



**B. HEPWORTH**  
AND COMPANY LIMITED

*...performance wiper  
systems...*

INSTALLATION AND MAINTENANCE  
INSTRUCTIONS FOR THE  
**100NM COMPACT**  
SINGLE STATION  
WINDSCREEN WIPER SYSTEM

# CONTENTS

GENERAL INFORMATION AND SAFETY SUMMARY .....	4
SAFETY PRECAUTIONS .....	4
INTRODUCTION .....	4
VARI-ARC LEVER SETTINGS .....	4
ABBREVIATIONS AND DEFINITIONS .....	4
DESCRIPTION OF WIPER SYSTEM .....	5
WIPER MOTOR ASSEMBLY – RH BRACKET .....	5
WIPER MOTOR ASSEMBLY – LH BRACKET.....	6
EXPLODED VIEW OF LINKAGE .....	7
ELECTRICAL CONNECTIONS – HIGH VOLTAGE DC MOTOR .....	8
ELECTRICAL CONNECTIONS – HIGH VOLTAGE AC MOTOR .....	8
WIPER ARM ASSEMBLY .....	9
INSTALLATION INSTRUCTIONS.....	9
DRILLING DIAGRAM.....	11
DRILLING DIAGRAM.....	12
FITTING THE WIPER UNIT .....	13
VARI ARC UNITS – ARC ADJUSTMENT .....	14
FITTING THE WIPER BLADE.....	15
FITTING THE WIPER ARM ASSEMBLY .....	16
ADJUSTING THE WIPER BLADE ANGLE .....	18
TROUBLESHOOTING – TABLE.....	19
INTRODUCTION .....	19
SAFETY PRECAUTIONS .....	19
TROUBLESHOOTING PROCEDURES .....	19
TROUBLESHOOTING TABLE.....	19
TROUBLESHOOTING TABLE – CONTINUED.....	20
MAINTENANCE – TABLE.....	21
INTRODUCTION .....	21
SAFETY PRECAUTIONS .....	21
SCHEDULED MAINTENANCE ACTION CHECK .....	21
MAINTENANCE TABLE.....	21
MAINTENANCE TABLE – CONTINUED.....	22
HOW TO CHECK FOR WEAR ON THE ROD END .....	22
MAINTENANCE INSTRUCTIONS .....	23
TO REPLACE THE WIPER BLADE .....	24
TO REPLACE THE WIPER ARM.....	25
TO REMOVE THE ENTIRE WIPER MOTOR UNIT ASSEMBLY .....	26
TO REPLACE THE DRIVE CRANK ASSEMBLY .....	27

TO REPLACE THE WIPER MOTOR ..... 28  
TO REPLACE THE TIE BAR ..... 29  
TO REPLACE THE LEVER/LINER/SPINDLE SUB ASSEMBLY ..... 30  
EXTERNAL FITTINGS – ARMS..... 31  
EXTERNAL FITTINGS – LINKAGE..... 32

# 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 is shown in Figures 1a, 1b & 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

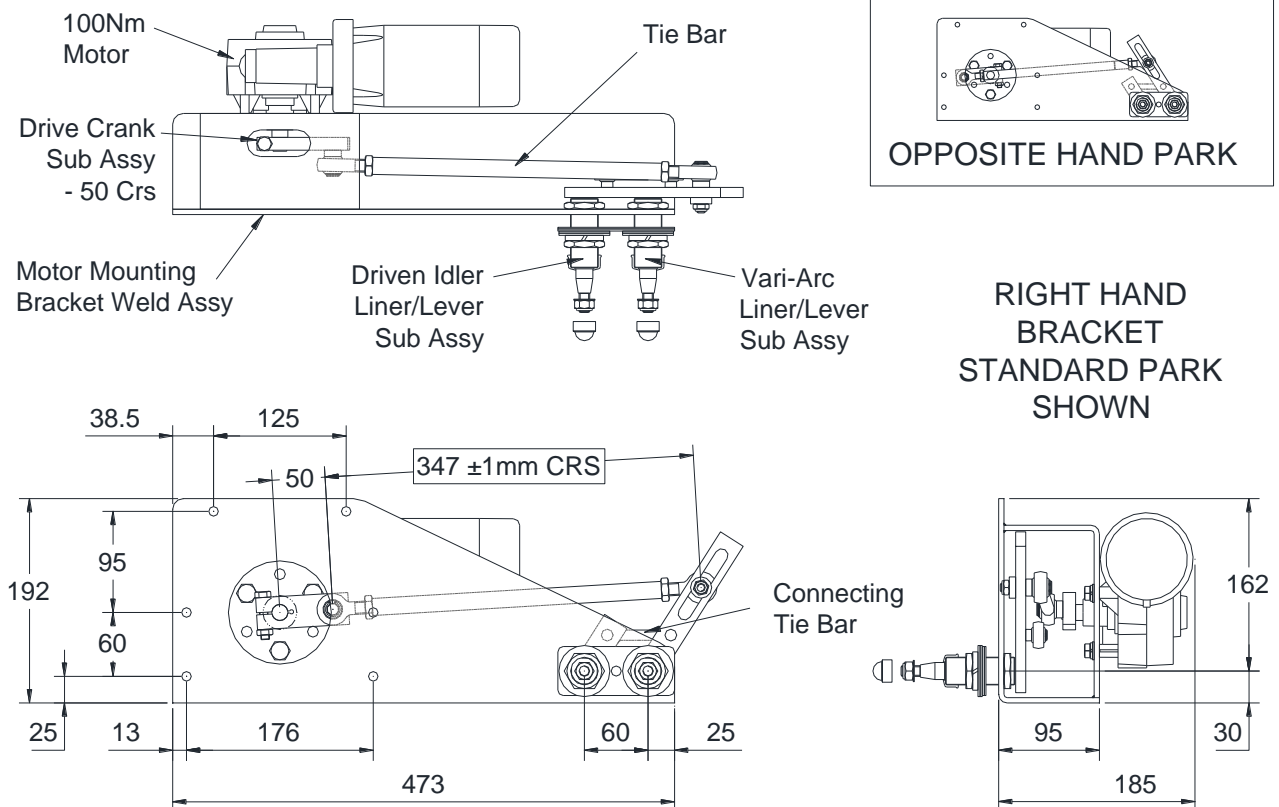
The drive lever is secured to the wiper motor shaft and connected through a tie bar, to the spindle lever assembly. These components transfer the motor shaft rotation to the wiper arm assemblies.

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.

