

WIPER TI-SIII-M-LP200

BARRIER™ TI UV SYSTEM SPECTRA 3 LP200 MEMBRANE

WIPER UPGRADE MANUAL



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CONTENTS

DOCUMENT HISTORY:	2
HEALTH AND SAFETY	4
Health and Safety Information	4
INTRODUCTION	6
An Introduction to UV Disinfection Systems	6
What is Ultraviolet (UV) Light?	6
How does UV Disinfection Work?.....	6
Safety Advantages of Evoqua UV Technology Disinfection	6
Evoqua UV Technology Disinfection Systems	6
TERMINOLOGY	7
MANUAL WIPER UPGRADE	8
Introduction	8
INSTALLATION GUIDELINES	8
General installation guidelines	8
Installation Checklist.....	8
UV Lamp Maintenance	9
Draining the uv chamber	10
Quartz Thimble Maintenance	11
UV Chamber Maintenance	12
UV Chamber Access	12
Manual Wiper Shaft Install	13
Manual Wiper FLANGE Install	14
Manual Wiper HOUSING Install	15
Manual Wiper Assembly.....	16
Spares.....	17
Spares Kits.....	17
SPECTRA SETTINGS UPDATE	18
Introduction	18
Spectra operation	18
Wipe reminder set up	19
Wiper Reminder timer set up.....	19
OPERATION INSTRUCTIONS	20

Health and Safety

HEALTH AND SAFETY INFORMATION



All personnel involved in the installation, maintenance and operation of the UV system should read the relevant manual.



Electrical Safety

WARNING: Always ensure electrical plant or equipment is isolated before carrying out maintenance.



Electrical Ground / Earth

WARNING: All equipment must be Grounded / Earthed.



Hot Temperature

CAUTION: Chamber can be hot.
Allow 15 minutes for lamps and other components to cool down before removal.



Process Isolation - Fluid

WARNING: Always fully isolate the system from the process before carrying out maintenance.
DANGER: Failure to follow the correct procedures can cause serious injury or death due to forcible ejection of materials from the UV chamber.



Process Isolation - Wiper

CAUTION: Contact with moving parts can cause injury, for example trap fingers, clothing may become caught in moving parts of machinery, drawing in operatives.



Ultraviolet Light

WARNING: Do not expose skin or eyes to ultraviolet light.
CAUTION: Do not touch lamps immediately after operation. Allow 15 minutes for lamps and other components to cool down.



Quartz Components

CAUTION: Handle quartz components with care to avoid breakages.



Mercury - Lamp Breakage / Chemical Hazard

CAUTION: Lamps contain Mercury take care to avoid breakages. If a breakage occurs follow mercury spillage procedure below.



Lamp Recycling

Always recycle UV lamps properly and safely.

MERCURY SPILLAGE

Anticipate this event by having a spill kit on hand. Spill kits are commercially available, and most however most contain the following components:

1. Latex barrier gloves
2. Sealable plastic bag
3. Soft cloth, or cardboard rectangle
4. Syringe or pipette
5. Small brush, barrier foam or duct tape
6. Powdered Sulphur.

Mercury spillage procedure:

1. Put on Latex gloves
 2. Collect quartz pieces, place in cloth in sealed bag. Mark bag as "sharp hazard"
 3. Locate mercury ball. Use brush to aggregate smaller balls into large ball
 4. Use syringe to draw up mercury bead. Transfer mercury onto paper towel, place inside sealed bag. Mark bag as "mercury hazard"
 5. Use barrier foam or duct tape to collect remains of mercury - dispose of as detailed in point 4.
 6. Consult site regulations regarding notification of a mercury spill. A UV lamp contains a maximum of 300 mg of mercury
 7. Powdered Sulphur is optional - it can make collection of very small mercury balls easier.
-

Introduction

AN INTRODUCTION TO UV DISINFECTION SYSTEMS

Unlike chemical approaches to water disinfection, Ultraviolet (UV) light provides a rapid and effective method to disinfect water and other liquids.

WHAT IS ULTRAVIOLET (UV) LIGHT?

UV light is a form of light that is invisible to the human eye and is classed as a non-ionising (or non-radioactive) radiation. It occupies the portion of the electromagnetic spectrum between X-rays and visible light.

HOW DOES UV DISINFECTION WORK?

A unique characteristic of UV light is that a specific range of its wavelengths (those between 200 and 300 nm are categorized as germicidal – meaning that UV light damages the DNA and RNA of microorganisms and prevents them from causing infection. This capability has allowed widespread adoption of UV light as an environmentally friendly, chemical-free, and highly effective way to disinfect liquids.

SAFETY ADVANTAGES OF EVOQUA UV TECHNOLOGY DISINFECTION

- UV is a chemical-free process that adds nothing to the water except UV light.
- UV requires no transportation, storage or handling of toxic or corrosive chemicals – a safety benefit for plant operators and the surrounding community.
- UV treatment creates no carcinogenic disinfection by-products that could adversely affect the quality of the treated water.
- UV is highly effective at inactivating a broad range of microorganisms including chlorine-resistant pathogens like Cryptosporidium and Giardia.
- UV can be used (alone or in conjunction with a catalyst) to break down toxic chemical contaminants while at the same time performing disinfection of the treated water.

EVOQUA UV TECHNOLOGY DISINFECTION SYSTEMS

The main features of the Evoqua Barrier™ Ti UV system are:

- UV Chamber: pure titanium chamber body inside which water is exposed to UV light for disinfection.
- UV Lamps: housed within a high purity quartz sleeve, these emit high-intensity UV light to treat the process fluid.
- Control Panel: contains the Spectra controller and lamp power system.
- Wiper: manual system used to clean quartz sleeves.
 - Note: not all systems are fitted with a Manual Wiper
- UV Sensor: monitors UV intensity inside the chamber and feeds readings back to the control panel.
- Temperature Sensor: monitors temperature of the chamber to protect people and equipment if the water flow is interrupted unexpectedly.

Terminology

The following terminology is used throughout this Manual:

TERM	DESCRIPTION
Control Panel	Contains control and power electronics for UV system
Wiper	Cleaning system for UV Lamp sleeves and sensor window
Spectra	Electronic control systems used for monitoring and control of UV treatment
UV Chamber	Comprising a single chamber in which water is treated by UV irradiation, and the associated inlet and outlet valves, components, and instruments

Manual Wiper Upgrade

INTRODUCTION

An optional wiper upgrade is available for the Barrier™ Ti UV Disinfection system models TI-2200-8 and TI-4200-8.

This is a manually operated wiper which uses bespoke wiper blades to clean the quartz tubes that house the UV lamps, as well as the window of the UV intensity sensor which monitors the performance of the system.

This wiping mechanism ensures that the UV system is operating optimally at the lowest power consumption possible by removing any fouling / contaminants from the quartz components.

