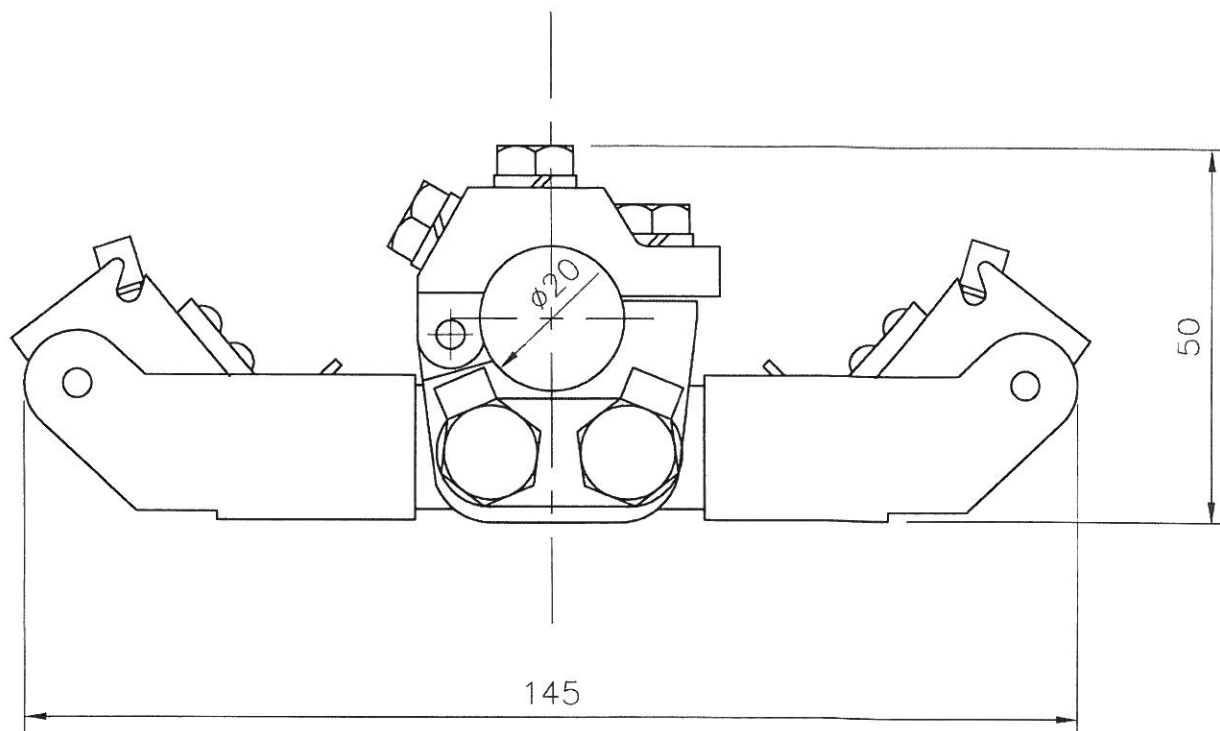
This grounding assembly should be checked every seven days for cleanliness. If there has been a build-up of oil on the slipring face this should be removed with a degreaser. Inspect and clean the brushes and brush holder to prevent blocking from dirt. Inspect the brush copper leads (pig tails) to ensure they have not become loose or corroded. The brush wear-down should be noted and the compression of the hold-down springs on the brushes should be adjusted to ensure good electrical contact.

6.0

DRAWINGS.

NOTE

UNIT AS DRAWN TO BE USED AS EARTHING ASSY. SEE DRG. No. AM 1041
ONE ARM TO BE REMOVED FOR USE AS MONITORING ASSY. SEE DRG. Nos.
AM 1043 & AM1038/2



