



# HEPWORTH RAIL INTERNATIONAL

## Installation & Maintenance Manual



PERFORMANCE DESIGNED WIPER SYSTEMS  
*for The Rail Industry*

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Installation and Maintenance

## INSTRUCTIONS

### TRAIN 18

PROJECT No. – 1036446

Creation Date	1 <sup>ST</sup> November 2018	
Revision Level	Revision Date	Revision Details
2	19/12/2018	UPDATED ELECTRICAL CONECTIONS TABLE (PAGE 18)
3	28/09/2021	PAGE 6, 7 & 39 UPDATED

# 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 Hepworth Rail International 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.

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

## 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 arms and the wiper blades.

## Abbreviations and Definitions

<i>Abbreviation</i>	<i>Definition</i>
Assy	Assembly
Brk	Bracket
D. Crk	Drive Crank
DS	Drivers Side
G.R.P.	Glass Reinforced Plastic

<i>Abbreviation</i>	<i>Definition</i>
NDS	Non-Drivers Side
LH	Left Hand
RH	Right Hand
S.A.	Sub Assembly
SS	Stainless Steel

# SCOPE OF SUPPLY

## **Wiper Linkage Assy – S613255VM/S613256VM**

The wiper motor is mounted on a fabricated steel bracket which is polyester powder coated black to prevent corrosion. The motor is connected electrically by means of a multi-pin connector.

The drive crank is secured to the wiper motor shaft and connected through a double bearing or a tie-bar/bearing assy, to the main spindle lever assy. These components transfer the motor shaft rotation to the wiper arm assy.

The drive mechanism 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.

A main spindle and idler spindle are used on pantograph units. These pass through the bulkhead, connecting the drive mechanism to the wiper arm. These are manufactured from stainless steel, to prevent corrosion.

## **Wiper Arm Assy – 805528/805529**

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

One wiper arm assy is used on each unit. The wiper arm assy mounts directly onto the spindles protruding through the cab structure.

The wiper arm is secured to the spindles with a series of nuts and washers.

## **Wiper Blade – B140 39 B**

The blade is secured to the arm assy using the blade clip arrangement on the arm with a blade retaining screw and Nylock nut.

## **Wash Tank/Pump Assembly – 150A19500**

The 9.6L water tank is fabricated from stainless steel. Mounting is achieved by bolting via four slotted brackets on the side of the tank.

The wash pump is mounted on the inside of the wash tank, it is powered by a 24v DC supply, and when energised, the pump supplies washer fluid to the wash jet mounted on the wiper arm, through suitable tubing.

## **Filler spout with wash hose – 150A19600**

The external filler spout is fabricated from stainless steel, and polyester powder coated black mounting brackets. Mounting is achieved by bolting via 4 holes on the two welded brackets.

## **Off/Int/Slow/Fast & Push Wash Switch – 10171000**

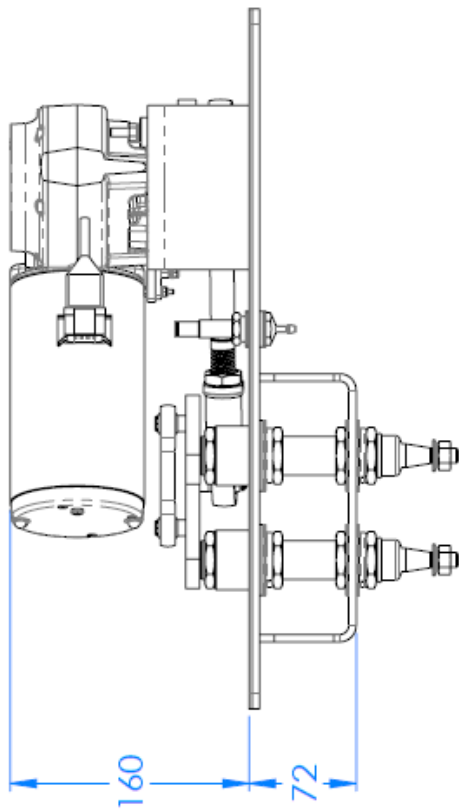
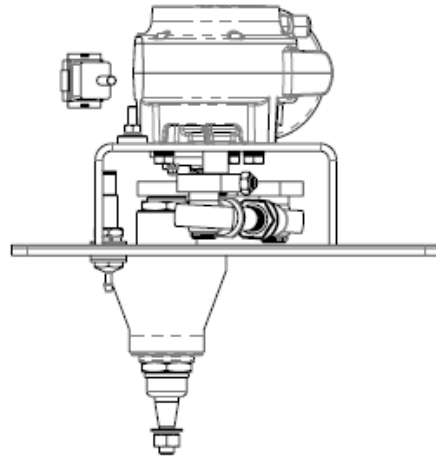
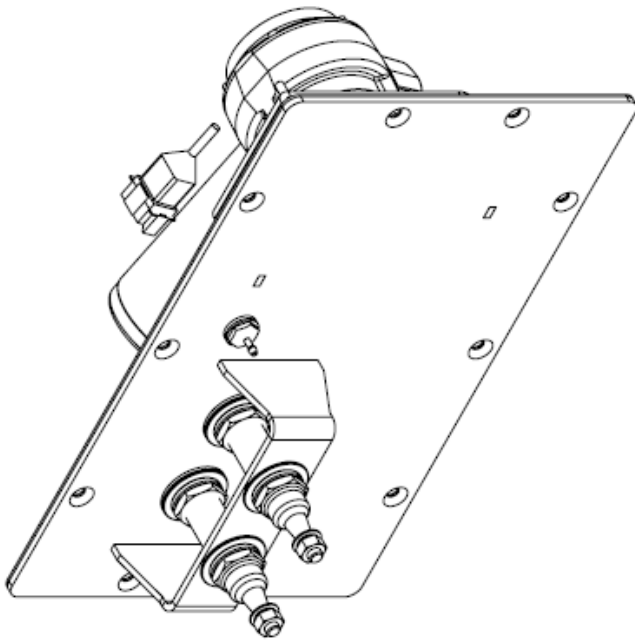
4 position, 90° switching angle, – Off; Intermittent; Slow; Fast & Push to Wash

## **Control Unit – HE0714-04**

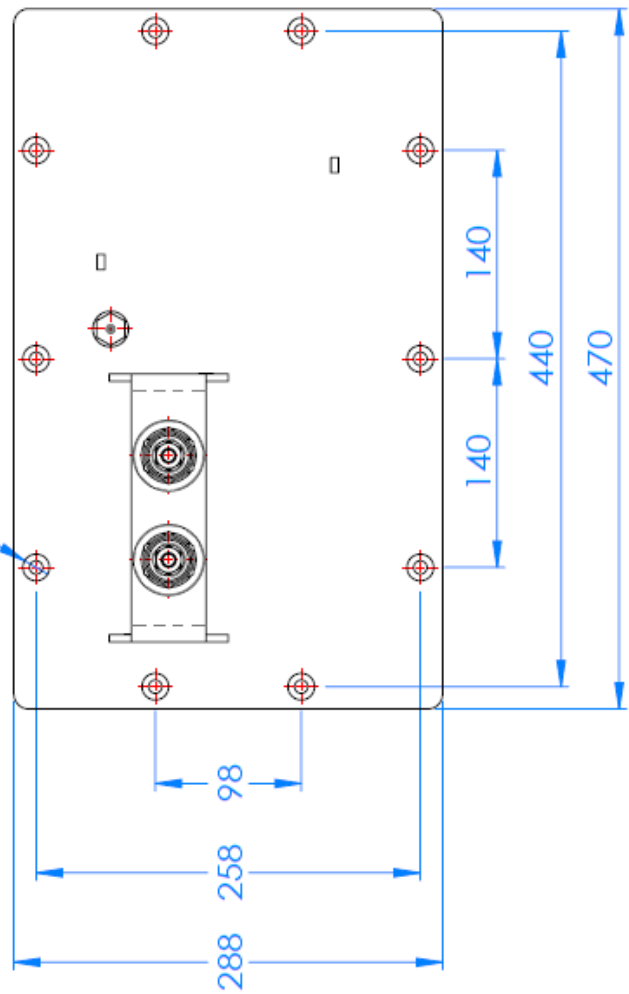
The control box is fabricated from stainless steel, and polyester powder coated black to be of good appearance. Mounting is achieved by bolting via flanges welded to the sides of the box.

Electrically connected by means of a multi-pin connector via a harness to the two motors, switch, pump and train interface.

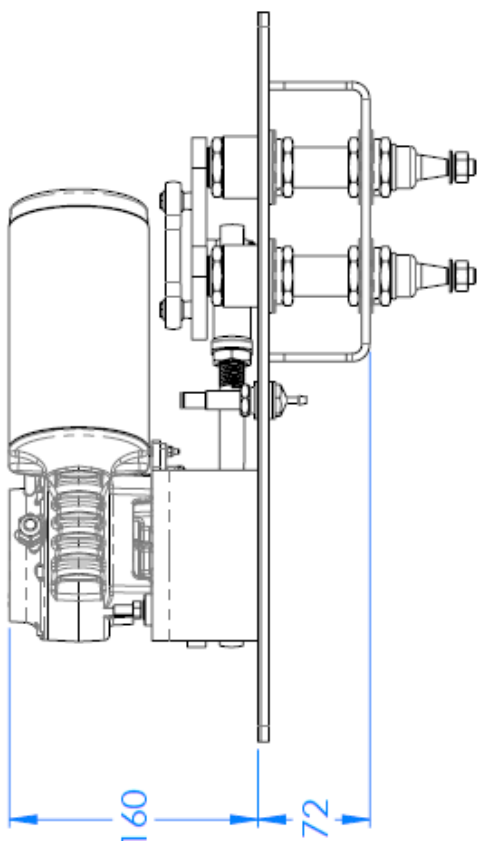
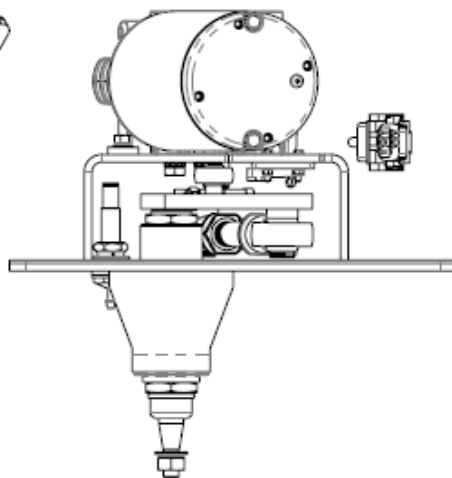
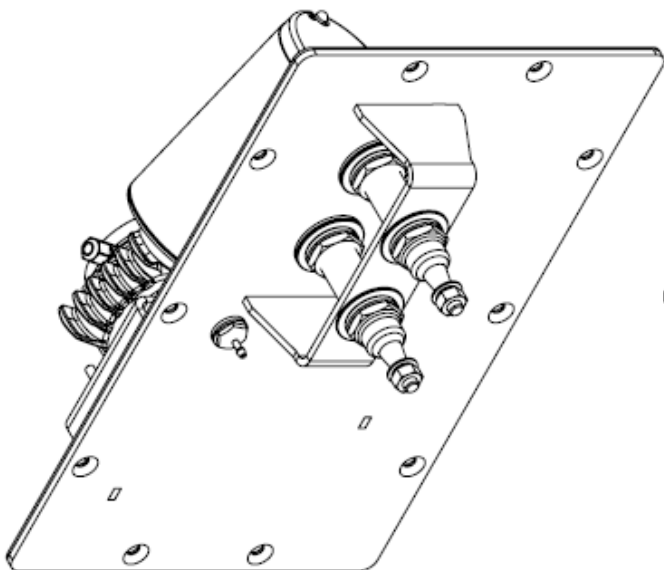
# WIPER LINKAGE ASSY – S613255VM



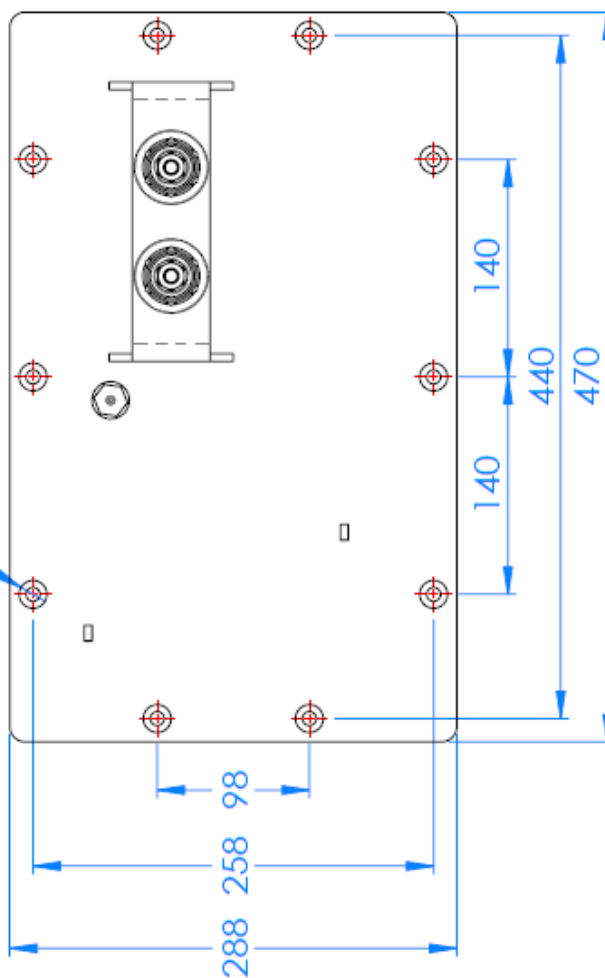
10 x  $\phi$  9 THRU ALL  
 $\sphericalangle$   $\phi$  18 X 90°