If left with no intervention these foulants can build up over time and inhibit the amount of UV light reaching and treating the water in the UV chamber. This would cause the UV system to run at higher power levels and can eventually lead to the water receiving less treatment than is required.

These foulants can also be 'burnt in' to the quartz components over time, requiring chemical cleaning either via Clean In Place (CIP) or stripping down of the UV chamber and cleaning the quartz components by hand, both of which require maintenance staff time and shut down and draining of the UV chamber.

Installation Guidelines

GENERAL INSTALLATION GUIDELINES

The guidelines in this section are designed to assist in the installation of a manual wiper upgrade kit into a Barrier TI-2200-8 or TI-4200-8 UV Disinfection System.

Please see contact information at the bottom of this manual if further support is required.

INSTALLATION CHECKLIST

It is good practice to complete the below checklist when installing a manual wiper upgrade kit to ensure the upgrade is operating correctly and the site is left in an appropriate state.

General Installation Checklist	Y/N
Inspect the goods to ensure no damage has occurred in transit. Check that that all ordered items are present (see Manual Wiper Assembly below (page 15) for parts list).	
Install the Wiper Upgrade Kit as described in the Installation steps below, pages 9-15	
Set up the Manual Wipe Reminder on the Spectra Controller Installation steps below, page 18-19	
Operate the Manual Wiper once to ensure the install is working correctly, see Operation Instructions below, page 20	
Ensure work area is clear and tidy once the install is completed, and double check for any signs of leaks before leaving the site	

UV LAMP MAINTENANCE

Please refer to the Health & Safety Section at beginning of the manual for Symbol explanations. These are to be adhered to when carrying out the following maintenance procedures.



UV Lamp Extraction

Ensure the UV system is isolated from power before carrying out maintenance on the UV Lamps

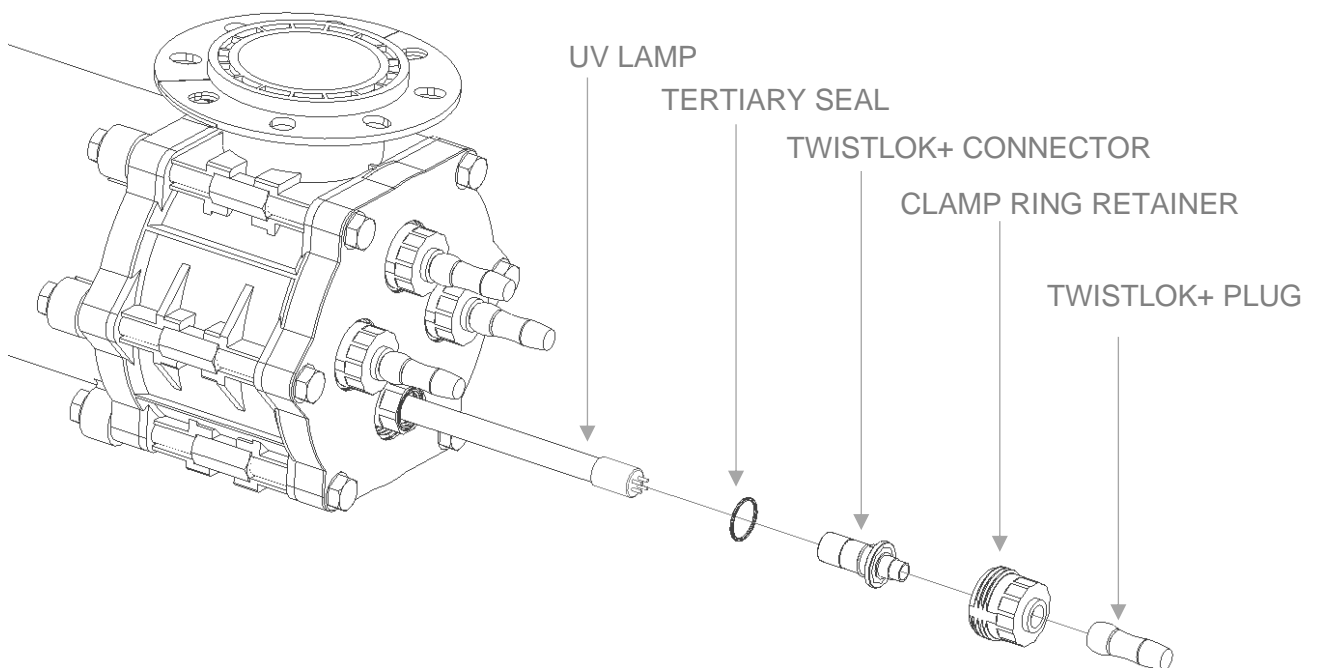
- 1 Twist the locking ring on the TWISTLOK+ PLUG anti-clockwise and remove
- 2 Unscrew the CLAMP RING RETAINER to access the TWISTLOK+ CONNECTOR & UV LAMP
- 3 Rotate the TWISTLOK+ CONNECTOR anticlockwise about 2 full turns to release the UV LAMP. The Tertiary seal should remain fitted to the CLAMP RING
- 4 Carefully extract the UV LAMP & TWISTLOK+ CONNECTOR from the QUARTZ THIMBLE keeping the lamp parallel to the UV Chamber at all times to avoid damage

UV Lamp Installation

Before inserting a new lamp, ensure all components are clean and dry.

Note: Please ensure that no dirt or fingerprints get onto the lamp surface as this will reduce the lamp life

- 1 Connect the TWISTLOK+ CONNECTOR to the new UV LAMP and insert into the CLAMP RING, keeping it parallel with the UV Chamber to avoid damage
- 2 While applying light pressure on the TWISTLOK+ CONNECTOR, rotate 2 turns clockwise into the CLAMP RING until the flange on the TWISTLOK+ CONNECTOR contacts the TERTIARY SEAL
- 3 Replace the CLAMP RING RETAINER and rotate clockwise to secure the UV LAMP in place
- 4 Re-fit the TWISTLOK+ PLUG. This is done by first lining up and engaging the contacts then rotating the locking ring $\frac{1}{4}$ turn clockwise to secure in place



DRAINING THE UV CHAMBER

Please refer to the Health & Safety Section at beginning of the manual for Symbol explanations. These are to be adhered to when carrying out the following maintenance procedures.



