INSTALLATION AND MAINTENANCE

INSTRUCTIONS FOR THE

110NM SINGLE STATION WINDSCREEN WIPER SYSTEM
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GENERAL INFORMATION AND SAFETY

SUMMARY

As we will have no influence on the installation of complete windscreen wiper systems if installation is to be carried out by the customer, we are unable to accept liability for installation errors.

If you require any additional information or any special problems arise which the installation/maintenance instructions do not treat in sufficient detail please contact B. Hepworth and Co Ltd directly.

Safety Precautions

CAUTION! BEWARE OF INJURY!

BEFORE WORKING ON THE WIPER SYSTEM, OBSERVE THE FOLLOWING REMARKS WITHOUT FAIL!

Most wiper motors have a park setting, which permits them to default to the parked position if connected to the vehicle electrical system, even when the wiper is switched off. FOR THIS REASON, AT THIS POINT IN TIME, NEITHER MAY THE WIPER ARM BE MOUNTED, NOR MAY ANY PERSON HAVE HANDS, FINGERS, ETC ANYWHERE NEAR THE WIPER SYSTEM. Even small wiper motors can neither be braked nor stopped by hand.

NEVER REACH INTO THE AREA OF THE ROD LINKAGE WHEN THE SYSTEM IS RUNNING!

When putting into service (i.e. when connecting the wiper motor to the vehicle electrical system, even if the wiper switch is in the 0 position), never leave any loose items such as screwdrivers in the area of the wiper system, as flying objects could lead to injury.

Please ensure the equipment is handled with care. Do not drop or bang the equipment down on a hard surface taking extra care around the area where the motor shaft is situated. Do not hammer the motor shaft when installing the equipment, as this will cause the motor gear plate to deform causing premature failure of the unit.

Introduction

The Windscreen Wiper system utilised is detailed on the following pages. The primary components that form the Windscreen Wiper System are the wiper motor linkage, the wiper arm assemblies and wiper blades.
CHAPTER 1

Functional and Equipment Description of System

Wiper Motor Assembly

The wiper motor and bracket is shown in Figures 1 & 2. The electric wiper motor forms the central part of the windshield wiper system. The motor is mounted on a fabricated mild steel bracket which is polyester powder coated to prevent corrosion. The motor is connected electrically by means of a multi-pin connector. Ref Figure 3.

The drive lever is secured to the wiper motor shaft and connected through a tie bar, to the spindle lever assembly. These components transfer the motor shaft rotation to the wiper arm assemblies.

The drive mechanism provides transfers the rotary output from the motor; to a reciprocating motion of the spindles, this mechanism is zinc plated and is sized to give the correct angle of arc for the windscreen wiper arm being driven.

The spindles that drive the wiper arms pass through the bulkhead, connecting the drive mechanism to the wiper arm; these are manufactured from stainless steel, to prevent corrosion. The spindles are driven from the main drive crank by connecting tie bars which distributes the load evenly between the arms of the wiper arm thus reduces the load on the individual interfaces between the wiper arm and the spindles.

Wiper Motor Assembly – RH BRACKET

Figure 1
Wiper Motor Assembly – LH BRACKET

Figure 2

External Fixings for Liner/Spindle Assemblies

Figure 3

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Idler Plate - Gasket</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Idler Plate</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>26mm Washer - Neoprene</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>26mm Washer – Flat</td>
<td>2</td>
</tr>
<tr>
<td>11</td>
<td>26mm Washer – Single Coil</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>M26 Hex. Nut</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>26mm Weather Cap</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>10mm Washer - Flat</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>M10 Nylock Nut</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>10mm Nut Weather Cap</td>
<td>2</td>
</tr>
</tbody>
</table>
Wiper Arm Assembly – P84

The wiper arm is manufactured from stainless steel and is polyester powder coated to prevent corrosion and to be of good appearance.

The wiper arm is shown in Figure 4. One wiper arm assembly is used on each unit. The wiper arm assembly mounts directly onto the spindles protruding through the bulkhead. The wiper arm is secured to the spindle via a series of nuts and washers.

The blade is secured to the arm assembly using the blade clip arrangement on the arm and blade bolt.

**Figure 4**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P84 Wiper Arm</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Articulated Curved Blade</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Blade Retaining Screw</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Nylock Nut</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Arm Head Weather Cap</td>
<td>1 or 2</td>
</tr>
<tr>
<td>6</td>
<td>Wash Jet Assy</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Ecoprene Wash Tube</td>
<td>Metres</td>
</tr>
</tbody>
</table>

The Following Items Are On The Linkage

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>10mm Washer - Flat</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>M10 Nylock Nut</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>10mm Nut Weather Cap</td>
<td>1 or 0</td>
</tr>
</tbody>
</table>

**IMPORTANT**
On arms with 2 x heavy duty heads the arc of wipe on the linkage MUST NOT exceed 70°

P84 ARMS 24” (NOM. 710mm)  
TO 46” (NOM 1170mm)  
1 x HEAVY DUTY HEAD

P84 ARMS 47”  
(NOM. 1195mm) & OVER  
2 x HEAVY DUTY HEADS
CHAPTER 2

Installation Instructions

These instructions are meant as a guide. If you experience any difficulty in the fitting of these units, please do not hesitate to contact us for advice.