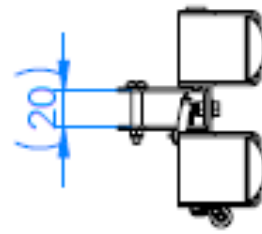
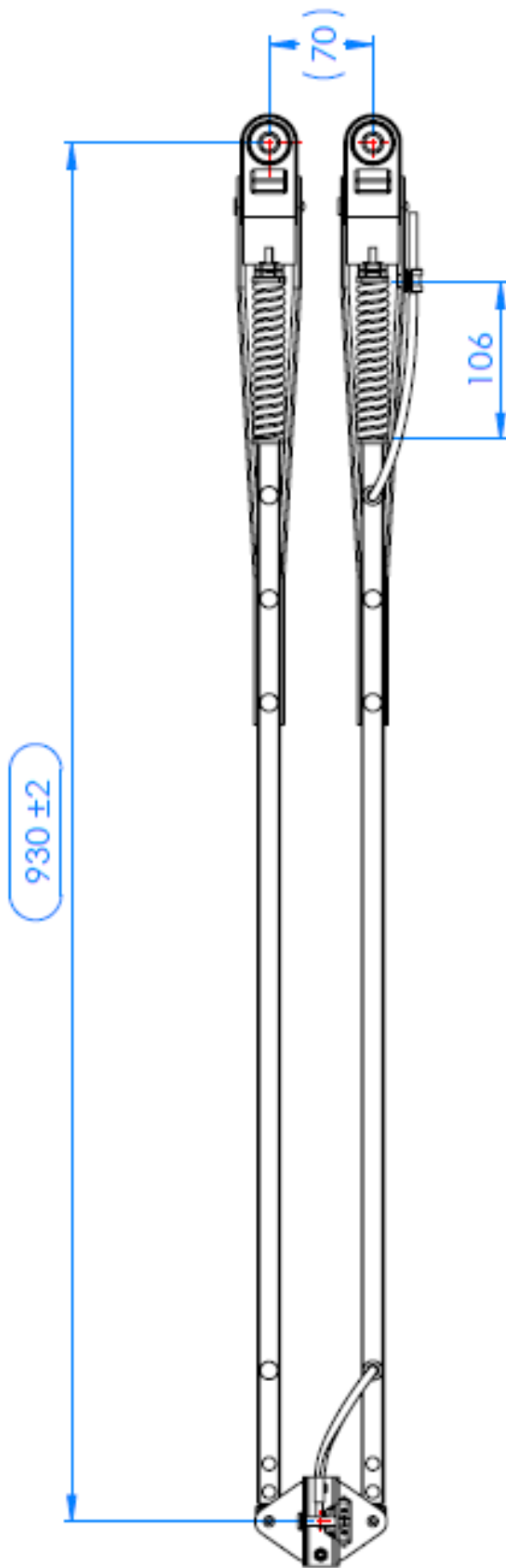
# WIPER LINKAGE ASSY – S613256VM



10 x  $\phi$  9 THRU ALL  
 $\sphericalangle$   $\phi$  18 X 90°

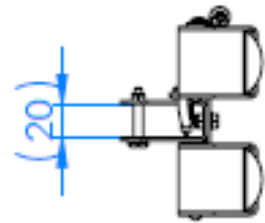
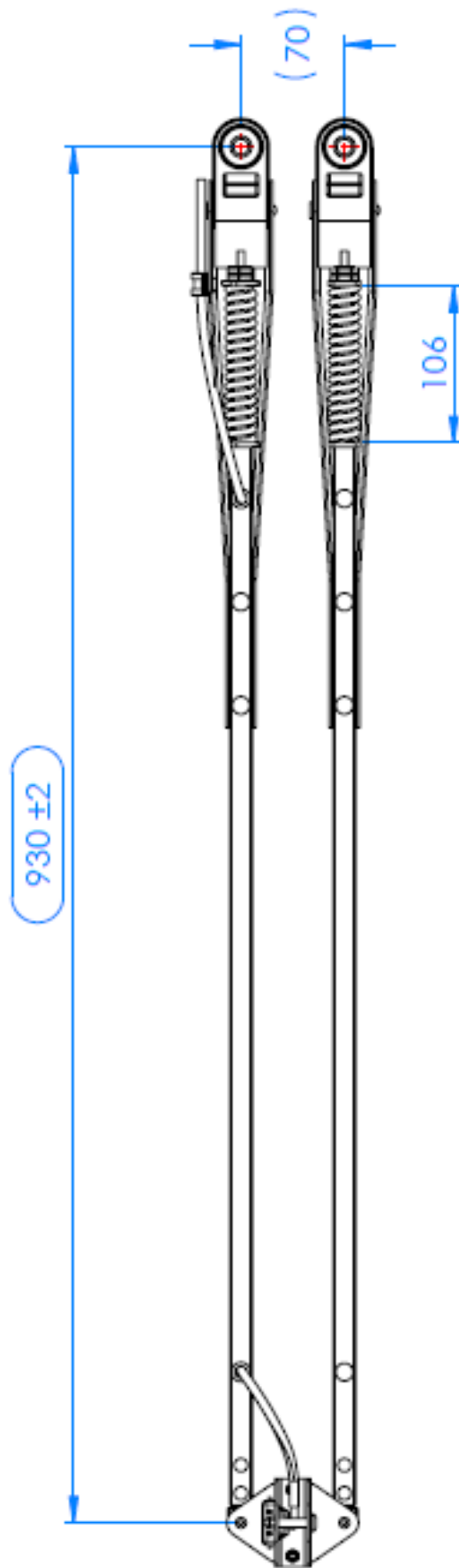


# WIPER ARM ASSY – 805528

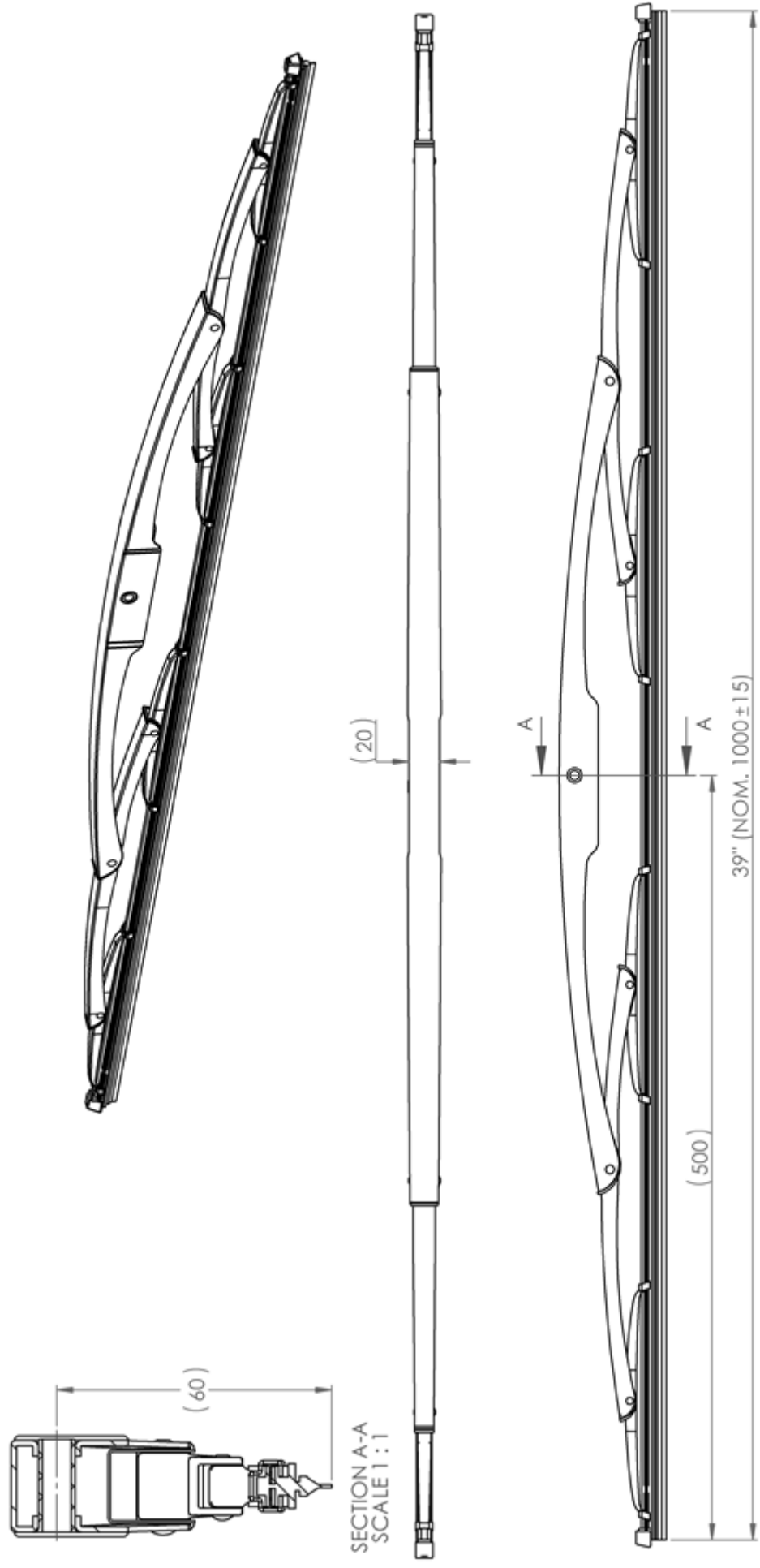




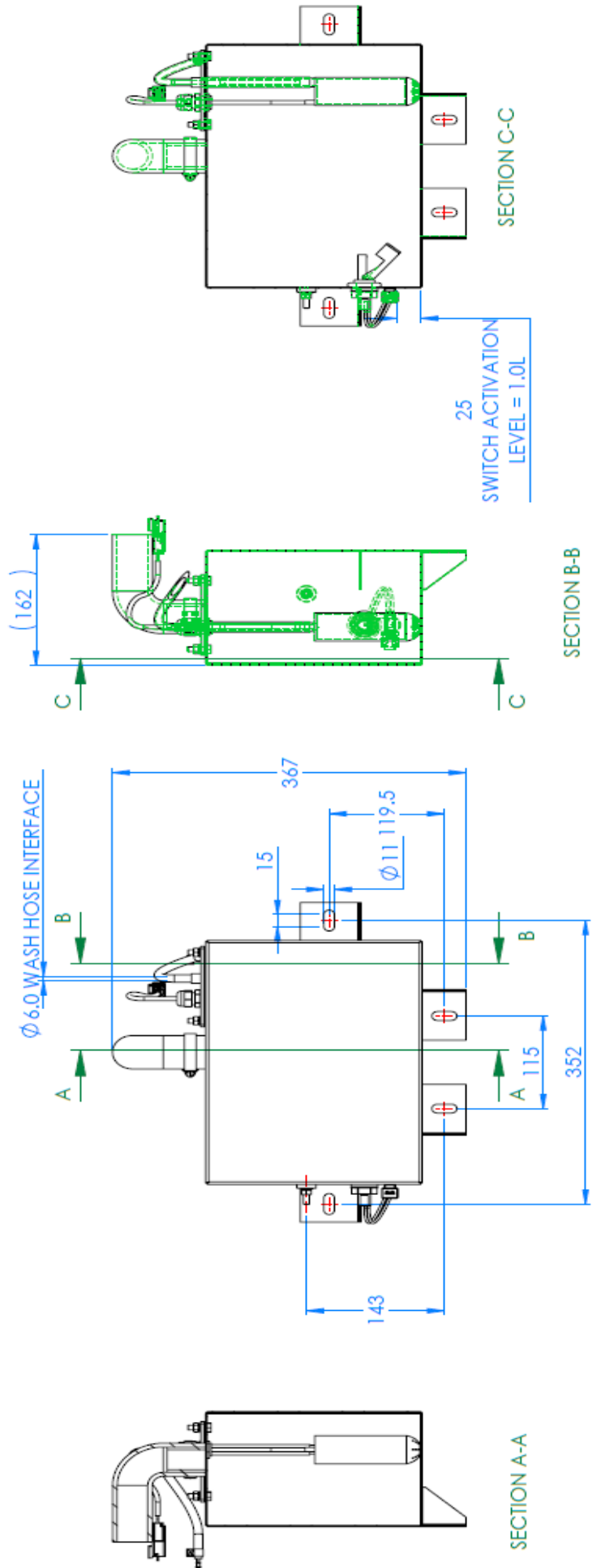
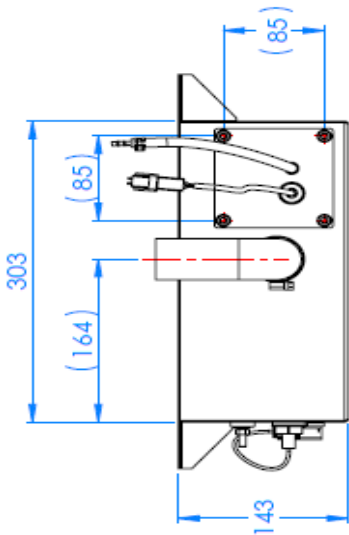
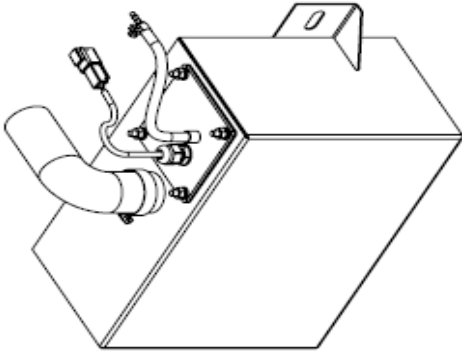
# WIPER ARM ASSY – 805529