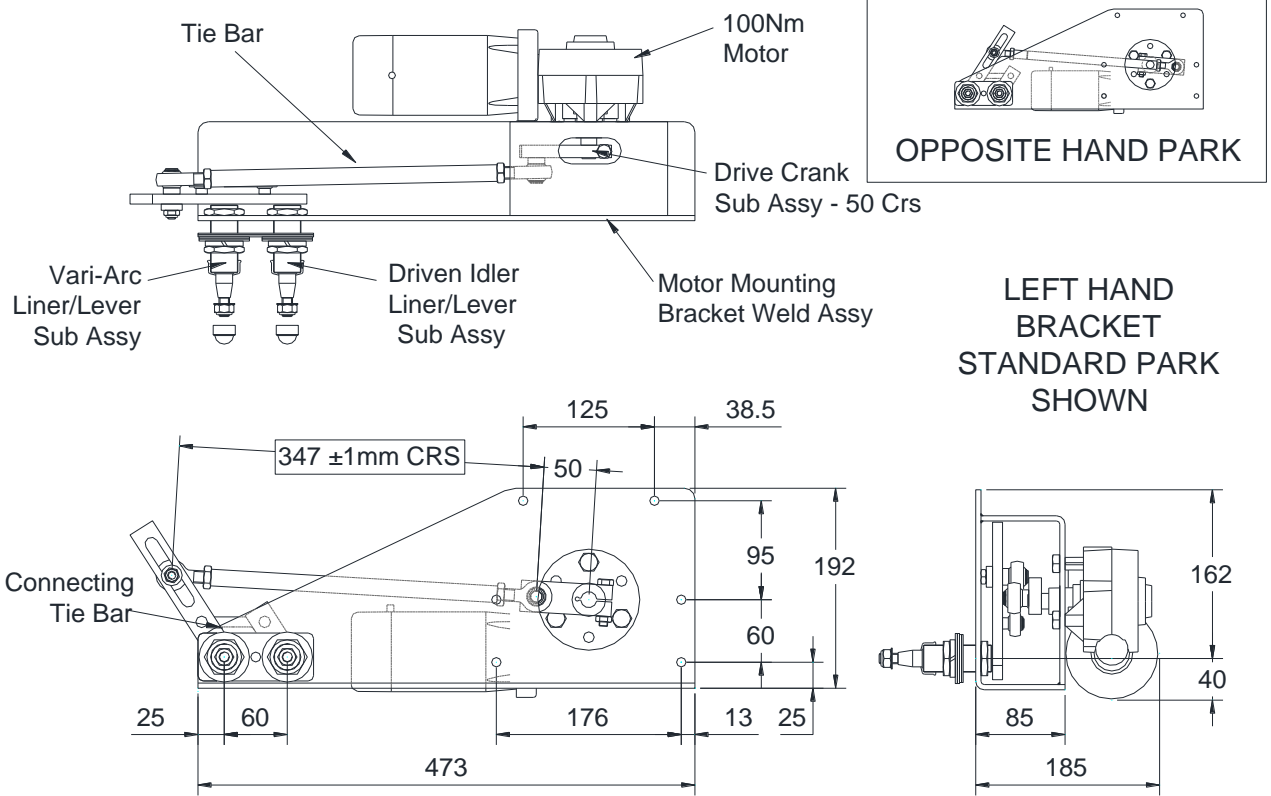
## Wiper Motor Assembly – RH BRACKET

Figure 1a



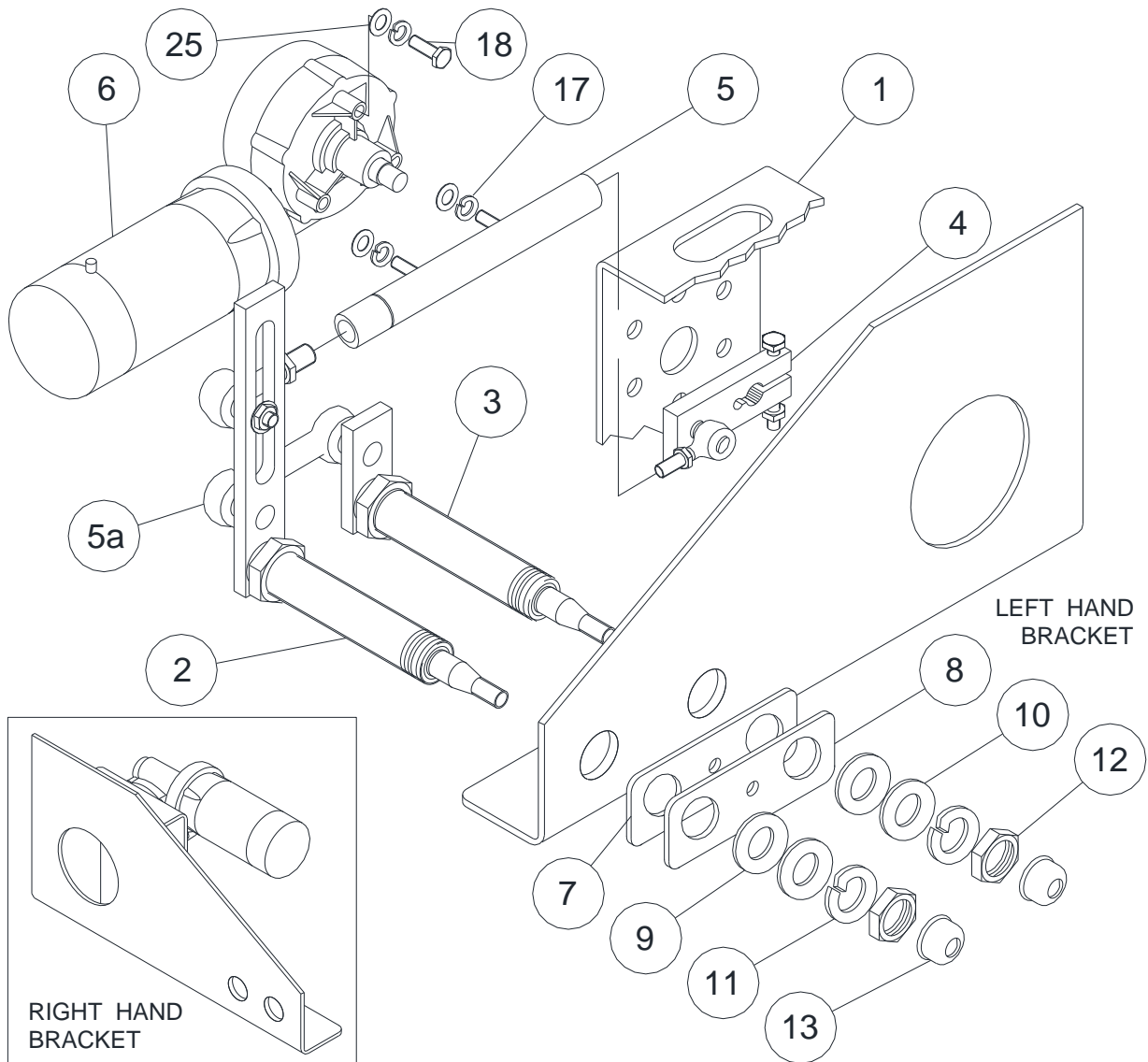
# Wiper Motor Assembly – LH BRACKET

Figure 1b



## Exploded View of Linkage

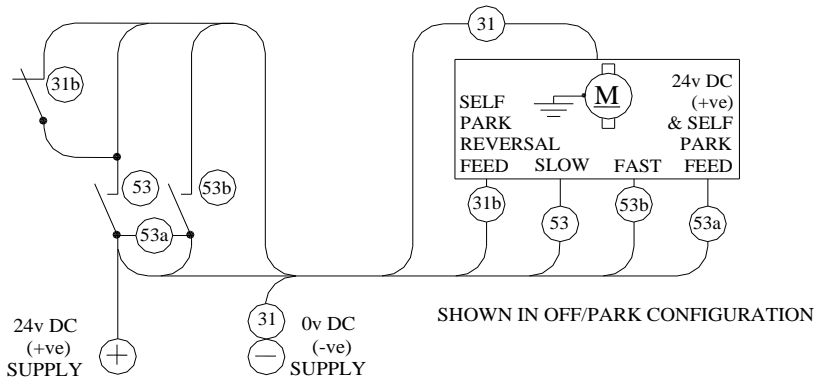
**Figure 2**



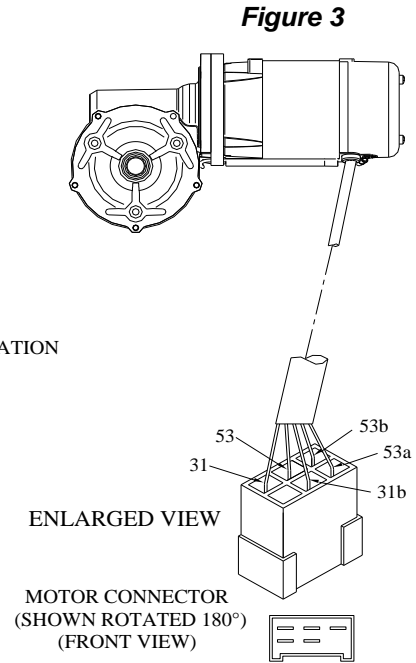
ITEM	DESCRIPTION	QTY
1	Motor Mounting Bracket	1
2	Liner V.Arc Lever Sub Assy	1
3	Idler Liner Sub Assy	1
4	Drive Crank Sub Assy 40 Crs	1
5	Tie Bar - 270mm Overall	1
6	100Nm (IER) Motor	1
7	Idler Plate - Gasket	1
8	Idler Plate	1

