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Installation & Maintenance Manual

Series 5010 Wash System

General Description of the Window Wash System

The window wash system is supplied with water from the ship's fresh water system. It is held in a storage tank that is topped up automatically. A high pressure boost pump draws water from this storage tank and delivers it through piping to groups of external nozzles above or below the bridge windows to remove salt deposits, grease and general debris in conjunction with the ship's window wipers. When the wash is finished the wash water system piping is purged of water automatically by compressed air and the wipers then park.

To cope with poor weather or operating conditions customers have the option to have detergent and/or anti-freeze additives injected into the wash water as well as the wash water heated if required. An option to have remote bridge control of these three functions is also available.

The wash operation is controlled from the ship's bridge by a key incorporated in the remote window wiper control keypad. Where wipers are not fitted the wash system is controlled by a dedicated keypad on the bridge. The optional facilities are operated by a local control panel mounted on the wash system sledge that will be sited within the ship's bridge structure.

While the shipbuilder will install the entire window wash system, the wash system components will be supplied in two separate groups - one group by the shipbuilder and one group by Wynn Marine Ltd. The latter group of components is mostly fitted to the wash module sledge and comprises the wash pump, liquid storage tanks, any of the optional facilities for heating or injecting anti-freeze/detergent additives, associated valves, piping, cabling and the overall control module and power supply terminal boxes.

Technical Specification Of Wash System

Wash Pump

The pump is a peripheral turbine type with a cast iron body, stainless steel shaft and bronze impeller.

A mechanical seal of carbon/ceramic/NBR is fitted. The bearings are pre-packed shielded ball bearings. The pump is designed to operate up to 80° C.

The pump has an output of approximately 10Litres/min at 5bar and a maximum working pressure of 7.5bar. The pump complies with ISO 2548 Class C Annex B.

Wash Pump Motor

The motor runs at a constant speed of 2850 rpm and is of the totally enclosed fan cooled 2-pole design for 115V or 230V ac $\pm 10\%$ single-phase 50Hz or 60Hz operation. The motor casing is of aluminium and the shaft of stainless steel. Insulation is to Class F and the protection to IP44 with automatic thermal overload. The motor is further protected by an overload circuit breaker.

Motor Specifications

Model	Hz	Voltage	Fullload Current	HP	KW	Weight (Kg)
080M	50	230 AC	5.2A	0.8	0.59	9.2

Solenoid Valves for wash water control, air purge and ships' water supply

The valves are a 2/2 normally closed type with 1/4in BSP inlet and outlet ports, an 8mm diameter orifice, a brass body, VITON seats, stainless steel internals and operate between 0.1 to 16bar and up to 90° C. The valves use a 115/230V ac $\pm 10\%$ single phase 50/60Hz electrical supply and consume 8W. The solenoids are replaceable without tools.

Solenoid Valves for Anti-freeze and Detergent injection control (if these options are fitted)

The valves are a 2/2 normally closed type with 1/4in BSP inlet and outlet ports, a 4mm diameter orifice, a brass body, FKM seat and stainless steel internals. Operating range is 0 to 15bar and up to 130° C. They use a 115/230V ac $\pm 10\%$ single phase 50/60Hz electrical supply using 6VA.

Immersion heater fitted to wash water storage tank (if option is fitted)

Capacity	3kW or 6kW
Voltage	115/230V single phase $\pm 10\%$ 50Hz/60Hz
Immersed length	280mm (3kW) or 406mm (6kW)
Element	NiCr resistance wire sheathed in Incoloy 800
Thermostat	Adjustable range 5° to 80° C with auto reset
Enclosure	Nylon-coated lightweight mild steel
Mounting	2in square 4-bolt brass flange
Cable entry	1 x M25
Test pressure	12bar
IP Rating	IP66

Liquid Storage Tanks for wash water, anti-freeze and detergent additives

Capacity	Wash water tank – 60 litres Anti-freeze additive tank – 22 litres (if this option is fitted) Detergent additive tank – 10 litres (if this option is fitted)
Material	Polyethylene
Temperature limits	-20° to 70° C
Colour	Natural
High and low level	Vertical operation, dual switching, 115/230V ac/120V dc,
Float switches (wash water tank)	25VA max power, 0.6A max switching current
Temperature gauge (wash water tank)	Dial type with a 4in probe in stainless steel with 0° to 120° C range
Low level switch (all 3 tanks)	Internally mounted, reed type, polypropylene float switch

