B. HEPWORTH
AND COMPANY LIMITED

...performancewiper 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

Abbreviation	*Definition*
Assy	Assembly
Brk	Bracket
D. Crk	Drive Crank

Abbreviation	*Definition*
LH	Left Hand
RH	Right Hand
S.A.	Sub Assembly

DESCRIPTION OF WIPER SYSTEM

The wiper motor and bracket is shown in Figures 1, 2 & 4. 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.

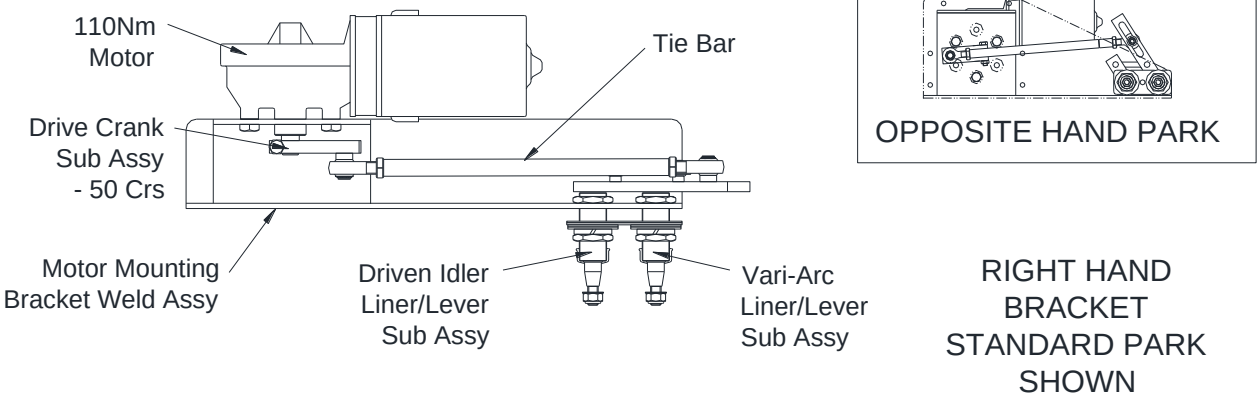
The Spindles that drive the wiper arms pass through the bulkhead, connecting the drive mechanism to the wiper arm; these are manufactured from stainless steel, to prevent corrosion. The spindles are driven from the main drive crank by connecting tie bars which distributes the load evenly between the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