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 – High Voltage DC Motor

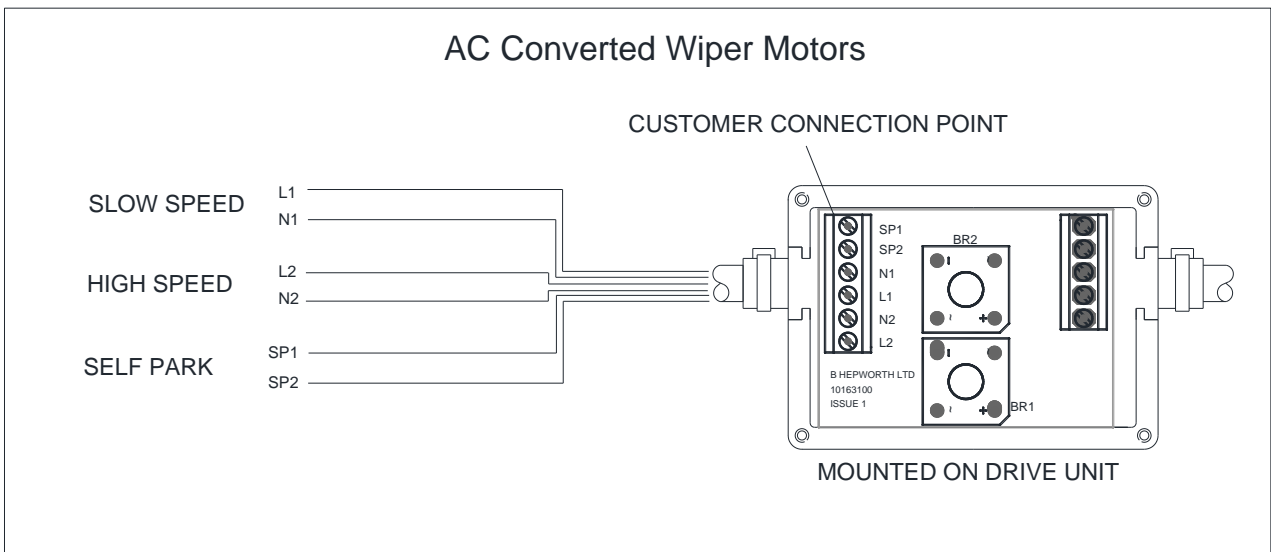


WIRING CONNECTION CODE	
31	0v DC (-ve) Supply
53	Slow Speed
53b	Fast Speed
53a	24v DC (+ve) Supply & Self Park
31b	Self Park – Reversal Speed



## Electrical Connections – High Voltage AC Motor

Connection should always be carried out in conjunction with the controller manual.



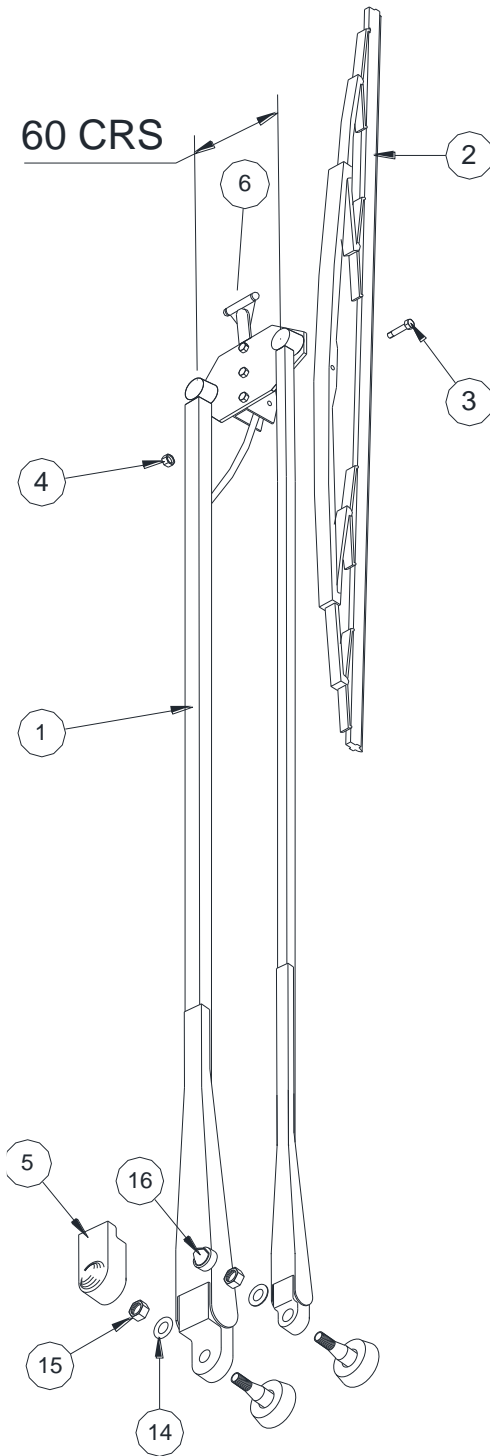


## Wiper Arm Assembly

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.