Nozzles

The nozzles produce a flat spray with tapered edges. They are of stainless steel or brass and have a 1/8in or 1/4in. BSPT male thread. The nozzle spray angle will be selected according to the dimensions of the ship's windows and the location of the nozzle (i.e. above or below the window). The flow capacity will be approximately 2Litres/min per nozzle at 5bar.

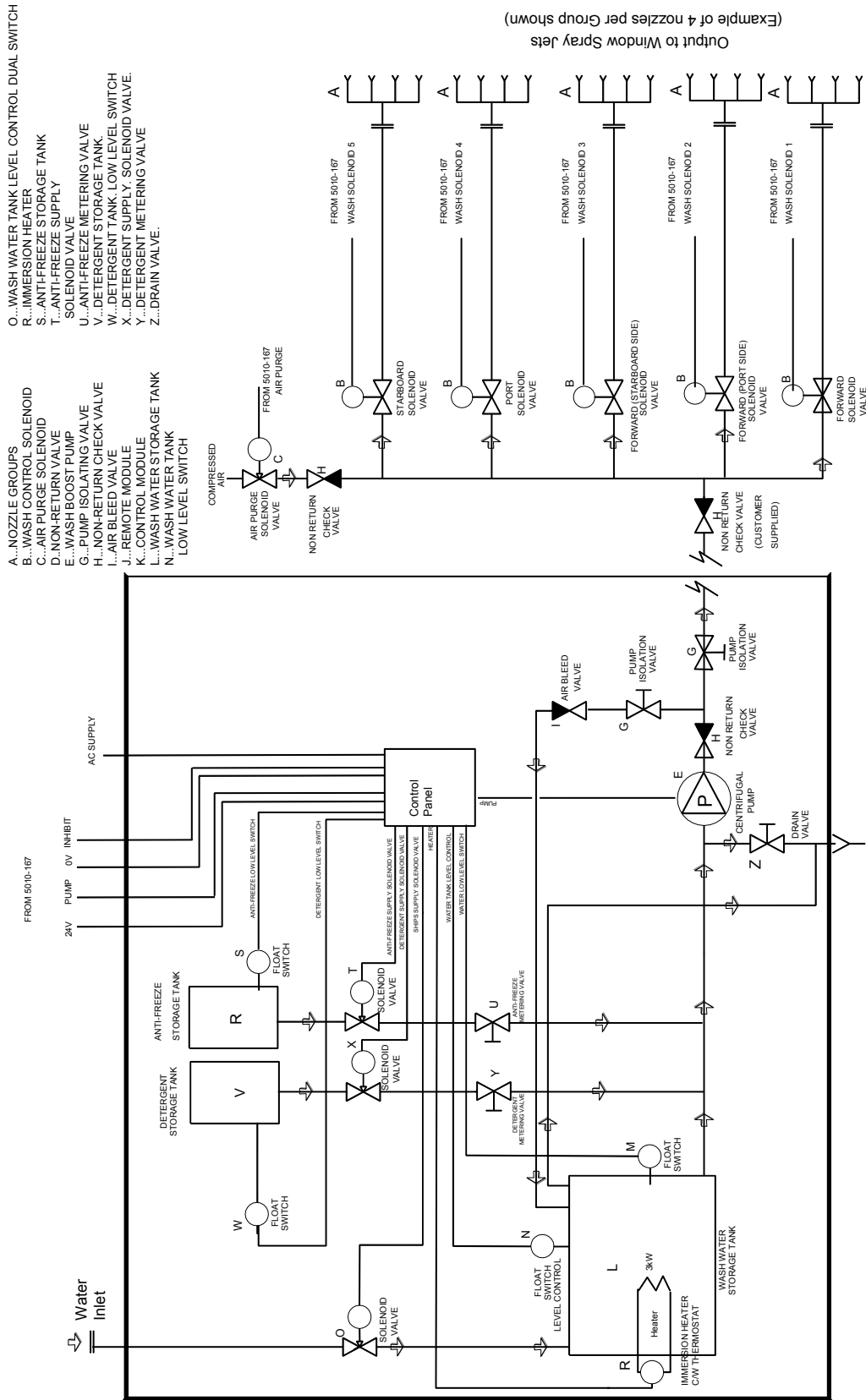
The shipbuilder will supply the following:

1. Wash system water piping (with insulation as required)
2. Nozzle swan-necks
3. Wash system pressure gauge sited on the bridge
4. Wash system water temperature gauge sited on the bridge
5. Wash system water relief valve piped to ship's drain
6. Fresh water supply to storage tank with a stopcock and in-line water filter
7. Ship's drain for draining storage tanks and pump
8. 115V or 230V ac single phase 50 or 60Hz fused electrical supply
9. 24V dc supply with fused breaker (Optional supply by WYNN MARINE)
10. Control cabling from bridge control keypad to control module sited on wash system module sledge
11. Control cabling from control module on system sledge to wash water, air purge, ship's water supply and additive control solenoid valves (if fitted)
12. Compressed air supply (max 7bar) to purge control valve with a stopcock
13. Compressed air piping from stopcock to purge valve
14. Air pressure gauge on ship's air supply system upstream of stopcock

Wynn Marine will supply the following to the shipbuilder for installation:

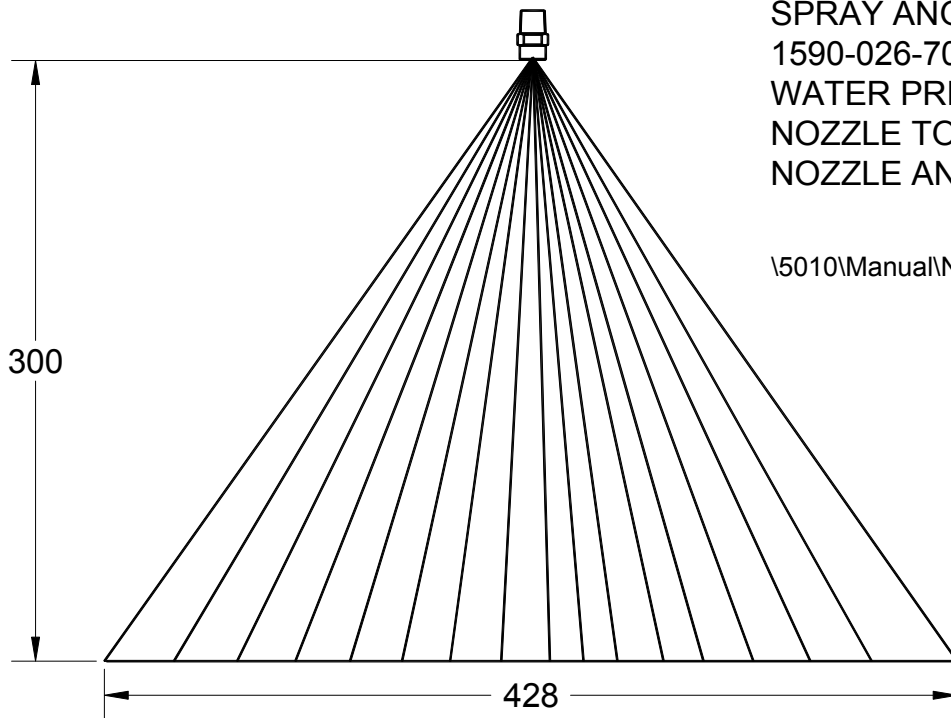
1. Nozzles
2. Solenoid valves to control wash water supply to nozzle groups
3. Solenoid valve to control air purging
4. Non-return check valve for air purge line
5. Rocker switches and panel with LED's for additive injection (if fitted)
6. Wash system module to supply up to 10 nozzles simultaneously consisting of:
 - Motor-driven wash pump with 2 isolating valves
 - Pressure gauge in pump discharge line
7. Non-return valve in pump discharge line
8. Wash water storage tank
9. Low level switch fitted to wash water tank
10. Solenoid valve to control supply of fresh water from ship's cold water system to the washwater storage tank
11. Float switch unit in wash water tank with dual switching facility to operate solenoid valve supplying water from the ship's cold water system
12. Immersion heater with an adjustable thermostat (if this option is fitted)
13. Temperature gauge fitted to wash water storage tank (if this option is fitted)
14. Anti-freeze additive storage tank (if this option is fitted)
15. Low level switch fitted to anti-freeze storage tank (if this option is fitted)
16. Anti-freeze supply solenoid valve (if this option is fitted)
17. Anti-freeze additive injection metering valve (if this option is fitted)
18. Detergent additive storage tank (if this optional is fitted)
19. Low level switch fitted to detergent storage tank (if this option is fitted)
20. Detergent additive solenoid injection control valve (if this option is fitted)
21. Detergent additive injection metering valve (if this option is fitted)
22. Drain valve for Storage Tanks and Boost Pump
23. All associated piping and cabling between sledge mounted equipment
24. Dedicated adjustable Control Module incorporating relays, contactors and PCB's, etc with fused power supply terminals
25. Module sledge with 4 resilient mounts