Drilling Diagram

NOTE - Drilling diagram is NOT to size and is for reference only

Drill holes 'A' and 'B' at Ø30mm (Note Hole 'B' not required on Pendulum units)
Drill hole 'C' at Ø8.5mm (6 options shown)
**Fitting the Wiper Motor Assembly**

When the spindle positions have been drilled in the bulkhead, the following procedures apply.

**Reference Figures 1, 2 & 3, Pages 4 & 5**

1. Remove 10mm weather Caps (16). M10 nuts (15), washers - flat (14), 26mm weather caps (13). M26 nuts (12), 26mm washers - single coil (11), 26mm washers - flat (10), 26mm neoprene washers (9), idler plate (8) and finally idler plate gasket (7).

**NOTE**

*Keep safe as will be required on assembly.*

**The Motor Unit is MOUNTED from INSIDE the Bulkhead.**

2. Slide liners through holes in bulkhead, align mounting bracket (1), with predrilled mounting holes and fix in place. *(Fixing bolts not supplied).*

3. **Outside Bulkhead** - ENSURE a proprietary sealant *(Not supplied)* is used around all points of entry through bulkhead.

4. **Fit following items** - one idler gasket (7), one idler plate (8), - *over both liners, next to bulkhead.*

   *Then on each Liner* - washer - neoprene (9), washer - flat (10), washer - single coil (11), M26 nylock nut (12)

   *(Torque Tighten ref Table 1, Page 13)*

5. Fit 26mm weather caps (13).

---

**Vari Arc Units - Arc adjustment**

**Figure 6**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Liner V.Arc Lever Sub Assy</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>12mm Right Hand Bearing Nut</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>12mm Right Hand Bearing</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>8mm Washer – Flat</td>
<td>1</td>
</tr>
<tr>
<td>26</td>
<td>M8 Securing Nylock Nut</td>
<td>1</td>
</tr>
<tr>
<td>27</td>
<td>V.Arc Bearing Pivot Pin</td>
<td>1</td>
</tr>
</tbody>
</table>

1. Run motor to insure it is parked correctly; then disconnect all Electrical Power.

2. Slacken bearing nuts both ends of tie bar and securing nylock nut (26) on vari-arc lever.

3. Slide bearing/tie bar assy pivot pin (27) towards liner/spindle assy to INCREASE arc to 90° max or away from liner/spindle assy to DECREASE arc to 40° min.

4. Ensure you note markings on lever when correct arc is reached.

   *Important: Pantograph Systems must not exceed 90° arc of wipe and 2 x heavy duty heads must not exceed 70°*

5. Adjust arc until blade parks approximately 75mm from edge of screen when screen is dry. Test on a wet screen to prove clearance is acceptable.
6. Tighten bearing nuts both ends of tie bar and securing nylock nut (26) on vari-arc lever. (Torque Tighten ref Table 1, Page 13).

IMPORTANT: Ensure BEARING CENTRES are as stated on drawings (Figures 1 & 2)

Electrical Connections

The 110Nm marine motor is 24v DC, two speed, self-parking, and insulated earth return as standard. The motor should be connected through a two speed self-park multi speed control switch, a toggle switch or a rotary switch (not supplied – Can be ordered separately).

For Ships Supply’s of nominal 110/120v AC 1 Phase – one of the following will be required

| PSU/115/24/6  | POWER SUPPLY UNIT-115v 24v 6.amp | will power 1 Motor Unit |
| PSU/115/24/12 | POWER SUPPLY UNIT-115v 24v 12.amp | will power 2 Motor Units |

For Ships Supply’s of nominal 220/2420v AC 1 Phase – one of the following will be required

| PSU/230/24/6  | POWER SUPPLY UNIT-230v 24v 6.amp | will power 1 Motor Unit |
| PSU/230/24/12 | POWER SUPPLY UNIT-230v 24v 12.amp | will power 2 Motor Units |

Note if more than 2 motors required – information of part number and supply details will be given on request

Wiring the Power Supply Unit (PSU)

**AC Primary Side**

Connect the live, earth and neutral wires on the AC primary side of the power supply unit to the ships supply -110/120v AC 1 Phase to a PSU/115 Unit, or 220/240v AC 1 Phase to a PSU/230 Unit

**DC Secondary Side**

Connect the 24v DC (+ ve) to the toggle, rotary or multi speed control switch as the positive ship’s supply

Connect the 0v DC (- ve) to the toggle, rotary or multi speed control switch as the negative ship’s supply
### Wiring to a Multi Speed Control Switch