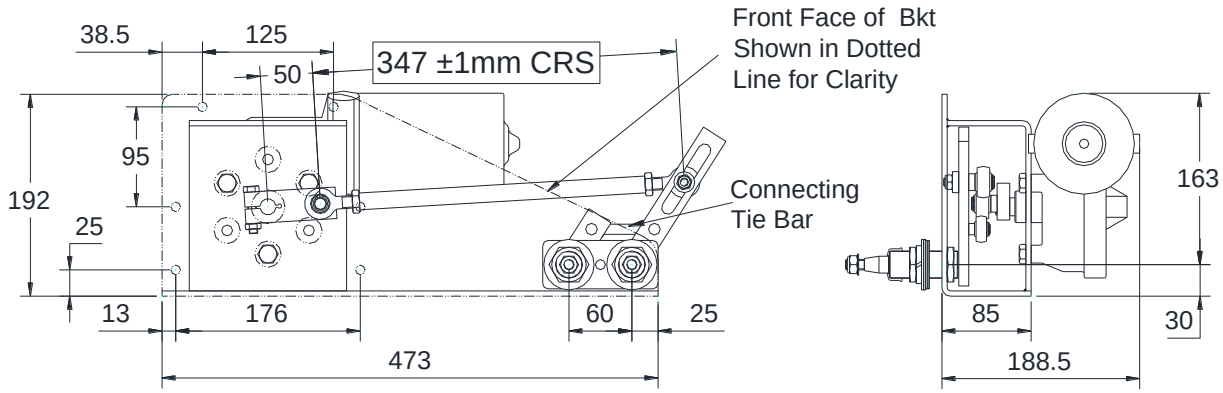
Motor Specifications

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 – RH BRACKET

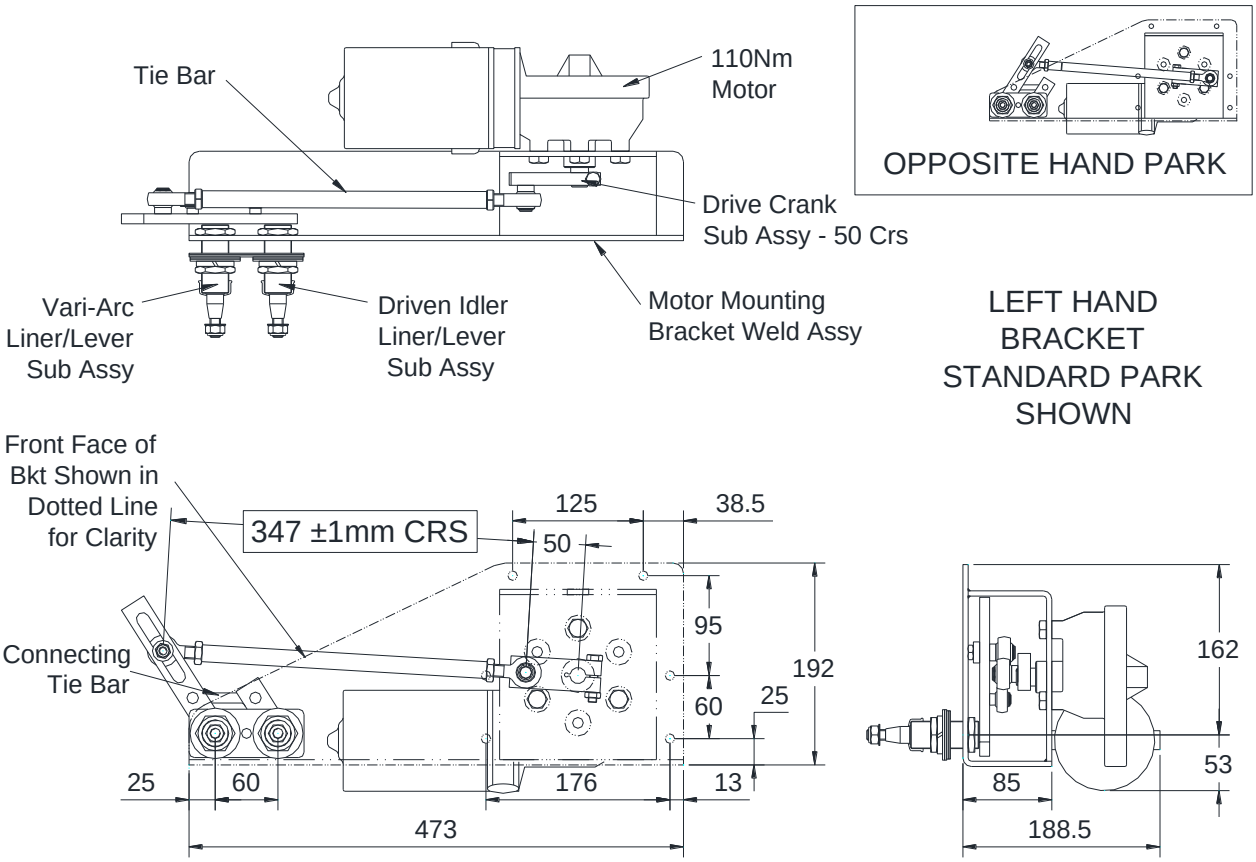
Figure 1





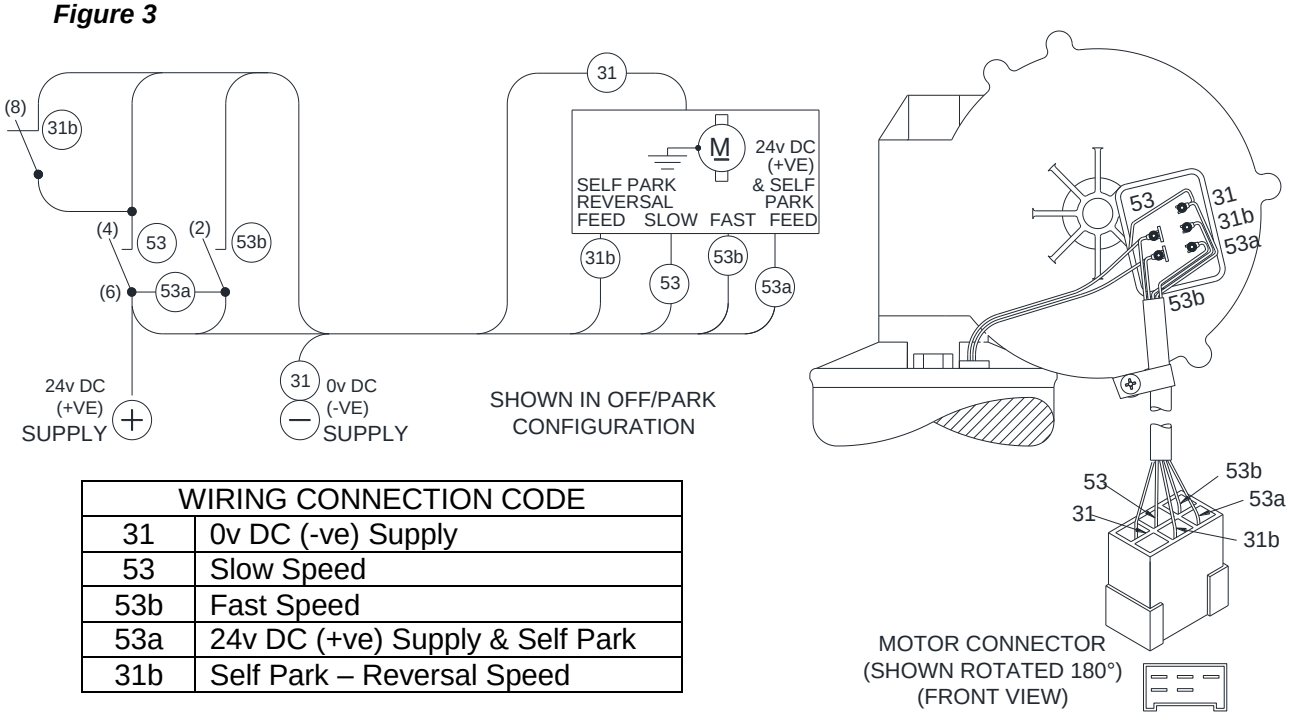
Wiper Motor Assembly – LH BRACKET

Figure 2



Electrical Connections

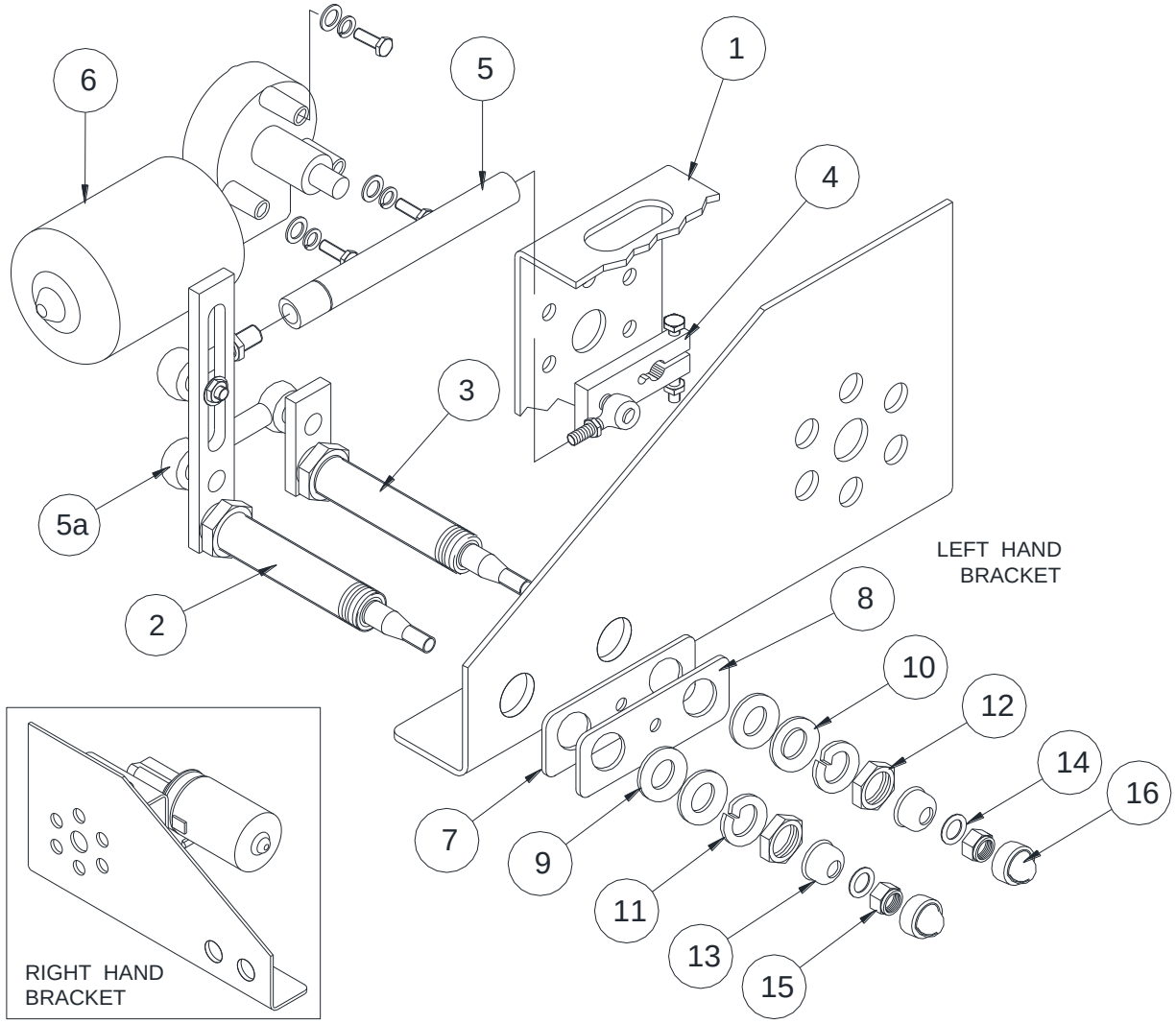
Figure 3



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

Exploded View of Linkage

Figure 4



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 50 Crs	1
5	Tie Bar – 280mm Overall	1
6	110Nm (IER) Motor	1
7	Idler Plate - Gasket	1
8	Idler Plate	1

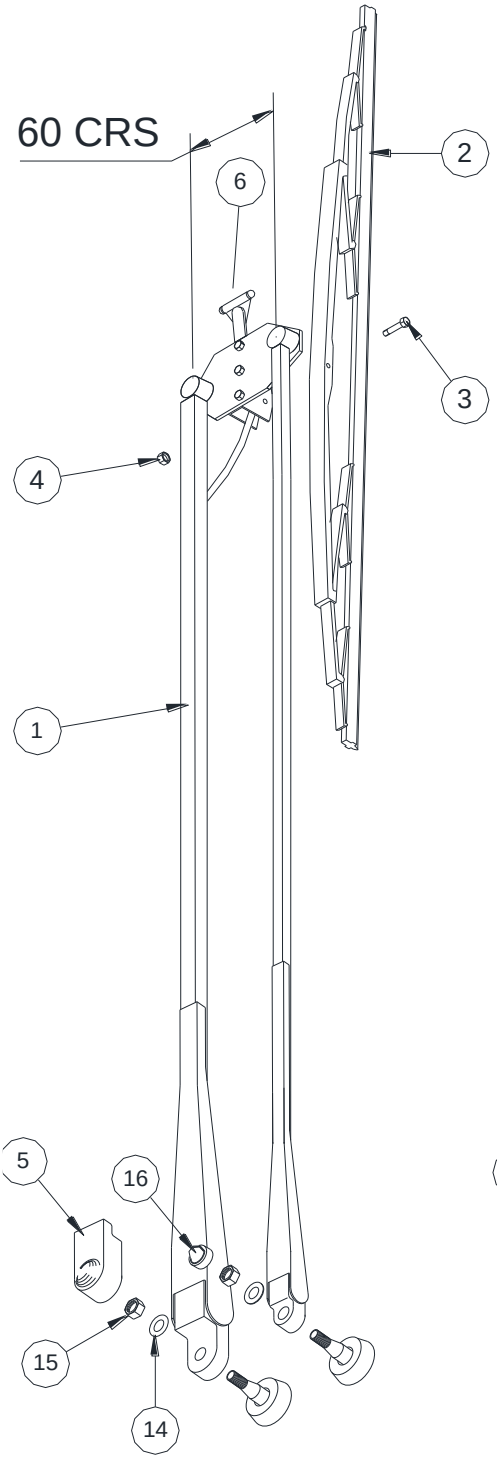
ITEM	DESCRIPTION	QTY
9	26mm Washer - Neoprene	2
10	26mm Washer – Flat	2
11	26mm Washer – Single Coil	2
12	M26 Hex. Nut	2
13	26mm Weather Cap	2
14	10mm Washer - Flat	2
15	M10 Nylock Nut	2
16	10mm Nut Weather Cap	2

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.



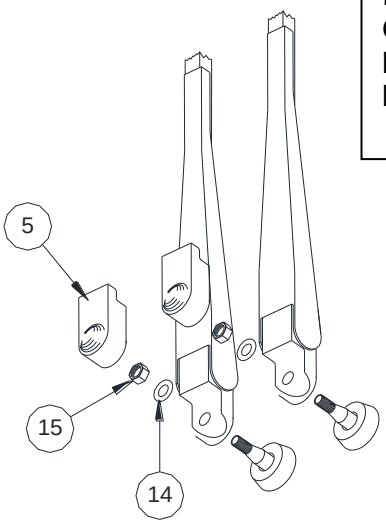
P84 ARMS 24" (NOM. 710mm)
TO 46" (NOM 1170mm)
1 x HEAVY DUTY HEAD

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 70º



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

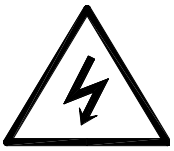
INSTALLATION INSTRUCTIONS

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.

