



B. HEPWORTH
AND COMPANY LIMITED

*...performance wiper
systems...*

INSTALLATION AND MAINTENANCE
INSTRUCTIONS FOR THE
110NM COMPACT
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 Customer Service at 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 the wiper blades.

Vari-Arc Lever Settings

IMPORTANT

Vari-arc levers which have been factory set will be torqued and paint marked. Do not adjust. Unpainted lever nuts must be torque tightened M8 = 20Nm, prior to the unit being fitted.

Where internal fixing screws and/or nuts are factory set and paint marked, leave untouched unless required to be changed or paint mark is damaged.

Abbreviations and Definitions

| <i>Abbreviation</i> | <i>Definition</i> |
|---------------------|-------------------|
| Assy | Assembly |
| Brk | Bracket |
| D. Crk | Drive Crank |

| <i>Abbreviation</i> | <i>Definition</i> |
|---------------------|-------------------|
| LH | Left Hand |
| RH | Right Hand |
| S.A. | Sub Assembly |

DESCRIPTION OF WIPER SYSTEM

The wiper motor and bracket are 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 provided 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.

Motor Specifications

| Motor Voltage | Wipe speed (Cycles per Minute) Slow/Fast | Start Current (Amps) | Run Current (Amps) Slow/Fast | Stall Current (Amps) Slow/Fast | F Type Fuse (Amps) | T Type Fuse (Amps) | C/D Type Circuit Breaker (Amps) |
|---------------|--|----------------------|------------------------------|--------------------------------|--------------------|--------------------|---------------------------------|
| 24V DC | 23/40 | 11.0 | 1.6/2.1 | 18.0/22.0 | 10 | 8 | 6 |

Wiper Motor Assembly – 110Nm

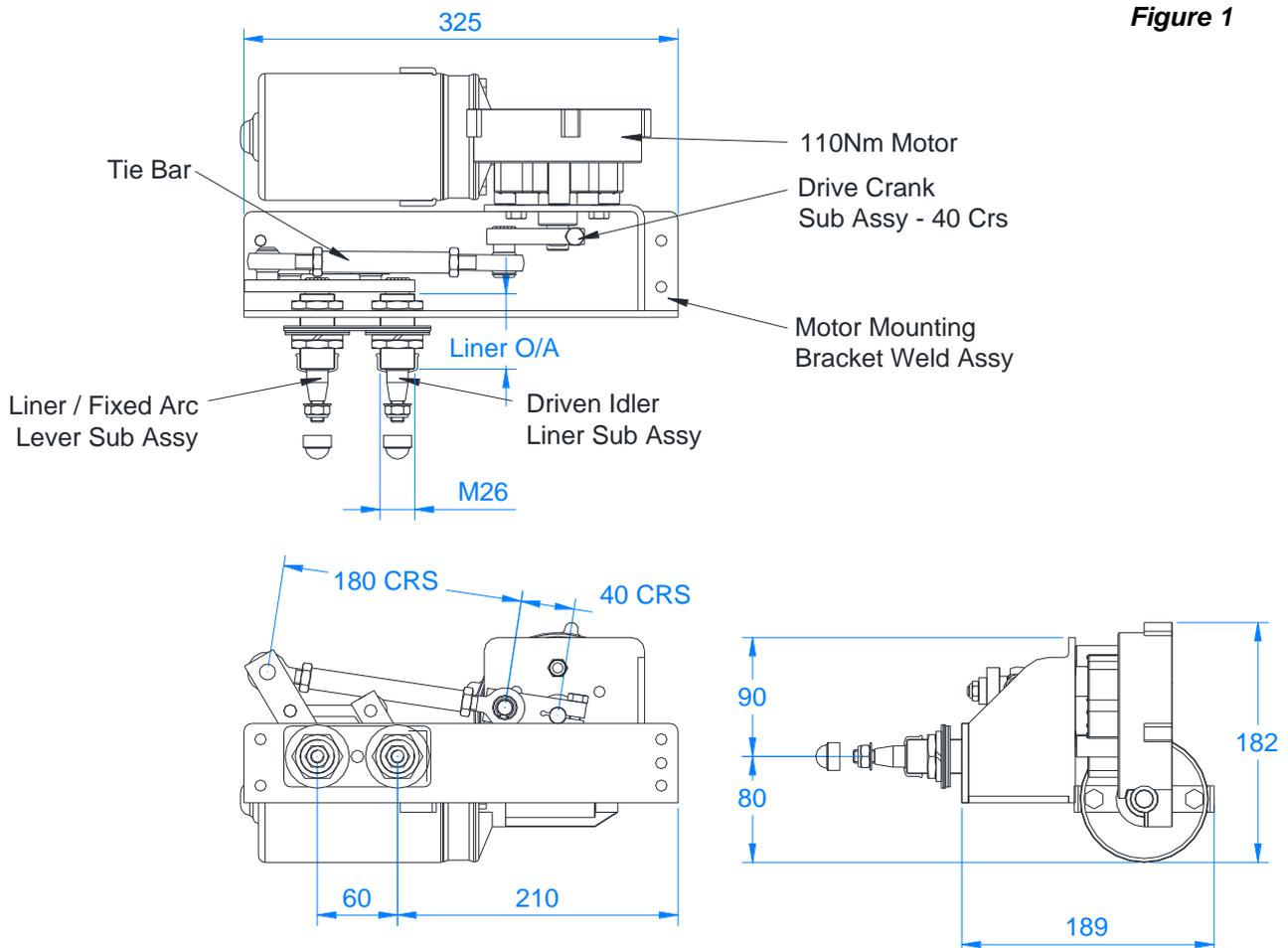
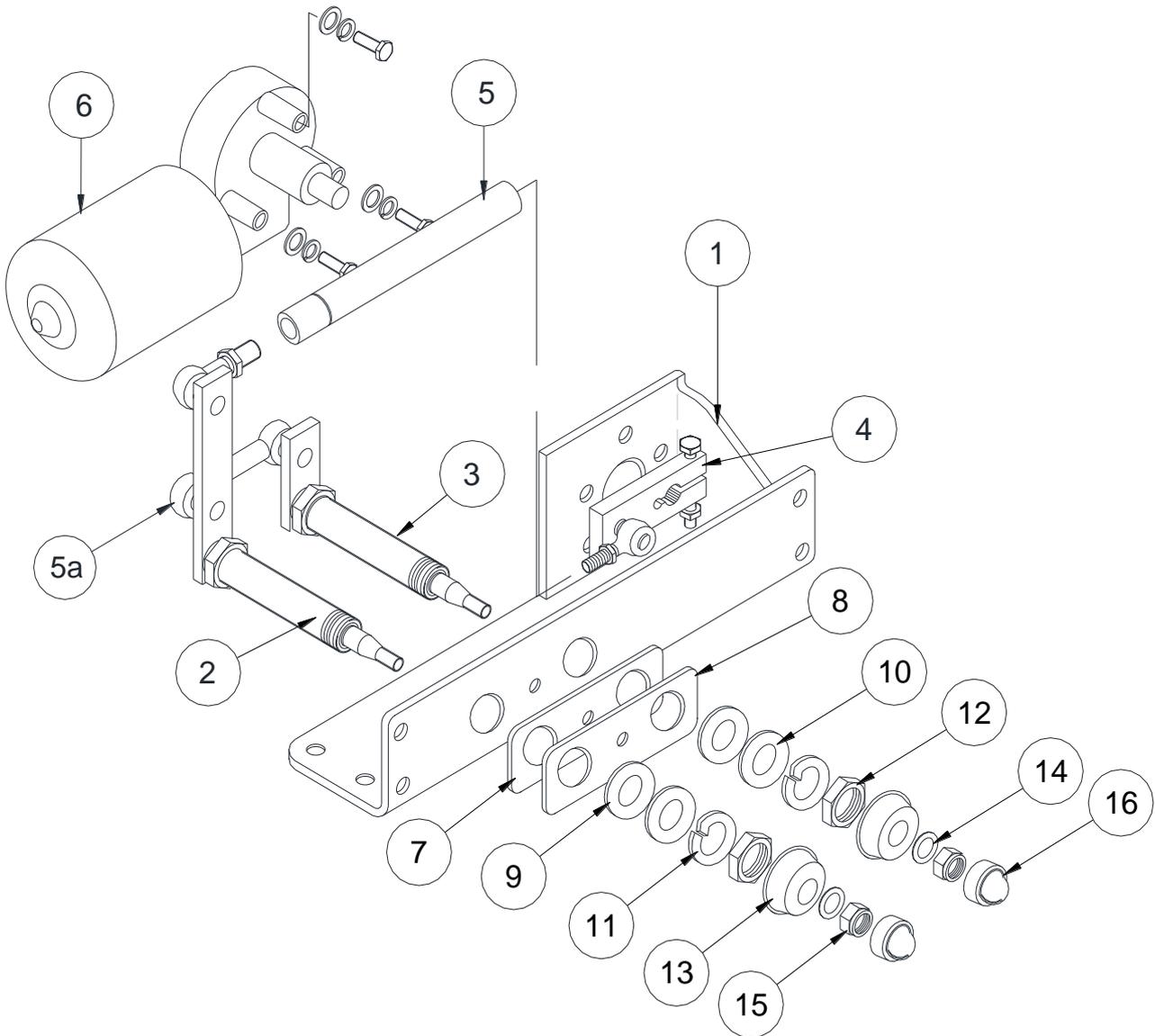


Figure 1

Exploded View of Linkage

Figure 2

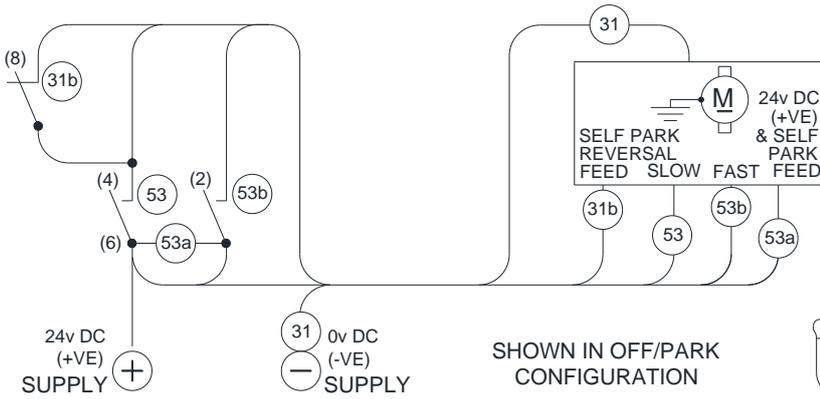


| ITEM | DESCRIPTION | QTY |
|------|-----------------------------|-----|
| 1 | Motor Mounting Bracket | 1 |
| 2 | Liner F.Arc Lever Sub Assy | 1 |
| 3 | Driven Idler Liner Sub Assy | 1 |
| 4 | Drive Crank Sub Assy 40 Crs | 1 |
| 5 | Tie Bar – 115mm Overall | 1 |
| 5a | Drive Link – 60 Crs | 1 |
| 6 | 110Nm (IER) Motor | 1 |
| 7 | Idler Plate – Gasket | 1 |
| 8 | Idler Plate | 1 |