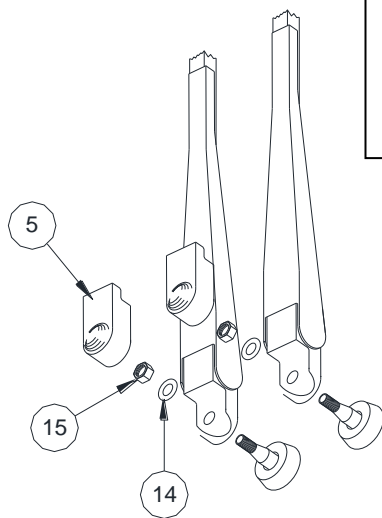


ITEM	DESCRIPTION	QTY
1	P84 Wiper Arm	1
2	Articulated Curved Blade	1
3	Blade Retaining Screw	1
4	Nylock Nut	1
5	Arm Head Weather Cap	1
6	Wash Jet Assy	1
7	Ecoprene Wash Tube	Metres

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

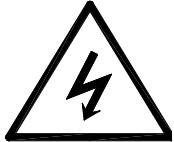
## NOTE

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.



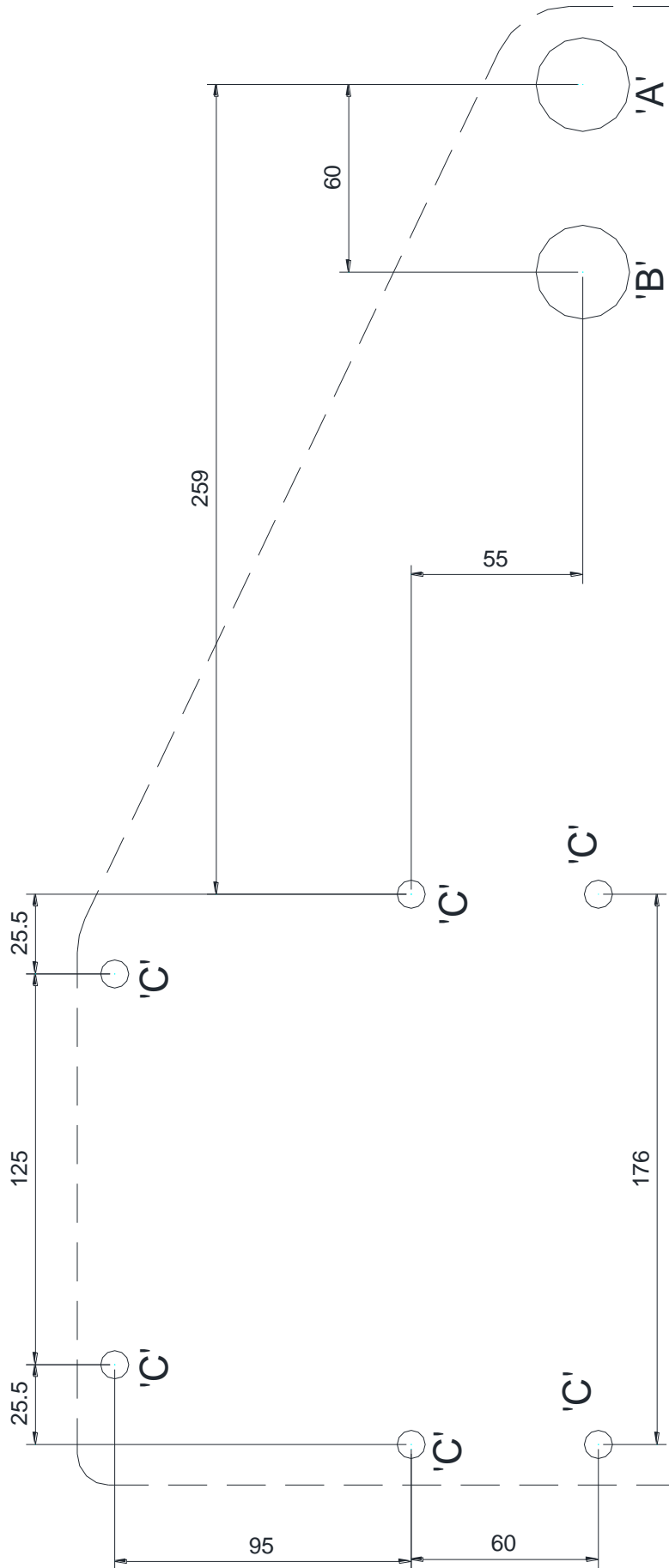
## WARNING:

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 100Nm RIGHT HAND BRACKET UNITS



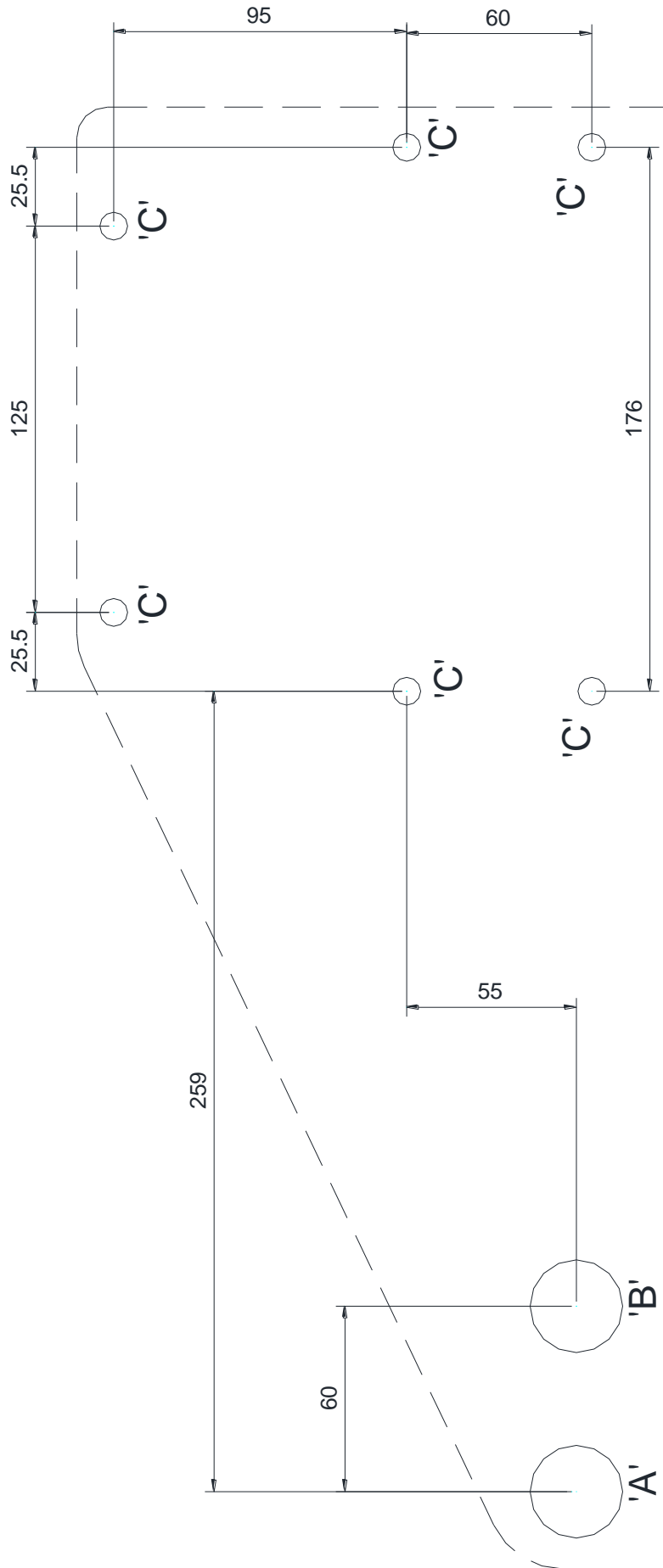
Drill holes 'A' and 'B' at  $\text{Ø}30\text{mm}$  (Note Hole 'B' not required on Pendulum units)