5010 Window Wash System and Manifold



(Example of 4 nozzles per Group shown)
Output to Window Spray Jets

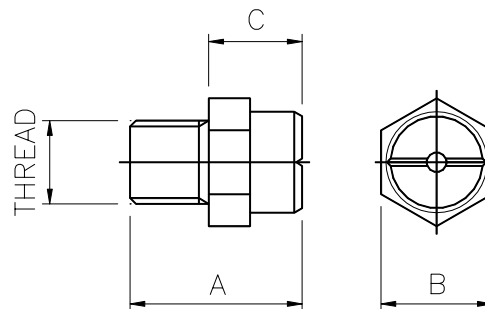
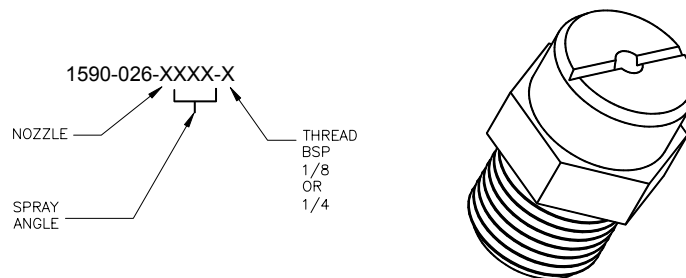
Nozzle Spray Angle