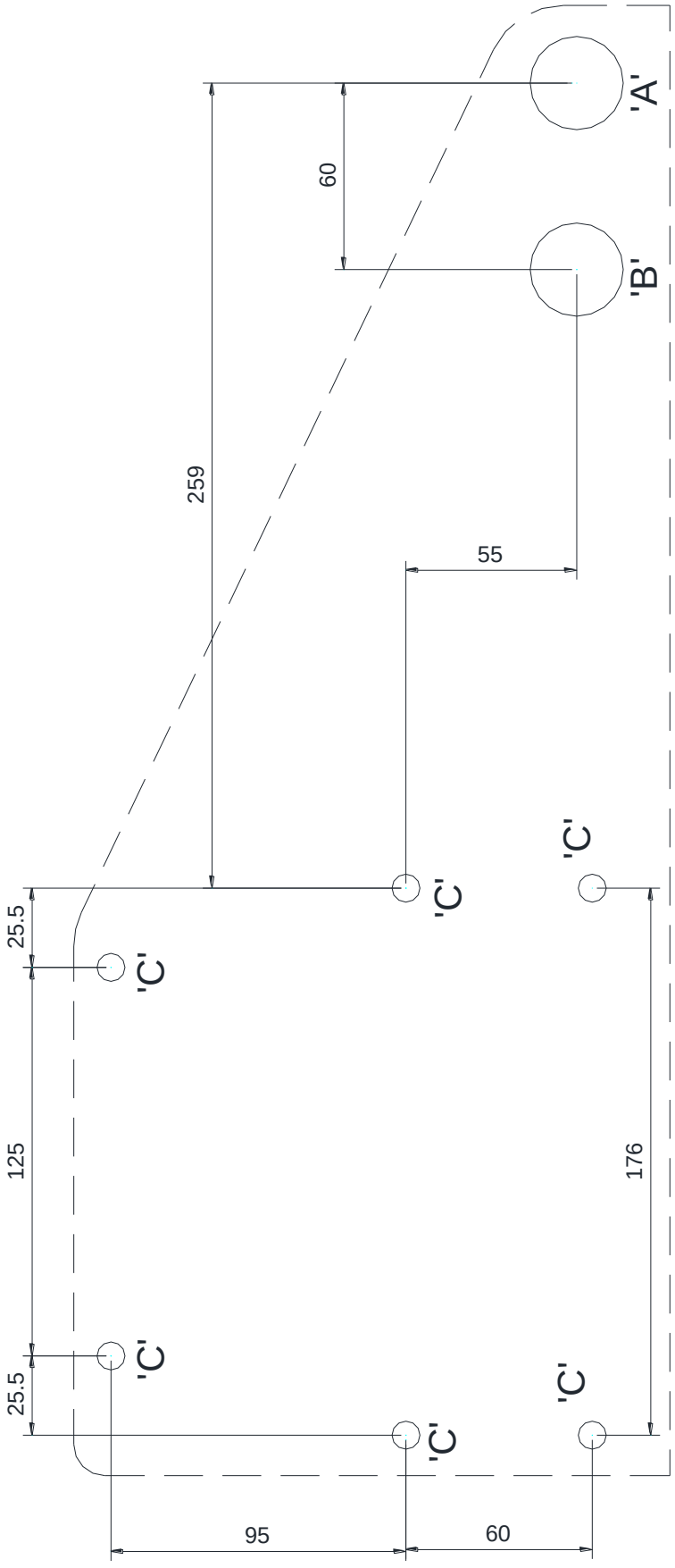
Use the drawings for reference.



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

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

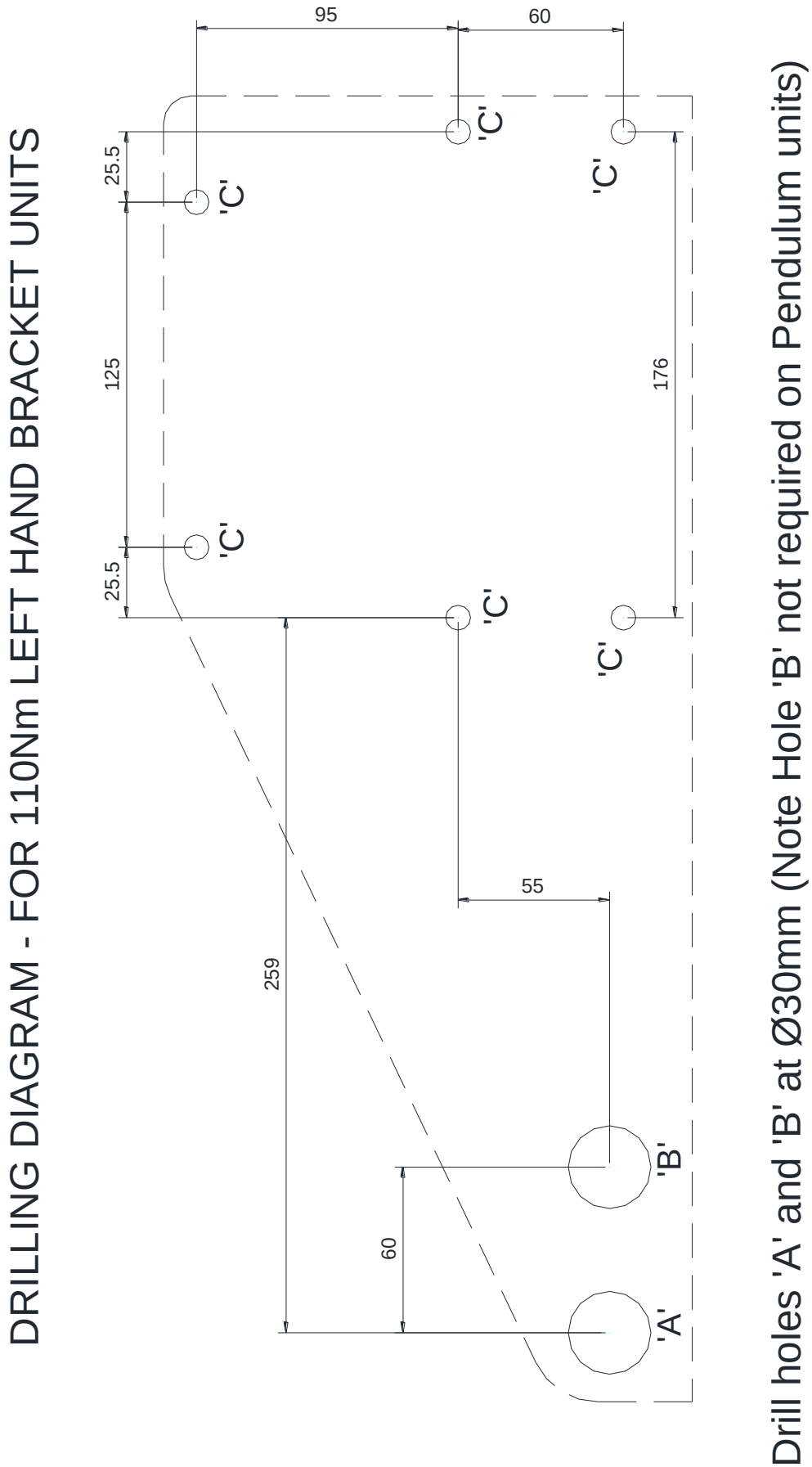
DRILLING DIAGRAM - FOR 110Nm RIGHT HAND BRACKET UNITS



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

Drill hole 'C' at Ø8.5mm (6 options shown)

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



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.

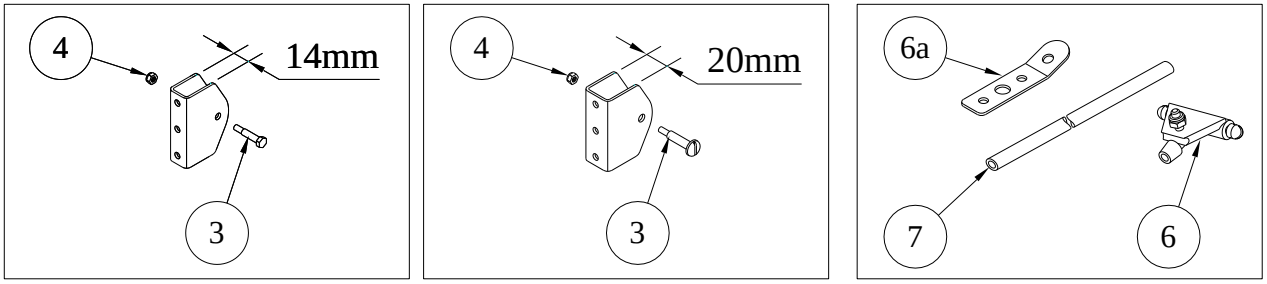
9. ***Internally –*** Wire motor to vessels electrics via switch/controller ***(May or/may not be supplied)***
   With Reference to Fitting Instructions – Electrical Connections

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.

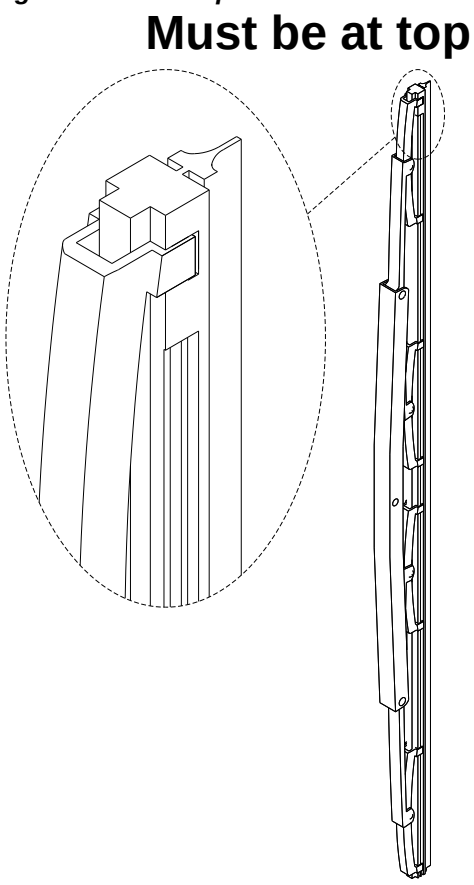
NOTE

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)

Figure – Blade Captive End



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).***

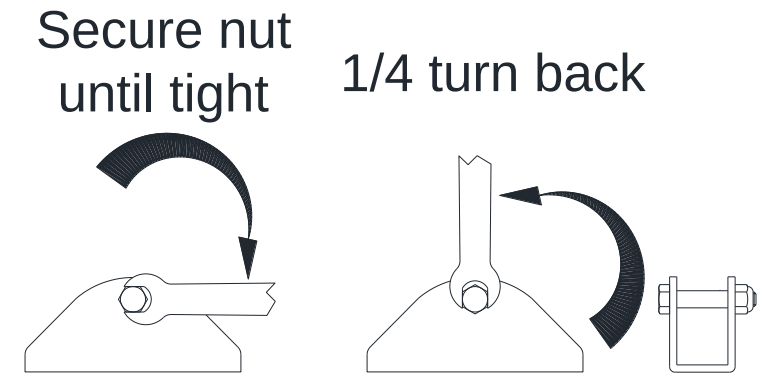
IMPORTANT

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



NOTE

Pictorial representation only, May not be exact to supplied arm

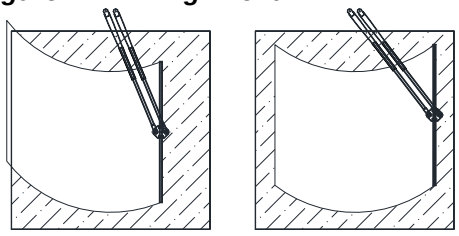
FITTING THE WIPER ARM ASSEMBLY

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.