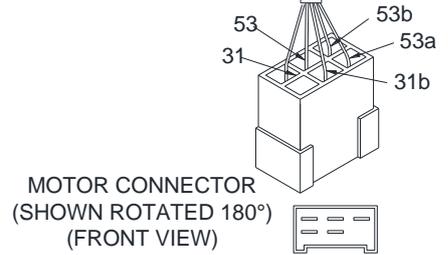
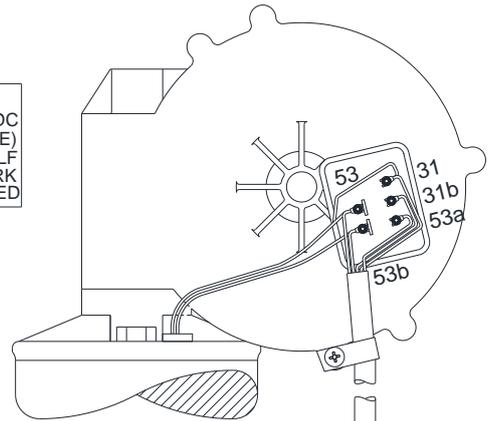
| ITEM | DESCRIPTION | QTY |
|------|---------------------------|-----|
| 9 | 26mm Washer – Neoprene | 2 |
| 10 | 26mm Washer – Flat | 2 |
| 11 | 26mm Washer – Single Coil | 2 |
| 12 | M26 Hex. Nut | 2 |
| 13 | 26mm Weather Cap | 2 |
| 14 | 10mm Washer - Flat | 2 |
| 15 | M10 Nylock Nut | 2 |
| 16 | 10mm Nut Weather Cap | 2 |

Electrical Connections

Figure 3



| WIRING CONNECTION CODE | |
|------------------------|---------------------------------|
| 31 | 0v DC (-ve) Supply |
| 53 | Slow Speed |
| 53b | Fast Speed |
| 53a | 24v DC (+ve) Supply & Self Park |
| 31b | Self Park – Reversal Speed |

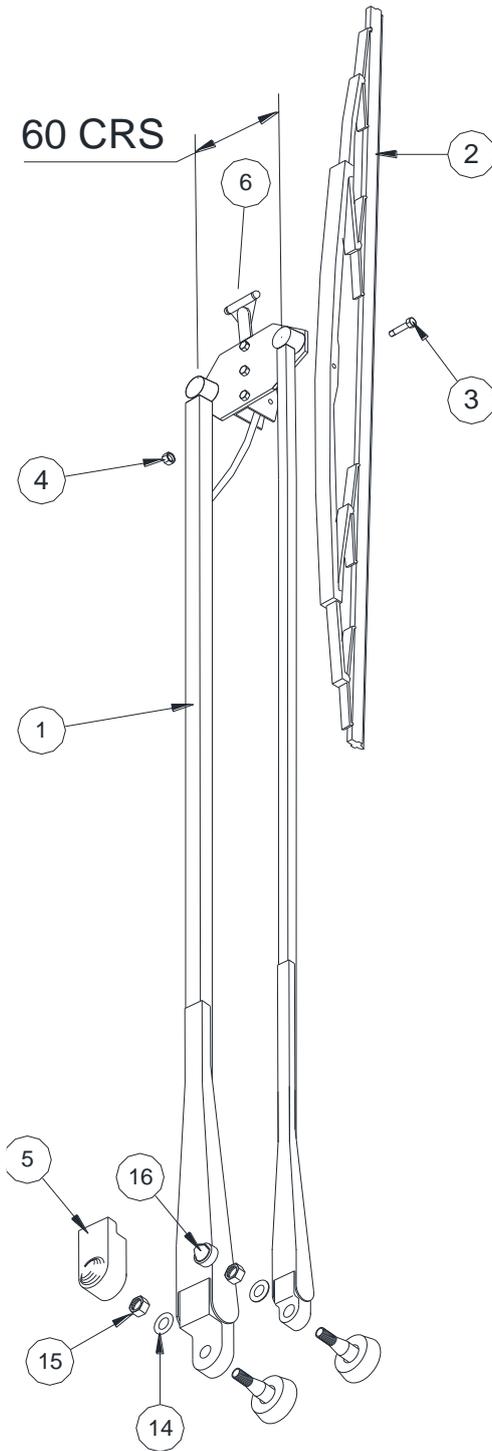


Wiper Arm Assembly

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 below. 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.

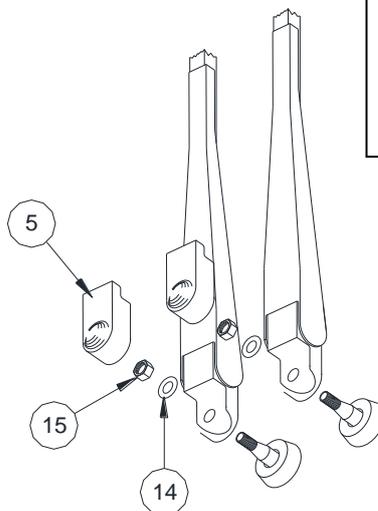


| ITEM | DESCRIPTION | QTY |
|------|--------------------------|--------|
| 1 | P84 Wiper Arm | 1 |
| 2 | Articulated Curved Blade | 1 |
| 3 | Blade Retaining Screw | 1 |
| 4 | Nylock Nut | 1 |
| 5 | Arm Head Weather Cap | 1 |
| 6 | Wash Jet Assy | 1 |
| 7 | Ecoprene Wash Tube | Metres |

The Following Items Are On The Linkage

| | | |
|----|----------------------|---|
| 14 | 10mm Washer - Flat | 2 |
| 15 | M10 Nylock Nut | 2 |
| 16 | 10mm Nut Weather Cap | 2 |

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

INSTALLATION INSTRUCTIONS

NOTE

Retain all items removed in a safe place, as they will be required on reassembly.

Any item to be discarded must be done in accordance to vessels manufacturer described task guidelines

If you experience any difficulty in the fitting of any of the units/components, please do not hesitate to contact Customer Service at B. Hepworth & Co. for advice.

Use the drawings for reference.



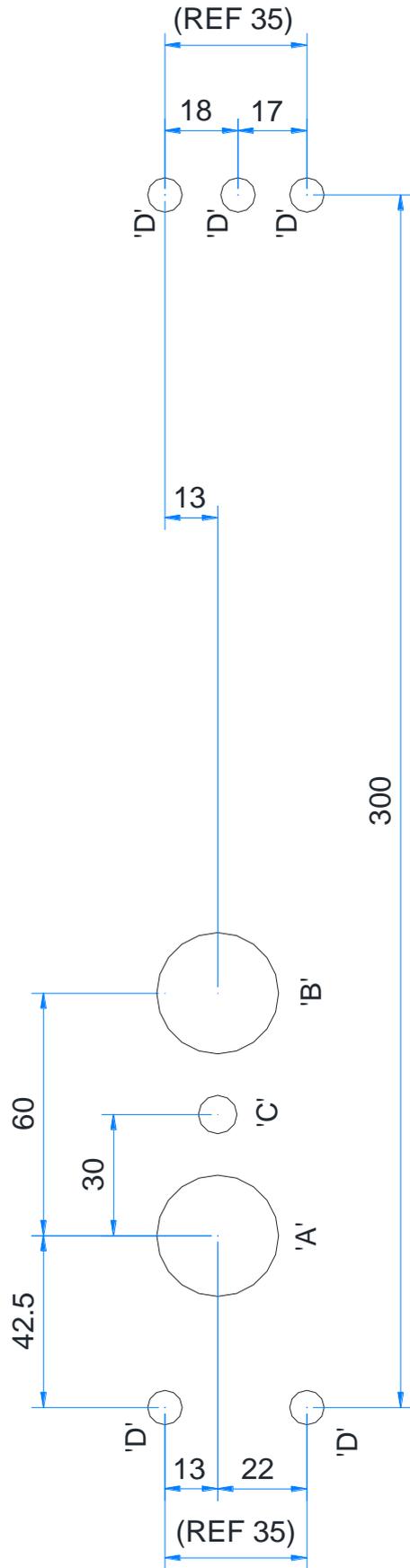
WARNING:

Isolate the electrical supply before commencing any fitting work on any part of the wiper system.

Drilling Diagram

NOTE – Drilling Diagram is NOT to size and is for reference only

DRILLING DIAGRAM - FOR 110Nm COMPACT UNITS



Drill holes 'A' and 'B' at Ø30mm (Note Hole 'B' not required on Pendulum units)

Drill hole 'D' at Ø8.5mm (5 options shown)

Drill hole 'C' at Ø9.5mm (Only required if wash tube is fitted through bulkhead between spindles)

FITTING THE WIPER UNIT

IMPORTANT

Vari-arc levers which have been factory set will be torqued and paint marked. Do not adjust. Unpainted lever nuts must be torque tightened M8 = 20Nm, prior to the unit being fitted.

Ref Figure – Drilling Diagram

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

Ref Figure 2 – Exploded Diagram

On all units –

1. Remove from each spindle one weather cap (16), one M10 nut (15), one washer – flat (14)
2. Remove from each liner, one weather cap (13), one M26 nut (12), one washer – single coil (11), one washer – flat (10), and one washer – neoprene (9)

On Pantograph units only –

3. Remove idler plate (8) and finally idler gasket (7)

NOTE the Motor Unit is MOUNTED from INSIDE the Bulkhead.

4. Fit motor unit and fix in place through predrilled mounting holes (**Fixing bolts not supplied**)
5. **Externally** – ENSURE a proprietary sealant (**Not supplied**) is used around all points of entry through bulkhead.

On Pantograph units only –

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

On all units –

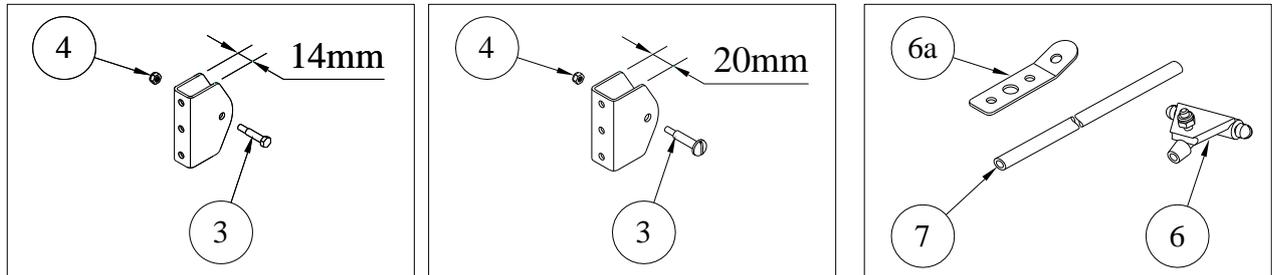
7. **Fit following items** – Onto each liner, one washer – neoprene (9), one washer – flat (10), one washer – single coil (11), one M26 nuts (12)
Torque M26 = 30Nm (on Brass Liner Nut)
Torque M26 = 50Nm (on SS Liner – G.R.P. – Nut)
Torque M26 = 80Nm (on SS Liner – Metal Structure – Nut)
8. Fit onto each liner, one M26 weather cap (13), ensuring that it sits tightly around spindle shaft.
9. **Internally** – Wire motor to vessels electrics via switch/controller (**May or may not be supplied**)
With Reference to Fitting Instructions – Electrical Connections

FITTING THE WIPER BLADE

The wiper blades should be changed every 12 months but this is dependent on use and operating conditions

With reference to the Maintenance Table and the Troubleshooting Table – Continued

Figure – Blade Clip Fixings



Ref Figure – Blade Clip Fixings

1. Remove blade retaining screw (1), and M4 Nylock nut (2), from blade clip on arm.

NOTE

No plastic spacers required – if supplied with blade

If only one end of the wiper blade rubber is captive, it must be fitted so it will be at the top of the screen when the arm is in the vertical position.

(Articulated blades only)

Ref Figure – Blade Captive End

2. Place wiper blade directly into arm blade clip.
3. Ensure that all fixing holes align, on wiper blade and arm blade clip.