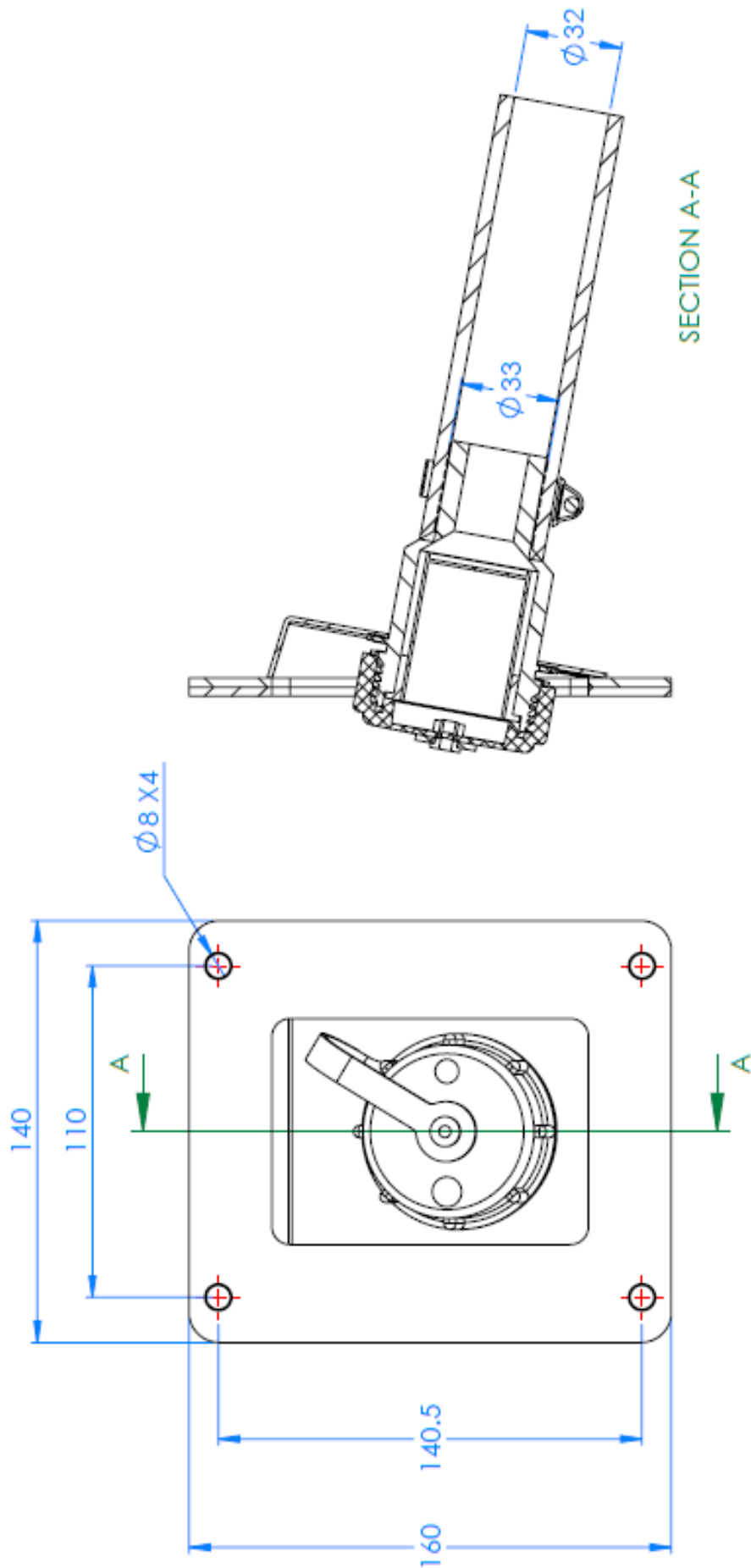
# ARTICULATED BLADES – B140 39 B



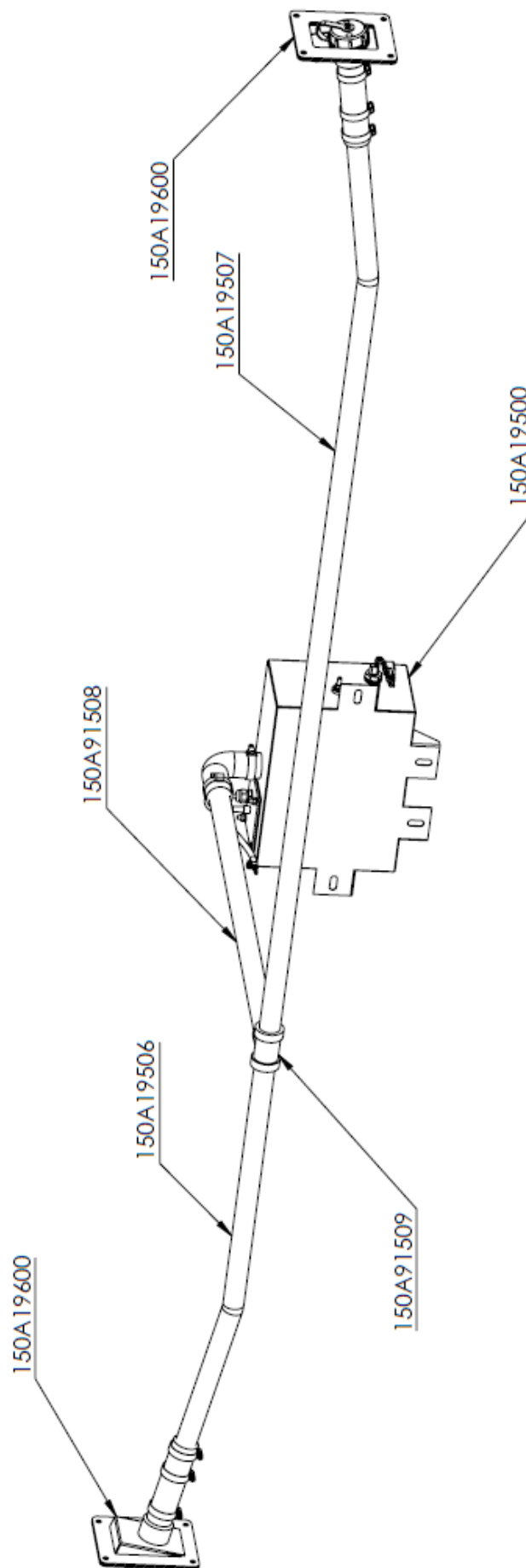
# WASH TANK WITH SUMBMERSIBLE PUMP – 150A9500



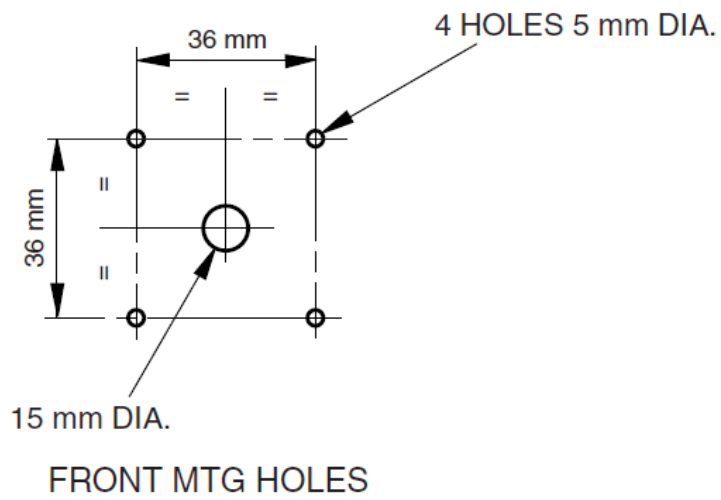
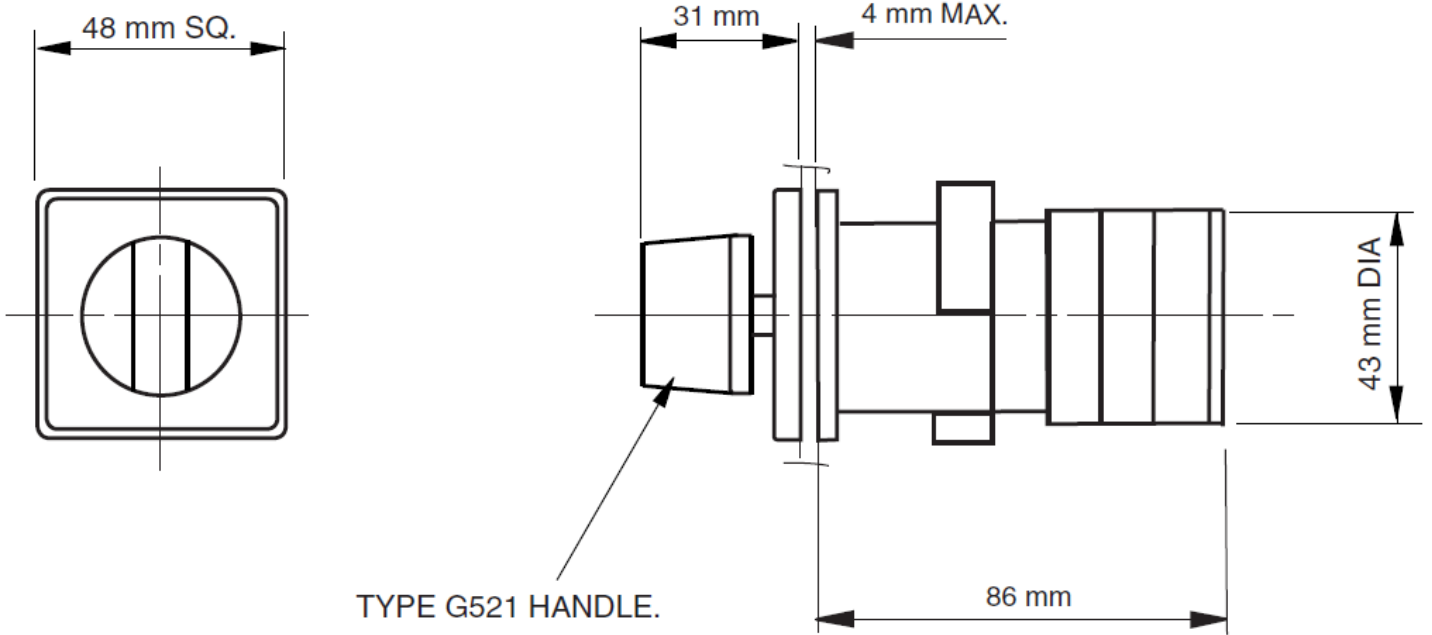
# EXTERNAL FILLER SPOUT – 150A19600



# WASH SYSTEM SCHEMATIC



# CONTROL SWITCH – 10171000





# INSTALLATION INSTRUCTIONS

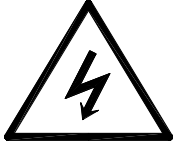
## NOTE

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 vehicle 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 Hepworth Rail International for advice.

Use the drawings for reference.