Figure – Arm Alignment



WRONG RIGHT

Pantograph Arms Only:

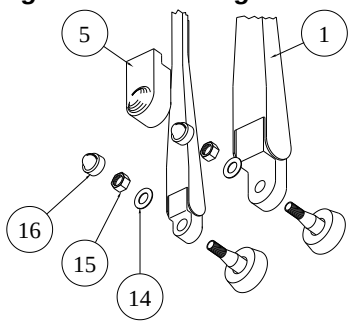
Ref Figure – Arm Alignment

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.

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.

Figure – Arm Fittings



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.

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

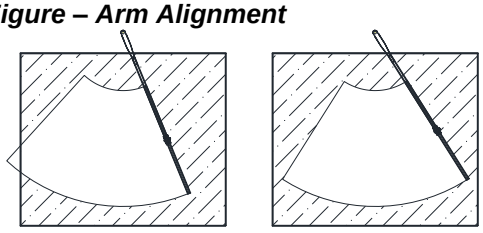
8. When correctly aligned, tighten M10 spindle nuts
   Torque M10 = 38Nm (on Spindle Nut)

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

Figure – Arm Alignment



WRONG RIGHT

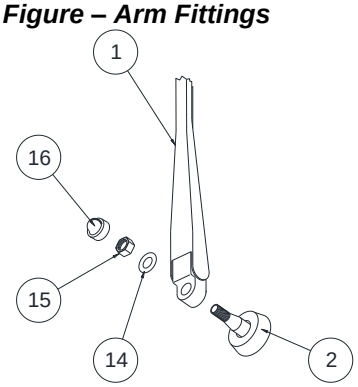
Pendulum Arms Only:

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.

Ref Figure – Arm Fittings

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.

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

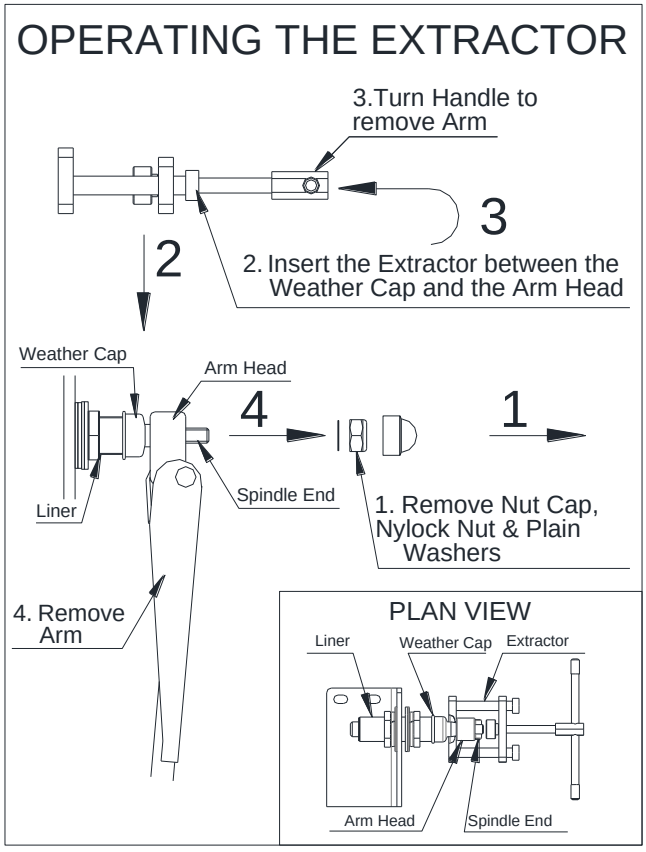
8. When correctly aligned, tighten M10 spindle nuts
   Torque M10 = 38Nm (on Spindle Nut)

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



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.

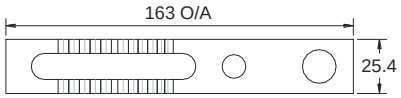
3. Slide bearing/tie bar assembly pivot pin ***(27)*** towards liner/spindle assembly to ***increase*** arc to 90° max or away from liner/spindle assembly to ***decrease*** arc to 40° min.

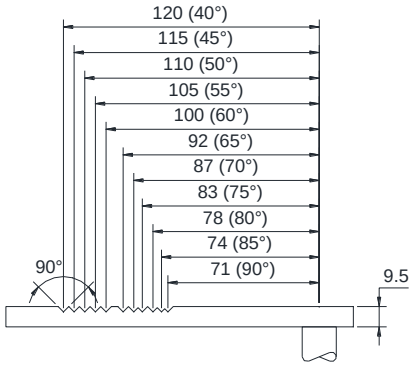
4. Ensure you note markings on lever when correct arc is reached. ***Important: Pantograph Systems must not exceed 90° arc of wipe***.

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)***

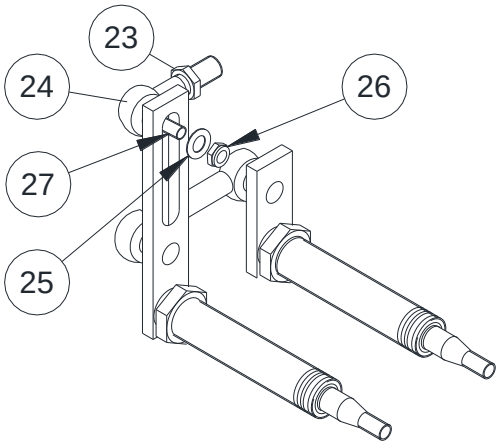
7. Tighten securing Nylock nut ***(26)*** on Vari arc lever
   Torque M8 = 20Nm (on Arm – V.A. lever)





50 CRS DRIVE CRANK

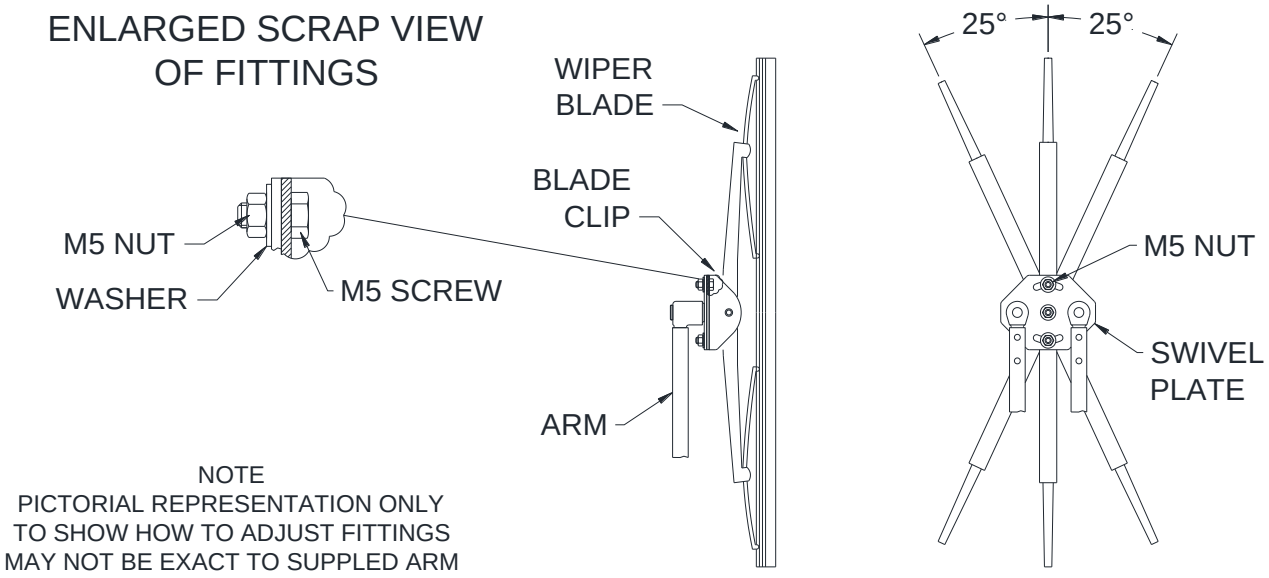
IMPORTANT:
Ensure BEARING CENTRES are as stated in drawing, Figure 1



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

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	Check position of switch	Turn switch to on position
	Voltage Level	Check supply voltage to switch. Check wiring and switch connections	Replace switch. Correct loose wiring connections. Replace broken wires
	System Jammed	Check wiper linkage	Release linkage. Release wiper arm
	Defective wiper motor		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	Check supply voltage to wiper system	Correct voltage supply problem
	Switch	Check for loose or broken wires	Replace faulty switch
	Wiring		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	Check supply voltage to wiper system	Correct voltage supply problem
	On/off switch		Replace faulty switch
	Motor Bracket	Check for broken bracket	Replace defective bracket
	Linkage	Check to see if Linkage is free moving	Free linkage replace worn or damaged components
	Defective Wiper Motor		Replace Wiper Motor
Arm and blade not operating correctly or over sweep operation	Voltage level	Check supply voltage to wiper system.	Correct voltage supply problem
	Linkage	Check for worn or broken linkage	Replace linkage
	Spindle	Check for excessive wear in spindle	Replace spindle
	Arm	Check that arm is not loose on spindle	Re-tighten spindle
		Check for excessive wear on arm	Clean spline on spindles with wire brush. replace arm
	Blade	Check fixing for wear	Replace blade
		Check blade for wear	Replace blade
		Check for excessive smearing on screen	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	Fill tank ***(see Note)***
		Check for damage to tank	Replace tank ***(see Note)***
		Check Pump is operational	Replace pump if faulty ***(see Note)***

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

PERIODICITY	***EQUIPMENT***	***TASK***
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.