Ref Figure – Blade Clip Fixings

4. Secure in place with blade retaining screw (1), and M4 Nylock nut (2).

IMPORTANT

DO NOT over tighten blade retaining screw and nut, as blade is required to pivot on glass.

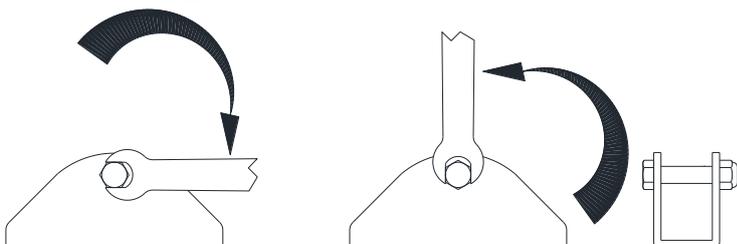
Ref Figure – Nut Tightening

5. Secure nut until tight – then 1/4 turn back

Figure – Nut Tightening

Secure nut
until tight

1/4 turn back

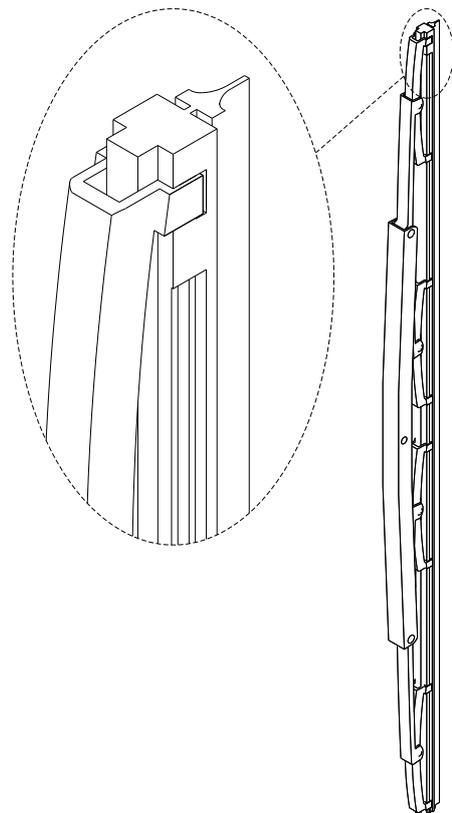


NOTE

Pictorial representation only, May not be exact to supplied arm

Figure – Blade Captive End

Must be at top



FITTING THE WIPER ARM ASSEMBLY

IMPORTANT:

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

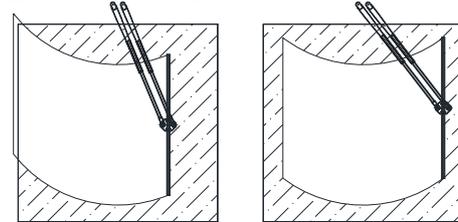
1. **Internally** – Run motor to insure it is parked correctly. Disconnect all electrical power.
2. **Externally** – While unit is being run, it is IMPORTANT to observe direction drive spindle rotates in immediately before it stops. This direction will give PARK POSITION.

Pantograph Arms Only:

Ref Figure – Arm Alignment

3. Fit arm onto spindle allowing blade to lay approx 50-75mm from edge of glass in PARKED POSITION. Test on a wet screen to prove clearance is acceptable.

Figure – Arm Alignment



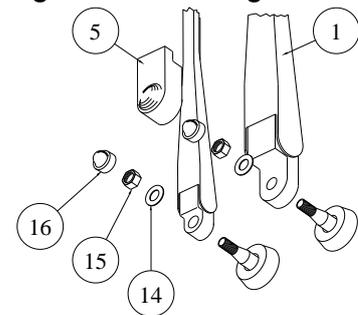
WRONG

RIGHT

Ref Figure – Arm Fittings

4. Fit one 10mm flat washer (14) on to spindle next to arm head, then one M10 Nylock nut (15), on to each spindle.
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.

Figure – Arm Fittings



Ref Figure – Arm Extractor

7. To correct alignment errors, – loosen nut and gently pull arm up spindle, realign and repeat stages above.

Use arm extractor tool to help pull wiper arm up spindle, if required

8. When correctly aligned, tighten M10 spindle nuts
Torque M10 = 38Nm (on Spindle Nut)
9. Fit weather caps supplied with linkage (16) and fit one/two M10 arm weather head caps (5).
10. Carefully push black wash hose attached to wiper arm onto bulkhead connector (**Not Supplied**)

IMPORTANT

On first fitting check spring pressure on blade in parked position it must NOT exceed recommended pressure

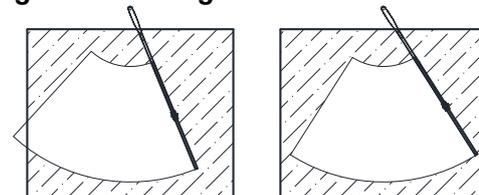
1-1.5kg

Pendulum Arms Only:

Ref Figure – Arm Fittings

3. Fit arm onto spindle allowing blade to lay approx 50-75mm from edge of glass in PARKED POSITION. Test on a wet screen to prove clearance is acceptable.

Figure – Arm Alignment



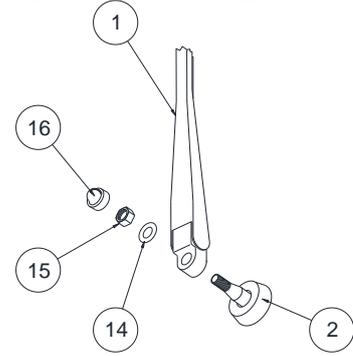
WRONG

RIGHT

Ref Figure – Arm Fittings

4. Fit one 10mm flat washer (14) on to spindle next to arm head, then one M10 Nylock nut (15), on to each spindle.
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.

Figure – Arm Fittings



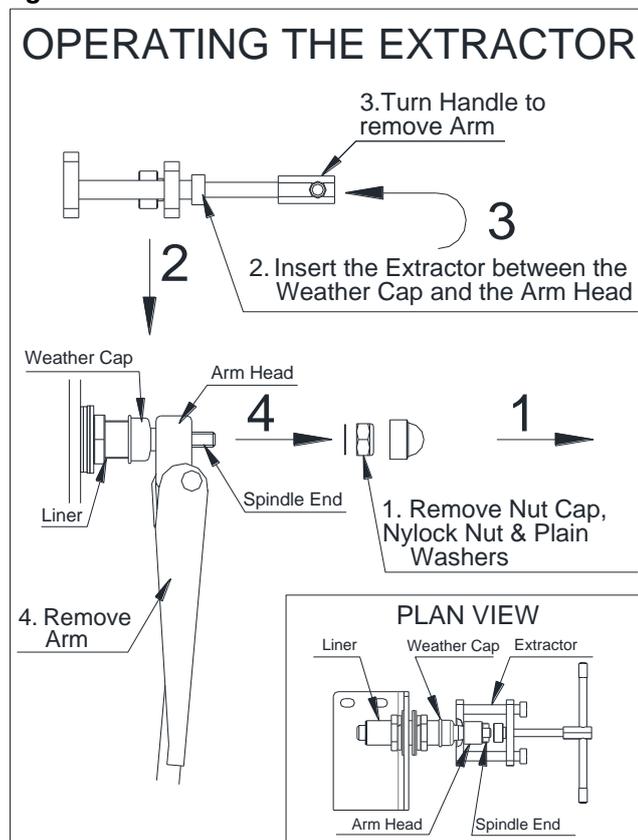
Ref Figure – Arm Extractor

7. To correct alignment errors, – loosen nut and gently pull arm up spindle, realign and repeat stages above.
Use arm extractor tool to help pull wiper arm up spindle, if required
8. When correctly aligned, tighten M10 spindle nuts
Torque M10 = 38Nm (on Spindle Nut)
9. Fit weather caps supplied with linkage (16)
10. Carefully push black wash hose attached to wiper arm onto bulkhead connector (**Not Supplied**)

IMPORTANT

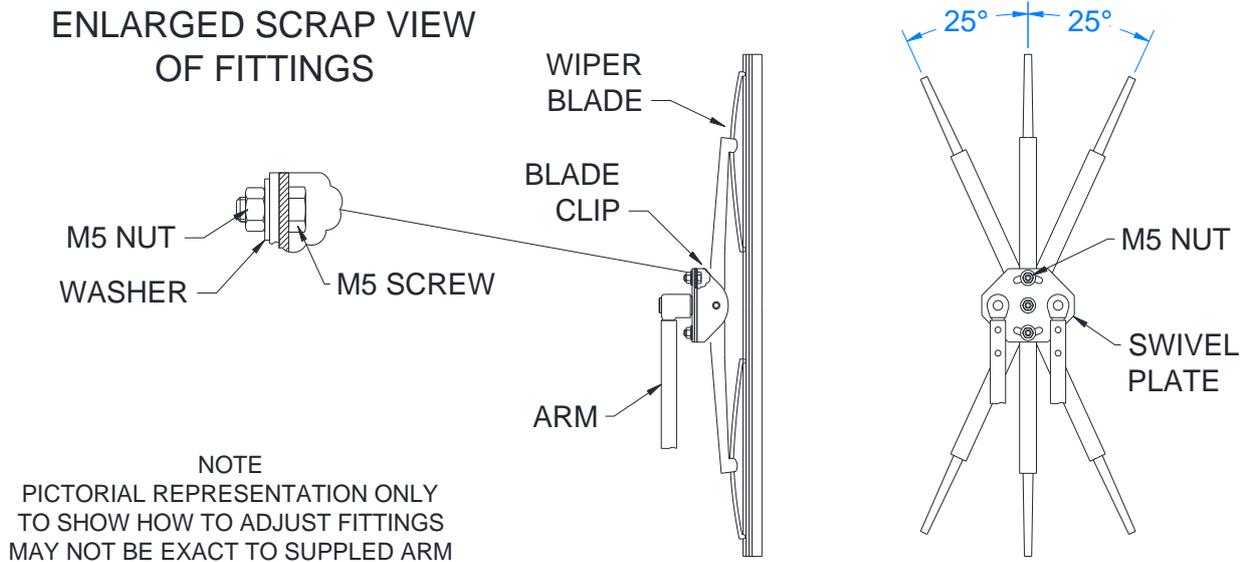
On first fitting check spring pressure on blade in parked position it must NOT exceed recommended pressure
1-1.5kg

Figure – Arm Extractor



ADJUSTING THE WIPER BLADE ANGLE

Figure – Adjusting the Wiper Blade Angle



IMPORTANT

Adjusting the Wiper Blade Angle only applies to Pantograph Arms with a Swivel Plate

Ref Figure – Adjusting the Wiper Blade Angle

1. On back of adjustable swivel plate, slacken all M5 screw and nut assemblies to allow movement of blade clip on plate.
2. Rotate blade clip and blade to correct angle. Max 25° about centre.
3. Re-tighten all M5 screw and nut assemblies
Torque M5 = 4.5Nm (on Arm – Swivel Plate/Blade Clip)

TROUBLESHOOTING – TABLE

Introduction

The following provides all the instructions and information necessary to locate problems and conduct tests on the windscreen wiper system components. The trouble-shooting table 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 the Table. These troubleshooting and repair procedures should be followed when encountering operational problems with the windshield wiper system