SPRAY ANGLE FOR NOZZLE
 1590-026-7065
 WATER PRESSURE 5 BAR
 NOZZLE TO WINDOW 300mm
 NOZZLE ANGLE 65°

\\5010\Manual\Nozzle 7065

Nozzle Dimensions

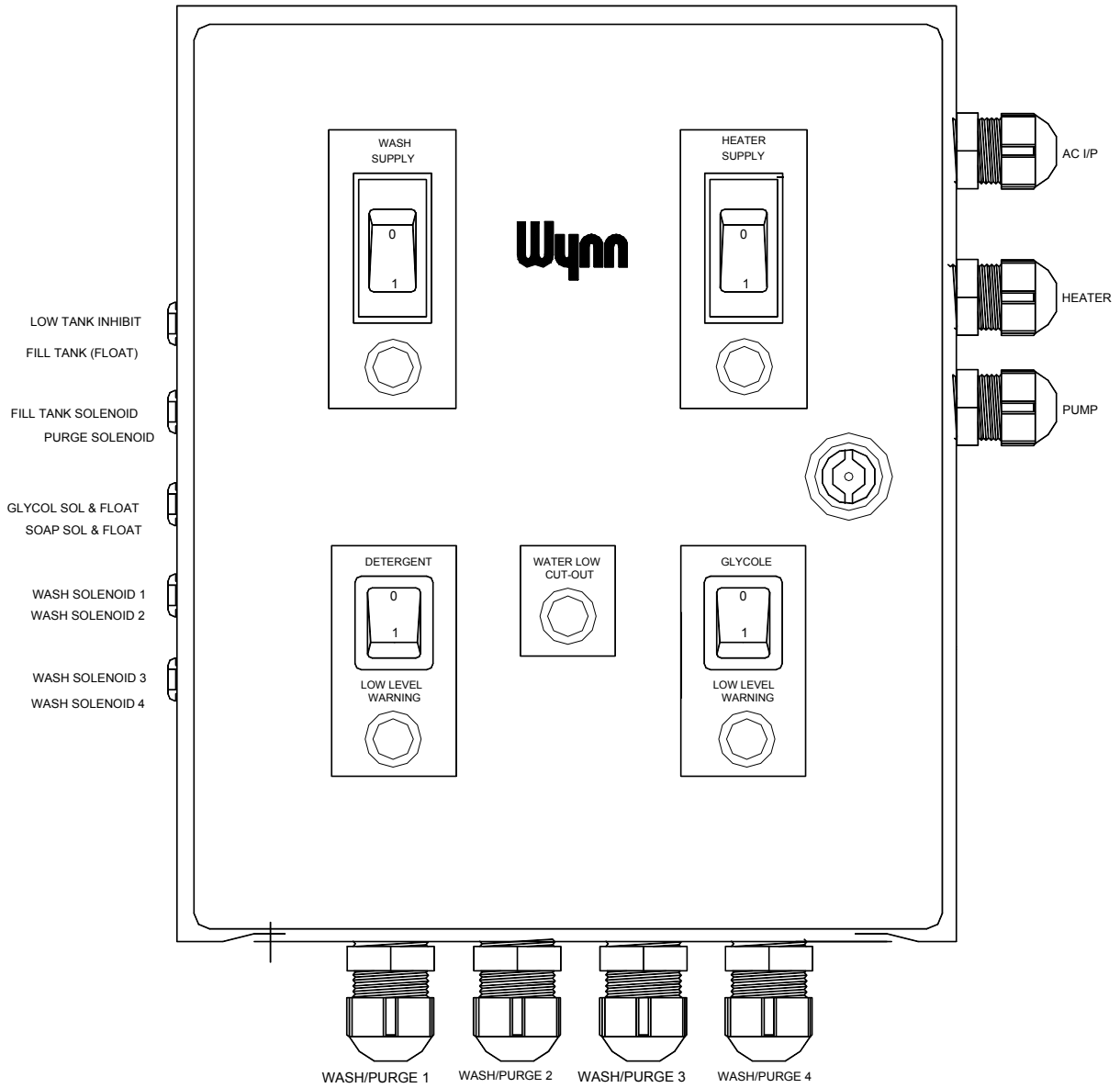


NOZZLE SPRAY OPTIONS

PART NUMBER	A	B	C	THREAD
1590-026	17.5	11.3	9.5	1/8" BSP
1590-026-7065-8	17.5	11.3	9.5	1/8" BSP
1590-026-7065-4	24.5	15.3	13.0	1/4" BSP

SIZE 6 ZERO SPAY

Wash System Sledge Control Module



Installation Of Wash System

Installation of the nozzles

The shipbuilder will carry out the installation of the nozzles. Wynn Marine will provide the shipbuilder with the appropriate nozzles and recommended dimensions and locations for each nozzle's swan-neck to ensure the correct spray coverage of each window.

Installation of the wash water control solenoid valves

The shipbuilder will carry out the siting and installation of the wash water control solenoid valves. The valves will be supplied separately - the shipbuilder will decide the location of each valve.

The valve control cabling should be run from each valve to the wash system control module sited on the wash module sledge.

Installation of the air purge solenoid valve

The shipbuilder will carry out the installation of the air purge solenoid valve. The valve should be sited upstream of and as close to its associated group of wash water control solenoid valves as possible to keep the time from starting the wash cycle to when the water reaches the window to a minimum.

The shipbuilder should connect the vessel's compressed air supply (approx 7bar) to the input of the purge valve via a stopcock with an upstream gauge to indicate the ship's air system pressure. The valve control cabling should be run from the purge valve to the wash system control module sited on the wash module sledge.

Installation of Air Purge Line Non-return Check Valve

This valve should be installed by the shipbuilder and should be immediately downstream of the air purge solenoid valve.