<table>
<thead>
<tr>
<th>Wire Color</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>RED</td>
<td>To terminal 53a on the motor - <em>(SELF PARK FEED)</em> and the positive ship’s supply – 24v DC (+ ve)</td>
</tr>
<tr>
<td>WHITE</td>
<td>To terminal 53b on the motor - <em>(HIGH SPEED)</em></td>
</tr>
<tr>
<td>YELLOW</td>
<td>To terminal 53 on the motor - <em>(LOW SPEED)</em></td>
</tr>
<tr>
<td>BLUE</td>
<td>To terminal 31b on the motor - <em>(SELF PARK REVERSAL FEED)</em></td>
</tr>
<tr>
<td>BLACK</td>
<td>To terminal 31 on the motor and the negative ship’s supply – 0v DC (- ve)</td>
</tr>
<tr>
<td>BROWN</td>
<td>To the Washer Pump (+ ve)</td>
</tr>
</tbody>
</table>

### Wiring to a Toggle Switch

<table>
<thead>
<tr>
<th>Position</th>
<th>Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>To terminal 31b on the motor - <em>(SELF PARK REVERSAL FEED)</em></td>
</tr>
<tr>
<td>4</td>
<td>To terminal 53 on the motor - <em>(LOW SPEED)</em></td>
</tr>
<tr>
<td>6</td>
<td>To terminal 53a on the motor - <em>(SELF PARK FEED)</em> and the positive ship’s supply – 24v DC (+ ve)</td>
</tr>
<tr>
<td>2</td>
<td>To terminal 53b on the motor - <em>(HIGH SPEED)</em></td>
</tr>
<tr>
<td>The negative ship’s supply – 0v DC (- ve)</td>
<td>To terminal 31 on the motor</td>
</tr>
</tbody>
</table>
Wiring to a Rotary Switch

**Electrical Connections**

**Figure 8**

<table>
<thead>
<tr>
<th>WIRING CONNECTION CODE</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>0v DC (-ve) Supply</td>
</tr>
<tr>
<td>53</td>
<td>Slow Speed</td>
</tr>
<tr>
<td>53b</td>
<td>Fast Speed</td>
</tr>
<tr>
<td>53a</td>
<td>24v DC (+ve) Supply &amp; Self Park</td>
</tr>
<tr>
<td>31b</td>
<td>Self Park – Reversal Speed</td>
</tr>
</tbody>
</table>
Fitting the Wiper Blade

Reference Figure 4, Page 6.

1. Remove blade retaining screw (3) and nut (4) from blade clip on arm.

2. Place wiper blade into blade clip on arm. 
   *(Note If only one end of blade rubber captive, it must be at top of screen.)*

3. Ensure that all fixing holes align.

4. Secure in place with blade retaining screw (3) and nut (4). Important DO NOT over tighten blade screw and nut, as blade is required to pivot on glass.

**NOTE**
The wiper blades should be changed every 6 months but this is dependent on use and operating conditions (Wiper Blades - Ref Table1, Page 13 & Table 2 – continued, Page 15)

Fitting the Wiper Arm Assembly

**IMPORTANT**
The blade must be fitted to the arm prior to the arm being fitted. (This is to prevent the blade clip damaging the screen.)

1. **Inside Bulkhead** - Run motor to insure it is parked correctly, then disconnect all Electrical Power.

2. **Outside Bulkhead** - While unit is being run, it is IMPORTANT to observe direction drive spindle rotates in immediately before it stops. This direction will give PARK POSITION.

3. Fit arm onto spindle allowing blade to lie as shown in drawings approx 75mm from edge of glass in PARKED POSITION.

4. Fit a washer - flat (14) onto spindle next to arm head, then a M10 nylock nut (15)

5. Only tighten nut sufficiently to allow arm and blade to travel across glass when motor is run to see if positioning is correct.

6. If incorrectly positioned - DO NOT ATTEMPT TO ROTATE OR TWIST ARM ON SPINDLE this will damage splined end of drive spindle, resulting in arm and blade slipping in operation.

7. To correct alignment errors, - loosen nut and gently pull arm up spindle, realign and repeat stages above. *(Arm Extractor Tool is available seeFigure8, Page 16 for instructions)*

8. When correctly aligned, tighten spindle nut. *(Torque Tighten ref Table 1, Page 13).*

9. Fit weather caps supplied with arm and linkage.
CHAPTER 3

Maintenance

Introduction

This chapter contains all preventative maintenance and removal and replacement procedures for the windscreen wiper components. Preventative maintenance procedures include the information required to replace the wiper blades.

Safety Precautions

Always disconnect the power when servicing the windscreen wiper system, or on any ancillary components. Serious damage to the equipment and/or personal injury may occur if the power is not disconnected.

Scheduled Maintenance Action Check

Table 1 is a scheduled maintenance action index. The index provides a list of all performance tests if applicable and preventative maintenance procedures. The table has three columns: periodicity, equipment and task. The periodicity column indicates the intervals between the maintenance tests and preventative maintenance procedures. The equipment column lists the equipment, assembly or subassembly that corresponds to the maintenance action. The task column lists the maintenance task to be performed.