Drill hole 'C' at  $\text{Ø}8.5\text{mm}$  (6 options shown)

## Drilling Diagram

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

### DRILLING DIAGRAM - FOR 100Nm LEFT HAND BRACKET UNITS



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 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 nuts (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 –*

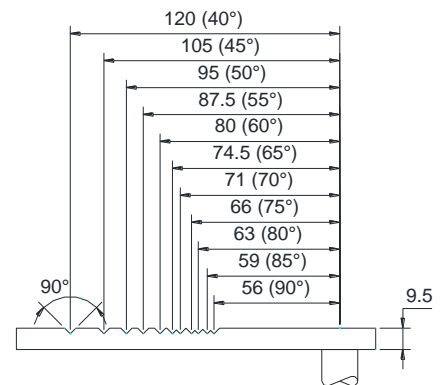
7. *Fit following items* – Onto each liner, one washer – neoprene (9), one washer – flat (10), one washer – single coil (11), one M26 nuts (12)  
*Torque M26 = 30Nm (on Brass Liner Nut)*  
*Torque M26 = 50Nm (on SS Liner – G.R.P. – Nut)*  
*Torque M26 = 80Nm (on SS Liner – Metal Structure – Nut)*
8. 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 FittingInstructions - Electrical Connections*

# VARI ARC UNITS – ARC ADJUSTMENT

## IMPORTANT

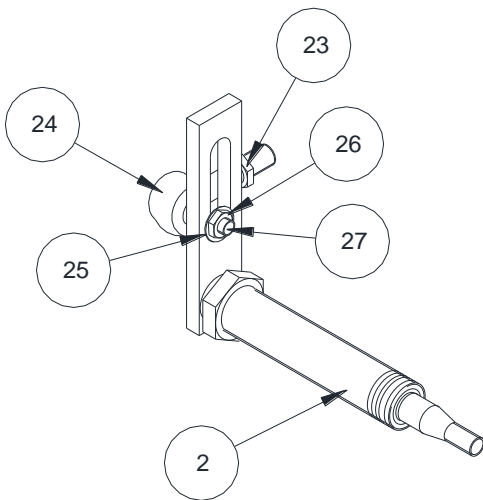
Vari-arc levers which have been factory set will be torqued and paint marked. Do not adjust. Unpainted lever nuts must be torque tightened M8 = 20Nm, prior to the unit being fitted.

1. **Internally** – Run Motor to insure it is parked correctly. Disconnect all Electrical Power.
2. Slacken bearing nuts at both ends of tie bar and securing Nylock nut (26) on Vari arc lever.
3. Slide bearing/tie bar assembly pivot pin (27) towards liner/spindle assembly to **increase** arc to 90° max or away from liner/spindle assembly 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.**
5. Adjust arc until blade parks approximately 75-100mm from edge of screen when screen is dry. Test on a wet screen to prove clearance is acceptable.
6. Tighten bearing nuts at both ends of tie bar and securing Nylock nut (26)
7. Tighten securing Nylock nut (26) on Vari arc lever  
**Torque M8 = 20Nm (on Arm – V.A. lever)**



## IMPORTANT:

Ensure BEARING CENTRES are as stated in drawing, Figure 1



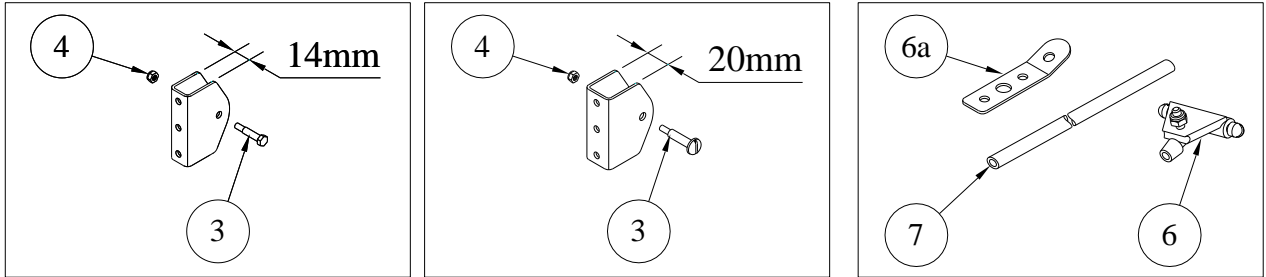
ITEM	DESCRIPTION	QTY
2	Liner V.Arc Lever Sub Assy	1
23	12mm Right Hand Bearing Nut	1
24	12mm Right Hand Bearing	1
25	8mm Washer – Flat	1
26	M8 Securing Nylock Nut	1
27	V.Arc Bearing Pivot Pin	1

# 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**

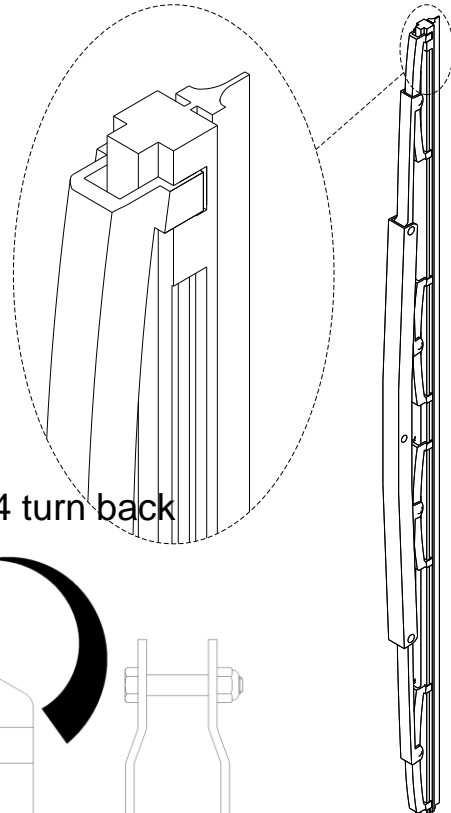
**DO NOT over tighten blade retaining screw and nut, as blade is required to pivot on glass.**