Troubleshooting Table

| SYMPTOM | PROBABLE CAUSE | TESTS AND CHECKS | CORRECTIVE ACTION |
|---|--|--|---|
| Wiper motor fails to start | On/off switch Voltage Level System Jammed Defective wiper motor | Check position of switch Check supply voltage to switch. Check wiring and switch connections Check wiper linkage | Turn switch to on position Replace switch. Correct loose wiring connections. Replace broken wires Release linkage. Release wiper arm Replace motor |
| Motor shaft turns but linkage & arm remain static | Defective or loose drive crank | Check linkage for a loose drive crank | Secure or replace drive crank. Clean motor output shaft with wire brush before replacing. With Ref to Maintenance Table – continued for Torque settings. |
| System operates but wiper arm remains static | Wiper arm | Check for loose wiper arm connection onto drive spindle | Secure or replace wiper arm after cleaning spindle spline with wire brush. Torque to M10 = 38Nm |
| Erratic Motor | Voltage level Switch Wiring | Check supply voltage to wiper system Check for loose or broken wires | Correct voltage supply problem Replace faulty switch Repair or replace wiring up to motor. Replace motor if this wiring is damaged |

Troubleshooting Table – Continued

| SYMPTOM | PROBABLE CAUSE | TESTS AND CHECKS | CORRECTIVE ACTION |
|---|---|--|--|
| Slow Motor Operation | Voltage Level On/off switch Motor Bracket Linkage Defective Wiper Motor | Check supply voltage to wiper system Check for broken bracket Check to see if Linkage is free moving | Correct voltage supply problem Replace faulty switch Replace defective bracket Free linkage replace worn or damaged components Replace Wiper Motor |
| Arm and blade not operating correctly or over sweep operation | Voltage level Linkage Spindle Arm Blade | Check supply voltage to wiper system. Check for worn or broken linkage Check for excessive wear in spindle Check that arm is not loose on spindle Check for excessive wear on arm Check fixing for wear Check blade for wear Check for excessive smearing on screen | Correct voltage supply problem Replace linkage Replace spindle Re-tighten spindle Clean spline on spindles with wire brush. replace arm Replace blade Replace blade Replace blade |
| Excessive wear on blade. | Spring pressure. | Use spring balance on centre of blade clip till blade begins to lift off glass. 1.0 – 1.1/2 kg Must not exceed 2.0 kg | Replace spring/arm. |
| Washer system not working correctly | No washer fluid from jets | Check washer fluid level in tank Check for damage to tank Check Pump is operational | Fill tank (<i>see Note</i>) Replace tank (<i>see Note</i>) Replace pump if faulty (<i>see Note</i>) |

NOTE

Tank and / or Pump may not be supplied by Hepworth's, but we recommend checking of these items in any case as lack of washer fluid on screen may lead to damage or premature failure of Windscreen Wiper equipment

MAINTENANCE – TABLE

Introduction

The following contains all preventative maintenance details for the windscreen wiper components. Preventative maintenance procedures include the information required for when to replace the wiper blades.

Refer to the Maintenance Instructions Section for removal and replacement for procedures.

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



WARNING:

Isolate the electrical supply before commencing any fitting work on any part of the wiper system.

The Maintenance Table 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.

Maintenance Table

| <i>PERIODICITY</i> | <i>EQUIPMENT</i> | <i>TASK</i> |
|-----------------------|-------------------------|--|
| Daily | Wiper Blades | Inspect wiper blades for damage, torn or missing rubber blades. Replace wiper blades as required |
| Daily | Windscreen Wiper System | Perform function test of wiper washer system. Do not carry out function test on a dry screen |
| Daily | Wash Tank | Ensure wash tank is filled with washer fluid to prevent wipers being used on a dry screen |
| Yearly or as required | Wiper blades | Non serviceable item. Replace at overhaul period or as required. |

Maintenance Table – continued

IMPORTANT

Where internal fixing screws and/or nuts are factory set and paint marked, leave untouched unless required to be changed or paint mark is damaged.

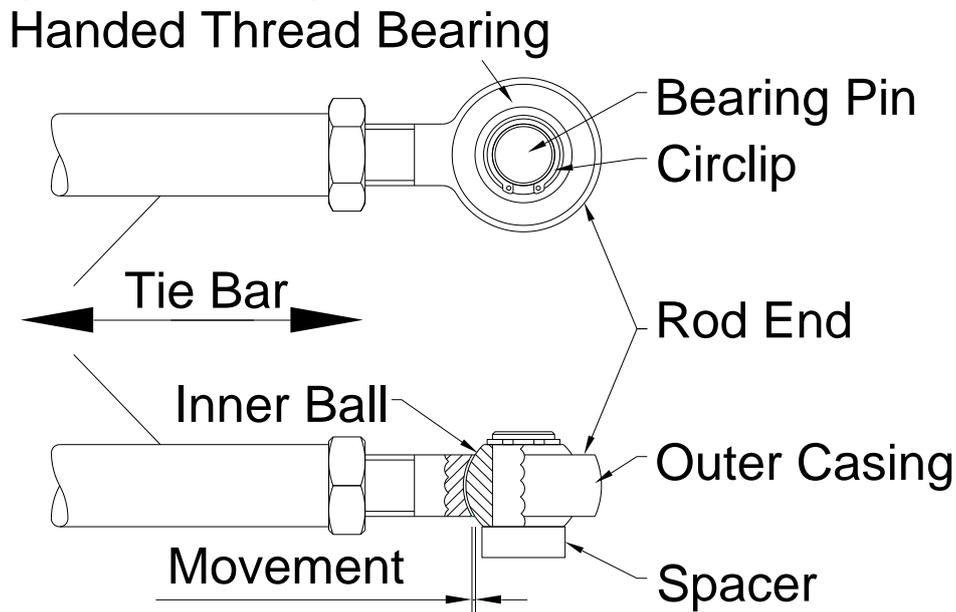
| PERIODICITY | EQUIPMENT | TASK |
|-------------|-----------------|--|
| Six Monthly | Complete System | <p>Check all torque settings for complete wiper system: Ref Note above. Shown below are torque settings used. (If required – Set torque wrench to correct setting. Fit on nut, turn, if correct, wrench should click.)</p> <p>M5 = 4.5Nm (on Arm Swivel Plate/Blade Clip – Nut)</p> <p>M8 = 2Nm (on Nylon Bulkhead Connector – Nut) M8 = 20Nm (on SS Bulkhead Connector – Nut)</p> <p>M8 = 20Nm (on Motor Bolts) M8 = 20Nm (on V.A. Lever) M8 = 25Nm (on Splined Drive Crk Nut & Bolt) M10 = 38Nm (on Spindle Nut) M12 = 20Nm (on Tie Bar with Threadlock) M26 = 30Nm (on Brass Liner)</p> <p>Carry out a visual check for wear in rod end. (Pull on the tie-bar/double bearing to see if any movement in the rod end bearing at the inner ball on the outer casing.)</p> |

How to check for wear on the Rod End

Ref Figure – Rod End Bearing

1. Pull on tie-bar or double bearing to see if any movement in rod end bearing at inner ball on outer casing.
In accordance with Maintenance Table – continued. Carry out a visual check for wear in rod end.
2. If excessive movement – replace

Figure – Rod End Bearing



MAINTENANCE INSTRUCTIONS

NOTE

Retain all items removed in a safe place, as they will be required on reassembly.

Any item to be discarded must be done in accordance to vessels described task guidelines

If you experience any difficulty in the removal/replacement of any of the units/components, please do not hesitate to contact Customer Service at B. Hepworth & Co. for advice.

Use the drawings for reference.



WARNING:

Isolate the electrical supply before commencing any fitting work on any part of the wiper system.

TO REPLACE THE WIPER BLADE

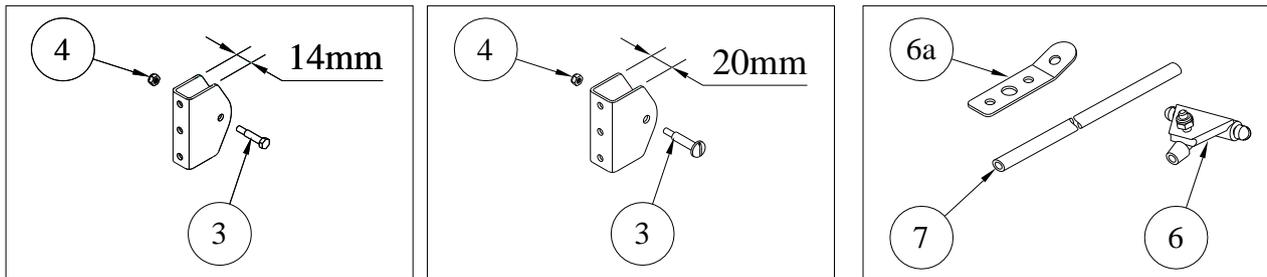
The wiper blades should be changed every 12 months but this is dependent on use and operating conditions

With reference to the Maintenance Table and the Troubleshooting Table – Continued

Removal

1. **Internally** – Run motor to ensure it is parked correctly. Disconnect all electrical power.
2. **Externally** – Carefully pull wiper arm assy away from windscreen to enable access to wiper blade.

Figure – Blade Clip Fixings



Ref Figure – Blade Fittings

1. Remove one blade retaining screw (3), and one M4 Nylock nut (4), from blade clip on arm.
2. Remove wiper blade from blade clip on wiper arm.

Reassembly

NOTE

Note if only one end of blade rubber captive, it must be at top of screen

1. Place wiper blade into blade clip on wiper arm.

Ref Figure – Blade Captive End

2. Ensure that all fixing holes align.

3. Secure in place with blade retaining screw (3), and nut (4).

IMPORTANT

Do not over tighten blade screw and nut, as wiper blade is required to pivot on glass.

Ref Figure – Nut Tightening

4. Secure nut until tight – then 1/4 turn back

Figure – Nut Tightening

Secure nut
until tight

1/4 turn back

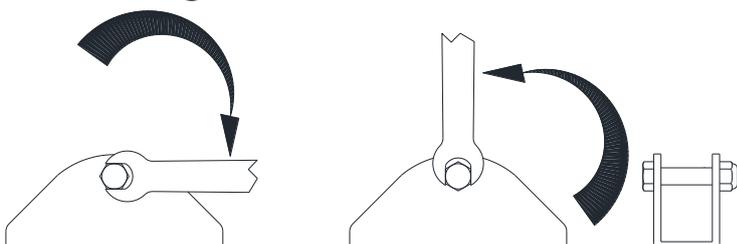
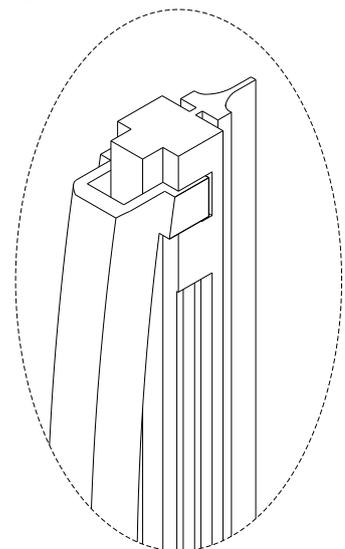


Figure – Blade Captive End



5. Lower wiper blade carefully back onto windscreen.

TO REPLACE THE WIPER ARM

Removal

With Reference to Wiper Arm Assembly – Pantograph or Pendulum

1. **Internally** – Run motor to ensure it is parked correctly. Disconnect all electrical power.
2. **Externally** – 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 10mm Nut Cap(s) – (16), M10 Nylock Nut(s) – (15) and 10mm Flat Washer(s) – (14). Then using Arm Extraction Tool carefully remove Arm
(Arm Extractor Tool is available see Fitting the Wiper Arm Assembly 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
In accordance with Fitting the Wiper Arm Assembly

TO REMOVE THE ENTIRE WIPER MOTOR UNIT ASSEMBLY

Removal

With Reference to Figure 2 – Exploded Diagram

1. **Internally** – Run motor to insure it is parked correctly. Disconnect all electrical power. Disconnect wiring from Motor.