Table 1

<table>
<thead>
<tr>
<th>PERIODICITY</th>
<th>EQUIPMENT</th>
<th>TASK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>Wiper blades</td>
<td>Inspect wiper blades for damage, torn or missing rubber blades. Replace wiper blades as required</td>
</tr>
<tr>
<td>Daily</td>
<td>Windscreen wiper system</td>
<td>Perform function test of wiper washer system. Do not carry out function test on a dry screen</td>
</tr>
<tr>
<td>Daily</td>
<td>Washer tubing and spray nozzle</td>
<td>Inspect tubing for damage or loose connection on nozzle. Check operation of spray nozzle on windscreen</td>
</tr>
<tr>
<td>Daily</td>
<td>Wash tank</td>
<td>Insure wash tank is filled with washer fluid to prevent wipers being used on a dry screen</td>
</tr>
<tr>
<td>3 monthly</td>
<td>Fixings of wiper arm to wiper spindle</td>
<td>Check torque settings M10 = 36-38Nm</td>
</tr>
<tr>
<td>6 Monthly</td>
<td>Complete system</td>
<td>Check all torque settings for complete wiper system: M8 = 18-20Nm (Fixing Nuts/Bolts, Drive Crank &amp; V.Arc Lever) M10 = 36-38Nm (Motor Bolts, Spindle Nut) M12 = 28-30Nm (Tie Bar) M26 = 78-82Nm (Liner - Steel Structure / Bulkhead) M26 = 50-52Nm (Liner - G.R.P.) Carry out a visual check for wear in rod end</td>
</tr>
</tbody>
</table>
**Table 1 - continued**

<table>
<thead>
<tr>
<th>6 monthly or As required</th>
<th>Wiper blades</th>
<th>Replace wiper blades</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 monthly</td>
<td>Motor terminal connection block</td>
<td><em>(110Nm motors only)</em> Using silicon insulating grease cover motor terminal connection block with grease</td>
</tr>
</tbody>
</table>

**CHAPTER 4**

**Troubleshooting**

**Introduction**

This chapter provides all the instructions and information necessary to locate problems and conduct tests on the windscreen wiper system components. The trouble-shooting chart is provided for logical isolation of faults.

**Safety Precautions**

Always disconnect the power when servicing the windscreen wiper system, or on any ancillary components. Serious damage to the equipment and/or personal injury may occur if the power is not disconnected.

**Troubleshooting Procedures**

Typical windshield wiper system troubleshooting procedures are contained in Table 2. These troubleshooting and repair procedures should be followed when encountering operational problems with the windshield wiper system.

**Table 2**

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>PROBABLE CAUSE</th>
<th>TESTS AND CHECKS</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiper motor fails to start</td>
<td>On/off switch</td>
<td>Check position of switch</td>
<td>Turn switch to on position</td>
</tr>
<tr>
<td></td>
<td>Voltage level</td>
<td>Check supply voltage to switch. Check wiring and switch connections</td>
<td>Replace switch. Correct loose wiring connections. Replace broken wires</td>
</tr>
<tr>
<td></td>
<td>System jammed</td>
<td>Check wiper linkage</td>
<td>Release linkage. Release wiper arm</td>
</tr>
<tr>
<td></td>
<td>Defective wiper motor</td>
<td></td>
<td>Replace motor</td>
</tr>
<tr>
<td>Motor shaft turns but linkage &amp; arm remain static</td>
<td>Defective or loose drive crank</td>
<td>Check linkage for a loose drive crank</td>
<td>Secure (Torque 18-20Nm) or replace drive crank. Clean motor output shaft with wire brush before replacing</td>
</tr>
<tr>
<td>System operates but wiper arm remains static</td>
<td>Wiper arm</td>
<td>Check for loose wiper arm connection onto drive spindle</td>
<td>Secure or replace wiper arm after cleaning spindle spline with wire brush. Torque to M10 = 36-38Nm</td>
</tr>
<tr>
<td>SYMPTOM</td>
<td>PROBABLE CAUSE</td>
<td>TESTS AND CHECKS</td>
<td>CORRECTIVE ACTION</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------------</td>
<td>------------------------------------------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Slow Motor Operation</td>
<td>Voltage level</td>
<td>Check for 24v DC supply to wiper system</td>
<td>Correct voltage supply problem</td>
</tr>
<tr>
<td></td>
<td>Switch</td>
<td>Check for broken switch</td>
<td>Replace faulty switch</td>
</tr>
<tr>
<td></td>
<td>Motor bracket</td>
<td>Check to see if linkage is free moving</td>
<td>Replace defective bracket</td>
</tr>
<tr>
<td></td>
<td>Linkage</td>
<td></td>
<td>Free linkage replace worn or damaged components</td>
</tr>
<tr>
<td></td>
<td>Defective motor</td>
<td></td>
<td>Replace wiper motor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erratic Motor</td>
<td>Voltage level</td>
<td>Check for 24v DC supply to wiper system</td>
<td>Correct voltage supply problem</td>
</tr>
<tr>
<td></td>
<td>Switch</td>
<td>Check for loose or broken wires</td>
<td>Replace faulty switch</td>
</tr>
<tr>
<td></td>
<td>Wiring</td>
<td></td>
<td>Repair or replace wiring up to motor. Replace motor if this wiring is damaged</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excessive wear on blade</td>
<td>Spring pressure.</td>
<td>Use spring balance on centre of blade clip till blade begins to lift off glass. 1 – 1.1/2 kg</td>
<td>Replace spring/arm.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arm and Blade not operating</td>
<td>Voltage level</td>
<td>Check for 24v DC supply to wiper system</td>
<td>Correct voltage supply problem</td>
</tr>
<tr>
<td>correctly or over sweep</td>
<td>Linkage</td>
<td>Check for worn or broken linkage</td>
<td>Replace linkage</td>
</tr>
<tr>
<td>operation</td>
<td>Spindle</td>
<td>Check for excessive wear in spindle</td>
<td>Replace spindle</td>
</tr>
<tr>
<td></td>
<td>Arm</td>
<td>Check that arm is not loose on spindle</td>
<td>Re-tighten spindle</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check for excessive wear on arm</td>
<td>Clean spline on spindles with wire brush. Replace arm</td>
</tr>
<tr>
<td></td>
<td>Blade</td>
<td>Check fixing for wear</td>
<td>Replace blade</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check blade for wear</td>
<td>Replace blade</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check for excessive smearing on screen</td>
<td>Replace blade</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washer system not working</td>
<td>No water from jets</td>
<td>Check water level in tank</td>
<td>Fill tank</td>
</tr>
<tr>
<td>correctly</td>
<td></td>
<td>Check for damage to tank</td>
<td>Replace tank</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check Pump is operational</td>
<td>Replace pump if faulty</td>
</tr>
</tbody>
</table>
CHAPTER 5