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	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.) ***M5 = 4.5Nm (on Arm Swivel Plate/Blade Clip – Nut)*** ***M8 = 2Nm (on Nylon Bulkhead Connector – Nut)*** ***M8 = 20Nm (on SS Bulkhead Connector – Nut)*** ***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)*** 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.)

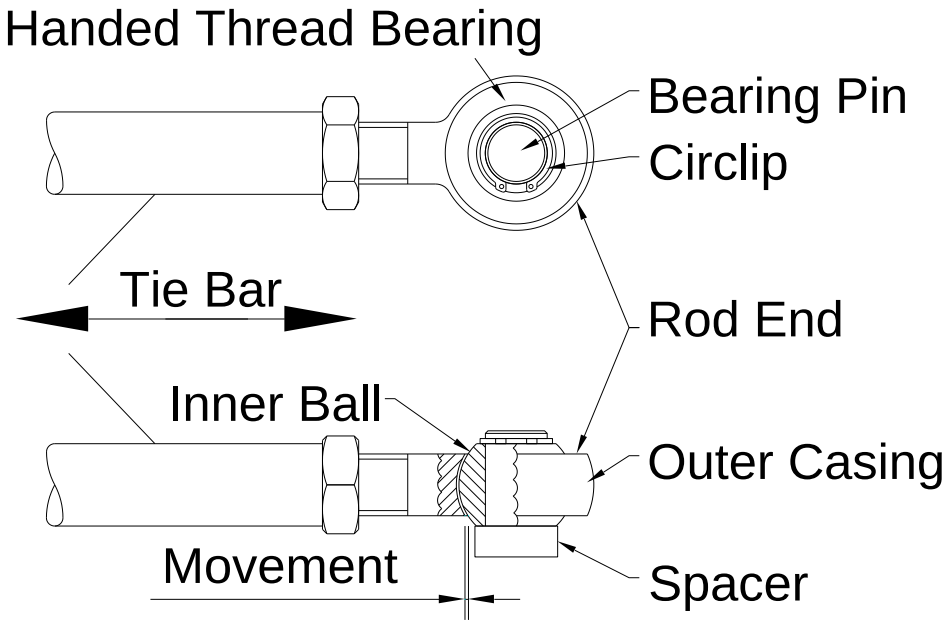
How to check for wear on the Rod End

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

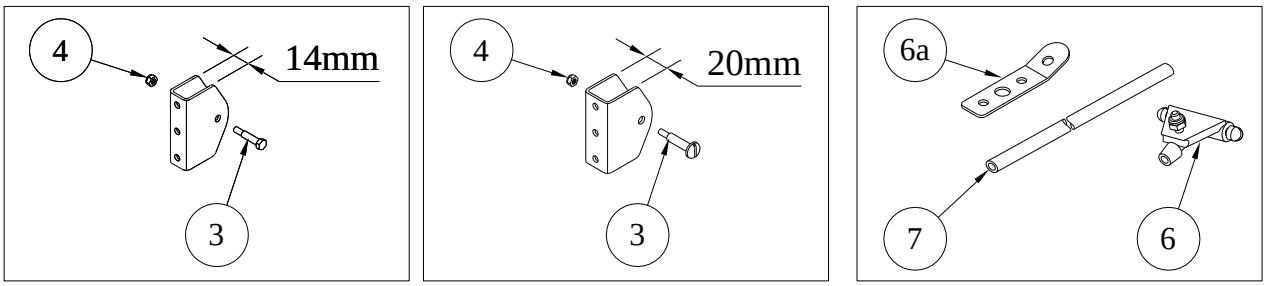
With reference to the Maintenance Table and the Troubleshooting Table – Continued

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

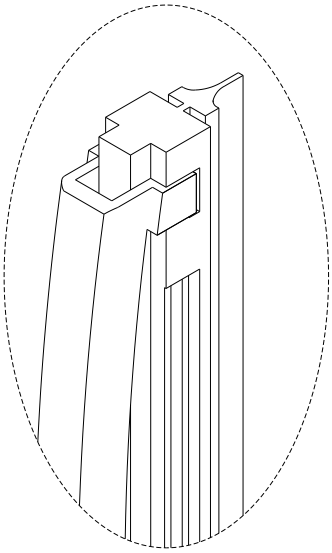
NOTE

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

Figure – Blade Captive End



2. Ensure that all fixing holes align.

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

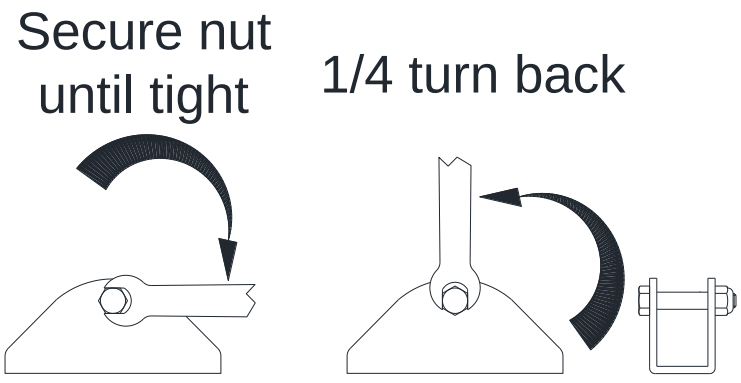
IMPORTANT

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



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 4 – 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.

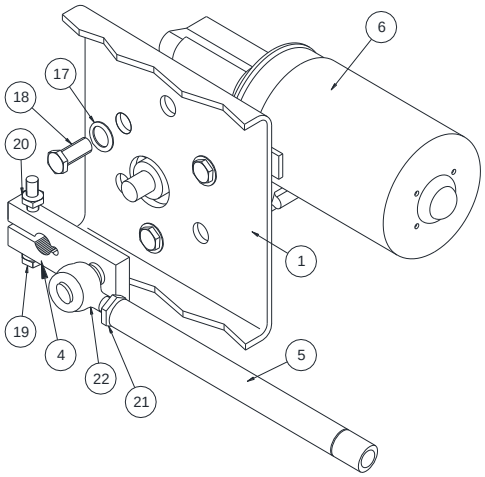
Replacement

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	110Nm 24v (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.

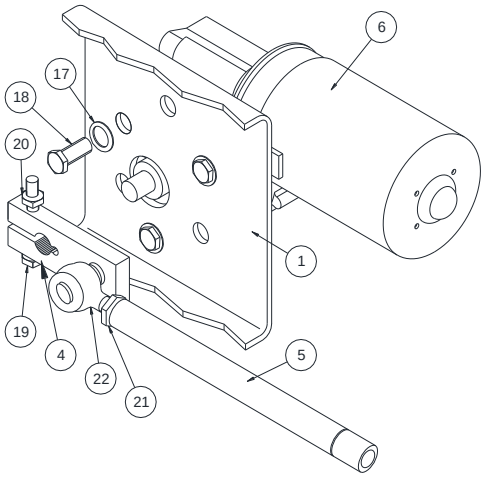
IMPORTANT: Ensure bearing centres are as stated in drawing (figure 1)

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	110Nm 24v (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.

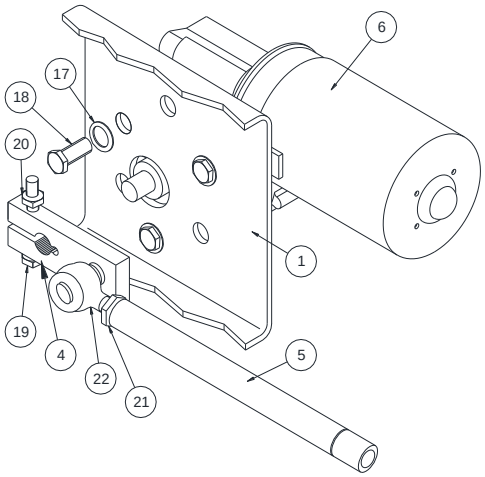
IMPORTANT:
Ensure bearing centres are as stated in drawing (figure 1)

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	110Nm 24v (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

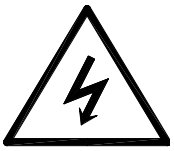
CONTROLLER INSTALLATION INSTRUCTIONS

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.

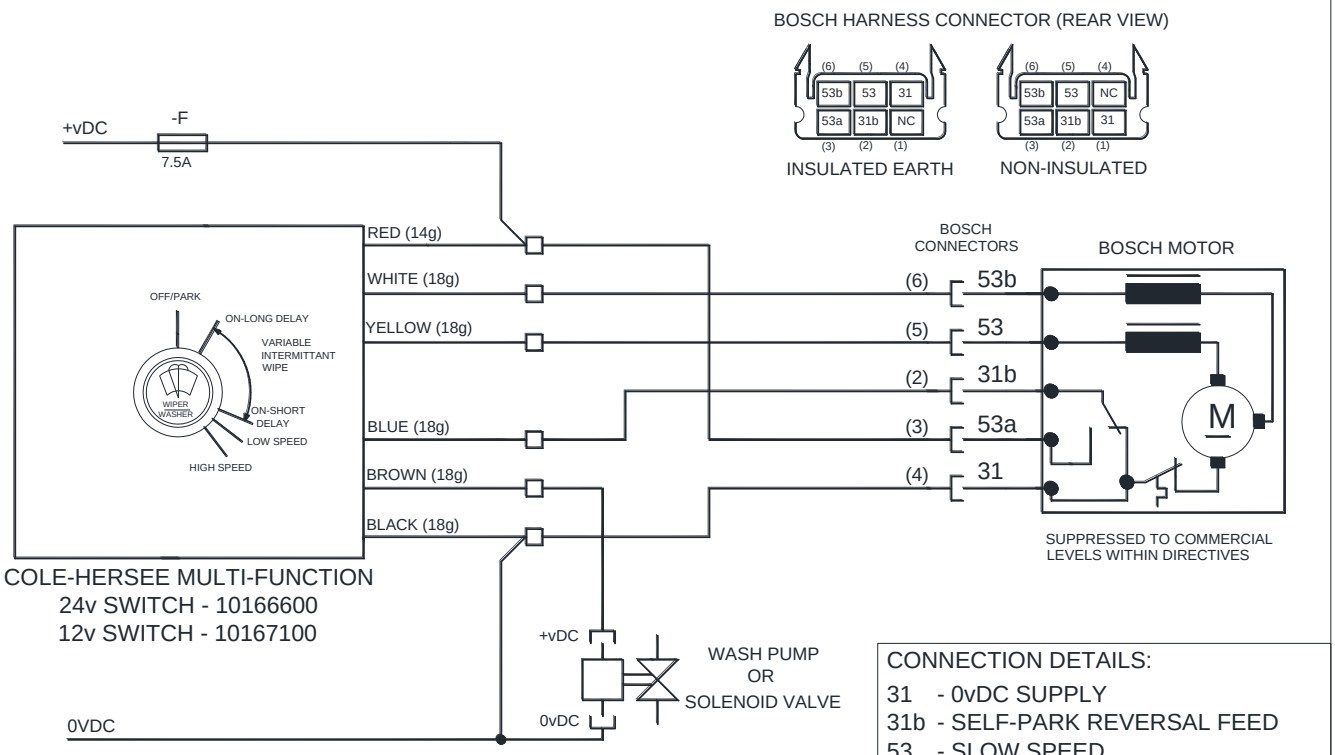
Use the drawings for reference.