IMPORTANT:

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

2. **Externally** – remove arm caps, nuts and washers. Then using arm extraction tool carefully remove arms
3. Remove 26mm weather caps (13), M26 nuts (12), 26mm single coil washers (11), 26mm flat steel washers (10) 26mm neoprene washers (9), idler plate (8) and finally idler plate gasket (7).
4. **Internally** – Unscrew fixing bolts from motor mounting bracket (1).
5. Carefully remove entire wiper motor unit from bulkhead.

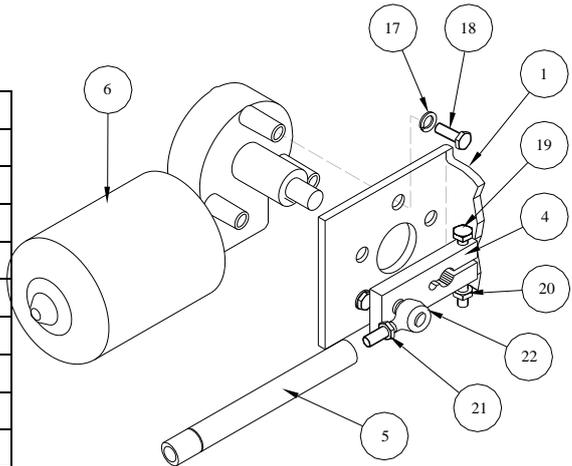
Replacement

1. Replace entire wiper motor assy.
In accordance with Fitting the Wiper Motor Assy
2. Fit wiper arm assy.
In accordance with Fitting the Wiper Arm Assembly

TO REPLACE THE DRIVE CRANK ASSEMBLY

Figure – Wiper Motor

| ITEM | DESCRIPTION | QTY |
|------|-----------------------------|-----|
| 4 | Drive Crank Sub Assy 40 Crs | 1 |
| 5 | Tie Bar – 115mm Overall | 1 |
| 6 | 110Nm 24v (IER) Motor | 1 |
| 17 | 8mm Washer – Single Coil | 3 |
| 18 | M8 Fixing Bolts | 3 |
| 19 | M8 Securing Bolt | 1 |
| 20 | M8 Securing Nylock Nut | 1 |
| 21 | M12 Left Hand Bearing Nut | 1 |
| 22 | M12 Left Hand Bearing | 1 |



Removal

Ref Figure – Wiper Motor

1. **Internally** – Run motor to insure it is parked correctly. Disconnect all electrical power.
2. Remove entire wiper motor assy.
In accordance with To Remove the Entire Wiper Motor Unit Assembly

IMPORTANT:

Please make a note of Drive Crank POSITION relative to SPINDLE LEVER, as this will affect PARK position for ARMS and BLADES, i.e. SPINDLE LEVER facing towards Motor or away from Motor

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 (left hand thread) (22)

Replacement

1. Screw tie bar onto bearing (left hand thread) (22) of **new** drive crank/bearing assy (4).
2. Carefully fit drive crank/bearing assy (4), over motor drive shaft, (referring to note after operation 2 on 'to remove' for position.) Tighten drive crank nut (20), and bolt (19).
3. Tighten both bearing nuts at either end of tie bar.

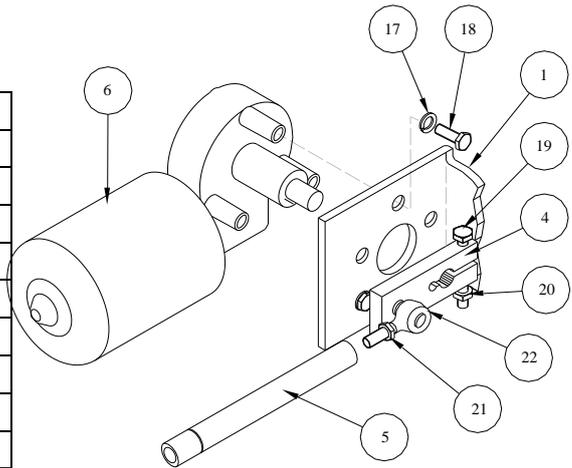
IMPORTANT: Ensure bearing centres are as stated in drawing (figure 1)

4. Replace entire wiper motor assy.
In accordance with Fitting the Wiper Motor Assy
5. Fit wiper arm assy.
In accordance with Fitting the Wiper Arm Assy

TO REPLACE THE WIPER MOTOR

Figure – Wiper Motor

| ITEM | DESCRIPTION | QTY |
|------|-----------------------------|-----|
| 4 | Drive Crank Sub Assy 40 Crs | 1 |
| 5 | Tie Bar – 115mm Overall | 1 |
| 6 | 110Nm 24v (IER) Motor | 1 |
| 17 | 8mm Washer – Single Coil | 3 |
| 18 | M8 Fixing Bolts | 3 |
| 19 | M8 Securing Bolt | 1 |
| 20 | M8 Securing Nylock Nut | 1 |
| 21 | M12 Left Hand Bearing Nut | 1 |
| 22 | M12 Left Hand Bearing | 1 |



Removal

Ref Figure – Wiper Motor

1. **Internally** – Run motor to insure it is parked correctly. Disconnect all electrical power. Disconnect wiring from Motor.
2. Remove entire wiper motor assy.
In accordance with To Remove the Entire Wiper Motor Unit Assembly

IMPORTANT:

Please make a note of Drive Crank POSITION relative to SPINDLE LEVER, as this will affect PARK position for ARMS and BLADES, i.e. SPINDLE LEVER facing towards Motor or away from Motor

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 **new** Wiper Motor (6) replace and tighten three fixing bolts (18) and washers (17)
2. Carefully fit drive crank/bearing assy (4), over motor drive shaft, (referring to note after operation 2 on 'to remove' for position.) Tighten drive crank nut (20), and bolt (19).
3. Tighten both bearing nuts at either end of tie bar.

IMPORTANT:

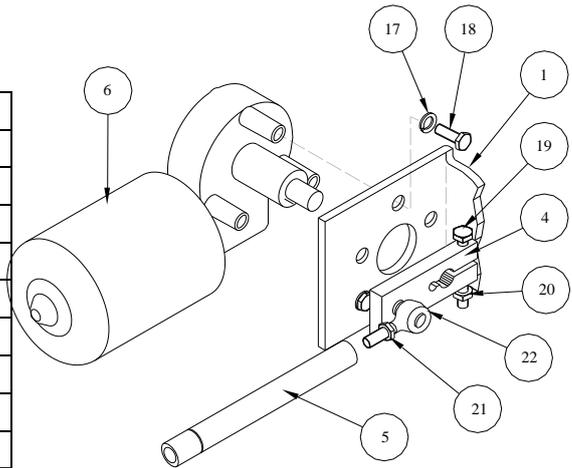
Ensure bearing centres are as stated in drawing (figure 1)

4. Replace entire wiper motor assy.
In accordance Fitting the Wiper Motor Assy
5. Fit wiper arm assy.
In accordance with Fitting the Wiper Arm Assy

TO REPLACE THE TIE BAR

Figure – Wiper Motor

| ITEM | DESCRIPTION | QTY |
|------|-----------------------------|-----|
| 4 | Drive Crank Sub Assy 40 Crs | 1 |
| 5 | Tie Bar – 115mm Overall | 1 |
| 6 | 110Nm 24v (IER) Motor | 1 |
| 17 | 8mm Washer – Single Coil | 3 |
| 18 | M8 Fixing Bolts | 3 |
| 19 | M8 Securing Bolt | 1 |
| 20 | M8 Securing Nylock Nut | 1 |
| 21 | M12 Left Hand Bearing Nut | 1 |
| 22 | M12 Left Hand Bearing | 1 |



Removal

Ref Figure – Wiper Motor

1. **Internally** – Run motor to insure it is parked correctly. Disconnect all electrical power. Disconnect wiring from Motor.
2. Remove entire wiper motor assy.
In accordance with To Remove the Entire Wiper Motor Unit Assembly

IMPORTANT:

Please make a note of Drive Crank POSITION relative to SPINDLE LEVER, as this will affect PARK position for ARMS and BLADES, i.e. SPINDLE LEVER facing towards Motor or away from Motor

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 (left hand thread) (22)
6. Repeat operation 5 on liner/lever/bearing assy (right hand thread) and remove tie bar (5),

Replacement

1. Screw **new** tie bar (note groove is on right hand end of tie bar) onto bearing (right hand thread) at liner/lever/bearing assy.
2. Screw **new** tie bar on to bearing (left hand thread) (22) of drive crank/bearing assy.
3. Carefully fit drive crank/bearing assy (4), over motor drive shaft, (referring to note after operation 2 on 'to remove' for position.) Tighten drive crank nut (20), and bolt (19).
4. Tighten both bearing nuts at either end of tie bar.

IMPORTANT:

Ensure bearing centres are as stated in drawing (figure 1)

5. Replace entire wiper motor assy.
In accordance with Fitting the Wiper Motor Assy
6. Fit wiper arm assy.
In accordance with Fitting the Wiper Arm Assy

CONTROLLER INSTALLATION INSTRUCTIONS

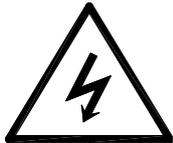
NOTE

Retain all items removed in a safe place, as they will be required on reassembly.

Any item to be discarded must be done in accordance to vessels manufacturer described task guidelines

If you experience any difficulty in the fitting of any of the controller /switches, please do not hesitate to contact Customer Service at B. Hepworth & Co. for advice.