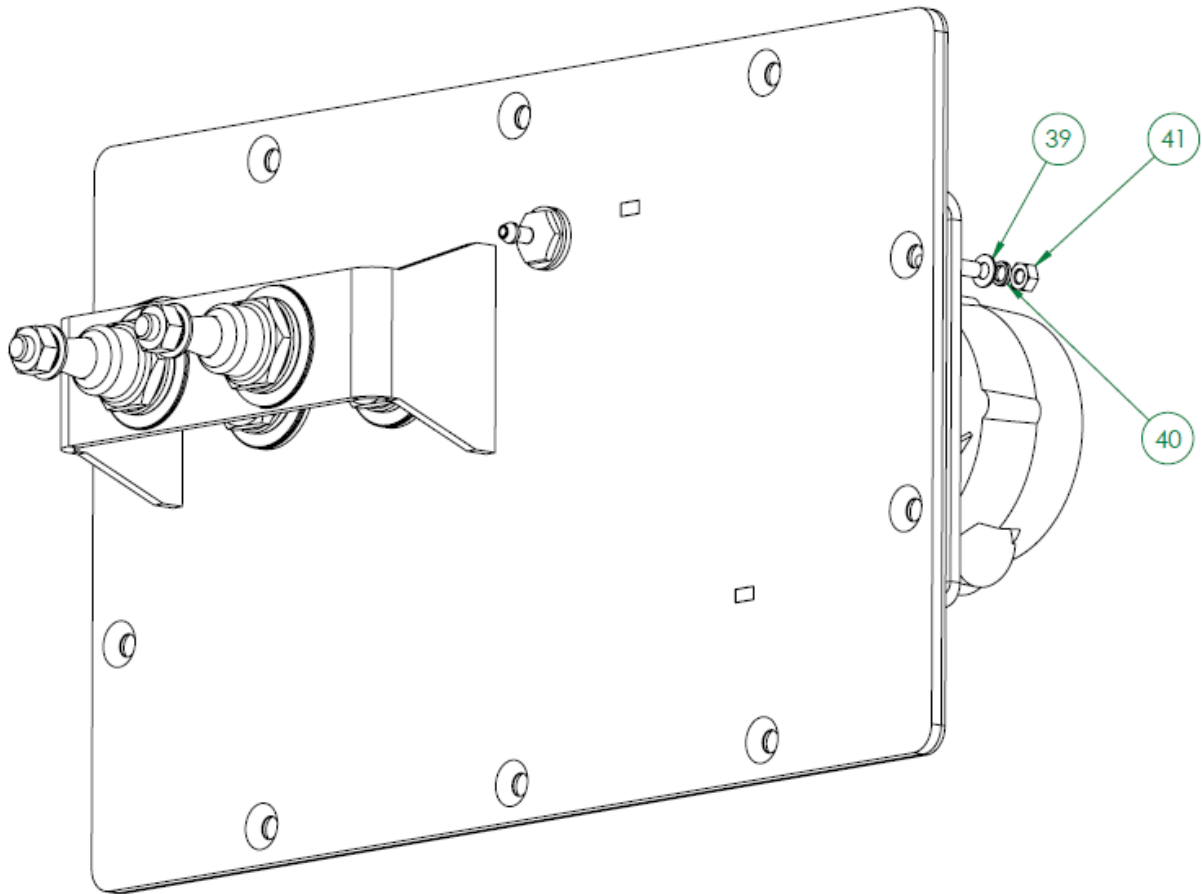
## WARNING:

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



# FITTING THE WIPER LINKAGE ASSY – M26

Figure – Exploded Diagram



## NOTE

The motor unit is MOUNTED from OUTSIDE the cab structure.

### *Ref Figure – Exploded Diagram*

1. Remove and retain from earth boss one M6 nut (41), one 6mm washer – single coil (40), and two 6mm washers – flat (39)

## IMPORTANT

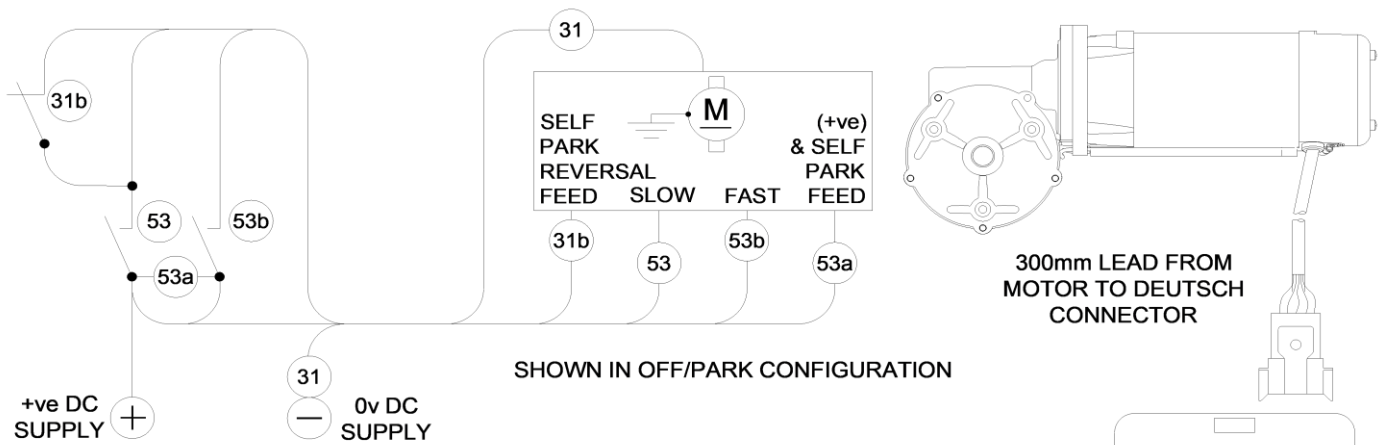
Remove front G.R.P. cover from area of unit mounting.

*(This is a vehicle manufacturer described task)*

2. Onto earth boss fit one 6mm washer – flat (39), one earth lead (*not supplied*), one 6mm washer – flat (39), one 6mm washer – single coil (40), and one M6 nut (41)  
***Torque M6 = 12Nm (on Earth Boss – Nut)***
3. ***Externally*** – ENSURE a proprietary sealant (*Not supplied*) is used around all points of entry through cab structure.
4. Wire motor to cab electrics via switch/controller. (*Not supplied*)  
***In accordance with Installation Instructions – Electrical Connections***
5. Fit wiper arm and blade  
***In accordance with Installation Instructions – Fitting the Wiper Arm and Blade Assy***

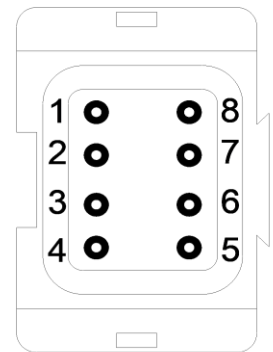
# ELECTRICAL CONNECTIONS

Figure – Electrical Connections



ENLARGED VIEW

8 way DEUTSCH CONNECTOR (REAR VIEW - No Clip shown)



Pin 1	-	CPS	CENTRE
Pin 2	Core 3	0V	CENTRE PARK 0V
Pin 3	-	53A	+ VE DC SUPPLY
Pin 4	Core 2	50	SELF PARK FEED
Pin 5	Core 4	53	SLOW SPEED
Pin 6	Core 5	53B	FAST SPEED
Pin 7	Core 1	31	MOTOR 0V DC
Pin 8			

# FITTING THE WIPER BLADE

The wiper blades should be changed every 6 months but this is dependent on use and operating conditions

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

## Ref Figure – Blade Fittings

1. Remove and retain one blade retaining screw (3), and one M4 nylock nut (4), 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.

## Ref Figure – Blade Captive End

2. Place wiper blade into blade clip on arm (1)
3. Ensure that all fixing holes align.
4. Secure in place with one blade retaining screw (3), and one M4 nylock nut (4)

### 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 Fittings

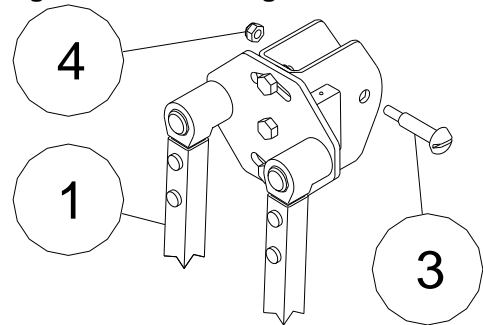
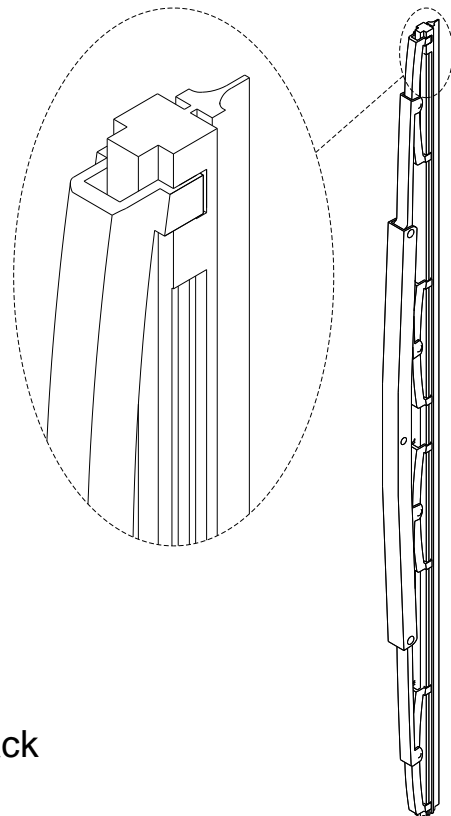


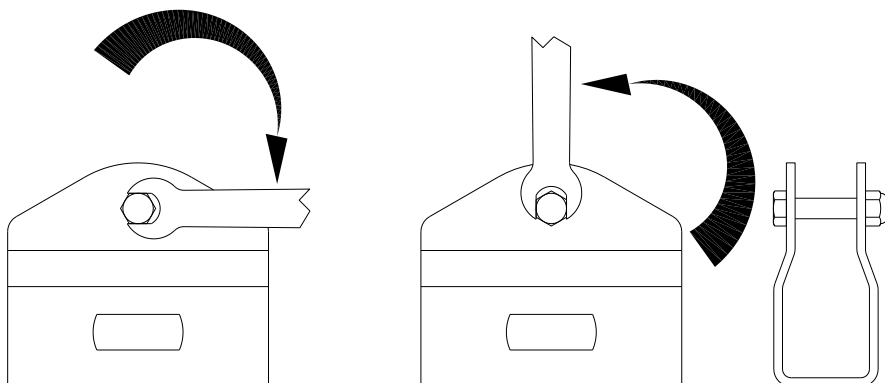
Figure – Blade Captive End

**Must be at top**



Secure nut  
until tight

1/4 turn back



# FITTING THE WIPER ARM ASSY HD

## 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. **Internally** – Run motor to insure it is parked correctly. Disconnect all electrical power.

## IMPORTANT

Externally – watch the unit whilst it runs, to observe the direction the drive spindle rotates in immediately before the unit stops. This direction will confirm the PARK POSITION.

### Ref Figure – Spindle/Arm Fittings

2. Remove one weather cap (5) from each arm head.

### Ref Figure – Arm Position

3. Fit arm (1), onto spindle so blade lies in position shown.
4. Fit one washer – plain (14), one washer – single coil (15), and one spindle nut (16)

## NOTE

Spindle nuts do not need to be torque tightened at this stage as arm may have to be removed to correct any misalignment.

5. Tighten spindle nut sufficiently to allow wiper arm and blade to travel across glass when motor is run.
6. De-isolate electrical supply to motors. Spray washer fluid on screen and briefly run wipers, checking area covered.

## CAUTION

Do not attempt to rotate or twist the wiper arm on the spindle it will cause damage to the spline on the spindle, resulting in the wiper arm and blade slipping in operation.

7. If blades position needs adjusting, isolate electrical supply to motors

### Ref Figure— – Arm Extractor Tool

8. Loosen one spindle nut (16), on each spindle. Carefully pull arm (1), up spindle (2), and realign.

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

9. When correctly aligned, isolate electrical supply to motor. Tighten one spindle nut (16).

**Torque M10 = 38Nm (on Spindle Nut)**

### Ref Figure – Spindle/Arm Fittings

10. Fit one arm weather head cap (5) onto each arm head.

Figure – Spindle/Arm Fittings

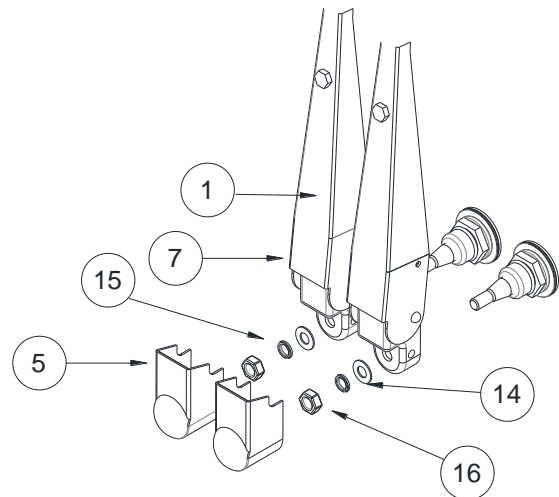
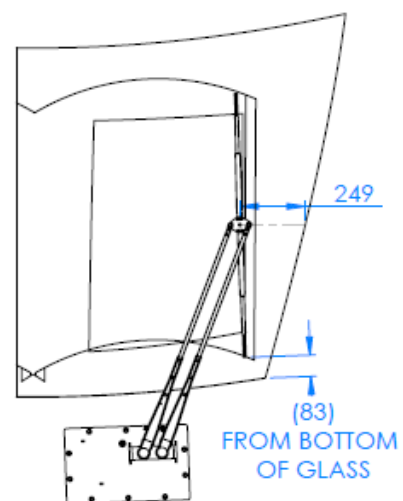


Figure – Arm Position



DIMENSION TO BE MIRRORED ON OTHER ARM/BLADE

**Ref Figure – Bulkhead Connector**

11. Carefully push black wash hose attached to wiper arm onto external end of bulkhead connector.
12. Fix in place with tie wrap.