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

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

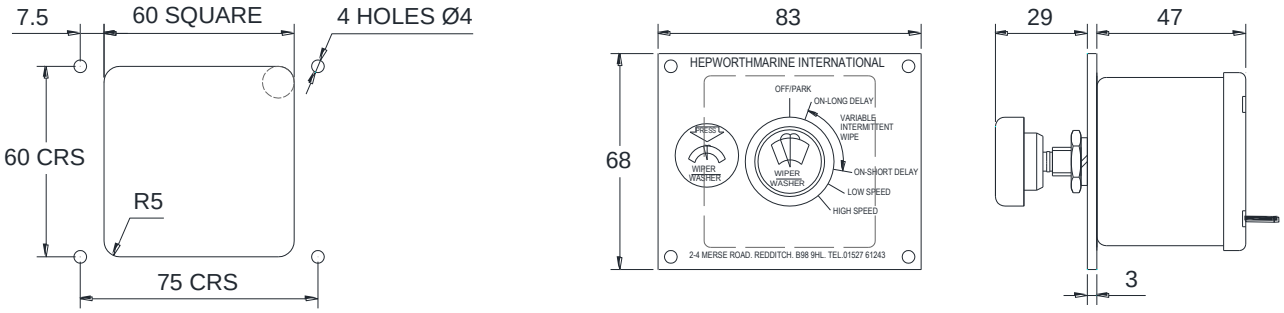
WIRING DETAIL



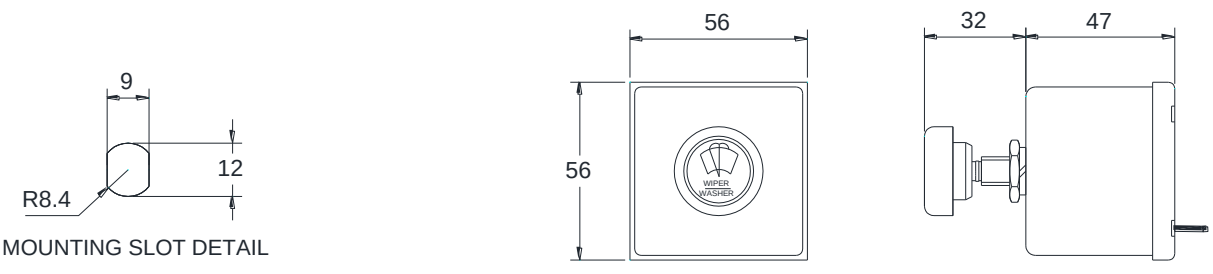
CONNECTION DETAILS:

31 - 0vDC SUPPLY
31b - SELF-PARK REVERSAL FEED
53 - SLOW SPEED
53a - SELF-PARK FEED & +VE SUPPLY
53b - FAST SPEED

CONSOLE CUT OUT DETAIL - 90087010 - 1 x 24v Multi-Switch & Plate
- 90087200 - 1 x 12v Multi-Switch & Plate



CONSOLE CUT OUT DETAIL - 10166600 - 1 x 24v Multi-Switch only
- 10167100 - 1 x 12v Multi-Switch only



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.

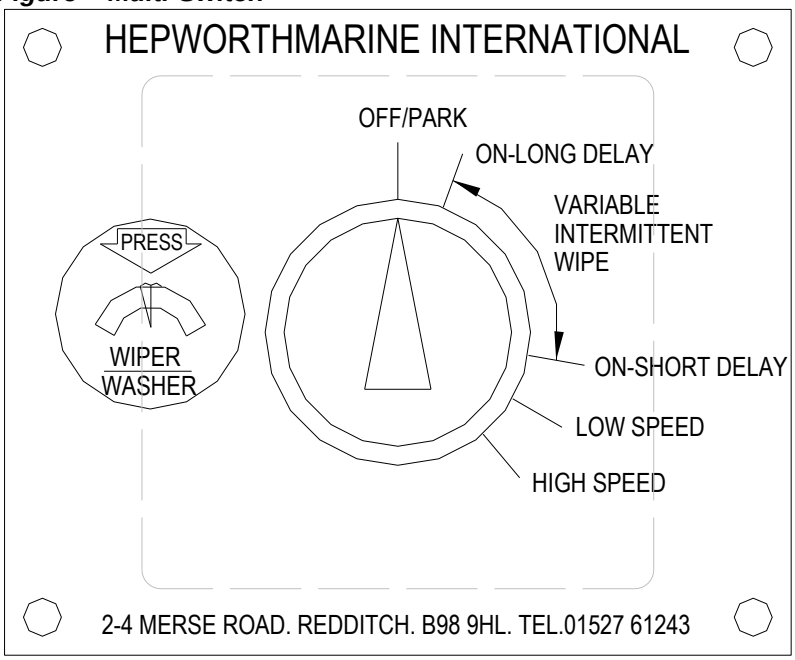
5. Turn knob CLOCKWISE to next (CLICK) ***(LOW SPEED)***. This gives a continuous wipe across screen at a standard speed, with no delay between wipes.

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)***

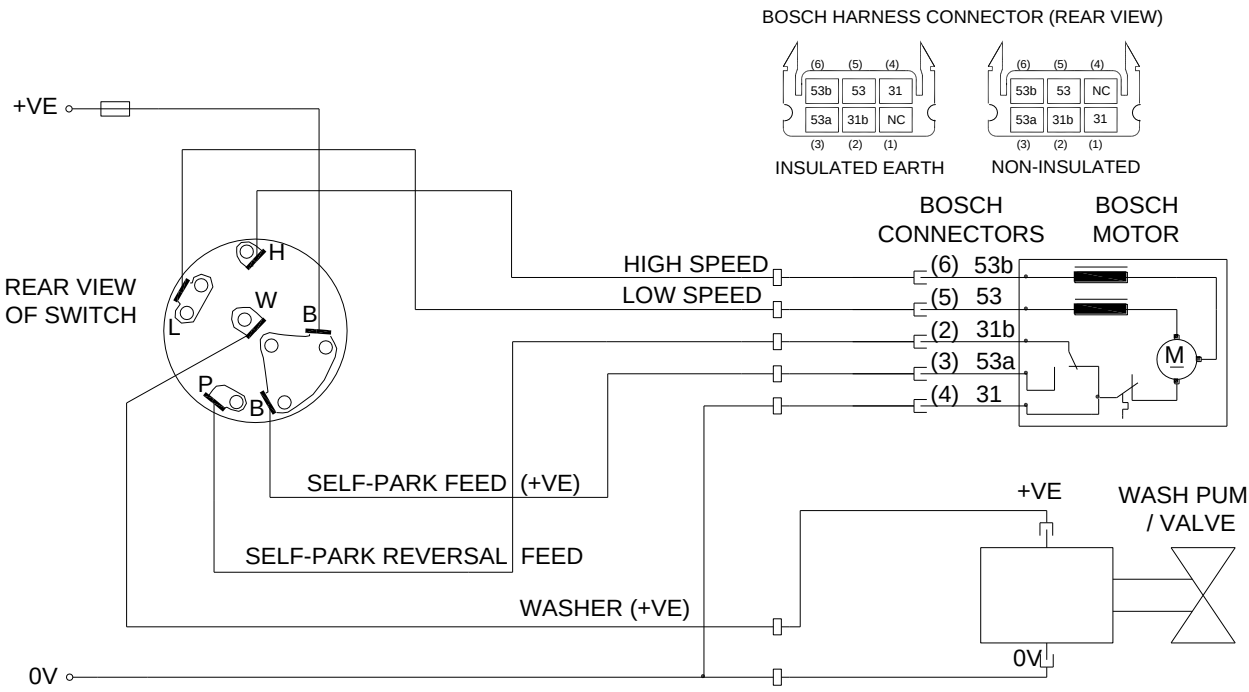
IMPORTANT
When turning to the off position ensure that it CLICKS to confirm fully off