FOR USE WITH SILVER GRAPHITE BRUSH DRG. No. AM 1042



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Companies Europe Ltd

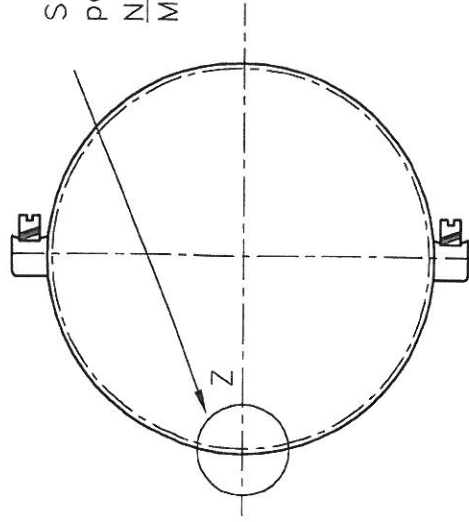
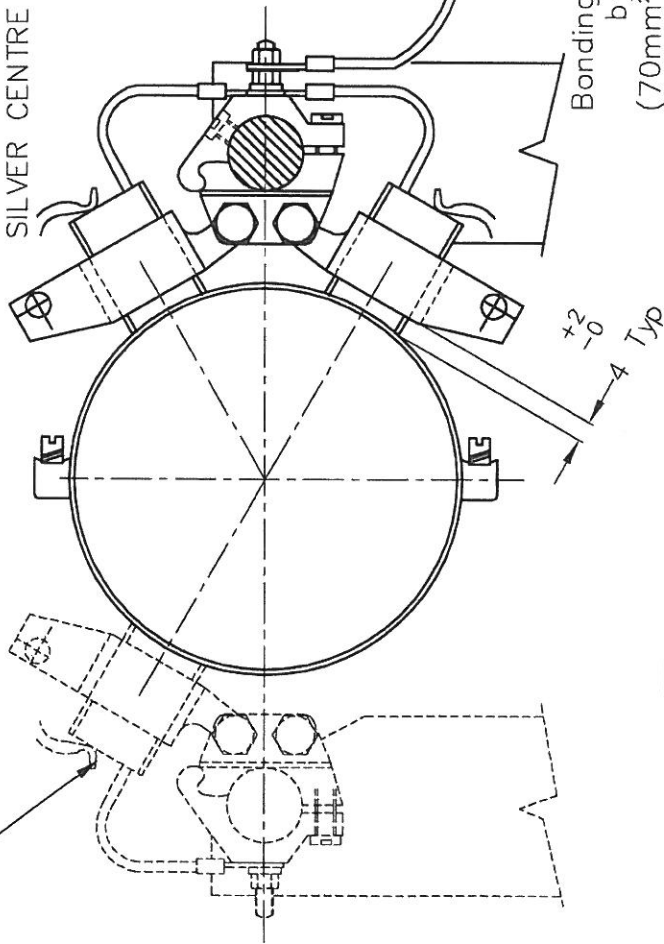
Certain items shown on this
drawing are subject to worldwide
patent applications

BRUSH HOLDER
(SILVER GRAPHITE BRUSH)

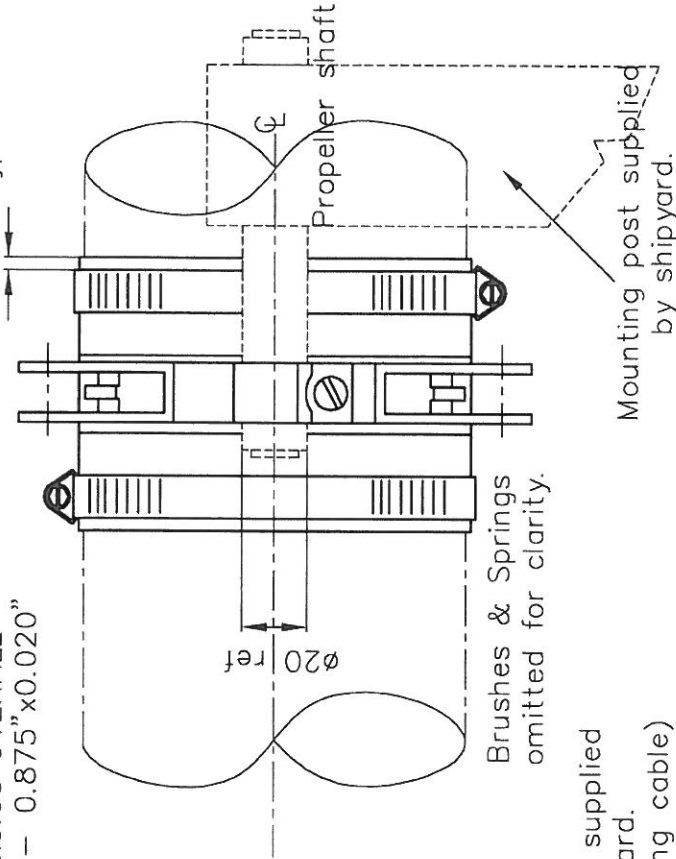
Drawn	Date	Checked	Date	Chill No.	Scale
RO	14/02/01	BM	14/02/01	N/A	NTS
DRG.No. AM 1038					ISSUE 01

See drg. AM 1043
for Monitor Brush Assy.