**Ref Figure – Nut Tightening**

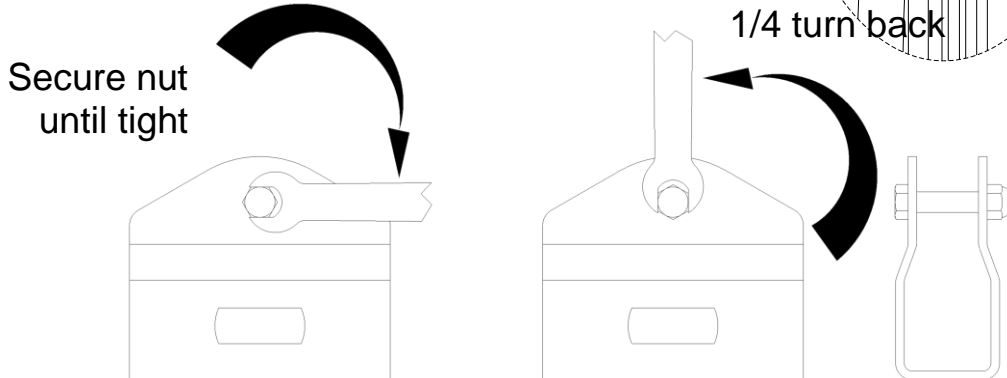
5. Secure nut until tight – then 1/4 turn back

**Figure - Blade Captive End**

**Must be at top**



**Figure – Nut Tightening**



**NOTE**

*Pictorial representation only, May not be exact to supplied arm*

# 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)

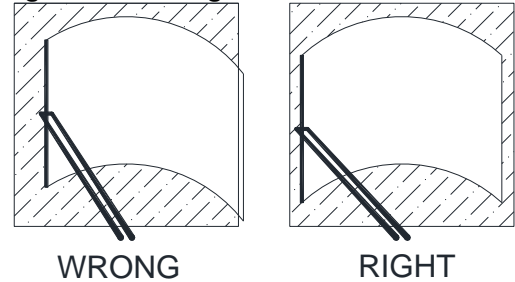
1. **Internally** – Run motor to insure it is parked correctly. Disconnect all electrical power.
2. **Externally** – While unit is being run, it is IMPORTANT to observe direction drive spindle rotates in immediately before it stops. This direction will give PARK POSITION.

### 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.

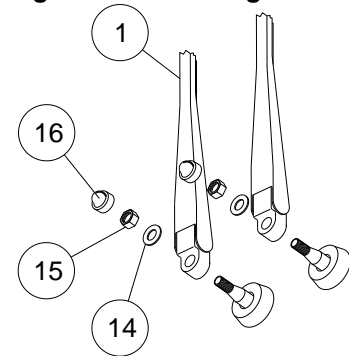
Figure – Arm Alignment



#### 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

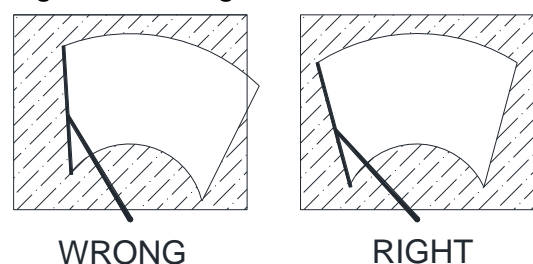
1-1.5kg

### 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

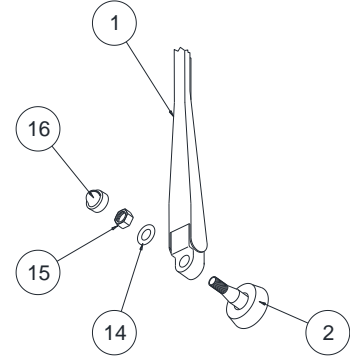




**Ref Figure – Arm Fittings**

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**



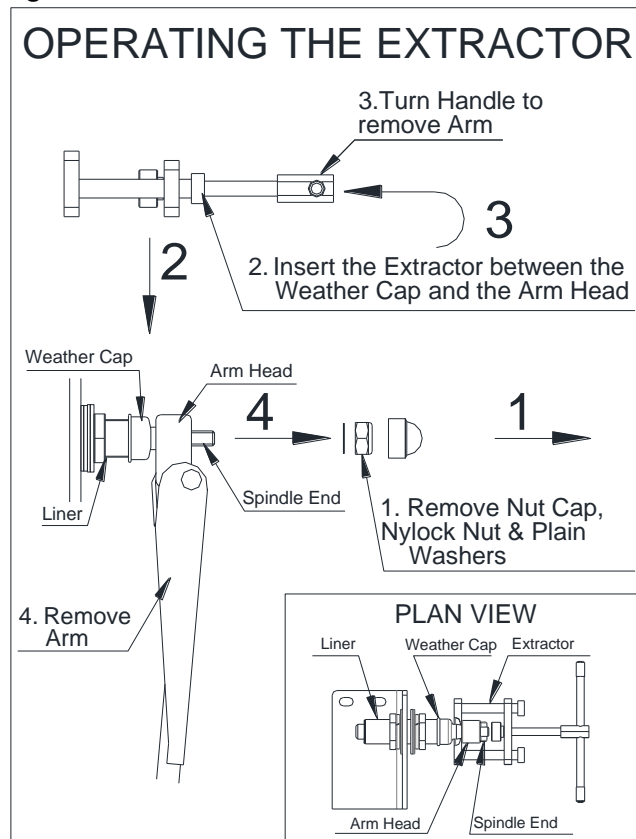
**Ref Figure – Arm Extractor**

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**



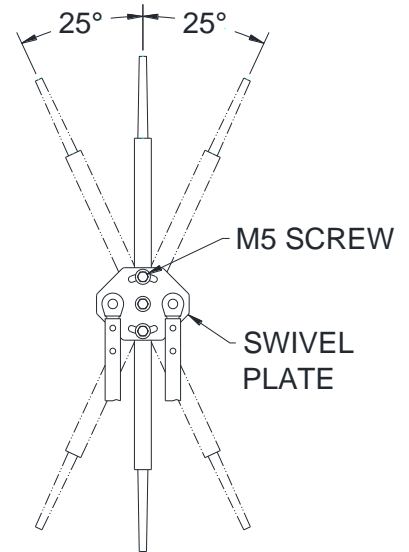
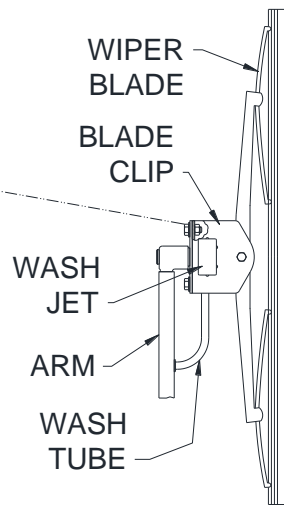
# ADJUSTING THE WIPER BLADE ANGLE

Figure – Adjusting the Wiper Blade Angle

ENLARGED SCRAP VIEW  
OF FITTINGS



NOTE  
PICTORIAL REPRESENTATION ONLY  
TO SHOW HOW TO ADJUST FITTINGS  
MAY NOT BE EXACT TO SUPPLIED ARM



## 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*

<b>SYMPTOM</b>	<b>PROBABLE CAUSE</b>	<b>TESTS AND CHECKS</b>	<b>CORRECTIVE ACTION</b>
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

<b>SYMPTOM</b>	<b>PROBABLE CAUSE</b>	<b>TESTS AND CHECKS</b>	<b>CORRECTIVE ACTION</b>
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

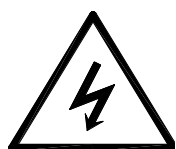
The following contains all preventative maintenance details for the windscreen wiper components. Preventative maintenance procedures include the information required for when to replace the wiper blades.