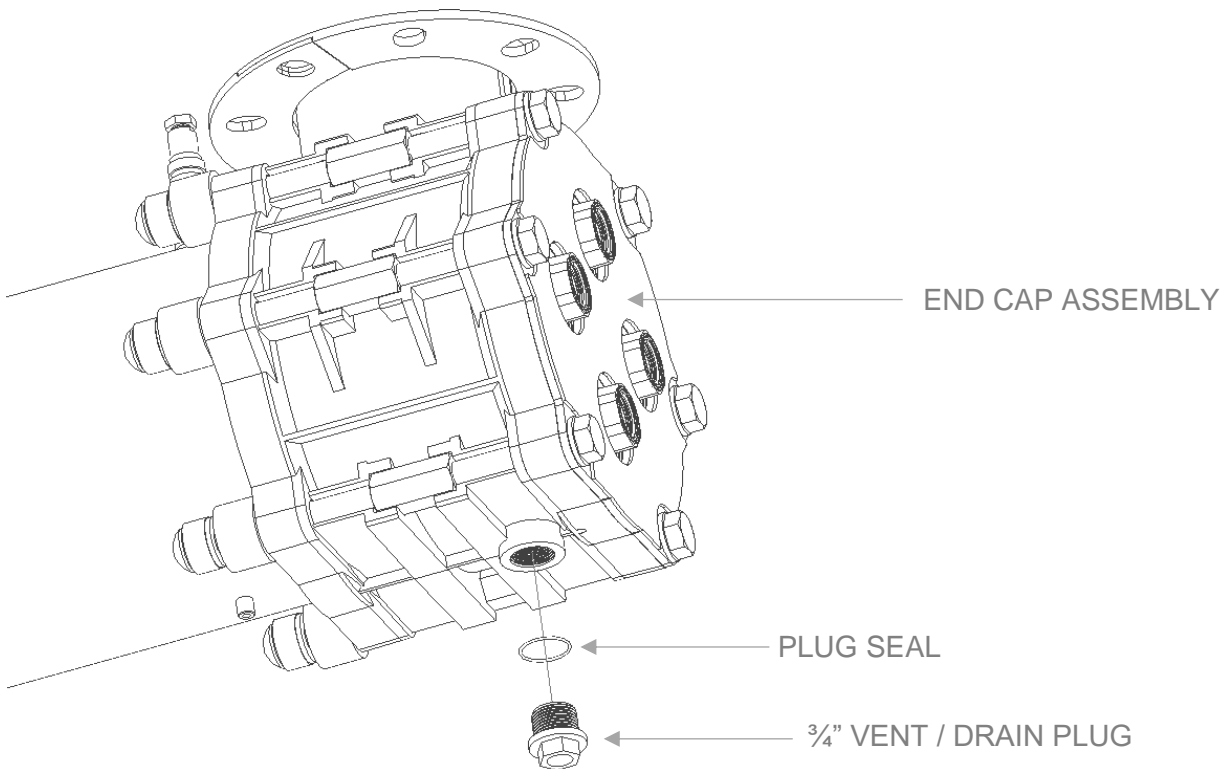
Drain / Vent Plug Removal

Ensure the UV system is isolated from power and flow before carrying out this process

- 1 Unscrew the VENT / DRAIN PLUG from the END CAP ASSEMBLY. There is one VENT / DRAIN PLUG at each end. Make sure the PLUG SEAL is accounted for
- 2 Allow the water to fully drain from the system

Drain / Vent Plug Installation

- 1 Screw the VENT / DRAIN PLUG into the END CAP ASSEMBLY. Ensure the PLUG SEAL is properly located on the VENT / DRAIN PLUG. This should be tightened to 10 Nm / 7.5 lbf. ft.
- 2 Once any other work is carried out reapply flow to the UV chamber and check that there are no leaks present



QUARTZ THIMBLE MAINTENANCE

Please refer to the Health & Safety Section at beginning of the manual for Symbol explanations. These are to be adhered to when carrying out the following maintenance procedures.



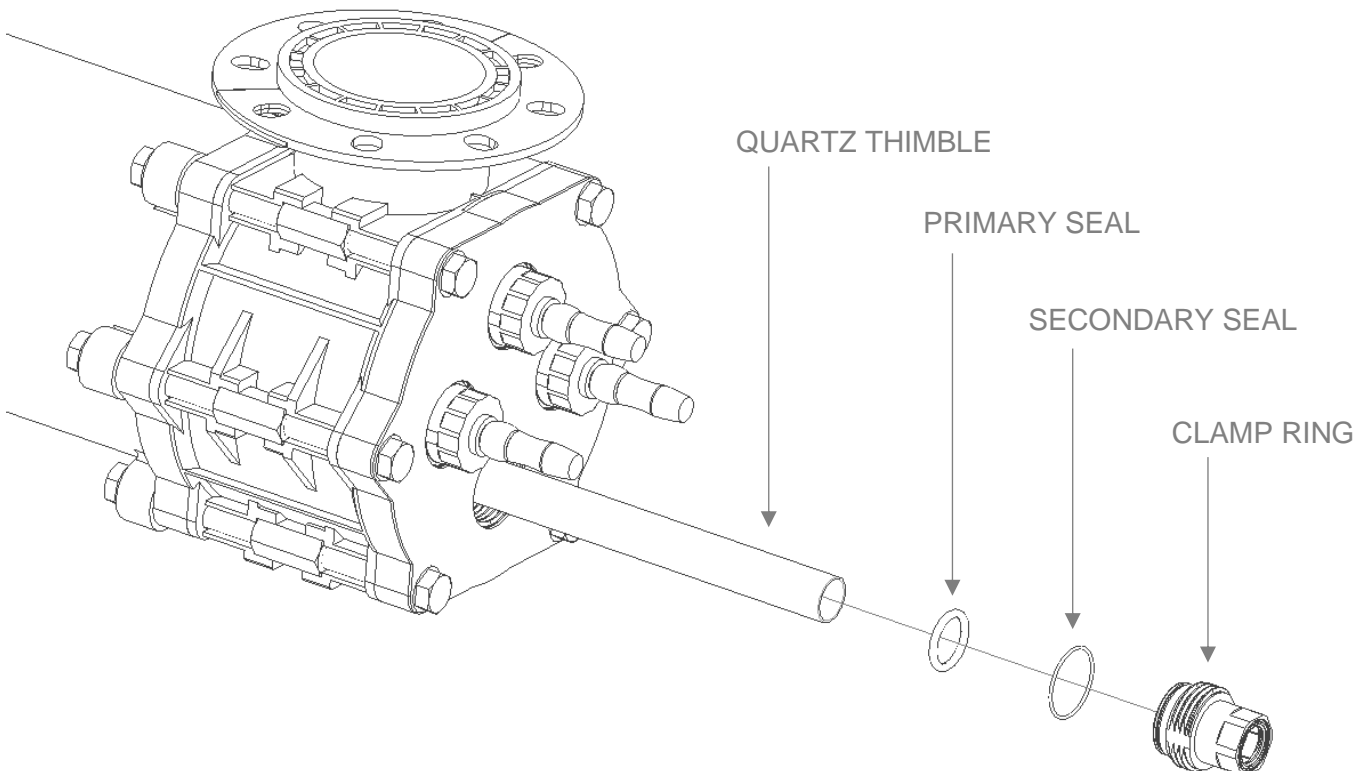
Quartz thimble Extraction

Ensure the UV Chamber is isolated from flow and drained before carrying out any maintenance work