Maintenance Instructions

IMPORTANT NOTE:

Before replacing the drive crank, motor, tie bar or liner/lever sub assemblies, it is necessary to remove the entire wiper motor unit from the bulkhead. First remove the arms and blades.

Retain all items removed in a safe place, as they will be required on reassembly. If you experience any difficulty in fitting these units, please do not hesitate to contact us for advice.

Use the drawings for reference.

To Replace the Wiper Blade

Removal

Reference Figure 4, Page 6.

1. **Inside Bulkhead** - Run Motor to insure it is parked correctly; then disconnect all Electrical Power.

2. **Outside Bulkhead** - Carefully pull Wiper Arm Assembly away from windscreen to enable access to Wiper Blade.

5. Remove blade retaining screw (3) and nut (4) from blade clip on arm.

3. Remove Blade from Blade Clip on Arm.

Replacement

6. Place wiper blade into blade clip on arm.

(Notes the only one end of blade rubber captive, it must be at top of screen.)

7. Ensure that all fixing holes align.

8. Secure in place with blade retaining screw (3) and nut (4). Important DO NOT over tighten blade screw and nut, as blade is required to pivot on glass.

NOTE
The wiper blades should be changed every 6 months but this is dependent on use and operating conditions. (Wiper Blades - Ref Table1, Page 13 & Table 2 – continued, Page 15)

To Replace the Wiper Arm

Removal

Reference Figure 4, Page 6.

1. Run motor to insure it is parked correctly; then disconnect all electrical power.
2. **Outside Bulkhead** - While unit is being run, it is IMPORTANT to observe direction drive spindle rotates in immediately before it stops. This direction will give PARK POSITION.

3. Remove arm weather cap (5 & 16), M10 nylock nut (15) and 10mm washer - flat (14). Then using Arm Extraction Tool carefully remove Arm (Arm Extractor Tool is available see Figure 8, Page 16 for instructions)

**Replacement**

**IMPORTANT**
The blade must be fitted to the arm prior to the arm being fitted. (This is to prevent the blade clip damaging the screen,)

1. Fit wiper arm and blade,  
   In accordance with fitting instructions, Page 12.

---

**To Remove the Entire Wiper Motor Unit Assembly**

**Removal**

*Ref Figures 1, 2 & 3, Pages 4 & 5*

1. **Inside Bulkhead** - Run motor to insure it is parked correctly; then disconnect all electrical Power.

2. Disconnect wiring from Motor.

**IMPORTANT**
Please make a note of PARKED position of ARMS and BLADES, before removal

3. **Outside Bulkhead** - Remove arm caps, nuts and washers. Then using arm extraction tool carefully remove arms.

4. Remove 26mm weather caps (13), M26 nuts (12), 26mm washers - single coil (11), 26mm washers - flat (10) 26mm washers - neoprene (9), idler plate (8) and finally idler plate gasket (7).

5. **Inside Bulkhead** - Unscrew fixing bolts from motor mounting bracket (1).

6. Carefully remove entire wiper motor unit from bulkhead.
**Replacement**

*Ref Figures 1, 2 & 3, Pages 4 & 5*

**NOTE**
The Motor Unit is MOUNTED from INSIDE the Bulkhead.

1. Slide liners through holes in bulkhead, align mounting bracket (1), with predrilled mounting holes and fix in place. *(Fixing bolts not supplied).*

2. **Outside Bulkhead** - ENSURE a proprietary sealant *(Not supplied)* is used around all points of entry through bulkhead.