MATERIAL - COPPER/SILVER INLAY
DIMENSIONS - 2.75" x 0.08" OVERALL
SILVER CENTRE STRIP - 0.875" x 0.020"



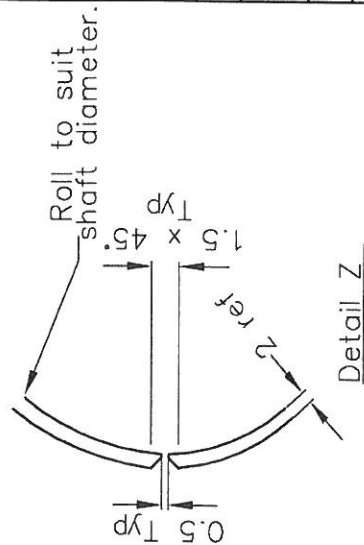
Details of Band Clamp
Assembly.
(stainless steel)



Soft solder infill - file and
polish at final assembly. (See detail Z)

NOTE

Mating faces MUST BE FLUSH



O	REDRAWN ONTO CAD	C.G.	21/3/96
No.	DESCRIPTION	DOR No.	DATE



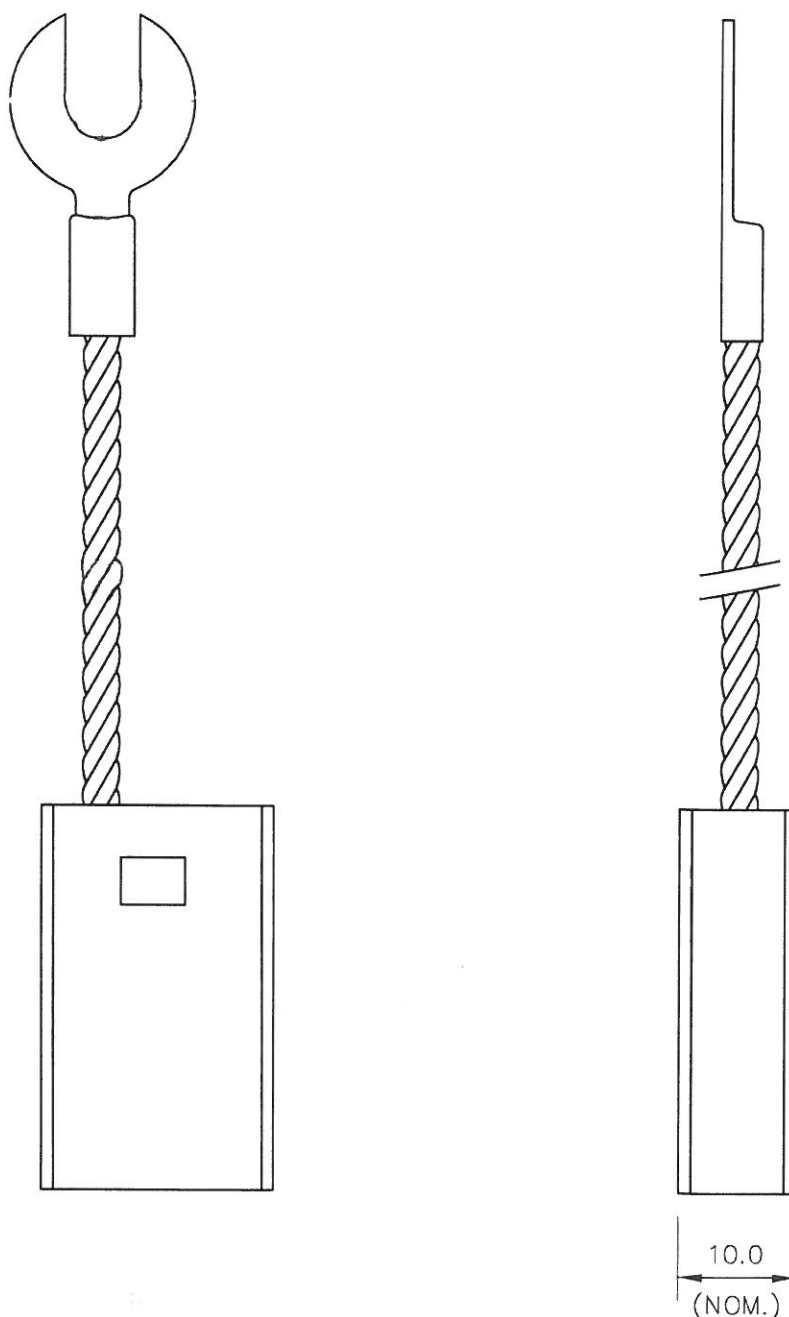
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P & O			
PROPELLER SHAFT EARTHING ASSEMBLY FOR COPPER / SILVER INLAY SLIPRING			
Drawn	C.G.	Date	18/4/96
Scale	N.T.S.	Checked	PR
		DWG. No.	AM 1041
		Issue No.	00