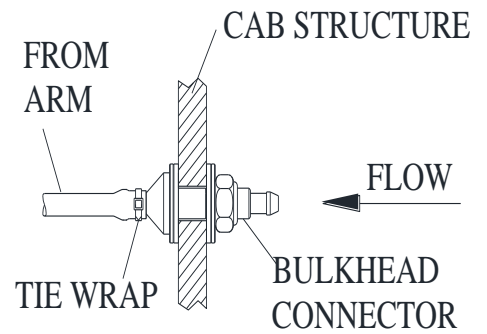
**IMPORTANT**

On first fitting, check the force on the blade in parked position, it must NOT exceed recommended pressure. 1.75-2.25 kg

**IMPORTANT**

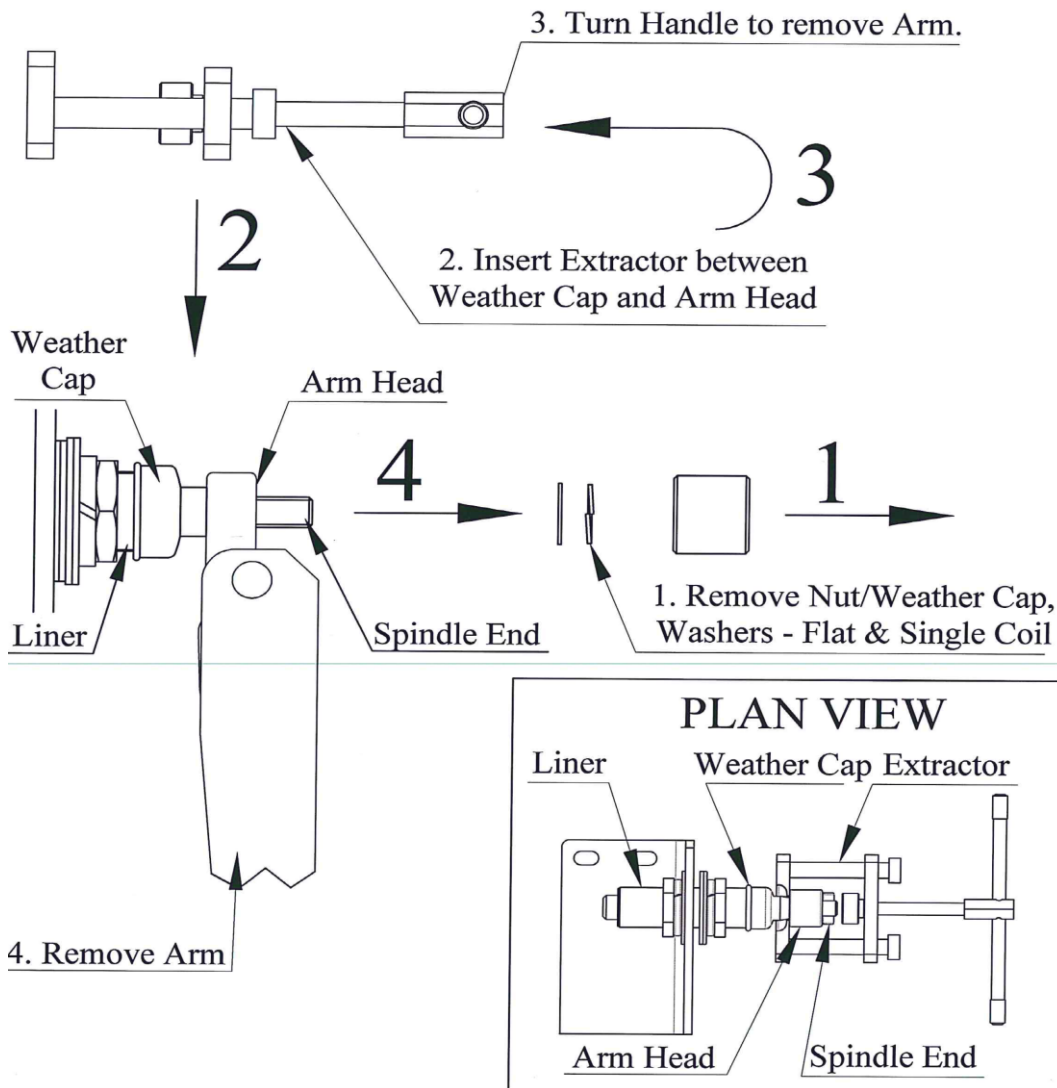
Replace front G.R.P. cover over area of unit mounting.  
*(Fixings not supplied – this is a vehicle manufacturer described task)*

**Figure – Bulkhead Connector**



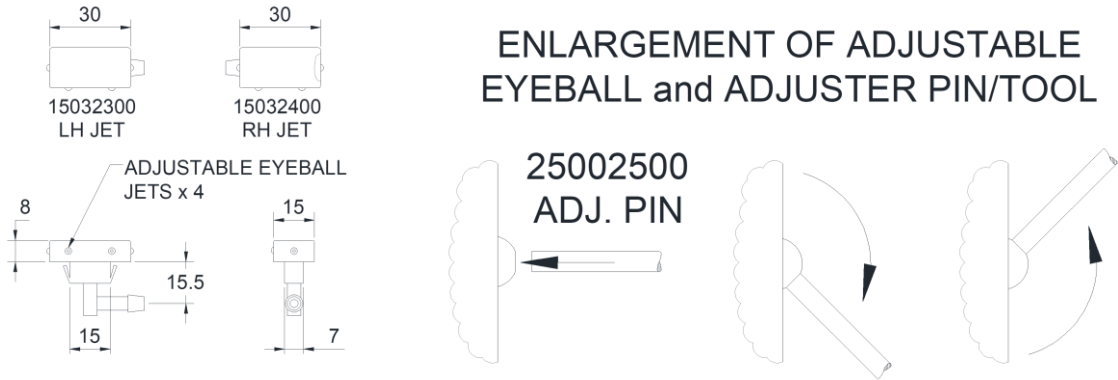
**Figure – Arm Extractor Tool**

# OPERATING THE EXTRACTOR



# THE WASH JET SPRAY AREA

Figure – Adjusting the Wash Jet

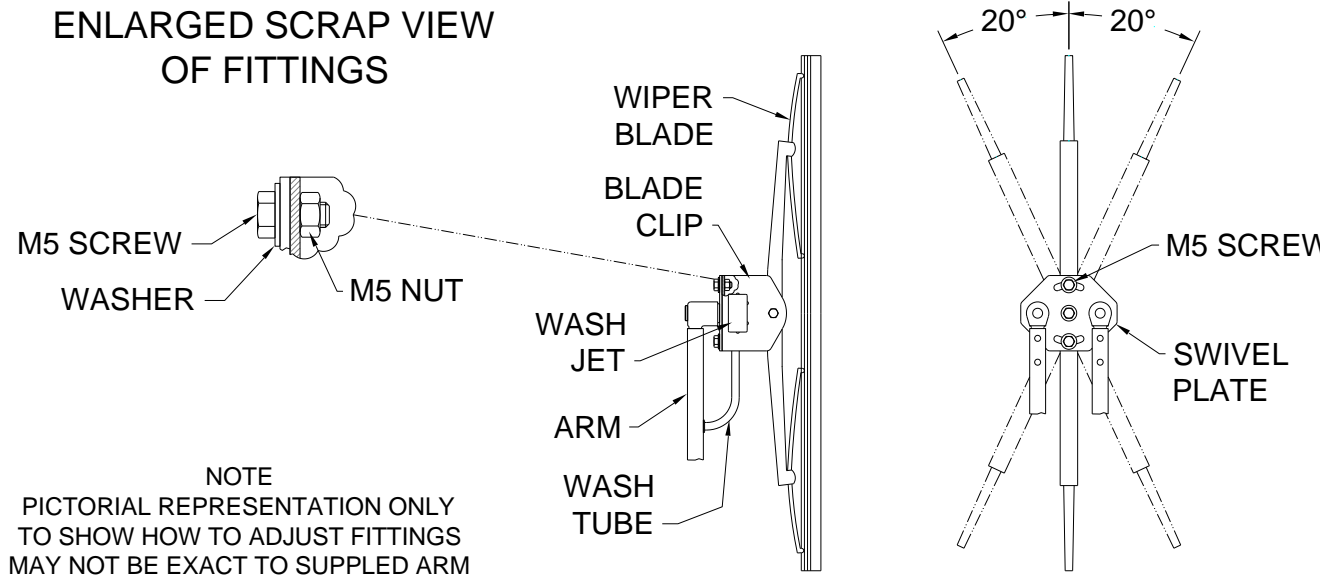


Ref Figure – Adjusting the Wash Jet

1. There are four adjustable eyeball jets on each jet body. Jet bodies are handed to suit leading edge of blade.
2. Ensure the windscreen is wet before operating wipers. Make sure flow of washer fluid from jet nozzle, on wiper arm is directed onto windscreen within sweep of wiper.
3. Using adjuster pin/tool provided, adjust eyeball jets, so that the spray pattern on screen is within sweep of wiper.

## ADJUSTING THE WIPER BLADE ANGLE

Figure – Adjusting the Wiper Blade Angle



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

Ref Figure – Adjusting the Wiper Blade Angle

1. On back of adjustable swivel plate, slacken all M5 screw and nut assy's to allow movement of blade clip on plate.
2. Rotate blade clip and blade to correct angle. Max 20° about centre.
3. Re-tighten all M5 screw and nut assy's  
**Torque M5 = 4.5Nm (on Arm – Swivel Plate/Blade Clip)**

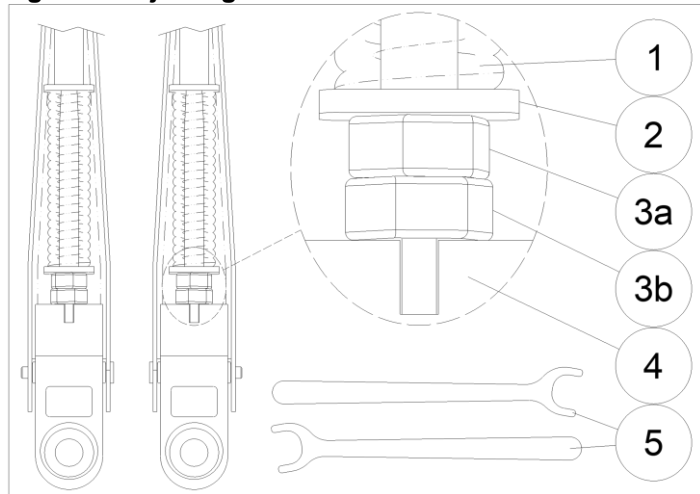
# ADJUSTING THE FORCE ON THE BLADE

## IMPORTANT

The arm is set to optimum pressure for the length of arm and blade relative to cab position, if pressure is incorrect for any reason; the following operations apply to alter spring tension on the wiper arm to correct it

Figure – Adjusting the force on the blade

Item	Description	QTY (per Arm)
1	Spring	2
2	Spring Retention Plate	2
3a	Retention Plate Nut	2
3b	Head Nut	2
4	Arm Head	2
5	Adjustment Spanners	2



## NOTE

Moving the nuts upwards to compress the wiper arm spring increases the pressure on the wiper blade. Due to space restriction it is not possible to torque set the nuts once reset.

1. **Externally** – Remove arm and blade.  
*In accordance with Maintenance Instructions: to Replace the Wiper Arm – Removal*

## To Increase Pressure

*Ref Figure – Adjusting the Wiper Blade Angle*

2. Using adjustment spanners (5), slacken head nut (3b), away from spring retention nut (3a)
3. Move retention plate nut (3a), one half turn TOWARDS spring retention plate (2)
4. Move head nut (3b), to lock tightly against it.
5. Repeat as necessary till correct pressure is achieved

## To Decrease Pressure

*Ref Figure – Adjusting the Wiper Blade Angle*

2. Using adjustment spanners (5), slacken head nut (3b), away from spring retention nut (3a)
3. Move retention plate nut (3a), one half turn AWAY FROM spring retention plate (2)
4. Move head nut (3b), to lock tightly against it.
5. Repeat as necessary till correct pressure is achieved.

## NOTE

To test spring pressure – use spring balance on centre of blade clip till blade begins to lift off glass. –

*With reference to arm drawing for pressure settings*

## IMPORTANT

DO NOT wind linkage liner/spindles in or out to adjust spring tension, they are set to tolerance.