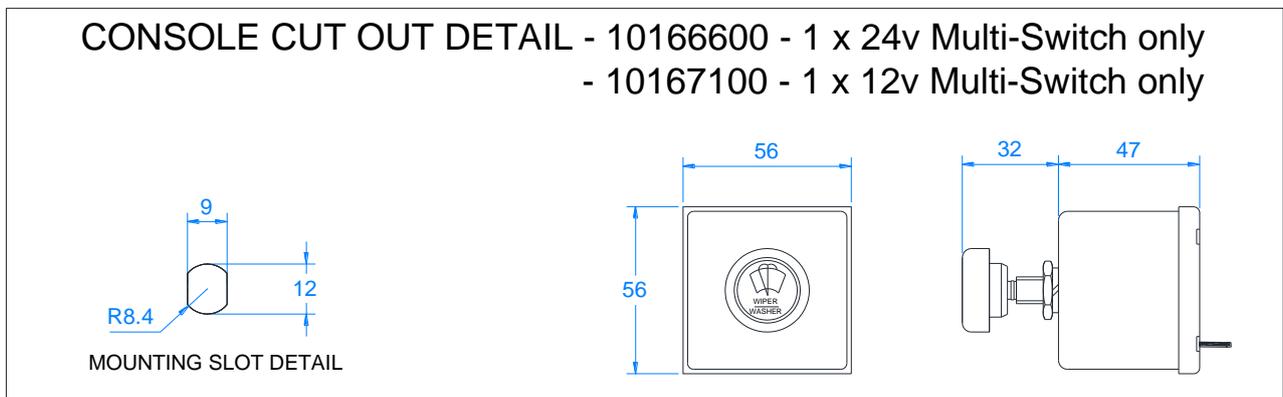
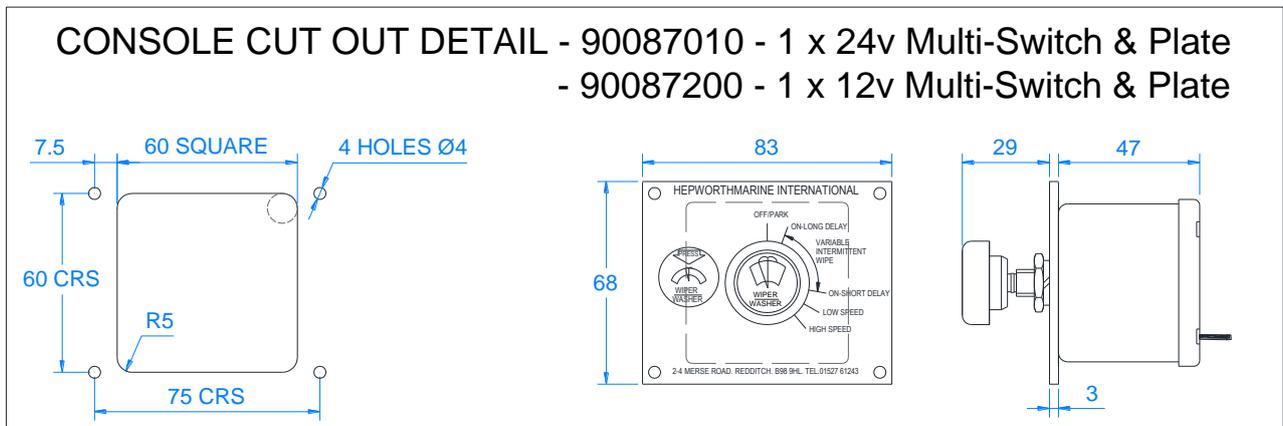
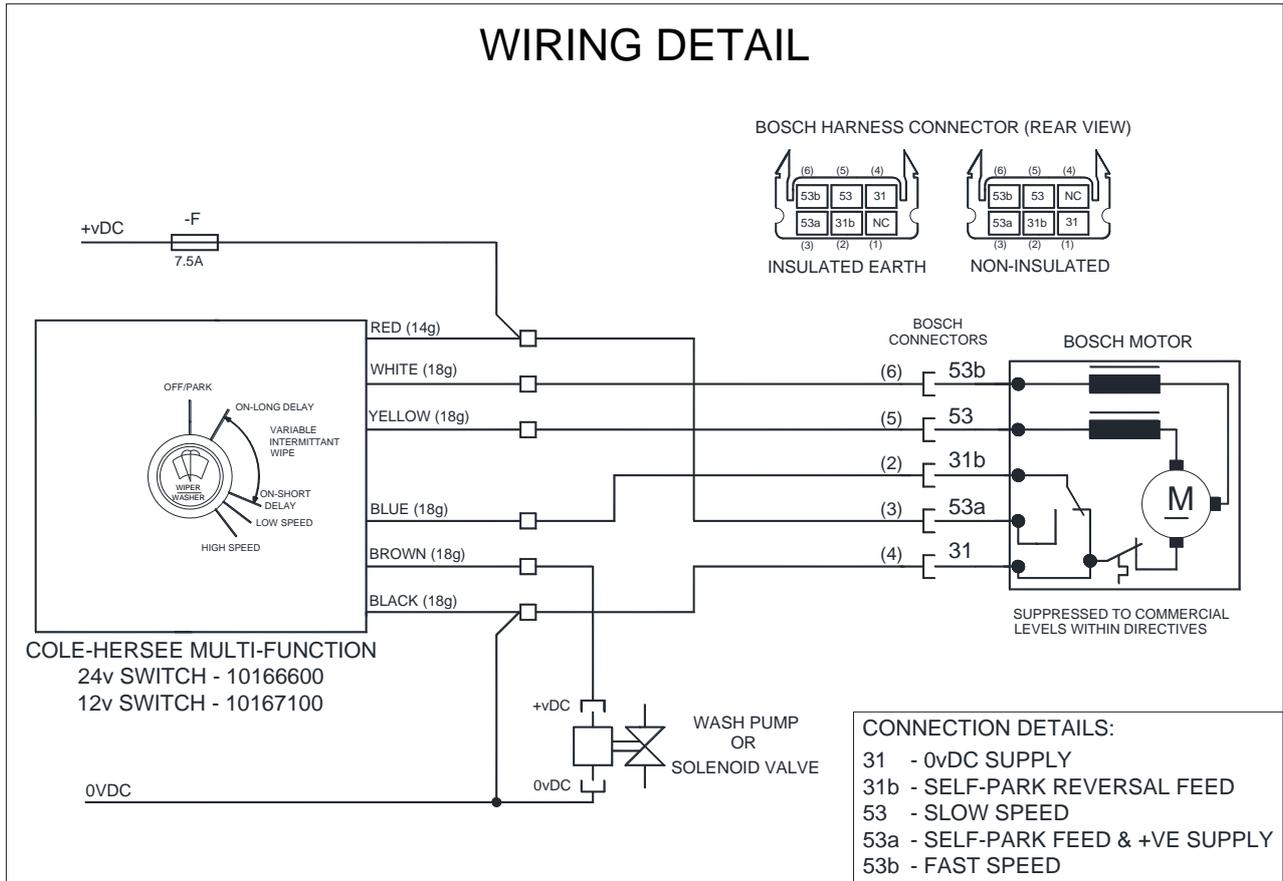
Use the drawings for reference.



WARNING:

Isolate the electrical supply before commencing any fitting work on any part of the wiper system.

12V OR 24V MULTI-SWITCH – WIRING & SIZES



12V OR 24V MULTI-SWITCH – OPERATION

NOTE

For other all other switch or control instructions refer to the ship's fitters/suppliers manual.

Ref Figure – Multi-Switch

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

IMPORTANT

Do not run wipers on a dry screen.

2. To apply washer fluid to screen, press knob. (**WIPER WASHER**) This will apply washer fluid for period of time button is pressed.

NOTE

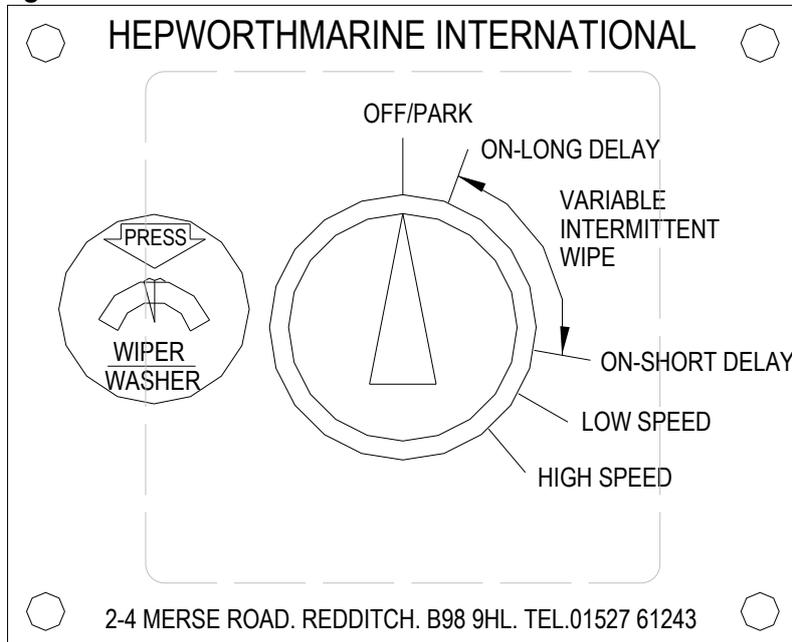
The wiper will also operate for 3-4 wipes at normal speed after the washer fluid stops.

3. Turn knob CLOCKWISE it will (CLICK) which turns wipers on. Switch is now in area of variable intermittent wipe cycle time. Which is between (**ON-LONG DELAY 15 seconds**) and (**ON-SHORT DELAY 2 seconds**) positions.
4. As knob is turned further clockwise between two positions it shortens delay period between wipes.
5. Turn knob CLOCKWISE to next (CLICK) (**LOW SPEED**). This gives a continuous wipe across screen at a standard speed, with no delay between wipes.
6. Turn knob CLOCKWISE to last (CLICK) (**HIGH SPEED**). This gives a continuous wipe across screen at a faster speed, with no delay between wipes.
7. Turn knob ANTI-CLOCKWISE to off position when finished. (**OFF/PARK**)

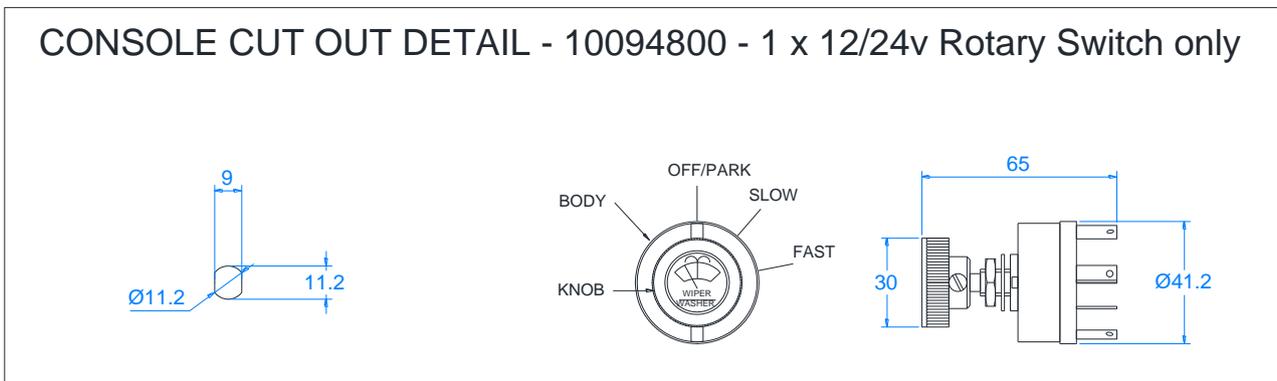
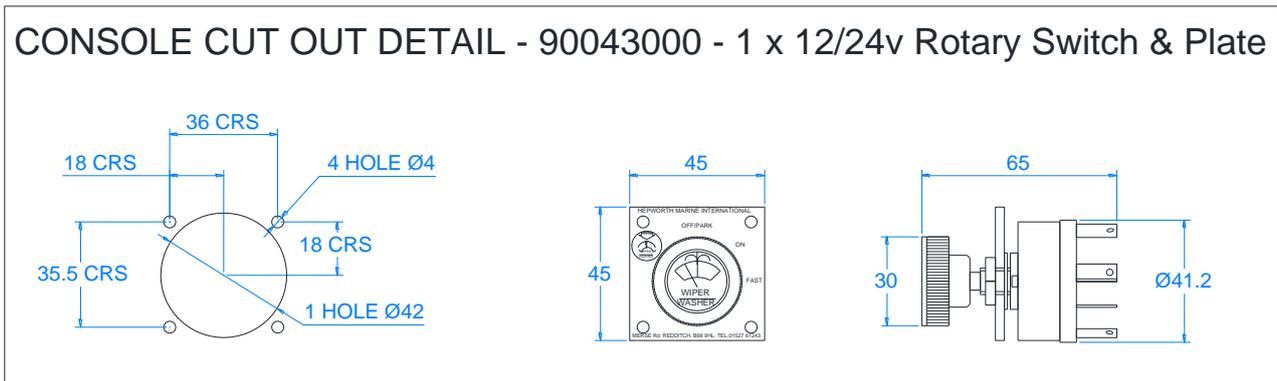
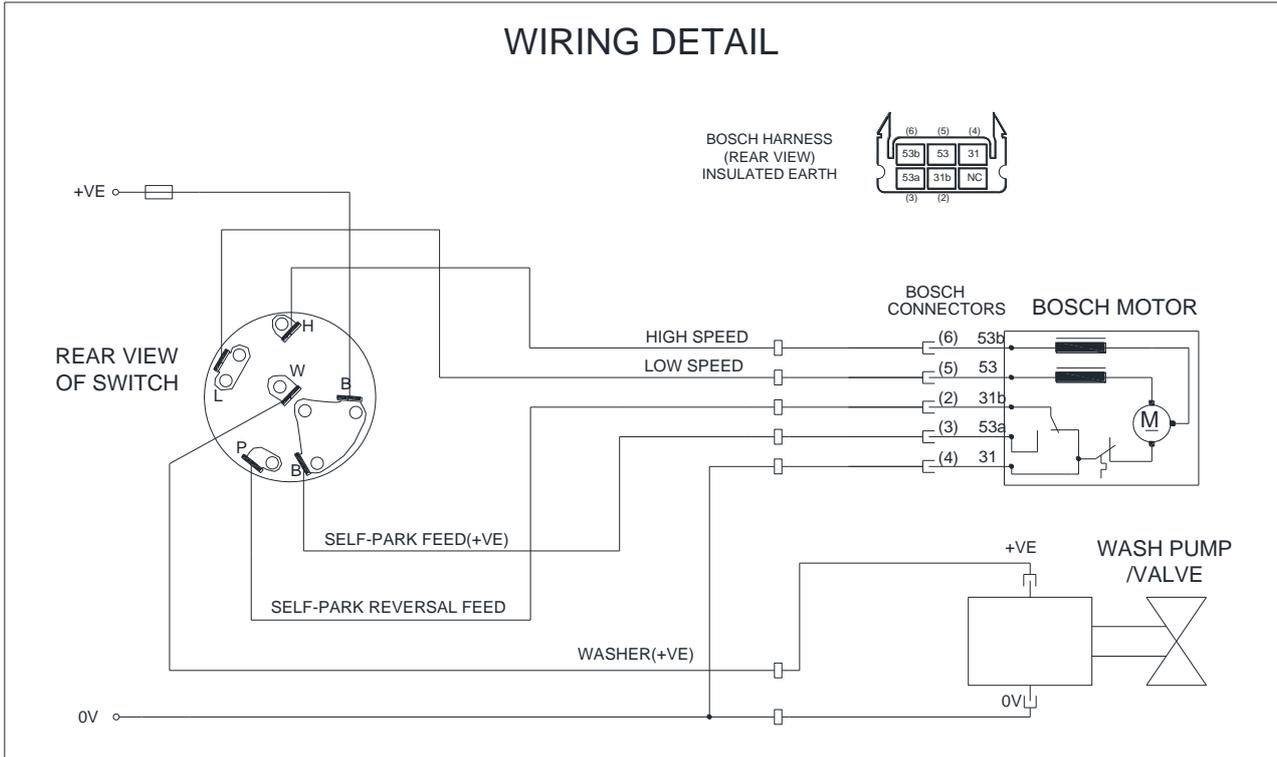
IMPORTANT