- 1 Follow the **UV Lamp Extraction** procedure detailed in the previous subsection
- 2 Unscrew the CLAMP RING and remove. The CLAMP RING may initially feel difficult to unscrew, this will be the SECONDARY SEAL doing its job and this is normal
- 3 Remove the PRIMARY SEAL from around the QUARTZ THIMBLE
- 4 Carefully remove the QUARTZ THIMBLE keeping it parallel to the UV chamber to avoid damage

Quartz sleeve Installation

- 1 Carefully slide the new/cleaned QUARTZ THIMBLE into the hole in the end flange, keeping it parallel with the UV Chamber so it locates in the opposing flange. If a wiping system is installed, ensure the sleeve is gently guided through the wiper ring.
- 2 Ensure the SOFT SEAT & SPRING are removed from the old QUARTZ THIMBLE and placed into the new one
- 2 Install the PRIMARY SEAL over the QUARTZ THIMBLE, and ensure the SECONDARY SEAL is installed on the CLAMP RING. Ensure the seals are in good condition and replace as necessary. Screw the CLAMP RING into place over the quartz sleeve, this should be tightened to 20 Nm / 15 lbf. ft. or hand tight plus $\frac{3}{4}$ turn.
- 3 Follow the **UV Lamp Installation** procedure detailed in the previous subsection



UV CHAMBER MAINTENANCE

UV Chamber Access

Please refer to the Health & Safety Section at beginning of the manual for Symbol explanations. These are to be adhered to when carrying out the following maintenance procedures.



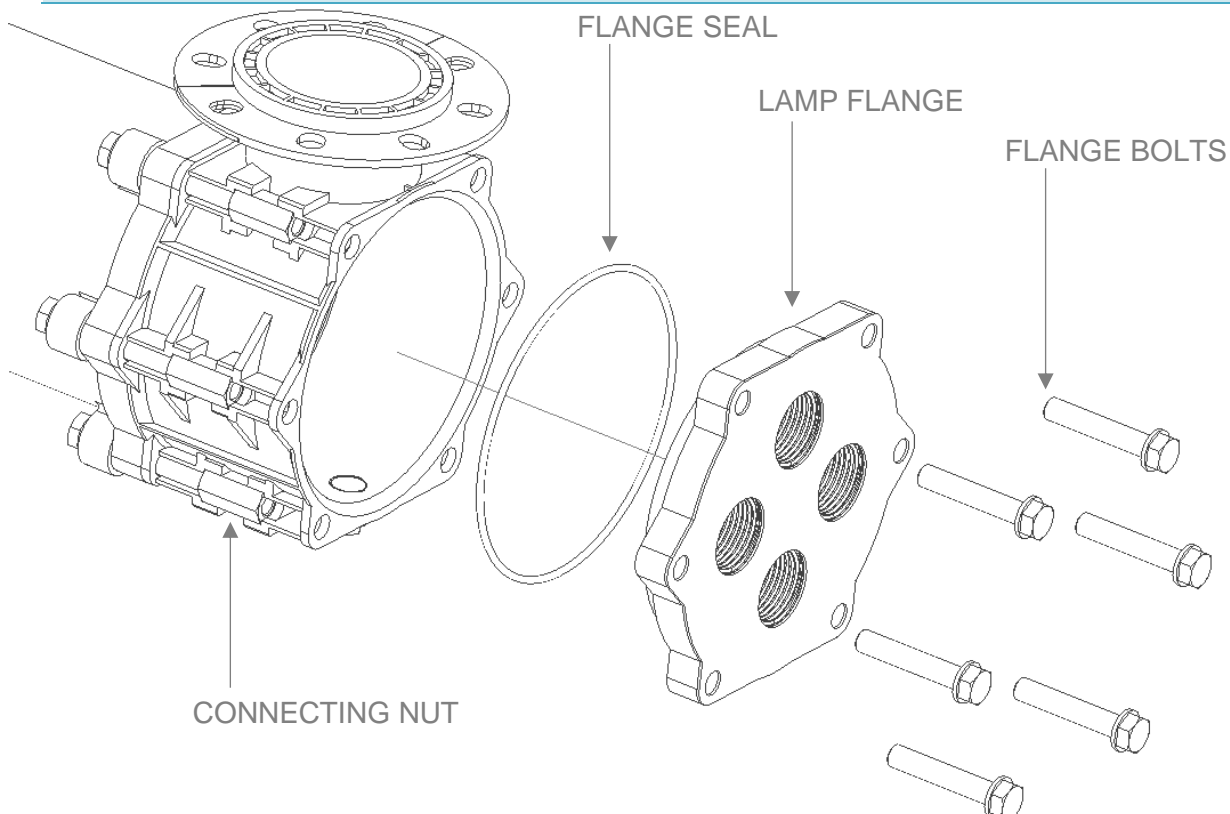
Lamp Flange Removal

It may be required to gain access to the inside of the UV chamber to maintain internal components, clean the system, or remove debris. Ensure the UV Chamber is isolated from flow and drained before carrying out any maintenance work

- 1 Follow the instructions above to remove the UV LAMPS and QUARTZ THIMBLES
- 2 Remove the hex head FLANGE BOLTS, using a spanner to ensure the CONNECTING NUTS do not spin when doing this.
- 3 The LAMP FLANGE can then be removed, there is no need to remove the cover label as this time
- 4 The FLANGE SEAL should also be removed

Lamp Flange Installation

- 1 Install the FLANGE SEAL on the rear side of the LAMP FLANGE. Replace the FLANGE SEAL if required
- 2 Install the LAMP FLANGE back onto the chamber, ensuring that the bolt holes are aligned between the parts.
- 3 Re install the FLANGE BOLTS, ensuring they are tightened evenly to apply the correct pressure to the FLANGE SEAL. These should be tightened to 20 Nm / 15 lbf. ft. for TI-2200 & TI-4200 models and 10 Nm / 7.5 lbf. ft. for TI-1200 models