THIS MAY INVALIDATE FUTURE WARRANTY CLAIMS, as adjustment may cause damage to the linkage/motor, increased stresses in arm and give premature wear on bearings

# TROUBLESHOOTING – TABLE

## Introduction

This chapter provides all the instructions and information necessary to locate problems and conduct tests on the windscreen wiper system components. The trouble-shooting 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  Defective control Box	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  Replace control Box
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.  <i>Reference torque settings table</i>
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.  <i>Reference torque settings table</i>
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	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	Replace wiper arm after cleaning spindle spline with wire brush. <i>Reference torque settings table</i>
	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. 1.75-2.25 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 Replace tank Replace pump if faulty

**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**

# INSPECTION / MAINTENANCE – TABLES

## Introduction

This chapter contains daily inspection and all preventative maintenance details for the windscreen wiper components. Preventative maintenance procedures include the information required for when to replace the wiper blades.

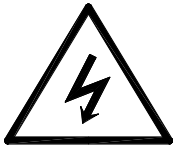
### IMPORTANT

Refer to Maintenance Instructions 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 Inspection and Maintenance Tables are a Scheduled Maintenance Action Index. The index provides a list of all performance tests if applicable and preventative maintenance procedures. The tables have 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.

### *Inspection Table*

### 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.

<b>PERIODICITY</b>	<b>EQUIPMENT</b>	<b>TASK</b>
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	Washer Tubing and Spray Nozzle	Inspect tubing for damage or loose connection on nozzle. Check operation of spray nozzle on windscreen
Daily	Wash Tank *	Ensure wash tank is filled with washer fluid to prevent wipers being used on a dry screen.

## MAINTENANCE TABLE

### 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.

<i>PERIODICITY</i>	<i>EQUIPMENT</i>	<i>TASK</i>
Once after three months or As required	Fixings of wiper arm to wiper spindle	Check torque settings (Set torque wrench to correct setting. Fit on nut, turn, if correct, wrench should click.) <i>Reference torque setting table</i>
Twelve monthly or as required	Wiper blades	Non serviceable item Replace wiper blades
Once after first six months.  Then visually check annually	Complete System	Check for wear, Replace/overhaul parts if necessary Check all torque settings for complete wiper system. <i>Reference torque setting table</i>  Carry out a visual check for wear in rod end. <i>Reference Figure – Rod End Bearing</i>

## TORQUE SETTINGS

### NOTE

If required – Set torque wrench to correct setting, fit on nut, turn, if correct, wrench should click.

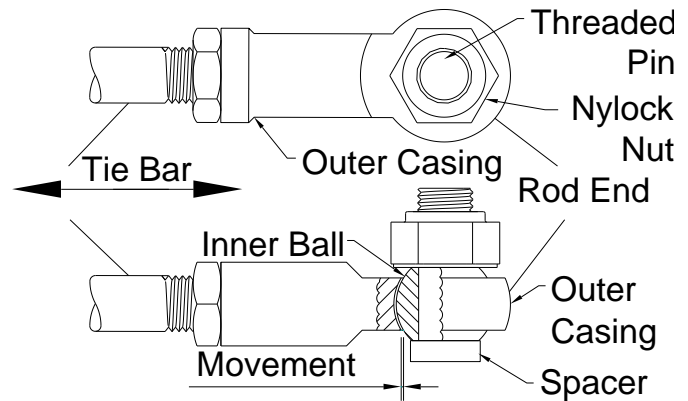
<i>WHERE USED (*May Not be fitted on this</i>	<i>DESCRIPTION</i>	<i>SIZE</i>	<i>TORQUE</i>
Arm -Swivel Plate/Blade Clip	Nut & Bolt	M5	4.5Nm
Earth Boss (*)	Nut	M6	12Nm
Wiper Motor	Bolt	M8	25NM
SS Bulkhead Connector (*) – Stainless Steel	Nut	M8	20Nm
Splined Drive Crank	Nut & Bolt	M8	25Nm
Ø16 Spindle	Nut	M10	38Nm
Threaded Bearing Pin	Nut	M16	25Nm
SS Liner – Metal Structure	Nut	M26	80Nm

## How to check for wear on the Rod End

### *Ref Figure – Rod End Bearing*

1. Pull on tie-bar to see if any movement in rod end bearing at inner ball on outer casing.
2. If excessive movement – replace.

Figure – Rod End Bearing

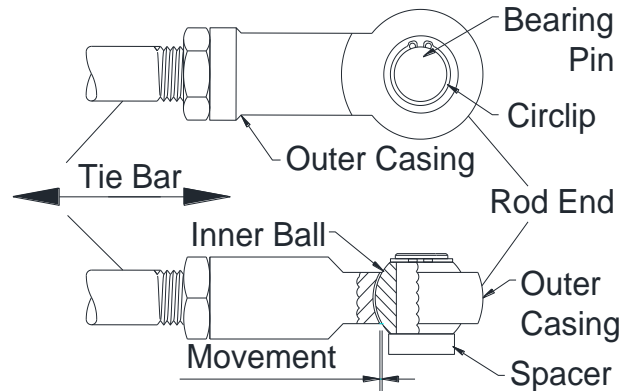


## How to check for wear on the Rod End (16mm)

### *Ref Figure – Rod End Bearing*

1. Pull on tie-bar to see if any movement in rod end bearing at inner ball on outer casing.
2. If excessive movement – replace.

Figure – Rod End Bearing



# MAINTENANCE INSTRUCTIONS

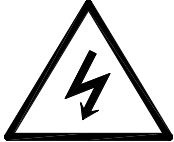
## NOTE

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 vehicle manufacturer 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 Hepworth Rail International 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

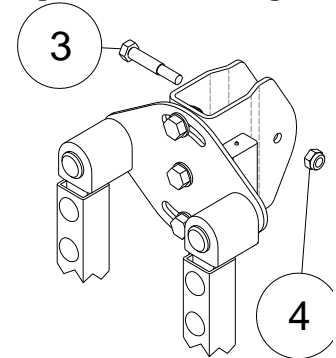
## Removal

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.

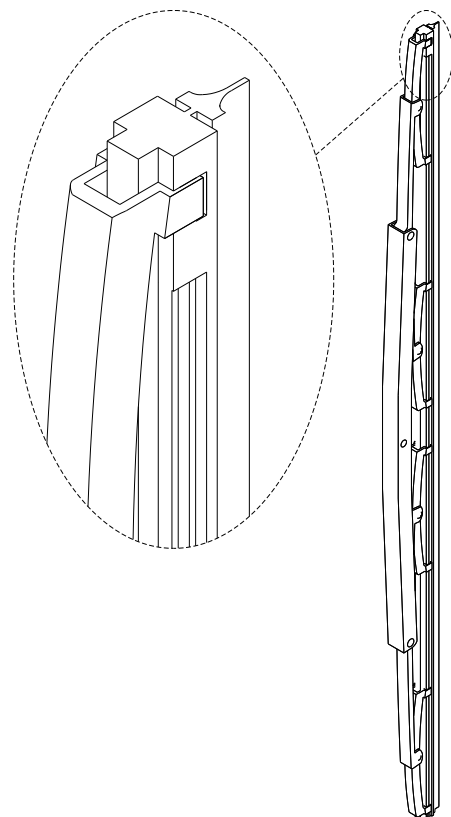
1. Place wiper blade into blade clip on wiper arm.

## Ref Figure – Blade Captive End

2. Ensure that all fixing holes align.
3. Secure in place with blade retaining screw (3), and nut (4)

Figure – Blade Captive End

**Must be at top**



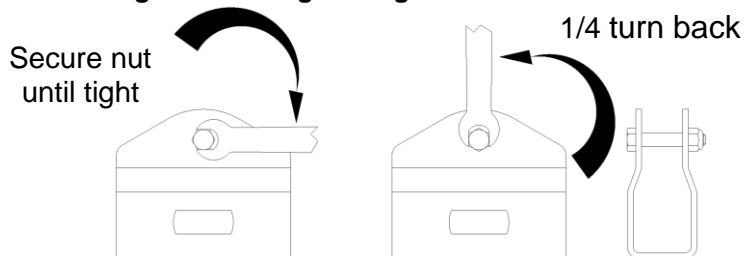
### IMPORTANT

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



### NOTE

Pictorial representation only, May not be exact to supplied arm

5. Lower wiper blade carefully back onto windscreen.

# TO REPLACE THE WIPER ARM

## IMPORTANT

Remove front G.R.P. cover from area of unit mounting.

*(Fixings not supplied – this is a vehicle manufacturer described task)*

## Removal

1. **Internally** – Run motor to ensure it is parked correctly. Disconnect all electrical power.

## IMPORTANT

**Externally** – watch the unit whilst it runs, to observe the direction the drive spindle rotates in immediately before the unit stops. This direction will confirm the PARK POSITION.

### Ref Figure – Bulkhead Connector

2. Remove tie wrap from wash tube (7), on external end of bulkhead connector.

## NOTE.

The wash hose may leak washer fluid on removal from the bulkhead connector. Keep washer fluid away from any electrical and/or mechanical part that could be affected by it.

3. Carefully remove wash hose on arm from end of connector.

### Ref Figure – Spindle/Arm Fittings

4. Remove one weather cap (5) from each arm head.
5. Remove from each spindle one spindle nut (16), one washer – single coil (15), one washer – flat (14)

Figure – Bulkhead Connector

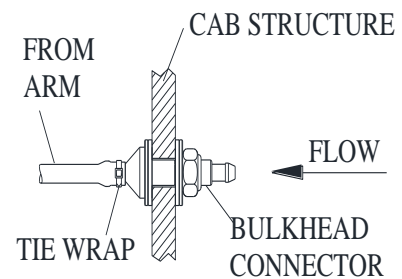


Figure – Spindle/Arm Fittings

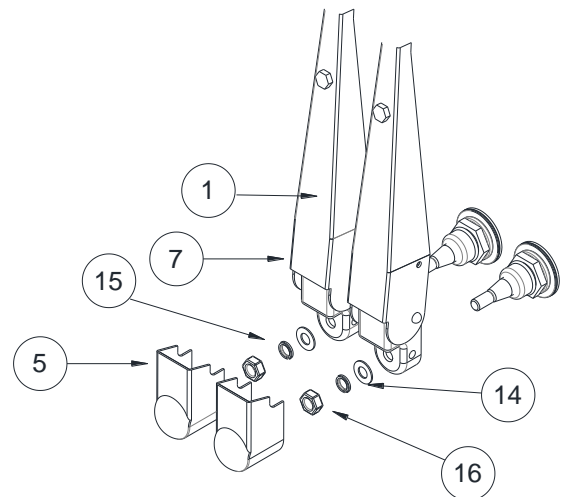
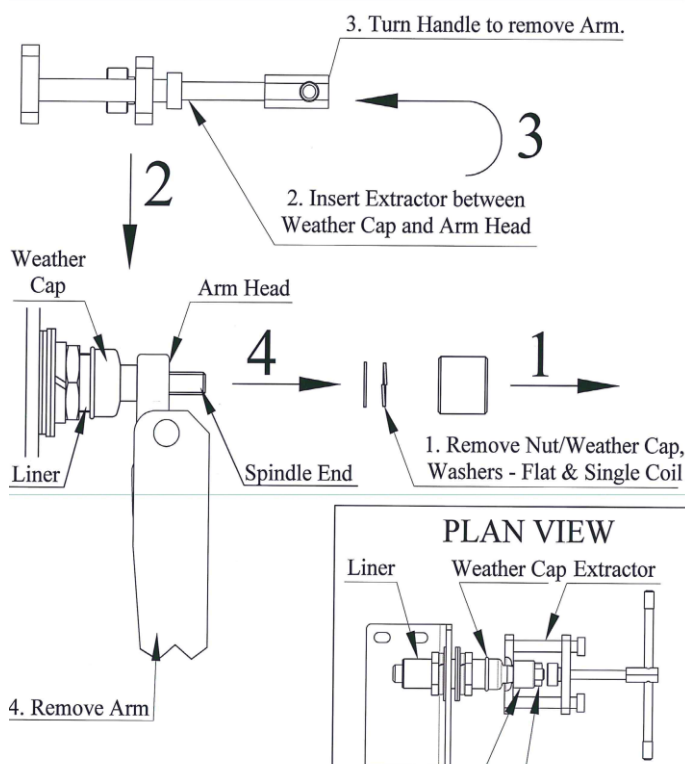


Figure – Arm Extractor Tool

## OPERATING THE EXTRACTOR



Ref Figure – Arm Extractor Tool

6. Using arm extraction tool carefully remove wiper arm.

## Replacement

1. Replace wiper arm and blade assy

**In accordance with Installation Instructions – Fitting the Wiper Arm Assy**

## IMPORTANT

Replace front G.R.P. cover over area of unit mounting.

*(Fixings not supplied – this is a vehicle manufacturer described task)*

# TO REPLACE THE ENTIRE WIPER LINKAGE ASSY

Figure – Entire Linkage Assy

## IMPORTANT

Before replacing the wiper motor or wiper mechanism, it is necessary to remove the entire wiper linkage assy from the cab structure.

## IMPORTANT

Remove front G.R.P. cover from area of unit mounting.