3. *Fit following items* - one idler plate gasket (7), one idler plate (8), *- over both liners, next to bulkhead. Then onto each Liners* - a 26mm washer - neoprene (9), one 26mm washer - flat (10), one 26mm washer - single coil (11), one M26 nylock nut (12) *(Torque tighten ref Table 1, Page 13)*

4. Fit weather caps (13).

---

**To Replace the Drive Crank Assembly**

![Diagram of Drive Crank Assembly]

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Drive Crank Sub Assy 50 Crs</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Tie Bar – 270mm Overall</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>110Nm 24v (IER) Motor</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>10mm Washer – Single Coil</td>
<td>3</td>
</tr>
<tr>
<td>18</td>
<td>M10 Fixing Bolts</td>
<td>3</td>
</tr>
<tr>
<td>19</td>
<td>M8 Securing Bolt</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>M8 Securing Nylock Nut</td>
<td>1</td>
</tr>
<tr>
<td>21</td>
<td>M12 Left Hand Bearing Nut</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>M12 Left Hand Bearing</td>
<td>1</td>
</tr>
</tbody>
</table>

---

**Removal**

*Reference figure 10*

**IMPORTANT**
Always isolate working area before attempting any work on the linkage, arm or blade.

1. Remove arm and blade assy.
   **In accordance with removal instructions, Page 22**

2. Remove entire wiper motor unit assy.
   **In accordance with removal instructions, Page 16**
NOTE
Check and note position of drive crank before removal, i.e. away from spindles, as this will affect the park position on reassembly.

3. Slacken both bearing nuts at either end of tie bar.

4. Slacken drive crank nut (20), and bolt (19), carefully remove drive crank/bearing assy (4), from motor drive shaft.

5. Unscrew tie bar (5) from drive crank bearing (LH thread) (22).

Replacement

1. Screw tie bar onto bearing (LH thread) (22), of NEW drive crank/bearing Assy (4).

NOTE
Clean the motor output shaft with a wire brush before replacing the drive crank.

2. Carefully fit drive crank/bearing assy (4), over motor drive shaft, (referring to NOTE after operation 2 on ‘Removal’ for position). Tighten drive crank nut (20), and Bolt (19). (Torque tighten ref Table 1, Page 13).

3. Tighten both bearing nuts at either end of tie bar (Torque tighten ref Table 1, Page 13).

IMPORTANT: Ensure BEARING CENTRES are as stated on drawings (Figures 1 & 2)

4. Replace entire wiper motor unit assy.
In accordance with fitting instructions, Page 17

5. Fit wiper arm and blade,
In accordance with fitting instructions, Page 12

To Replace the Wiper Motor

Removal

Reference figure 10

IMPORTANT
Always isolate working area before attempting any work on the linkage, arm or blade.

1. Remove arm and blade assy.
In accordance with removal instructions, Page 22

2. Remove entire wiper motor unit assy.
In accordance with removal instructions, Page 16

NOTE
Check and note position of drive crank before removal, i.e. away from spindles, as this will affect the park position on reassembly.

3. Slacken both bearing nuts at either end of tie bar.

4. Slacken drive crank nut (20), and bolt (19), carefully remove drive crank/bearing assy (4), from motor drive shaft.
5. Unscrew three fixing bolts (18) and remove with washers (17) remove Wiper Motor (6)

Replacement

1. Replace wiper motor (6) replace and tighten three fixing bolts (18) and washers (17)
   (Torque Tighten ref Table 1, Page 13).

NOTE
Clean the motor output shaft with a wire brush before replacing the drive crank.

2. Carefully fit drive crank/bearing assy (4), over motor drive shaft, (referring to NOTE after
   operation 2 on ‘Removal’ for position). Tighten drive crank nut (20), and Bolt (19).
   (Torque tighten ref Table 1, Page 13).

3. Tighten both bearing nuts at either end of tie bar.
   (Torque tighten ref Table 1, Page 13).

4. Replace entire wiper motor unit assy.
   In accordance with fitting instructions, Page 17

5. Fit wiper arm and blade,
   In accordance with fitting instructions, Page 12

To Replace the Tie Bar

Removal

Reference figure 9

IMPORTANT
Always isolate working area before attempting any work on the linkage, arm or blade.

1. Remove arm and blade assy.
   In accordance with removal instructions, Page 22

2. Remove entire wiper motor unit assy.
   In accordance with removal instructions, Page 16

NOTE
Check and note position of drive crank before removal, i.e. away from spindles, as this will
affect the park position on reassembly.

3. Slacken both bearing nuts at either end of tie bar.

4. Slacken Drive Crank Nut (20), and Bolt (19), carefully remove Drive Crank/Bearing Assy (4),
   from Motor Drive Shaft.

5. Unscrew Tie Bar (5) from drive crank bearing (LH thread) (22).

6. Repeat operation 5 on liner/lever/bearing assy (RH thread) and remove tie bar (5).
Replacement

1. Screw NEW tie bar (NOTE groove is on RH thread end of tie bar) onto bearing (RH Thread) at liner/lever-bearing assy.

2. Screw NEW tie bar on to bearing (LH thread) of drive crank/bearing Assy.

NOTE
Clean the motor output shaft with a wire brush before replacing the drive crank.

3. Carefully fit drive crank/bearing assy (4), over motor drive shaft, (referring to NOTE after operation 2 on ‘Removal’ for position). Tighten drive crank nut (20), and Bolt (19). (Torque tighten ref Table 1, Page 13).