Figure – Multi-Switch



12V/24V ROTARY SWITCH – WIRING & SIZES

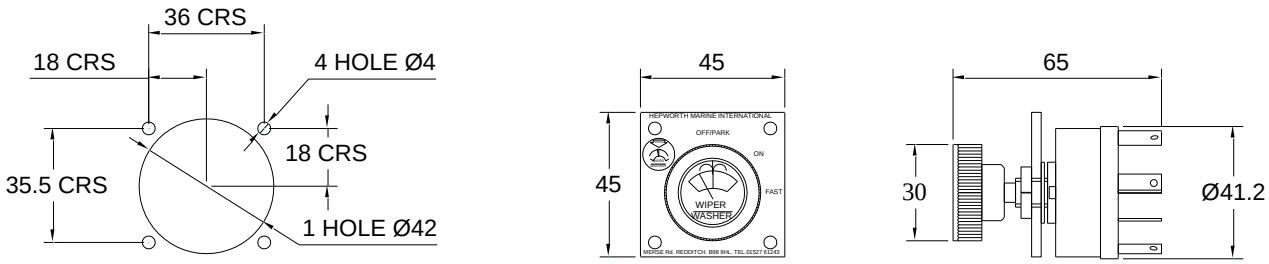
WIRING DETAIL



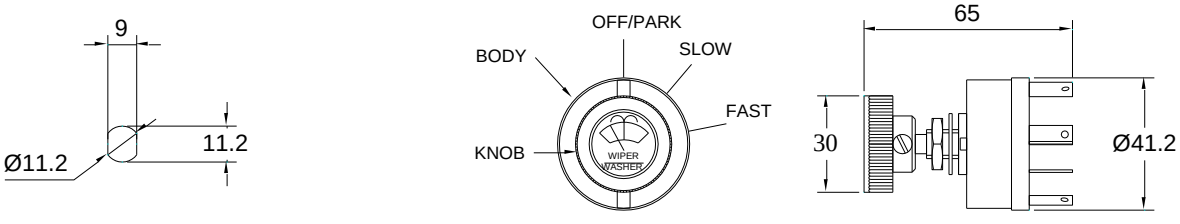
CONNECTION DETAILS:

31 - 0vDC SUPPLY
31b - SELF-PARK REVERSAL FEED
53 - SLOW SPEED
53a - SELF-PARK FEED & +VE SUPPLY
53b - FAST SPEED

CONSOLE CUT OUT DETAIL - 90043000 - 1 x 12/24v Rotary Switch & Plate



CONSOLE CUT OUT DETAIL - 10094800 - 1 x 12/24v Rotary Switch only



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 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.

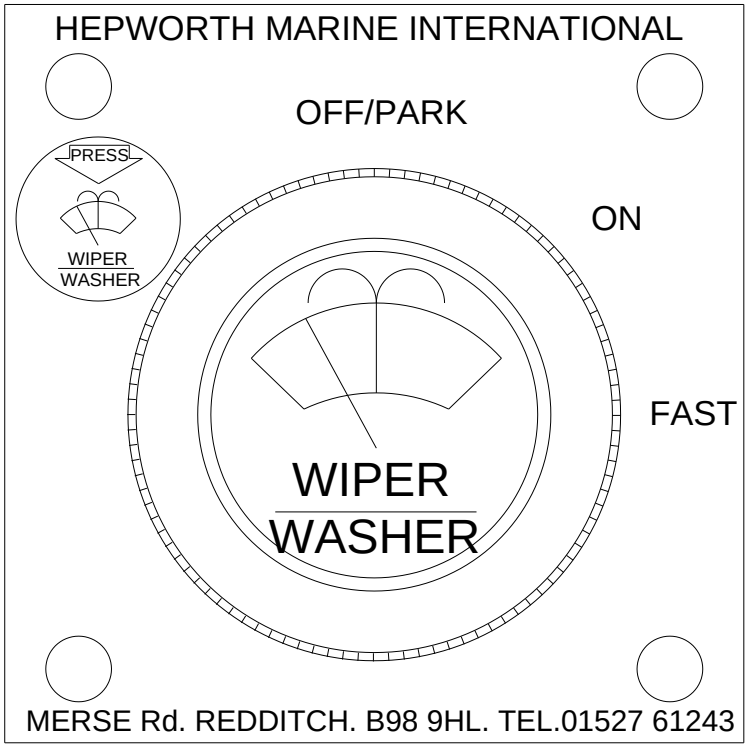
NOTE
It does not activate the wiper

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.

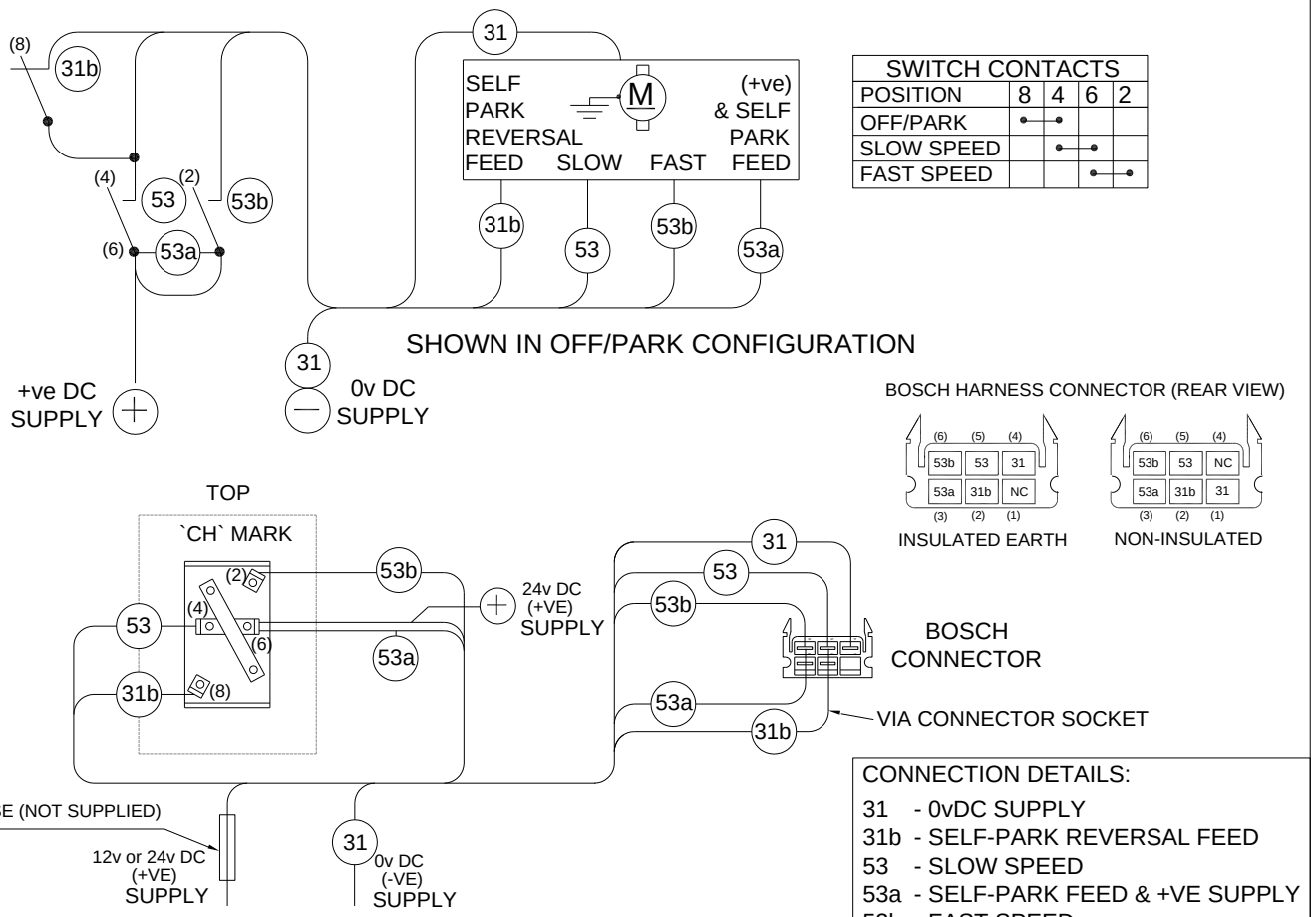
5. Turn knob ANTI-CLOCKWISE to off position when finished. ***(OFF/PARK)***

Figure – Rotary Switch



12V/24V TOGGLE SWITCH – WIRING & SIZES

WIRING DETAIL



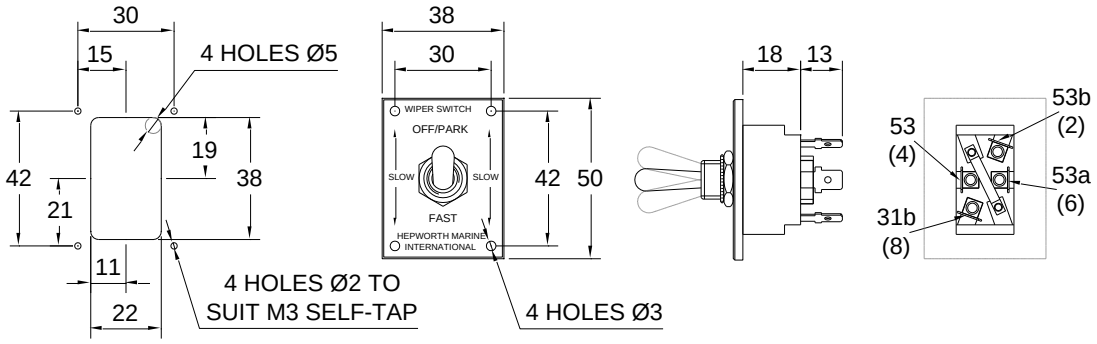
SWITCH CONTACTS				
POSITION	8	4	6	2
OFF/PARK	•	•		
SLOW SPEED		•	•	
FAST SPEED			•	•

BOSCH HARNESS CONNECTOR (REAR VIEW)

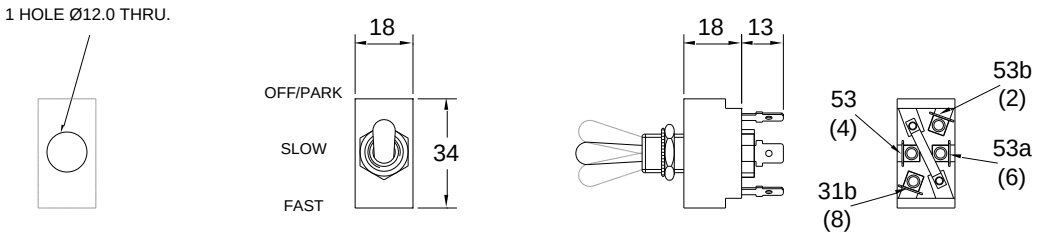
CONNECTION DETAILS:

31 - 0vDC SUPPLY
31b - SELF-PARK REVERSAL FEED
53 - SLOW SPEED
53a - SELF-PARK FEED & +VE SUPPLY
53b - FAST SPEED

CONSOLE CUT OUT DETAIL - 90041400 - 1 x 12/24v Toggle Switch & Plate



CONSOLE CUT OUT DETAIL - 10079200 - 1 x 12/24v Toggle Switch only



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 before starting. ***(OFF/PARK)***

IMPORTANT
Do not run wipers on a dry screen.