MANUAL WIPER SHAFT INSTALL

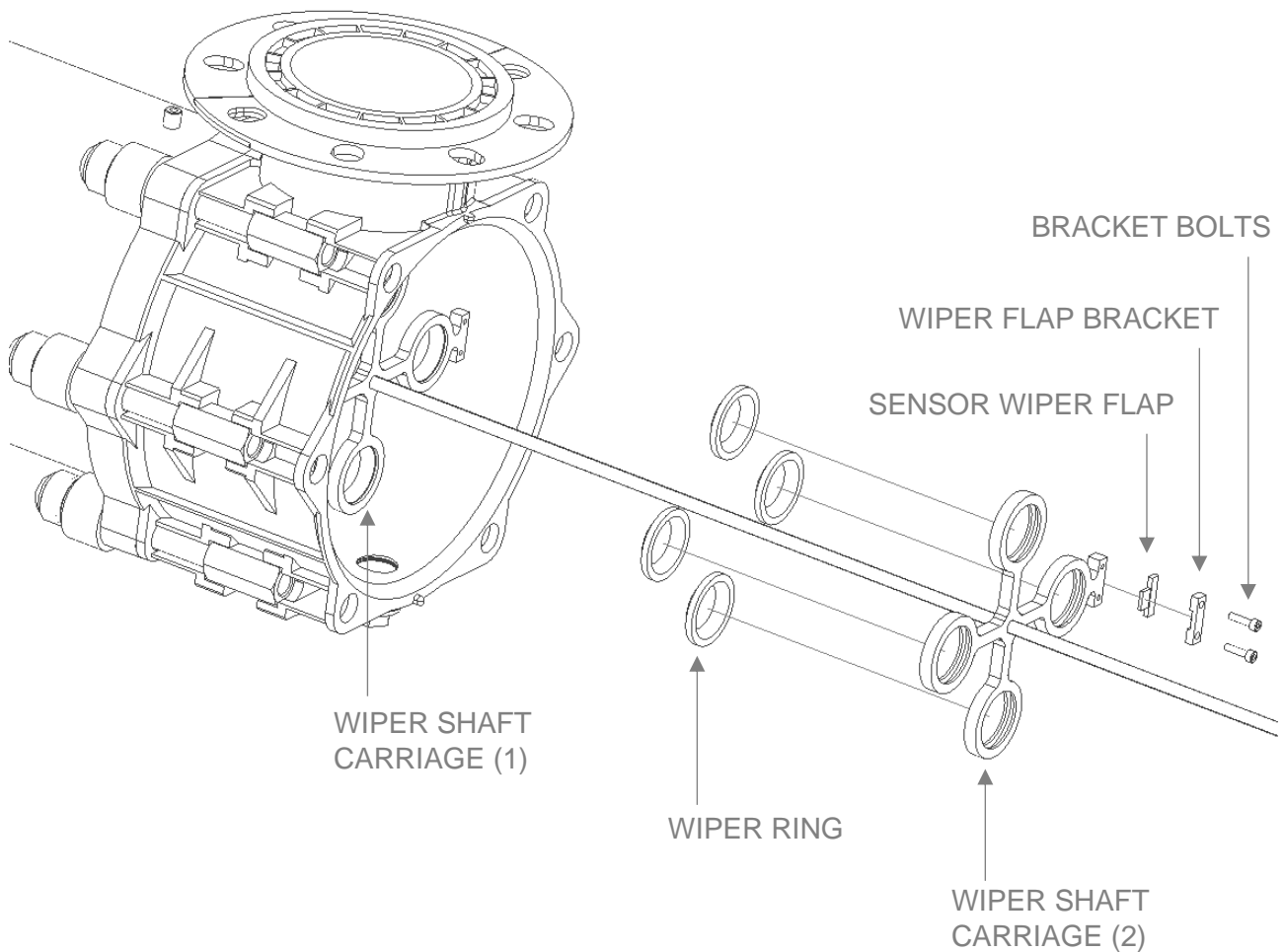
Please refer to the Health & Safety Section at beginning of the manual for Symbol explanations. These are to be adhered to when carrying out the following maintenance procedures



Wiper Shaft Install

Follow the previous instructions for UV LAMP, QUARTZ THIMBLE, and LAMP FLANGE removal

- 1 Install the WIPER RINGS into both WIPER SHAFT CARRIAGES by compressing the WIPER RING and then fitting into the internal groove on the WIPER SHAFT CARRIAGE.
- 2 Note that the WIPER RINGS should be installed such that the narrow opening is facing towards the rear of the chamber to aid installation of the QUARTZ THIMBLES later
- 3 Install the SENSOR WIPER FLAP onto the bracket of the WIPER SHAFT CARRIAGE 2, followed by the WIPER FLAP BRACKET and the BRACKET BOLTS
- 4 Insert the assembled WIPER SHAFT into the UV CHAMBER ensuring the SENSOR WIPER FLAP is aligned with the UV SENSOR WINDOW



MANUAL WIPER FLANGE INSTALL

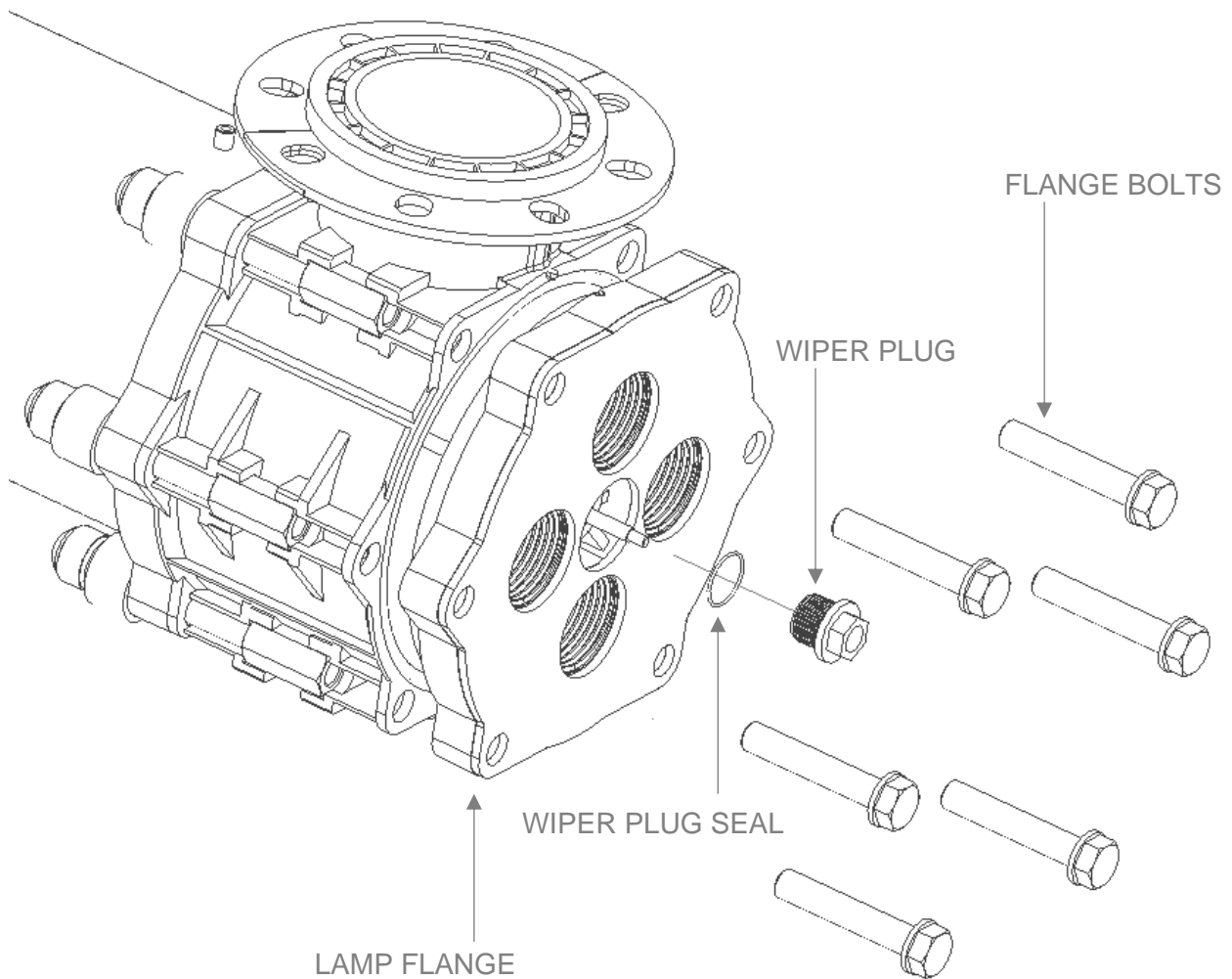
Please refer to the Health & Safety Section at beginning of the manual for Symbol explanations. These are to be adhered to when carrying out the following maintenance procedures