**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.

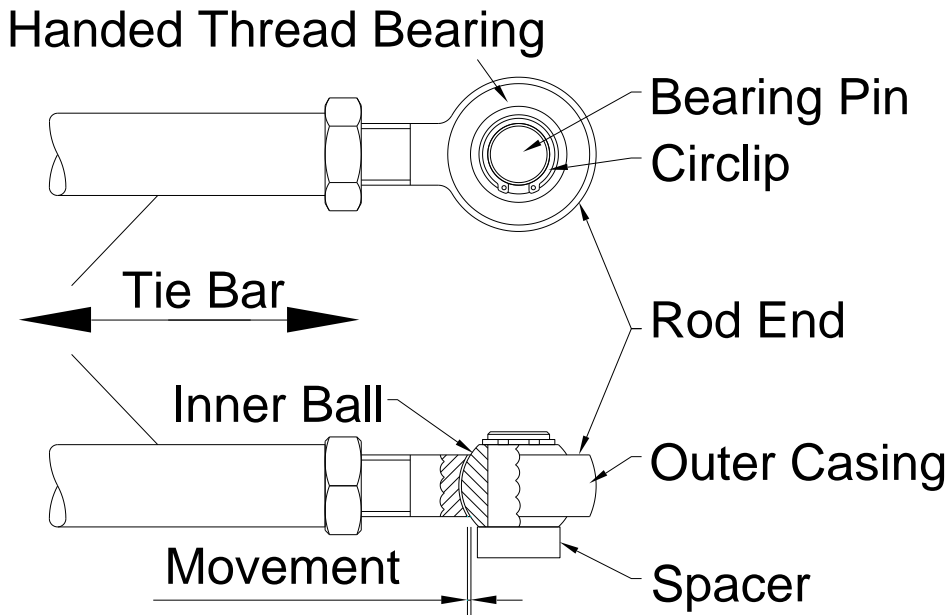
PERIODICITY	EQUIPMENT	TASK
Six Monthly	Complete System	<p>Check all torque settings for complete wiper system:  <b>Ref Note above.</b> Shown below are torque settings used.                      (If required – Set torque wrench to correct setting. Fit on nut, turn, if correct, wrench should click.)</p> <p><b>M5 = 4.5Nm (on Arm Swivel Plate/Blade Clip – Nut)</b></p> <p><b>M8 = 2Nm (on Nylon Bulkhead Connector – Nut)</b>  <b>M8 = 20Nm (on SS Bulkhead Connector – Nut)</b></p> <p><b>M8 = 20Nm (on Motor Bolts)</b>  <b>M8 = 20Nm (on V.A. Lever)</b>  <b>M8 = 25Nm (on Splined Drive Crk Nut &amp; Bolt)</b>  <b>M10 = 38Nm (on Spindle Nut)</b>  <b>M12 = 20Nm (on Tie Bar with Threadlock)</b>  <b>M26 = 30Nm (on Brass Liner)</b></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

- 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.*
- If excessive movement – replace

**Figure – Rod End Bearing**



# MAINTENANCE INSTRUCTIONS

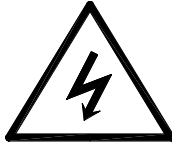
## NOTE

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*

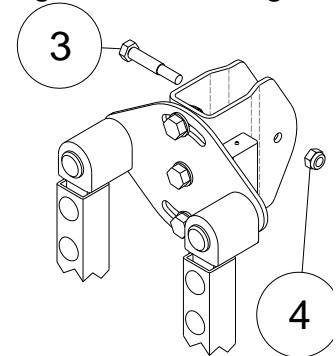
## Removal

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.

## Ref Figure – Blade Fittings

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

Figure – Blade Fittings



## Reassembly

### 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.

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

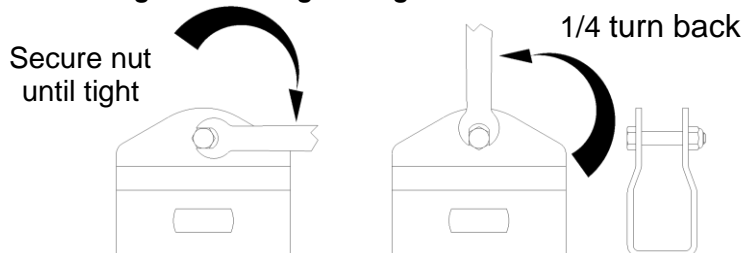
Do not over tighten blade screw and nut, as wiper blade is required to pivot on glass.

## Ref Figure – Nut Tightening

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

### NOTE

Figure – Nut Tightening

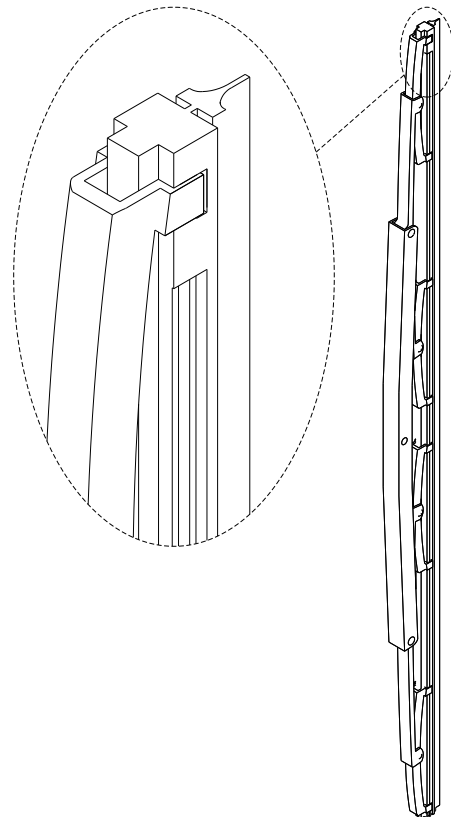


*Pictorial representation only, May not be exact to supplied arm*

5. Lower wiper blade carefully back onto windscreen.

Figure - Blade Captive End

**Must be at top**





# 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.

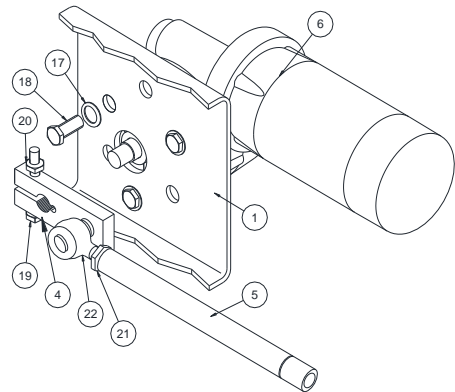
## *Replacement*

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 50 Crs	1
5	Tie-bar – 270mm Overall	1
6	100Nm (IER) Motor	1
17	10mm Washer – Single Coil	3
18	M10 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

### Make a note of Vari Arc Pin/Double Bearing position on Vari Arc Lever.

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.