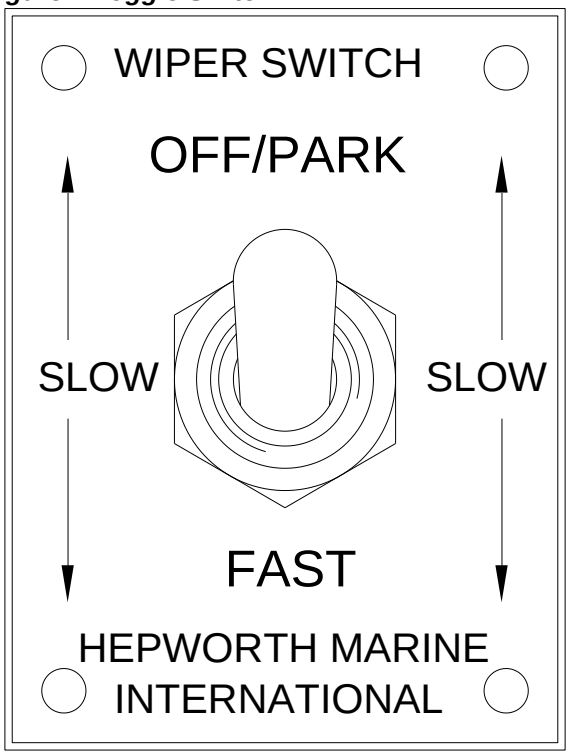
2. This switch does not control application of washer fluid.

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.

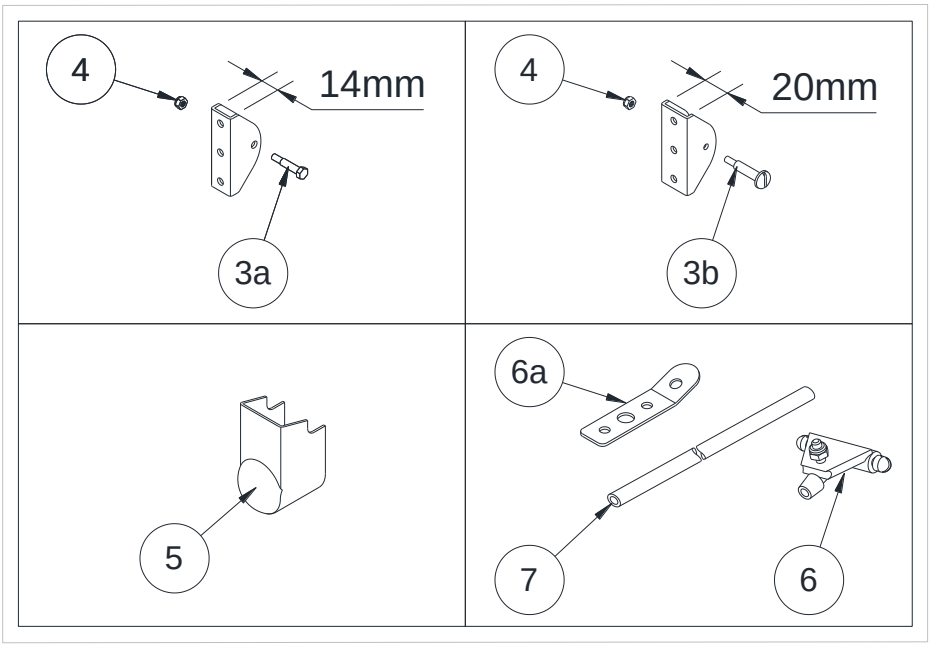
5. Push toggle to top position when finished. ***(OFF/PARK)***

Figure – Toggle Switch



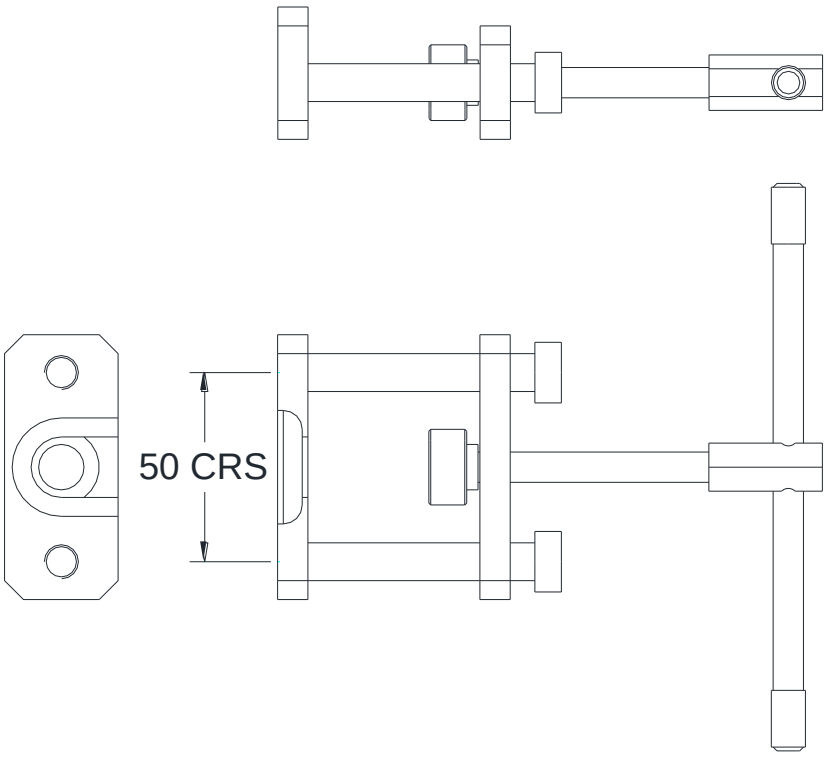
EXTERNAL FITTINGS – ARMS

Fittings for Arm and Blade



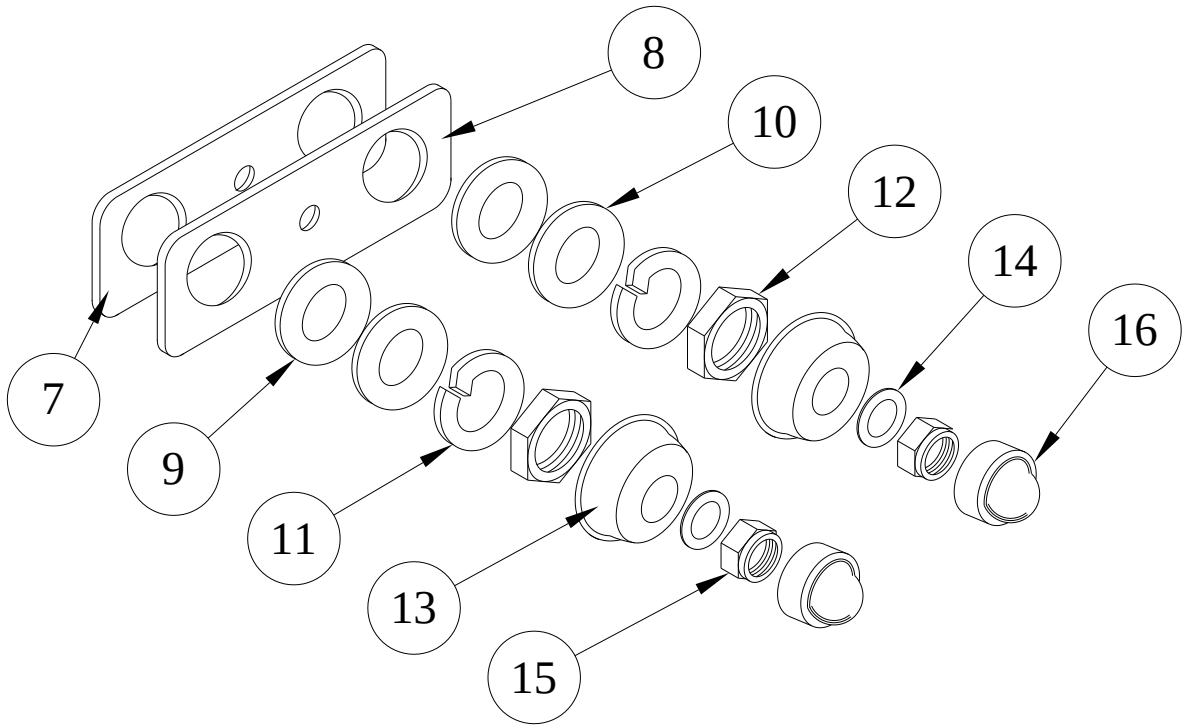
Part No.	*Description*	*Qty*
80205600	Blade Retaining Screw **(14mm Blade Clip)** ***(3)***	1 per Arm
80010700	Blade Retaining Screw **(20mm Blade Clip)** ***(3)***	1 per Arm
10011400	M4 Nylock Nut ***(4)***	1 per Arm
80005100	Heavy Duty Head – Weather Cap ***(5)***	1 per Arm
80200100	Wash Jet Assy ***(6)***	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*	
60680600	Arm Extractor Tool – All Head Types	As Required



EXTERNAL FITTINGS – LINKAGE

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



Part No.	*Description*	*Qty*
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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