Wiper Flange Install

Follow the previous instructions for UV LAMP, QUARTZ THIMBLE, and LAMP FLANGE removal, and WIPER SHAFT install

- 1 Follow the instructions above for LAMP FLANGE installation. See steps 2 & 3 for differences to the LAMP FLANGE install when installing a MANUAL WIPER
- 2 Note that the central hole on the flange label will need to be removed via the perforated cut
- 3 Note that the WIPER PLUG & WIPER PLUG SEAL will need to be removed before installing the LAMP FLANGE to allow it to fit over the WIPER SHAFT



MANUAL WIPER HOUSING INSTALL

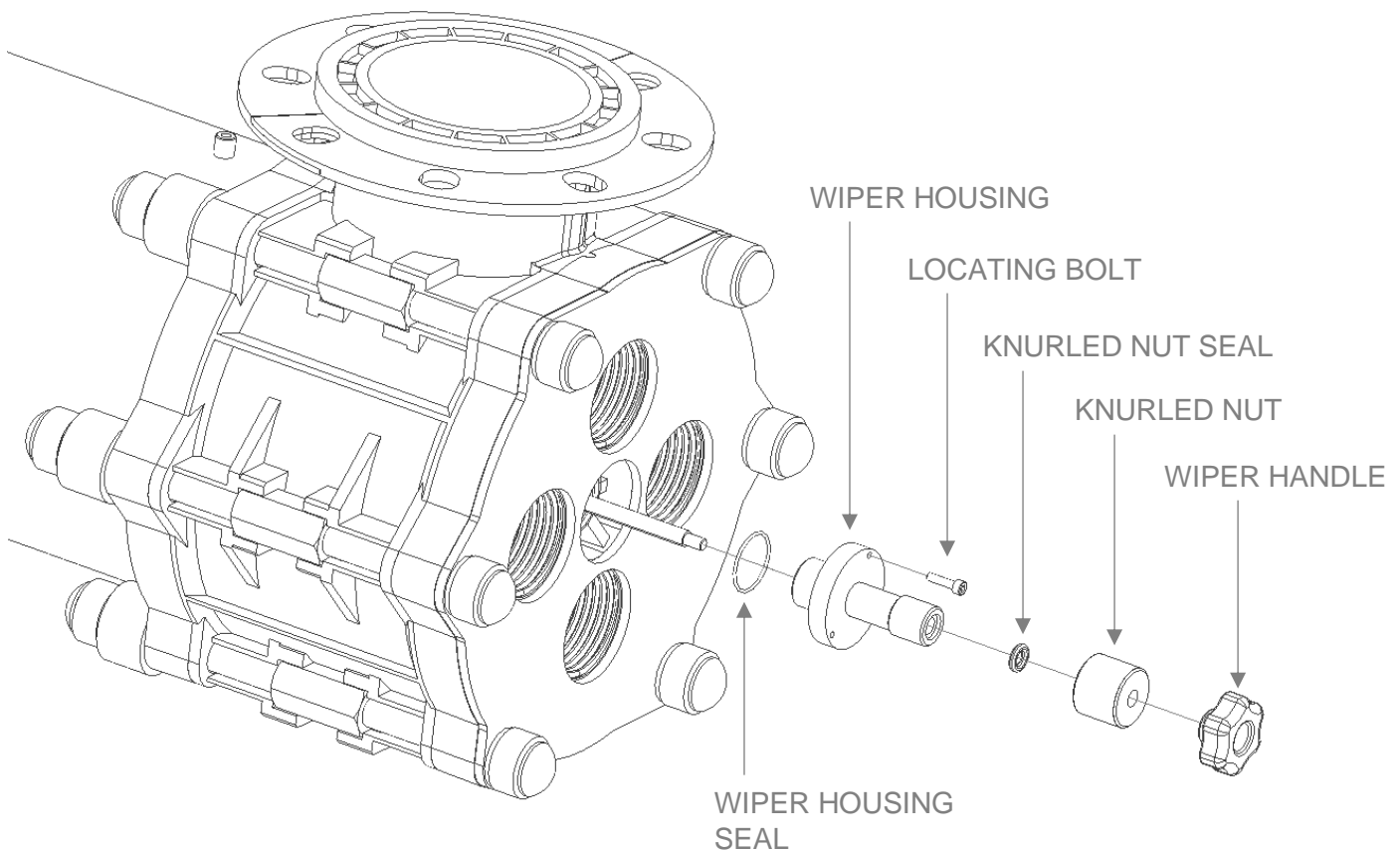
Please refer to the Health & Safety Section at beginning of the manual for Symbol explanations. These are to be adhered to when carrying out the following maintenance procedures