*(Fixings not supplied – this is a vehicle manufacturer described task)*

### Removal

1. **Internally** – Run motor to ensure it is parked correctly. Disconnect all electrical power.
2. **Externally** – Remove arm and blade.  
*In accordance with Maintenance Instructions – To Replace the Wiper Arm – Removal*

## NOTE

Keep safe as will be required on assembly.

3. **Internally** – Remove all cab wiring connections from motor (6)
4. Remove from earth boss, one M6 nut (41), one 6mm washer – single coil (40), one 6mm washer – flat (39), one earth lead, and one 6mm washer – flat (39)
5. Unscrew and remove fixings from mounting bracket position to cab structure.  
*(Fixings not supplied – this is a vehicle manufacturer described task)*
6. Carefully remove entire wiper linkage assy from cab structure, complete with fittings.
7. Carefully remove entire wiper linkage assy from cab structure.

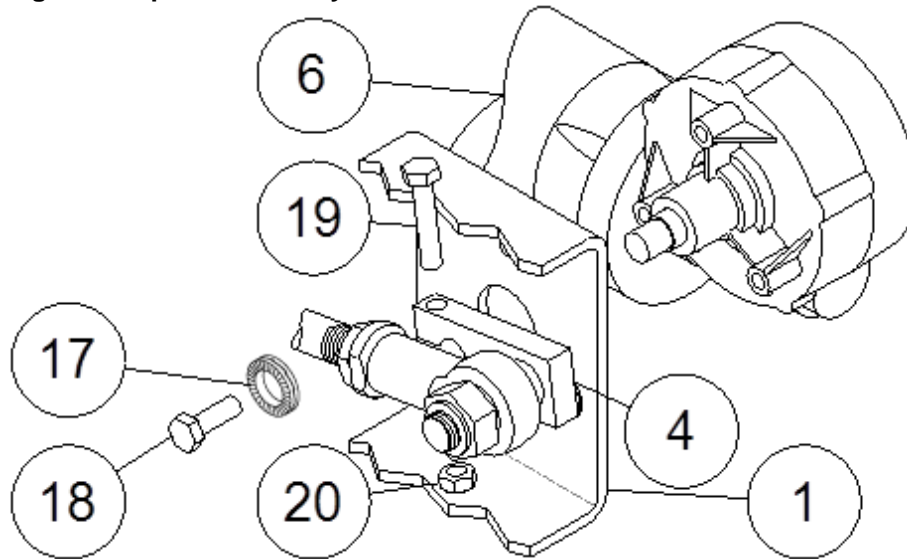
### Replacement

1. Replace entire wiper linkage assy  
*In accordance with Installation Instructions – Fitting the Wiper Linkage Assy*
2. Replace wiper arm and blade  
*In accordance with Installation Instructions – Fitting the Wiper Arm Assy*



# TO REPLACE THE WIPER MOTOR ASSY

Figure – Wiper Motor Assy



## NOTE

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

## Removal

1. Carefully remove entire wiper motor linkage assy from cab structure  
*In accordance with Maintenance Instructions – To Replace the Entire Wiper Motor Linkage Assy – Removal*

## IMPORTANT

Please make a note of drive crank position relative to spindle lever, i.e. spindle lever facing towards motor or away from motor

## Ref Figure – Wiper Motor Assy

2. Slacken drive crank nut (20), and bolt (19), carefully remove drive crank assy (4), (**complete with bearing, bearing nut and tie-bar (5),**) from motor drive shaft
3. Unscrew three fixing bolts (18) and remove with three Nordloc washers (17). Remove wiper motor (6), from bracket (1).

## Replacement

## NOTE

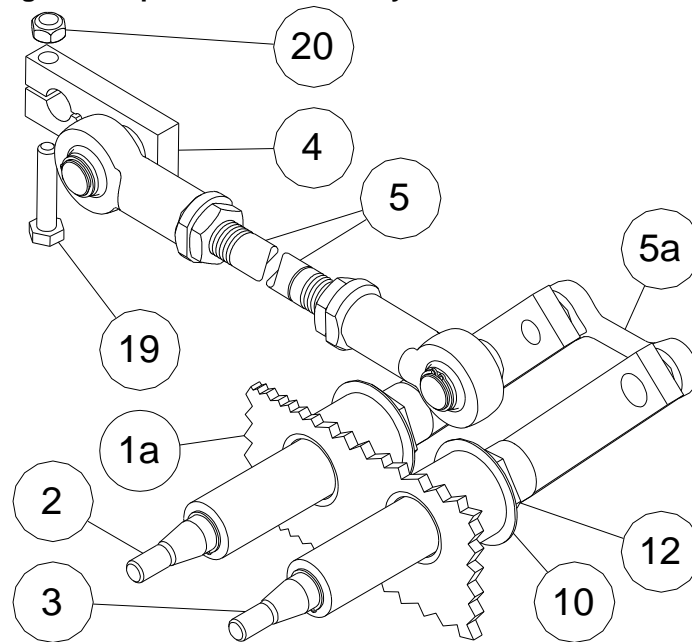
If required clean the motor drive shaft, with wire brush

## Ref Figure – Wiper Motor Assy

1. Replace wiper motor (6) into bracket (1), fit three Nordloc washers (17), and three fixing bolts (18)  
**Torque M8 = 25NM (on Motor Bolts)**
2. Carefully fit drive crank assy (4), (**complete with bearing, bearing nut and tie-bar (5),**) over motor drive shaft, (**Refer to note after operation 2**) on 'removal' for position. Tighten drive crank nut (20), and bolt (19).  
**Torque M8 = 25Nm (on Splined D. Crk Nut & Bolt)**
3. Replace entire wiper motor linkage assy  
*In accordance with Installation Instructions – Fitting the Wiper Linkage Assy*

# TO REPLACE THE WIPER MECHANISM ASSY

Figure – Wiper Mechanism Assy



## NOTE

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

### Removal

1. **Internally** – Run motor to ensure it is parked correctly. Disconnect all electrical power.
2. Carefully remove entire wiper linkage assy from cab structure.  
**In accordance with Maintenance Instructions – To Remove the Entire Wiper Motor Unit Assy**

### IMPORTANT

Please make a note of drive crank position relative to spindle lever, as this will affect park position for wiper arm and wiper blade i.e. spindle lever facing towards or away from motor.

### Ref Figure – Wiper Mechanism Assy

3. Slacken drive crank nut (20), and bolt (19), carefully remove drive crank assy (4 (complete with bearing, bearing nut and tie-bar (5),) from motor drive shaft.

### IMPORTANT

There is one washer – flat (10), and one hex nut (12), fitted on each liner inside the bracket. Take care on removal that the washers do not fall off.

4. Carefully remove both main liner/lever assy (2), and driven idler liner/lever assy (3), (complete with connecting bar (5a),) from mounting bracket weld assy (1a)

### Replacement

### NOTE

If required clean the motor drive shaft, with wire brush

### Ref Figure – Wiper Mechanism Assy

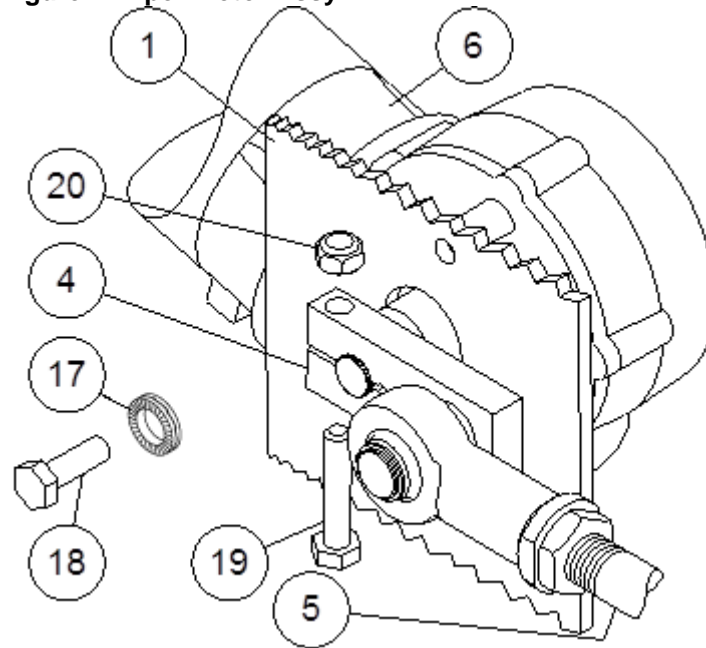
### IMPORTANT

There is one hex nut (12), fitted onto each liner (2 & 3), so that the front of the nut is 2.5mm from end of liner.

1. Fit one hex nut (12), onto each liner. . ***(As stated in Important note for distance)***
2. Insert both main liner/lever assy (2), and driven idler liner/lever assy (3), ***(complete with connecting bar (5a),)*** into liner bracket/mounting boss weld assy (1a) till each nut fits flush with liner mounting boss for correct setting distance.
3. Screw both main liner/lever assy (2), and driven idler liner/lever assy (3), ***(complete with connecting bar (5a),)*** into bracket (1) till each nut fits flush with inside of bracket for correct setting distance.
4. Carefully fit drive crank assy (4), ***(complete with bearing, bearing nut and tie-bar (5),)*** over motor drive shaft, ***(Refer to note after operation 2)*** on 'removal' for position. Tighten drive crank nut (20), and bolt (19).  
***Torque M8 = 25Nm (on Splined D. Crk Nut & Bolt)***
5. Replace entire wiper motor linkage assy  
***In accordance with Installation Instructions – Fitting the Wiper Linkage Assy***

# TO REPLACE THE WIPER MOTOR ASSY

Figure – Wiper Motor Assy



## NOTE

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

## Removal

1. Carefully remove entire wiper motor linkage assy from cab structure  
*In accordance with Maintenance Instructions – To Replace the Entire Wiper Motor Linkage Assy – Removal*

## IMPORTANT

Please make a note of drive crank position relative to spindle lever, i.e. spindle lever facing towards motor or away from motor

## Ref Figure – Wiper Motor Assy

2. Slacken drive crank nut (20), and bolt (19), carefully remove drive crank assy (4), (*complete with bearing, bearing nut and tie-bar (5),*) from motor drive shaft
3. Unscrew three fixing bolts (18) and remove with three Nordloc washers (17). Remove wiper motor (6), from bracket (1).

## Replacement

## NOTE

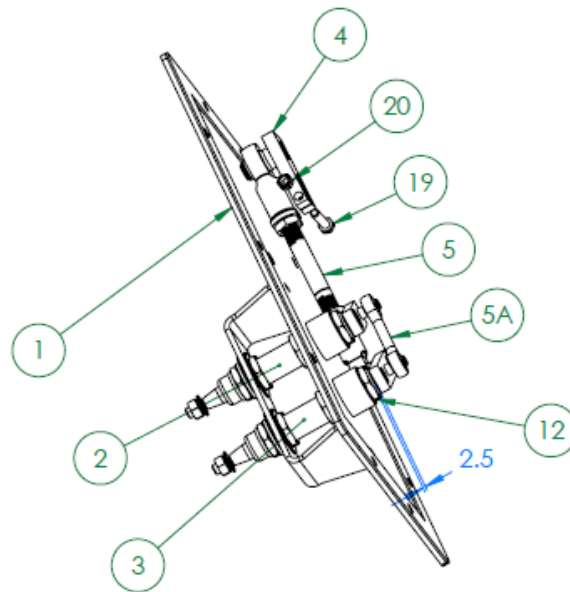
If required clean the motor drive shaft, with wire brush

## Ref Figure – Wiper Motor Assy

1. Replace wiper motor (6) into bracket (1), fit three Nordloc washers (17), and three fixing bolts (18)  
*Torque M8 = 25NM (on Motor Bolts)*
2. Carefully fit drive crank assy (4), (*complete with bearing, bearing nut and tie-bar (5),*) over motor drive shaft, (*Refer to note after operation 2*) on 'removal' for position. Tighten drive crank nut (20), and bolt (19).  
*Torque M8 = 25Nm (on Splined D. Crk Nut & Bolt)*
3. Replace entire wiper motor linkage assy  
*In accordance with Installation Instructions – Fitting the Wiper Linkage Assy*

# TO REPLACE THE WIPER MECHANISM ASSY

Figure – Wiper Mechanism Assy



## NOTE

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

## Removal

1. **Internally** – Run motor to ensure it is parked correctly. Disconnect all electrical power.
2. Carefully remove entire wiper linkage assy from cab structure.  
**In accordance with Maintenance Instructions – To Remove the Entire Wiper Motor Unit Assy**

## IMPORTANT

Please make a note of drive crank position relative to spindle lever, as this will affect park position for wiper arm and wiper blade i.e. spindle lever facing towards or away from motor.

## Ref Figure – Wiper Mechanism Assy

3. Slacken drive crank nut (20), and bolt (19), carefully remove drive crank assy (4) (complete with bearing, bearing nut and tie-bar (5),) from motor drive shaft.

## IMPORTANT

There is one hex nut (12), fitted on each liner inside the bracket. Take care on removal.