4. Tighten both bearing nuts at either end of tie bar (Torque tighten ref Table 1, Page 13).

IMPORTANT: Ensure BEARING CENTRES are as stated on drawings (Figures 1 & 2)

5. Replace entire wiper motor unit assy.
   In accordance with fitting instructions, Page 17

6. Fit wiper arm and blade,
   In accordance with fitting instructions, Page 12

To Replace the Lever/Liner/Spindle Sub Assembly

Reference figure 11

IMPORTANT
Always isolate working area before attempting any work on the linkage, arm or blade.

1. Remove arm and blade assy.
   In accordance with removal instructions, Page 22

2. Remove entire wiper motor unit assy.
   In accordance with removal instructions, Page 16

To Replace the Lever/Liner/Spindle Sub Assembly

Figure 11

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Liner V.Arc Lever Sub Assy</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Driven Idler Liner/Lever Sub Assy</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Tie Bar – 270mm Overall</td>
<td>1</td>
</tr>
<tr>
<td>5a</td>
<td>Connecting Tie Bar – 60mm Crs</td>
<td>1</td>
</tr>
<tr>
<td>23</td>
<td>12mm Right Hand Bearing Nut</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>12mm Right Hand Bearing</td>
<td>1</td>
</tr>
<tr>
<td>25</td>
<td>8mm Washer – Flat</td>
<td>1</td>
</tr>
<tr>
<td>26</td>
<td>M8 Securing Nylock Nut</td>
<td>1</td>
</tr>
<tr>
<td>27</td>
<td>V.Arc Bearing Pivot Pin</td>
<td>1</td>
</tr>
</tbody>
</table>

Removal

Reference figure 11

IMPORTANT
Always isolate working area before attempting any work on the linkage, arm or blade.

1. Remove arm and blade assy.
   In accordance with removal instructions, Page 22

2. Remove entire wiper motor unit assy.
   In accordance with removal instructions, Page 16
NOTE  
Check and note position of drive crank before removal, i.e. away from spindles, as this will affect the park position on reassembly.

3. Slacken both bearing nuts at either end of tie bar.

IMPORTANT  
Make a note of the protrusion length of the liner and/or spindle from the front of the bracket.

4. Unscrew tie bar (5) from main liner/lever/bearing Assy (RH Thread) (2).

5. Unscrew remove main liner/lever/bearing assy (2), complete with driven idler (3) and connecting tie bar (5a), from Bracket.

Replacement

1. Screw main liner/lever/bearing assy (2) complete with driven idler (3) and connecting tie bar (5a), into Bracket. (Referring to NOTE after operation 3 on ‘Removal’ for position).

2. Screw tie bar onto bearing (RH thread) (24) at main liner/lever/bearing assy (2). (Referring to NOTE after operation 2 on ‘Removal’ for position).

3. Tighten both bearing nuts at either end of tie bar  
   (Torque tighten ref Table 1, Page 13).

IMPORTANT: Ensure BEARING CENTRES are as stated on drawings (Figures 1 & 2)

4. Replace entire wiper motor unit assy. 
   In accordance with fitting instructions, Page 17

5. Fit wiper arm and blade, 
   In accordance with fitting instructions, Page 12

Vari Arc Units - Arc adjustment

1. Adjust vari-arc lever settings. 
   In accordance with removal instructions, Page 8

CHAPTER 6

Note – for other all other switch or control instructions refer to the ship’s fitters/suppliers manual.

Switch Operation – Multi-Switch

1. Check switch is in the off position before starting. (OFF/PARK)

IMPORTANT  
Do not run on a dry screen.

2. To apply water to the screen, press the knob. (WIPER WASHER) This will apply water for the duration of pressing the button. The wiper will also operate for 3-4 wipes at normal speed after the water stops.
3. Turn the knob CLOCKWISE it will (CLICK) which turns the wipers on. The switch is now in the area of variable intermittent wipe cycle time. Which is between the (ON-LONG DELAY) and (ON-SHORT DELAY) positions.

4. The further clockwise the knob is turned between the two positions shorter the delay between the wipes.

5. Turn the knob CLOCKWISE to the next (CLICK) (LOW SPEED) gives a continuous wipe across the screen at a standard speed, with no delay between the wipes.

6. Turn the knob CLOCKWISE to the last (CLICK) (HIGH SPEED) gives a continuous wipe across the screen at a faster speed, with no delay between the wipes.

7. Turn the knob ANTI-CLOCKWISE to the off position when finished. (OFF/PARK)

Switch Operation – Toggle Switch

1. Check switch is in the off position before starting. (OFF/PARK)

IMPORTANT
Do not run on a dry screen.

2. This Switch does not control water.

3. Pushing the Toggle to the centre position (SLOW) gives a continuous wipe across the screen at a standard speed, with no delay between the wipes.

4. Pushing the Toggle to the bottom position (FAST) gives a continuous wipe across the screen at a faster speed, with no delay between the wipes.

5. Push the Toggle to the top position when finished. (OFF/PARK)

Switch Operation – Rotary Switch

1. Check switch is in the off position before starting. (OFF/PARK)

IMPORTANT
Do not run on a dry screen.