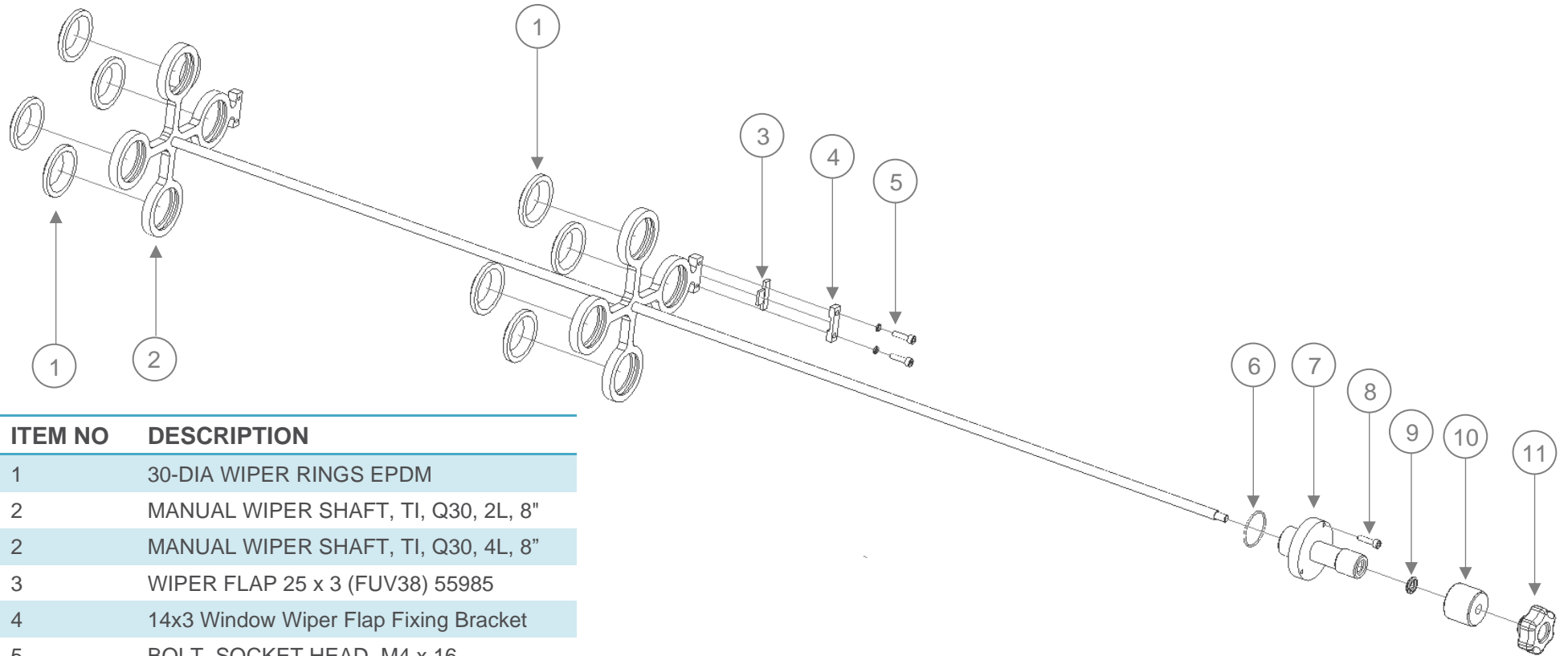
Wiper Housing Install

Follow the previous instructions for Manual Wiper Shaft and Manual Wiper Flange install

- 1 Install the WIPER HOUSING SEAL into the groove on the rear of the WIPER HOUSING.
- 2 Screw the WIPER HOUSING into the threaded port in the middle of the LAMP FLANGE over the protruding WIPER SHAFT.
- 3 Screw the LOCATING BOLT into one of the provided threaded holes in the WIPER HOUSING. Ensure that the hole is not blocked by the LAMP FLANGE, if it is then the other provided hole should be used.
- 4 Place the KNURLED NUT SEAL onto the WIPER HOUSING and screw the KNURLED NUT over the top.
- 5 Screw the WIPER HANDLE onto the threaded portion at the end of the WIPER SHAFT
- 6 Follow the instructions above to re-install the QUARTZ THIMBLES and UV LAMPS. When installing the QUARTZ THIMBLES take care to ensure these go through the WIPER RINGS in the WIPER SHAFT.



MANUAL WIPER ASSEMBLY



ITEM NO	DESCRIPTION
1	30-DIA WIPER RINGS EPDM
2	MANUAL WIPER SHAFT, TI, Q30, 2L, 8"
2	MANUAL WIPER SHAFT, TI, Q30, 4L, 8"
3	WIPER FLAP 25 x 3 (FUV38) 55985
4	14x3 Window Wiper Flap Fixing Bracket
5	BOLT, SOCKET HEAD, M4 x 16
6	EPDM 'O' Ring 31 x 2.0 V70 55985
7	MANUAL WIPER HOUSING, TI
8	BOLT, SOCKET HEAD, M4 x 16
9	EPDM 'O' Ring 8 x 3.0 V70 (Manual Wiper)
10	Knurled Lock Nut (Dia 30mm)
11	Nylon female scallop handwheel knob, M6

SPARES

Standard consumable spare parts for the Barrier™ Ti UV systems are available as kits for simplified ordering and maintenance.

Individual replacement parts are available for order in the event of loss or breakage of a component.

See contact information at the end of this manual to identify your local contact for genuine spares and replacements.

Spares Kits

MODEL	SEAL KIT PN		WIPER SEAL KIT PN		PREVENTATIVE MAINTENANCE KIT PN	
TI-2200-8	W3T614854	1003-8530	W3T614856	1003-8532	W3T614991	1003-8559
TI-4200-8	W3T614855	1003-8531	W3T614857	1003-8533	W3T614993	1003-8560




Spectra Settings Update




INTRODUCTION

The Spectra software includes a feature that will produce a priority message on the Spectra screen reminding the user to run a sweep of the manual wiper. This aims to ensure that the Manual Wiper is operated at the correct frequency based on the specific site requirements

SPECTRA OPERATION

Additional functions of the Spectra are accessed via the keypad on the Membrane. The keypad has the buttons Up, Down, Enter and Clear which allow the operator to scroll through the screens, enter values and select various control options.

Menu Navigation	
	Use these keys to scroll up and down the menu
	Press this key to enter the Menu or variable
	Pressing this button moves back up one level in the menu structure. When ready to exit the screen, pressing this button will take you back to the Main information screens

Modifying Variables	
	Use these keys to modify / select the relevant variables
	Press this key to accept the changes made to the variable
	Pressing this button returns you to the previous screen without accepting the changes made

The main information screens shown below can be scrolled through using the up and down arrows. These screens provide details about the systems running condition including lamp current, flow rate and UV Dose.

Pressing Enter on certain screens will give more information, e.g. pressing enter on the lamp current screen will show the individual lamp information (e.g. lamp current, hours and strikes) if more than one lamp is in use, the up and down arrows can be used to view other lamps information.

NOTE: Pressing the Clear button will always move back out of the current menu to the previous screen. Should more than one fault occur, the fault screen with the highest priority will be displayed. Pressing DOWN on the keypad accesses the lower priority screens. Once the cause of the alarm or fault has been rectified, pressing the reset button on the front membrane will reset the alarm.