When turning to the off position ensure that it CLICKS to confirm fully off

Figure – Multi-Switch



12V/24V ROTARY SWITCH – WIRING & SIZES



12V/24V ROTARY SWITCH – OPERATION

NOTE

For other all other switch or control instructions refer to the ship's fitters/suppliers manual.

Ref Figure – Rotary Switch

1. Check switch is in off position. (**OFF/PARK**)

IMPORTANT

Do not run wipers on a dry screen.

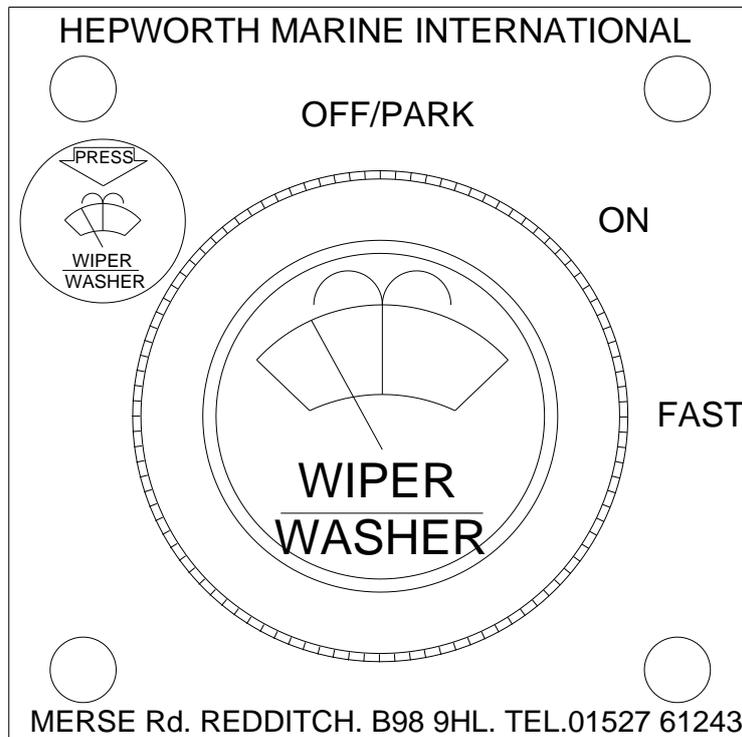
2. To apply washer fluid to screen, press knob. (**WIPER WASHER**) This will apply washer fluid for period of time button is pressed.

NOTE

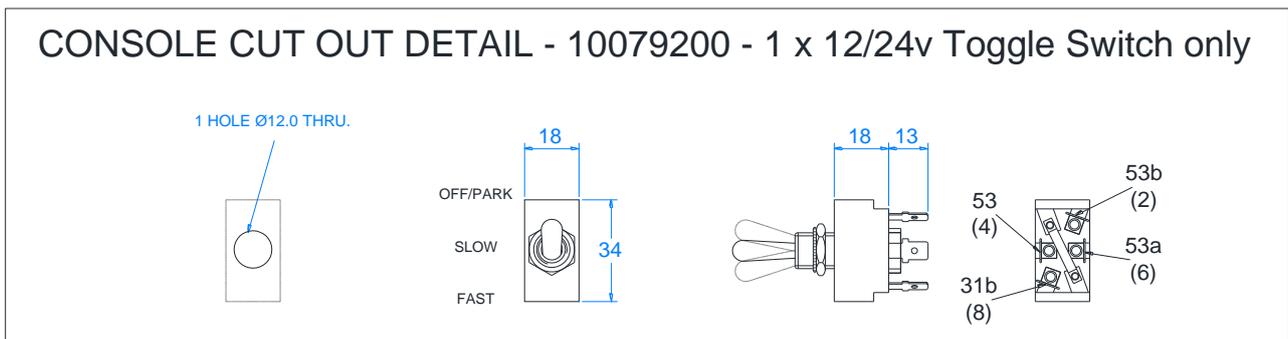
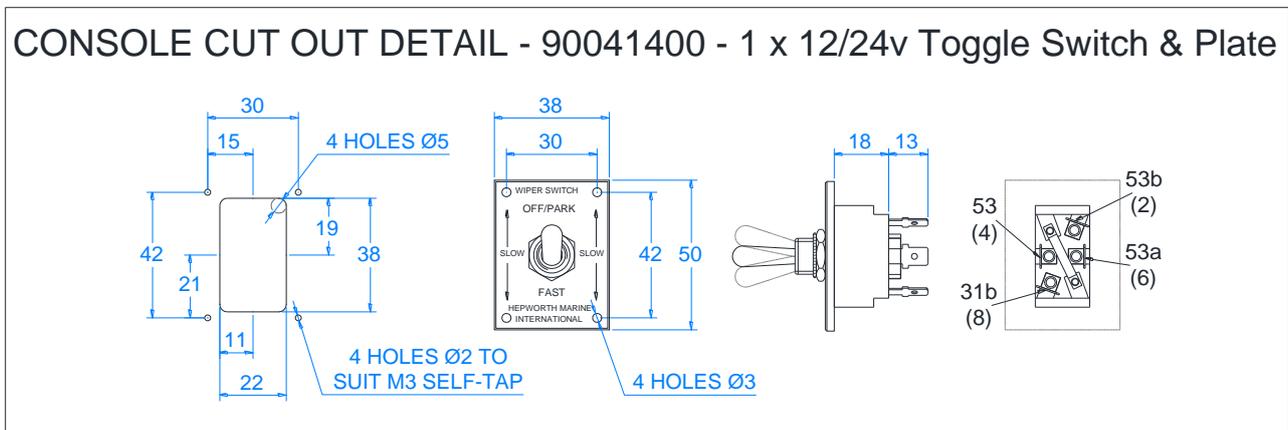
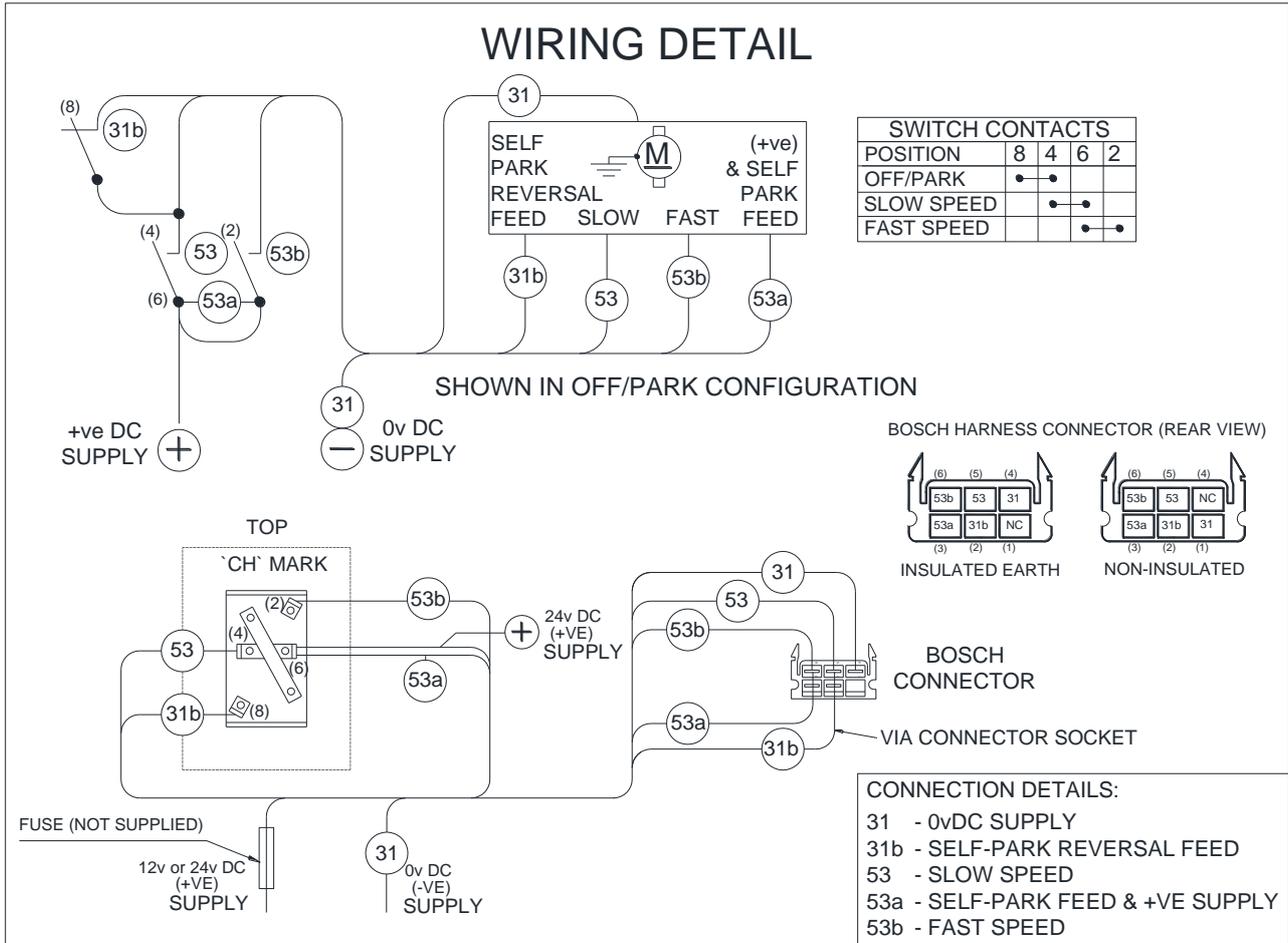
It does not activate the wiper

3. Turn knob CLOCKWISE it will (CLICK) which turns wipers on, (**ON**). This setting gives a continuous wipe across screen at a standard speed, with no delay between wipes.
4. Turn knob CLOCKWISE to last (CLICK) (**FAST**). This setting gives a continuous wipe across screen at a faster speed, with no delay between wipes.
5. Turn knob ANTI-CLOCKWISE to off position when finished. (**OFF/PARK**)

Figure – Rotary Switch



12V/24V TOGGLE SWITCH – WIRING & SIZES



12V/24V TOGGLE SWITCH – OPERATION

NOTE

For other all other switch or control instructions refer to the ship's fitters/suppliers manual.