2. To apply water to the screen, press the knob. (WIPER WASHER) This will apply water for the duration of pressing the button. (Note – it does not activate the wiper)

3. Turn the knob CLOCKWISE it will (CLICK) which turns the wipers on, (ON). This setting gives a continuous wipe across the screen at a standard speed, with no delay between the wipes.

4. Turn the knob CLOCKWISE to the last (CLICK) (FAST). This setting gives a continuous wipe across the screen at a faster speed, with no delay between the wipes.

5. Turn the knob ANTI-CLOCKWISE to the off position when finished. (OFF/PARK)
### SPARES LIST

**Fittings for M26 Liners and 16mm Spindles protruding outside the Bulkhead**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>60250300</td>
<td>Idler plate gasket <em>(7)</em> <em>(Pantograph Units Only)</em></td>
<td>1 per unit</td>
</tr>
<tr>
<td>60250200</td>
<td>Idler plate <em>(8)</em> <em>(Pantograph Units Only)</em></td>
<td>1 per unit</td>
</tr>
<tr>
<td>10029100</td>
<td>26mm washer - neoprene <em>(9)</em></td>
<td>1 per liner</td>
</tr>
<tr>
<td>10026100</td>
<td>26mm washer - flat <em>(10)</em></td>
<td>1 per liner</td>
</tr>
<tr>
<td>10026600</td>
<td>26mm washer – single coil <em>(11)</em></td>
<td>1 per liner</td>
</tr>
<tr>
<td>10015300</td>
<td>M26 hex nut <em>(12)</em></td>
<td>1 per liner</td>
</tr>
<tr>
<td>60054600</td>
<td>26mm weather cap <em>(13)</em></td>
<td>1 per liner</td>
</tr>
<tr>
<td>10027800</td>
<td>10mm washer - flat <em>(14)</em></td>
<td>1 per liner</td>
</tr>
<tr>
<td>10018000</td>
<td>M10 hex. nut <em>(15)</em></td>
<td>1 per liner</td>
</tr>
<tr>
<td>10063500</td>
<td>10mm nut cap <em>(16)</em></td>
<td>1 per liner</td>
</tr>
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**Fittings for Arm and Blade**

<table>
<thead>
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<th>Description</th>
<th>Qty</th>
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<tbody>
<tr>
<td>80010700</td>
<td>Blade retaining screw <em>(20mm blade clip)</em> <em>(3)</em></td>
<td>1 per arm</td>
</tr>
<tr>
<td>80205600</td>
<td>Blade retaining screw <em>(14mm blade clip)</em> <em>(3)</em></td>
<td>1 per arm</td>
</tr>
<tr>
<td>10011400</td>
<td>M4 nylock nut <em>(4)</em></td>
<td>1 per arm</td>
</tr>
<tr>
<td>10011400</td>
<td>Heavy duty head – weather cap <em>(5)</em></td>
<td>1 per arm</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>60680600</td>
<td>Arm extractor tool - all head types</td>
<td>As Required</td>
</tr>
</tbody>
</table>

**Documentation**

Whilst every effort is made to provide accurate information in good faith, no responsibility can be accepted by Hepworth and Wynn for inaccuracies and Hepworth and Wynn reserves the right to alter and amend specifications and designs without prior notice in line with our policy of continued improvement.

**Spares Part**

To enable technical troubleshooting and ordering of spare parts, this manual should be kept in a safe place on board. It is also advisable to keep one set of spare parts on board for emergency use. Please contact Hepworth and Wynn directly or your local distributor / service centre for all order requirements.

**Maintenance Schedule**

Plan your maintenance work according to the schedule in this manual.

**Our Commitment**

We are committed to a 10 year product support programme. This ensures that any spare part will be available for any wiper at least 10 years after its purchase. It is strongly recommended that only genuine replacement parts manufactured by HEPWORTH AND WYNN be used. This will guarantee that only suitable materials have been used and will ensure interchangeability of parts.

**Quality and Testing**

We are committed to the principles of Total Quality Management, ISO 9000. We manufacture our range of marine products to the highest standard and quality. We therefore maintain an ongoing schedule of product improvement and testing. To help us sustain such standards we maintain a salt-water test rig on which our products are taken, at random from the production line, and subjected to 3,000 hour continuous testing. We are sure you will receive many years trouble-free service from your Hepworth and Wynn product and hope you find this information pack comprehensive.

**Guarantee**

All Hepworth and Wynn equipment is tested before despatch from our works. Should any product or part prove defective in material or workmanship within one year of entering service, or two years of leaving the factory, whichever is the shortest, it will be repaired or replaced free of charge. No further claim can be considered.

We cannot accept any responsibility for the installation of equipment, or damage to the equipment during installation, or normal wear and tear. The guarantee is negated if the equipment is not installed strictly observing the instructions set out in this manual, or not maintained as specified.

This guarantee is expressly in lieu of all other guarantees expressed or implied and of all other obligations of liabilities on our part, and we neither assume nor authorise any other person to assume for us any other liability in connection with the sale of our equipment. Faulty equipment must be returned, carriage paid, to our works for examination. Any legal action must be settled in the English courts under English law.