WIPE REMINDER SET UP

To enable the Wipe Reminder please follow the below instructions:

Use the 'UP/DOWN' arrows on the Spectra HMI to navigate down to the 'OPERATOR MENU'

Press 'ENTER' to access the Operator Menu and scroll down to the 'MANUAL WIPER FITTED' screen.

Press 'ENTER' again to toggle the Wiper Enabled status. An asterix should appear in the top left corner to indicate the setting can be changed. Use the 'UP/DOWN' arrows to navigate to 'YES' and press 'ENTER' again to confirm.

Manual Wiper Fitted
No
Press Enter
To Change

WIPER REMINDER TIMER SET UP

To set the interval for the Wipe Reminder please follow the below instructions. Note that the timer is set to 24hrs by default, if this is suitable for the site requirements then no further change is needed.

Use the 'UP/DOWN' arrows on the Spectra HMI to navigate down to the 'OPERATOR MENU'

Press 'ENTER' to access the Operator Menu and scroll down to the 'WIPE REMINDER INT.' screen.

Press 'ENTER' again to change the Wipe Reminder Interval. An asterix should appear in the top left corner to indicate the setting can be changed. Use the 'UP/DOWN' arrows to increase / decrease the interval time (in hrs.).

Wipe Reminder Int.
24 Hrs
Press Enter
To Change

Operation Instructions

To operate the manual wiper please follow the below instructions (see MANUAL WIPER HOUSING INSTALL section to identify required parts)

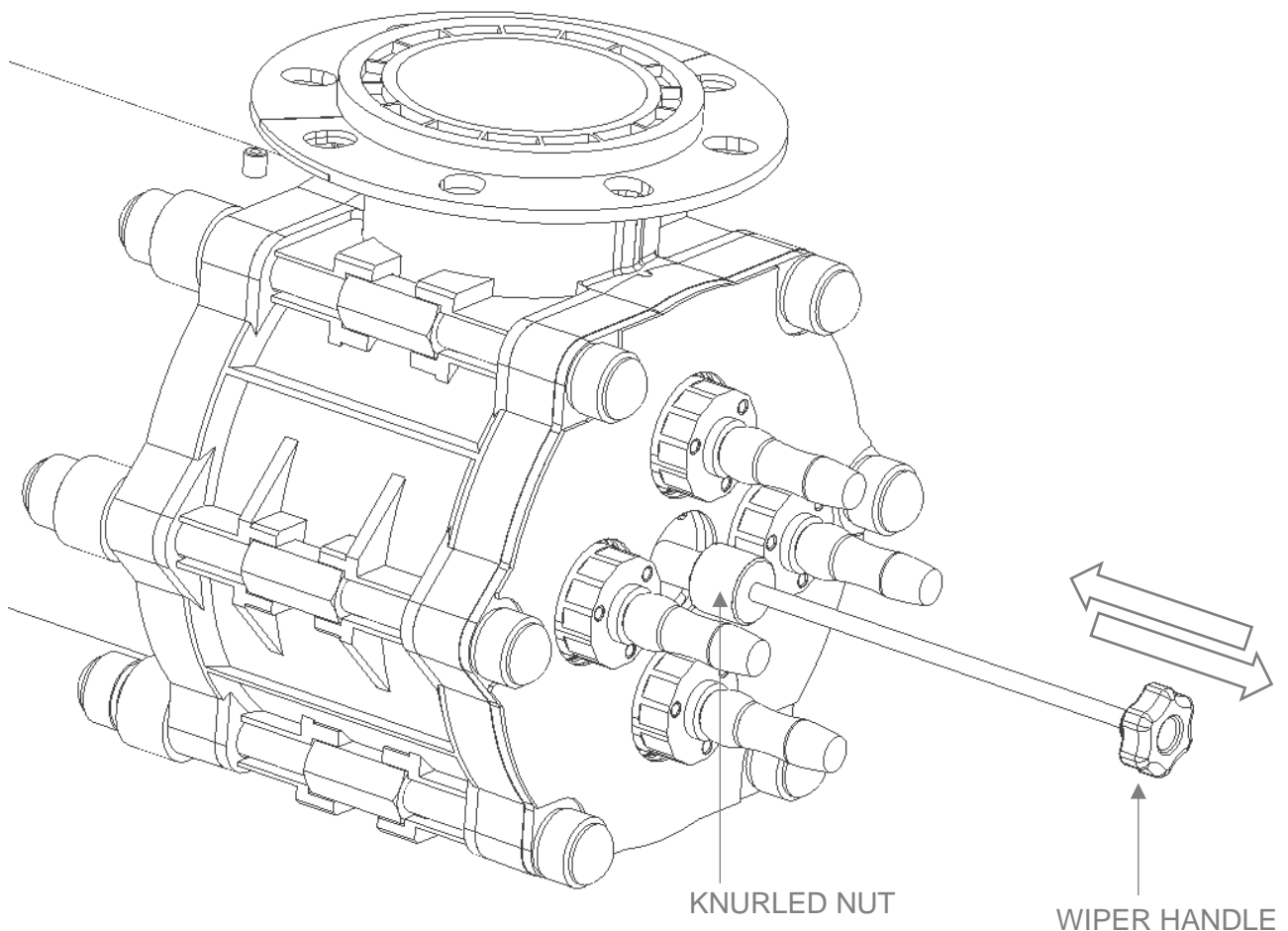
Please refer to the Health & Safety Section at beginning of the manual for Symbol explanations. These are to be adhered to when carrying out the following maintenance procedures



Manual Wiper Operation

Ensure the area around the chamber is clear and free from obstruction

- 1 Loosen the KNURLED NUT 1/2 turn
- 2 Pull the WIPER HANDLE away from the LAMP FLANGE slowly, keeping it in line with the UV Chamber
- 3 To wipe the full extent of the internal components the MANUAL WIPER should be drawn until a stop can be felt, this will correspond to ~450 mm / 18 inches.
- 4 Push the WIPER handle back into the LAMP FLANGE until another stop is felt
- 5 Re-tighten the KNURLED NUT and ensure no leaks are present
- 6 Press 'RESET' on the Spectra HMI to clear the Wipe Reminder screen



For further support please contact your local authorised service provider, or contact our head office in your region:

To arrange a service or commission:

North America

E: ets-uv.service@xylem.com

T: (1) 877-885-4628

Rest of World

E: customerservice.uk@xylem.com

T: 0300 124 0500

For genuine spare parts:

North America

E: ets-uv.service@xylem.com

T: (1) 877-885-4628

Rest of World

E: sparesdisinfection.uk@xylem.com

T: 0300 124 0500

For any other queries:

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