4. Carefully remove both main liner/lever assy (2), and driven idler liner/lever assy (3), (complete with connecting bar (5a),) from mounting bracket weld assy (1)

## Replacement

## NOTE

If required clean the motor drive shaft, with wire brush

## Ref Figure – Wiper Mechanism Assy

## IMPORTANT

There is one hex nut (12), fitted onto each liner (2 & 3), so that the front of the nut is 2.5mm from end of liner.

1. Fit one hex nut (12), onto each liner. (As stated in Important note for distance)

2. Screw both main liner/lever assy (2), and driven idler liner/lever assy (3), (**complete with connecting bar (5a),**) into bracket (1) till each nut fits flush with inside of bracket for correct setting distance.
3. Carefully fit drive crank assy (4), (**complete with bearing, bearing nut and tie-bar (5),**) over motor drive shaft, (**Refer to note after operation 2**) on 'removal' for position. Tighten drive crank nut (20), and bolt (19).  
**Torque M8 = 25Nm (on Splined D. Crk Nut & Bolt)**
4. Replace entire wiper motor linkage assy  
**In accordance with Installation Instructions – Fitting the Wiper Linkage Assy**

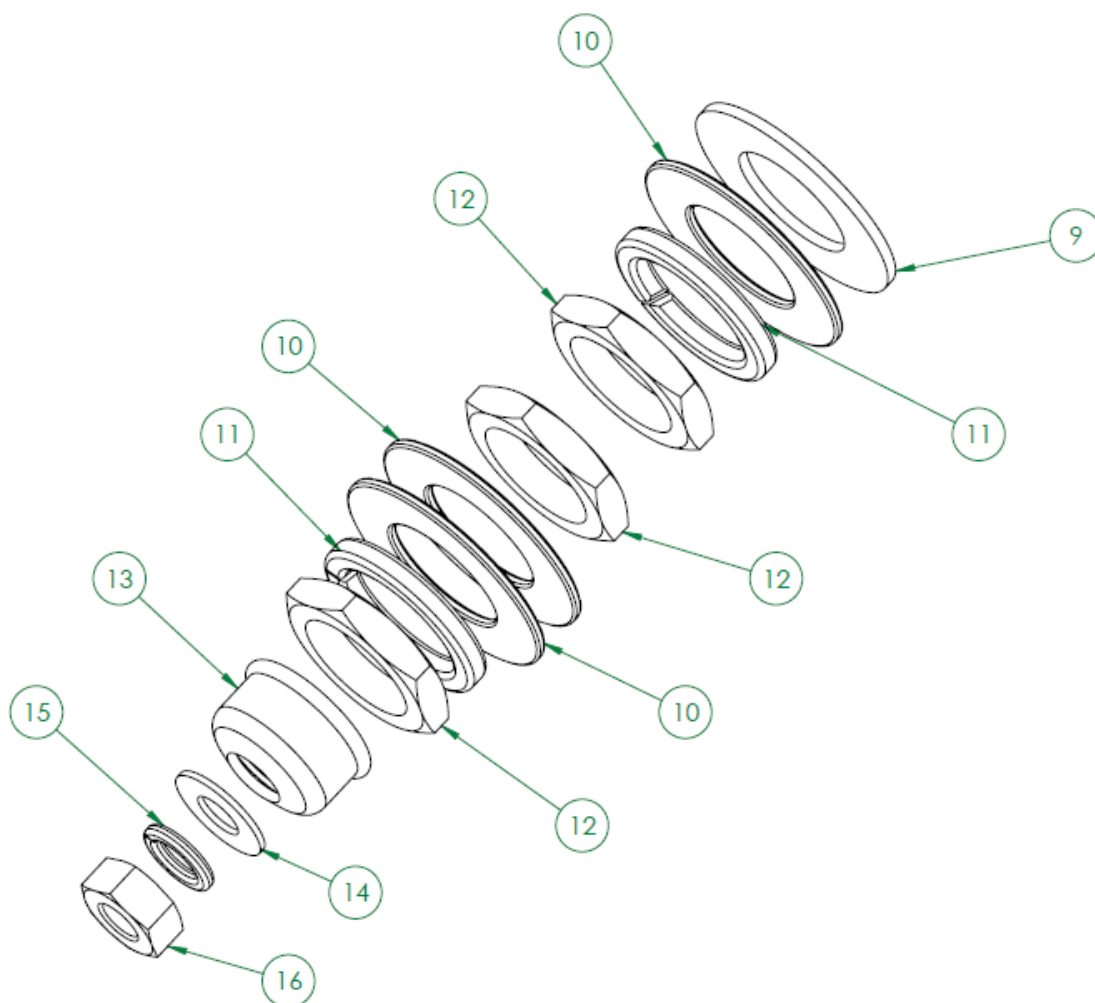
# SUPPLY LIST

*Note – 1 Train = 2 Cabs*

<i>Part No.</i>	<i>Description</i>	<i>Qty</i>
S612255VM	120NM 110v 30/45RPM PANTO LINKAGE WITH SENSOR & BH CONNECTOR – LH	1 per cab
S612256VM	120NM 110v 30/45RPM PANTO LINKAGE WITH SENSOR & BH CONNECTOR – LH	1 per cab
805528	H/DUTY PANTO ARM - 930MM - LH	1 per cab
805529	H/DUTY PANTO ARM - 930MM - RH	1 per cab
B140 39 B	39" CANTILEVER WIPER BLADE	2 per cab
150A19500	9.6L ST/ST WASH TANK WITH SUBMERSIBLE PUMP	1 per cab
150A19600	FILLER SPOUT ASS'Y WITH WASH HOSE	2 per cab
150A19700	WASH KIT	1 per cab
10171000	CONTROL SWITCH	1 per cab
HE0714-04	CONTROL BOX	1 per cab
HE0714-05	MATING HALF KIT	1 per cab

## External Fittings – Linkages

### Fittings for M26 Liners and 16mm Spindles protruding outside the Cab structure

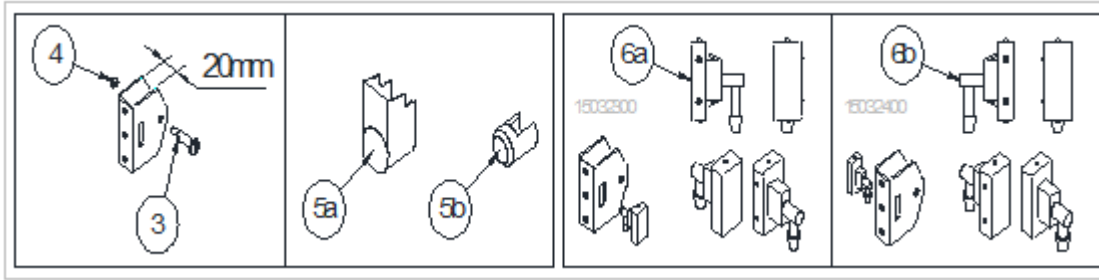


<i>Part No.</i>	<i>Description</i>	<i>Qty</i>
10029100	26mm Washer – Neoprene (9)	1 per liner
10026100	26mm Washer – Plain (10)	3 per liner
10026600	26mm Washer – Single Coil (11)	2 per liner
10018500-B	M26 Hex Nut (12)	3 per liner
60054600	26mm Weather Cap (13)	1 per liner
10027801	10mm Washer – Plain (14)	1 per liner
10024400	10mm Washer – Single Coil (15)	1 per liner
10015400	M10 Hex. Nut (16)	1 per liner



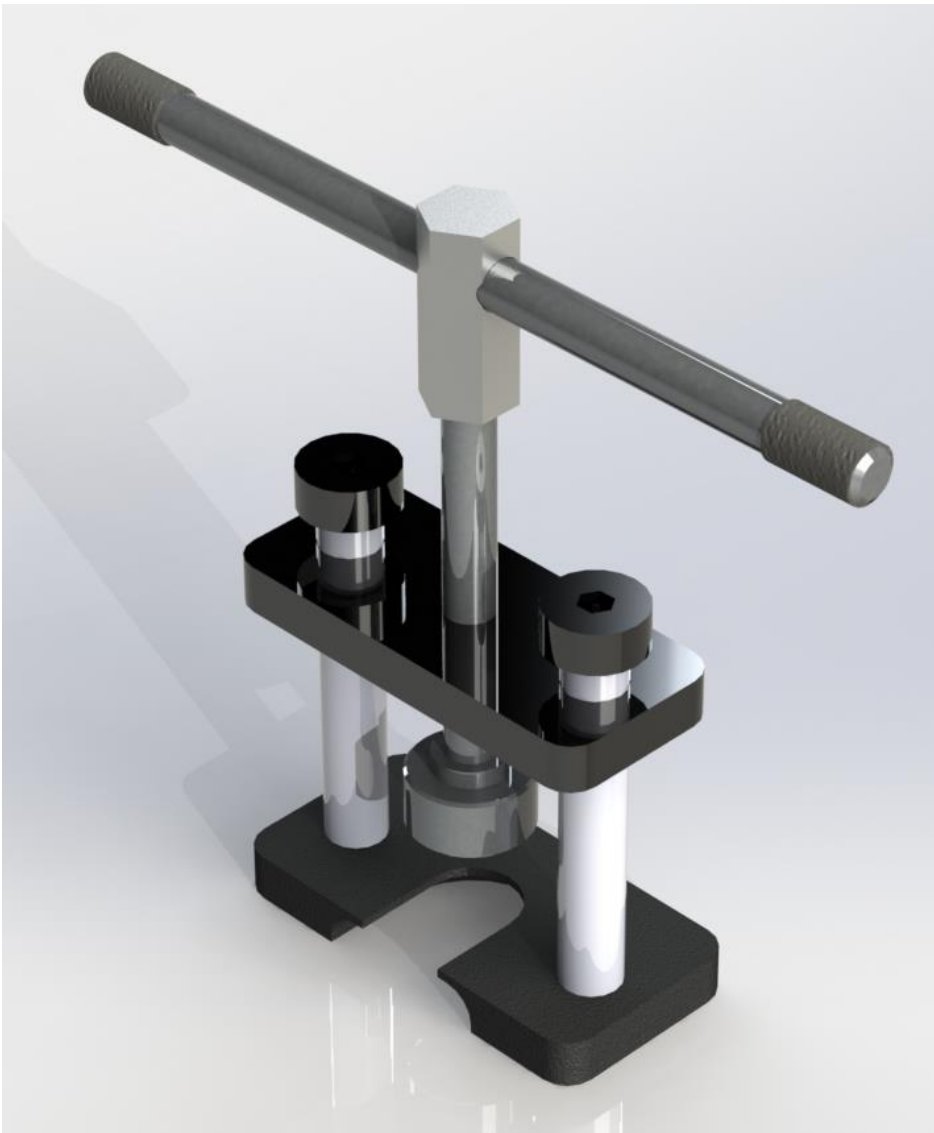
## External Fittings – Arms

### Fittings for Arm and Blade



Part No.	Description	Qty
80010700	Blade Retaining Screw ( <b>20mm B. Clip</b> ) (3)	1 per arm
10011400	M4 Nylock Nut (4)	1 per arm
80005100	Heavy Duty Cap (5A)	2 per arm
80200400	Wash Hose – 3mm I/D x 6mm O/D (7) ( <b>Not shown</b> )	1.5 Metres
15032300	Wash Jet (RH) (6)	1 per arm
15032400	Wash Jet (LH) (6)	1 per arm

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



# WIPER SYSTEM OVERHAUL PERIOD

## NOTE

The Overhaul Periodicity is a recommended scale of time not definitive date.

It is advised to get a condition report at within this time scale and if it is found that wear is less than or greater than expected periodicity can be upgraded in the manuals to suit.

<i>PERIODICITY</i>	<i>EQUIPMENT</i>	<i>TASK</i>
No later than 1 year before the major overhaul period.	System Assessment	The first 2 full train sets of wiper systems should be returned to the supplier for evaluation. It is at this time we will assess the wear on the system and provide an assessment on how many potential years operating life the system has.
At first major overhaul or based on the recommendations of the condition assessment	Motors	Based on the outcome of the condition assessment the motor brushes should be replaced at the first major overhaul period. The linkage may also be serviced. It will get stripped down, cleaned and reassembled.
At first major overhaul or based on the recommendations of the condition assessment	Linkage Assembly	Parts returned to B.Hepworth for major overhaul. Motors and linkage bearings will be replaced as well as all fixings. The linkage will also be serviced. It will get stripped down, cleaned and reassembled.
At the first major overhaul period	Wiper Arms	Wipers arms should be replaced at the first major overhaul period, as required or as indicated by the outcome of the condition assessment.
At the second major overhaul period	Wash Pump	Wash pump should be replaced at the second major overhaul period, as required or as indicated by the outcome of the condition assessment.
At the second major overhaul period (midlife overhaul)	Control Unit	Parts should be returned to supplier for overhaul at the second major overhaul period or as indicated by the outcome of the condition assessment. All relay contacts & power convertors will be replaced and connections checked.
At the second major overhaul period	Tank	Parts should be returned to supplier for desilting and leak test at the second major overhaul period.

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