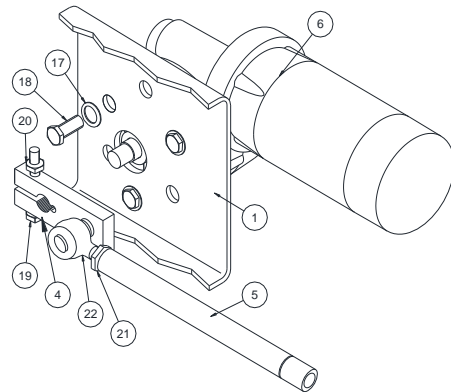
### IMPORTANT: Ensure bearing centres are as stated in drawing (figure 1)

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 50 Crs	1
5	Tie-bar – 270mm Overall	1
6	100Nm (IER) Motor	1
17	10mm Washer – Single Coil	3
18	M10 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:

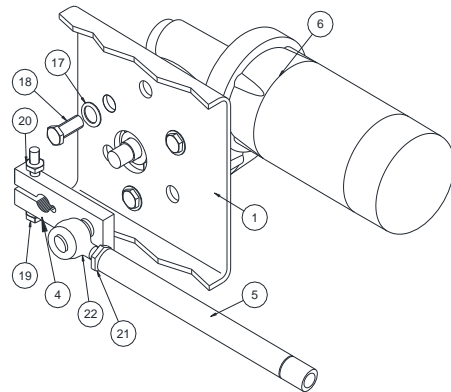
Ensure bearing centres are as stated in drawing (figure 1)

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 50 Crs	1
5	Tie-bar – 270mm Overall	1
6	100Nm (IER) Motor	1
17	10mm Washer – Single Coil	3
18	M10 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*

# TO REPLACE THE LEVER/LINER/SPINDLE SUB ASSEMBLY

## *Removal*

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.

### **IMPORTANT:**

**Make a note of the protrusion length of the Liner and/or Spindle from the front of the Bracket (1),**

4. Unscrew tie bar from right hand bearing of liner/lever/bearing assy.
5. Unscrew remove entire liner/lever/bearing assy from bracket.

## *Replacement*

1. Screw entire ***new*** liner/lever/bearing assy into bracket.
2. Screw tie bar onto right hand bearing at main liner/lever/bearing assy.
3. Tighten both bearing nuts at either end of tie bar.

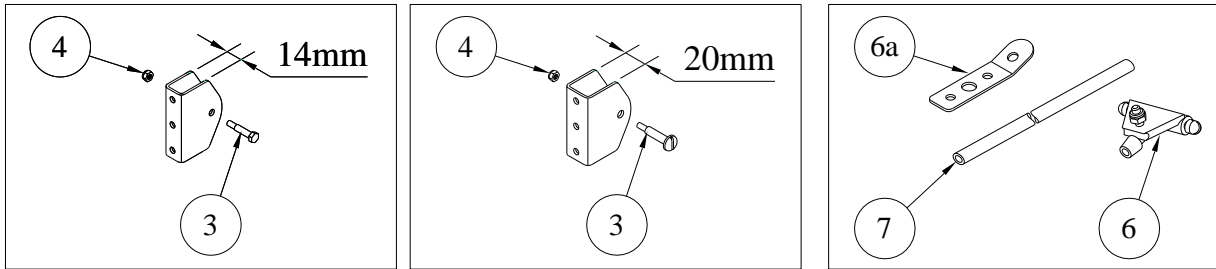
### **IMPORTANT:**

**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***

# EXTERNAL FITTINGS – ARMS

## Fittings for Arm and Blade



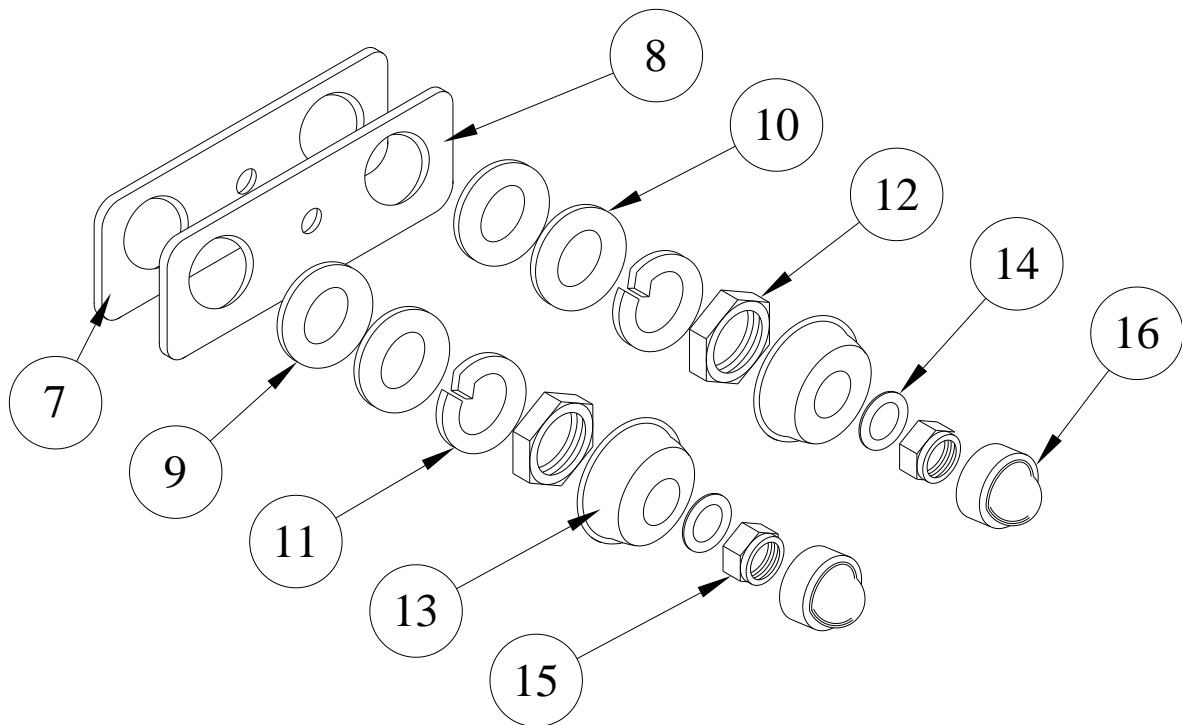
Part No.	Description	Qty
80205600	Blade Retaining Screw (14mm Blade Clip) (3)	1 per Arm
80010700	Blade Retaining Screw (20mm Blade Clip) (3)	1 per Arm
10011400	M4 Nylock Nut (4)	1 per Arm
80200100	Wash Jet Assy (6)	1 per arm
80201700	Wash Jet Bracket (6a)	1 per arm
80200400	Wash Hose – 4mm I/D x 6Mmm 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



**THIS PAGE INTENTIONALLY LEFT BLANK**

**THIS PAGE INTENTIONALLY LEFT BLANK**

**THIS PAGE INTENTIONALLY LEFT BLANK**

**North West Marine Distributors Ltd**

26940 26th Avenue

Aldergrove, BC V4W 4A4, Canada

Phone: (604) 607-7901

Email: [info@northwestmarine.ca](mailto:info@northwestmarine.ca)

[www.northwestmarine.ca](http://www.northwestmarine.ca)