MATERIAL : GRADE SM9173
CONSISTING OF 80% SILVER
AND 20% GRAPHITE



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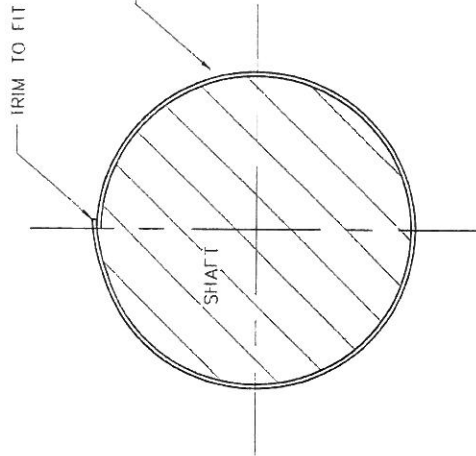
SILVER GRAPHITE EARTHING AND MONITORING BRUSH

Drawn	Date	Checked	Date	Chill No.	Scale
DPS	3/10/95	BM	3/10/95	N/A	NTS

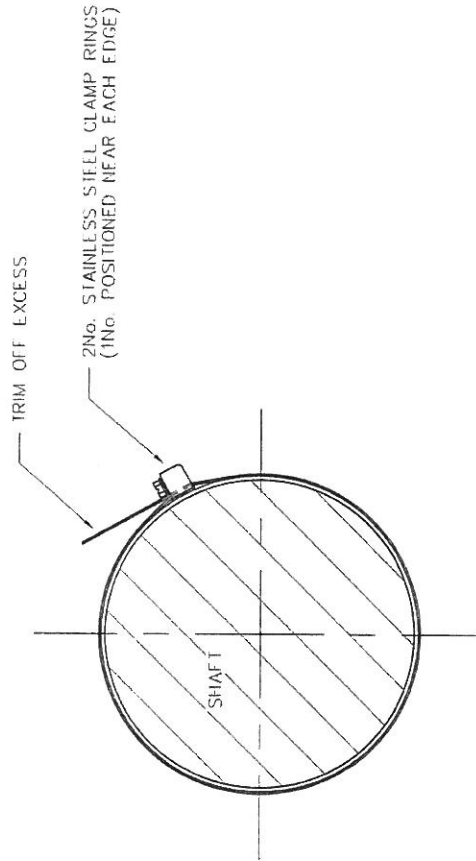
DRG.No.

AM 1042/1

ISSUE
01



FIT COPPER/SILVER BAND TO SHAFT



SECURE BAND WITH CLAMP RINGS

01	ISSUED FOR APPROVAL	N/A	*	*	*
1/2	DESCRIPTION	DCR No.	BY	CHECK	DATE
<p>Information shown on this drawing is confidential and must not be copied or conveyed to third parties without the express permission of Compro Companies Europe Ltd.</p> <p>Compro Companies Europe Limited <i>"Preserve and Sustain Global Assets and Infrastructure"</i> Adent Street, Boreham, Essex, UK Station on Tees, Cleveland TS11 3WQ Tel: (01662) 614106 Fax: 014400 1400 Telex: 507389</p>					
AQUAMATIC SYSTEM					
PROPSHAFT GROUNDING RING ASSEMBLY					
Drawn	RO	Date	9/8/06	Checked	BM
Scale	NTS	WEG. 1:2	AM1468	Issue No	01

7.0

SPARES.

Vi) PARTS LIST FOR PROPELLER SHAFT SLIPRING ASSEMBLY

Drawing AM 1041 Propeller Shaft Slipring Assembly.

Item No.	Description	Qty	Part No
1	Slipring	1	371
2	Brush Holder	1	AM 1038
3	Brushes (Silver Graphite)	2	AM 1042

specify diameter of shaft to which ring is to be fitted.

NOTE: Item marked * are contained in AQUAMATIC KIT B1/SG (Part 341/SG) one brush holder and two brushes. AQUAMATIC KIT B2/SG (Part 342/SG) contains a total of 4 brushes and are not supplied as separate items.

PROPELLER SHAFT MONITORING ASSEMBLY

Drawing AM 709 & AM 1278 & AM 1045

Item No.	Description	Qty	Part No
4	Single Brush Holder	1	AM 1043
5	Brush (Silver Graphite)	1	AM 1042
6	Millivolt Meter (250-0-250 MV)	1	AM 1364