Ref Figure – Toggle Switch

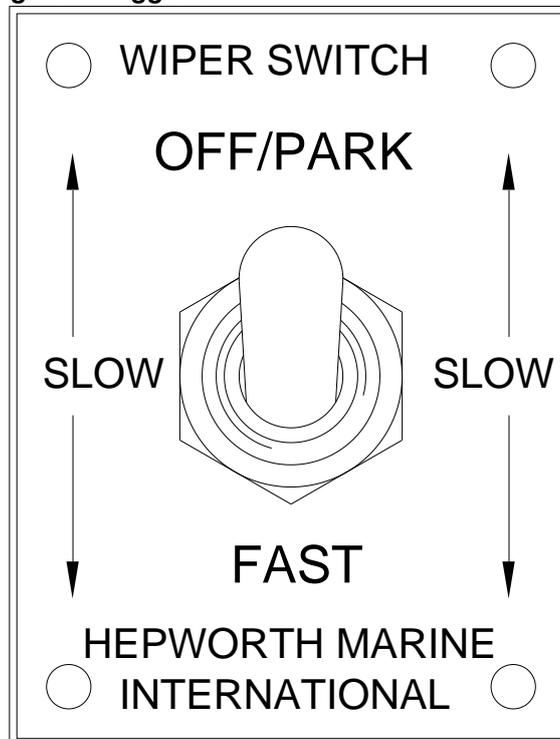
1. Check switch is in off position. (**OFF/PARK**)

IMPORTANT

Do not run wipers on a dry screen.

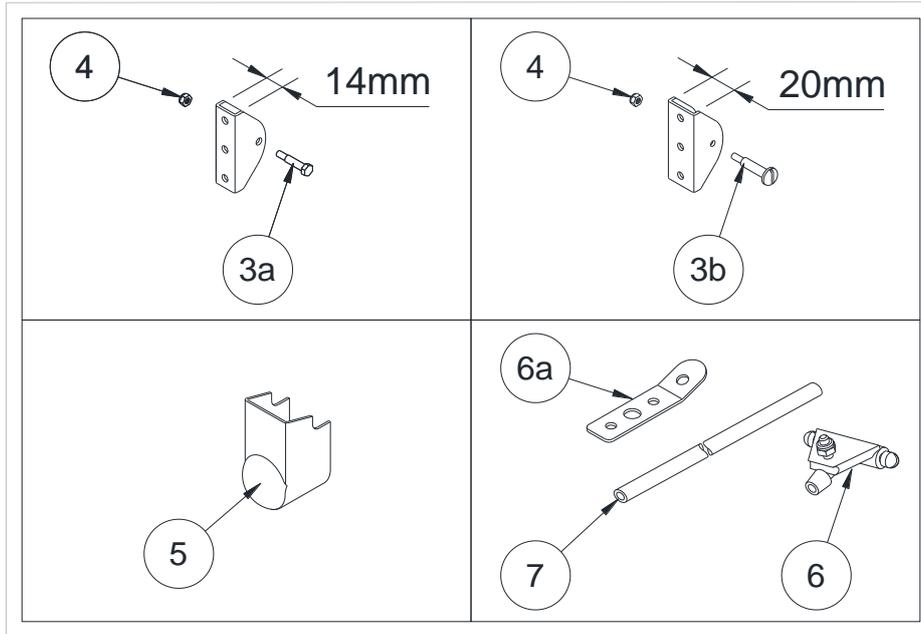
2. This switch does not control application of washer fluid.
3. Pushing toggle to centre position (**SLOW**) gives a continuous wipe across screen at a standard speed, with no delay between wipes.
4. Pushing toggle to bottom position (**FAST**) gives a continuous wipe across screen at a faster speed, with no delay between wipes.
5. Push toggle to top position when finished. (**OFF/PARK**)

Figure – Toggle Switch



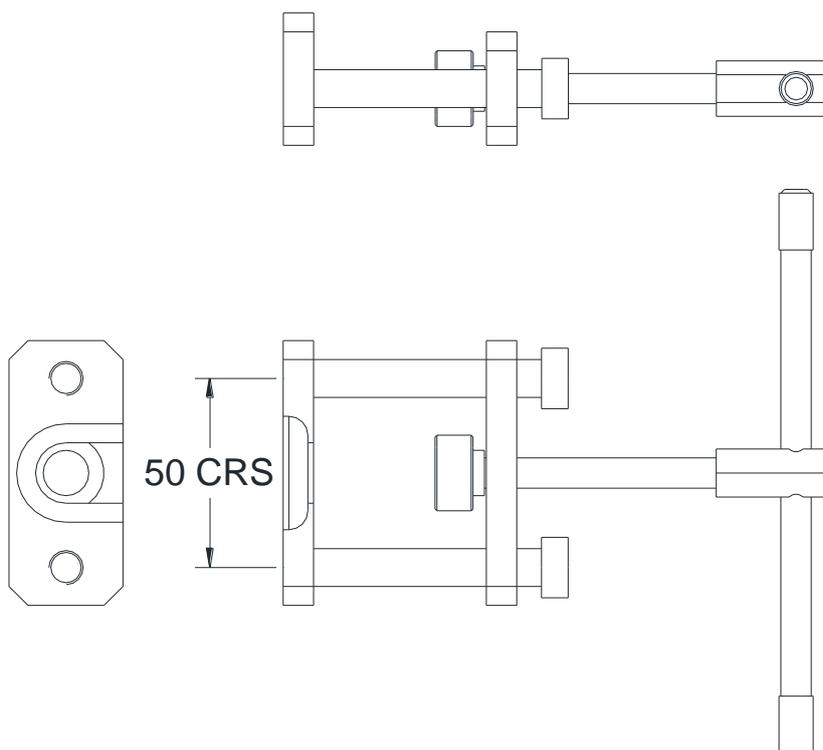
EXTERNAL FITTINGS – ARMS

Fittings for Arm and Blade



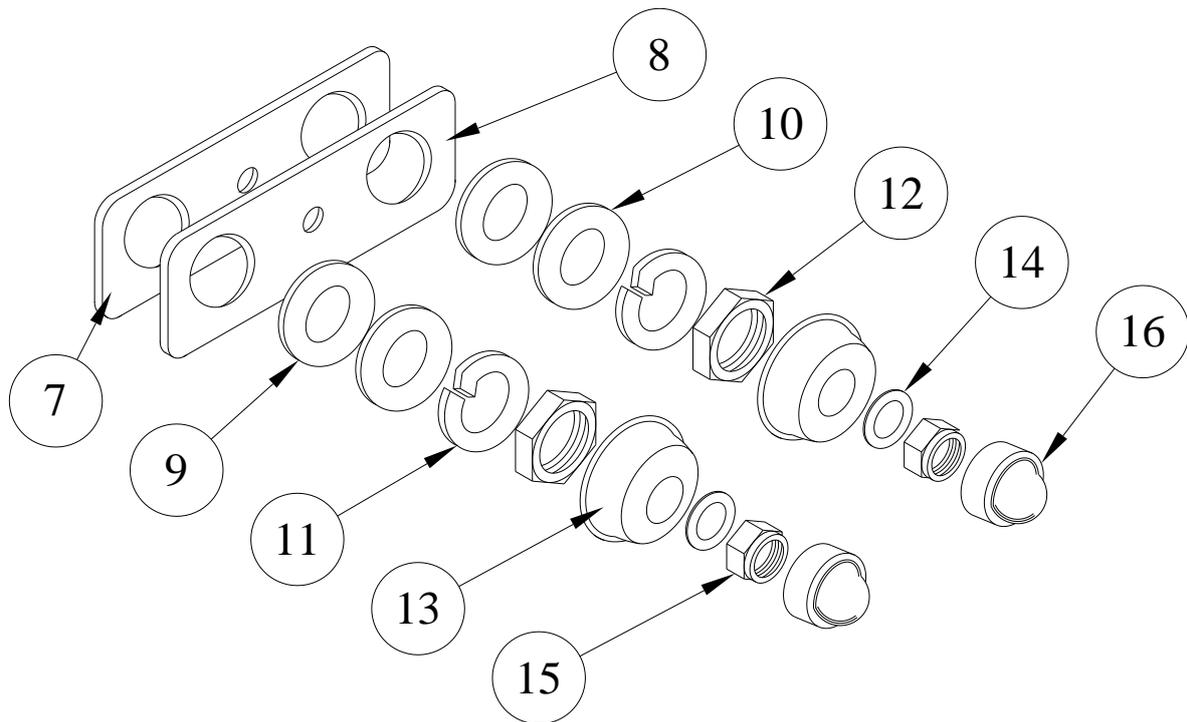
| Part No. | Description | Qty |
|----------|--|-----------|
| 80205600 | Blade Retaining Screw (14mm Blade Clip) (3) | 1 per Arm |
| 80010700 | Blade Retaining Screw (20mm Blade Clip) (3) | 1 per Arm |
| 10011400 | M4 Nylock Nut (4) | 1 per Arm |
| 80005100 | Heavy Duty Head – Weather Cap (5) | 1 per Arm |
| 80200100 | Wash Jet Assy (6) | 1 per Arm |
| 80201700 | Wash Jet Bracket (6a) | 1 per Arm |
| 80200400 | Wash Hose – 4mm I/D x 6Mmm O/D (7) | Metres |

| Part No. | Description | Qty |
|----------|-------------------------------------|-------------|
| 60680600 | Arm Extractor Tool – All Head Types | As Required |



EXTERNAL FITTINGS – LINKAGE

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



| <i>Part No.</i> | <i>Description</i> | <i>Qty</i> |
|-----------------|--------------------------------|-------------|
| 60250300 | Idler Gasket (7) | 1 per Unit |
| 60250200 | Idler Plate (8) | 1 per Unit |
| 10029100 | 26mm Washer – Neoprene (9) | 1 per Liner |
| 10026100 | 26mm Washer – Flat (10) | 1 per Liner |
| 10026600 | 26mm Washer – Single Coil (11) | 1 per Liner |
| 10015300 | M26 Hex Nut (12) | 1 per Liner |
| 60054600 | 26mm Weather Cap (13) | 1 per Liner |
| 10027800 | 10mm Washer – Flat (14) | 1 per Liner |
| 10018000 | M10 Hex. Nut (15) | 1 per Liner |
| 10063500 | 10mm Nut Cap (16) | 1 per Liner |

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