Installation of the Wash System Module (supplied on a sledge)

The shipbuilder will carry out the installation of the wash system module sledge.

The shipbuilder should provide and install the following prior to installation of the module:

- 4 in number deck studs with deck pad-pieces (spacing/size of studs TBA by Wynn Marine)

- Fresh water supply at approx 2bar via an in-line filter, 1/2in.BSP stopcock and hose for connection to sledge mounted solenoid valve (supplied by Wynn Marine)

- Appropriate AC electrical supply, up to 110/55Amps maximum via an isolating fused breaker

- 24V dc supply up to 1A and isolating fused/breaker (Optional supply by Wynn Marine)

- 25mm id drain to vessel's grey water sullage tank

- Control cabling between bridge control keypad/switch panel and control module sited on the wash system sledge

- Control cabling from wash system control module to wash water control, air purge and ship's water supply solenoid valves



Caution: The position of the Wash System Module **must allow easy access to all the equipment** within the module for maintenance or repair and manual filling of additive storage tanks.

Caution: Piping and cabling to/from the sledge **must allow for some movement** of the latter as it is supported on resilient mountings.

Caution: A ground cable **must** be fitted to the sledge

Electrical Installation

Solenoid Valves and Level Valves will pre-wired to the Control Box.

AC supply to the Control Box, Heater and Pump should be connected to a suitable AC supply.

Wash Purge connections are to be connected to the 3072 modules as required. See 3072 Wiring Diagram.

Maintenance Of The Wash System Equipment

General

The Wash System will be used for very short and infrequent periods and therefore maintenance will consist mainly of inspection for corrosion and general deterioration rather than for wear. It is recommended that the following maintenance procedures be included in the overall ship's planned maintenance system.

Nozzles

Alignment and **spray pattern** of each nozzle should be **checked weekly** by operating the wash system and checking each nozzle's performance. Misalignment could be caused by distortion of a swan-neck by a physical impact requiring re-alignment of the swan-neck. A poor spray pattern will be usually due to fouling of the nozzle orifice by the growth of natural organisms or by debris having passed through the piping and becoming trapped in the nozzle orifice.

Solenoid valves - wash water control, air purge, and ship's water supply and anti-freeze and detergent additive control

These valves are similar and require no maintenance other than a **12 monthly external inspection** for signs of leaks, security of fastenings and loose connections.

Wash Pump

The pump has pre-packed bearings and the only internal maintenance required should be an inspection of the mechanical seal and impellor **every 24 months**. The pump and adjacent piping, fastenings, etc should be inspected **every 6 months** for leaks, security and deterioration.

Wash Pump Motor

The motor is an induction type and totally enclosed with pre-packed bearings. No maintenance should be necessary other than an external inspection **every 6 months** of mounting fastenings, electrical cabling and glands for security and deterioration.

Liquid Containers

The containers are constructed of a non-corrodible material and their structure should require no maintenance. Security of piping connections, fastenings and cable connections, etc should be inspected **every 6 months**

The 3 containers should be drained down **every 12 months** and internally inspected for deposits and growth of organisms. If any is found the container should be removed and rinsed with fresh water. Container screw caps and aperture seals should be examined for security and deterioration and renewed as necessary.

Immersion heater (if option is fitted)

Every 3 months

Inspect the unit overall for leaks, fastener security and any deterioration.

Every 6 months

Remove the terminal cover and check the box is dry and clean and that all connections are tight.

Every 12 months

Check the element resistance is at least 2 megohms and check the continuity of all elements. Check and renew the cover gasket when necessary.



Caution: If the heater is not used for **3 months or longer**, carry out the 3 and 6 monthly maintenance routines before use.

System valves (auto/hand operated)

The following valves require no maintenance other than being worked through their full range and an inspection **every 12 months** for leaks, security of connections, glands, fastenings, etc:

- Pump isolating valves (2)
- Non-return check valves (2)
- Anti-freeze metering valve (if option is fitted)
- Detergent metering valve (if option is fitted)
- Wash water tank drain valve
- Air bleeding valve

System piping and fittings

The wash system module piping and associated fittings are made from non-corrodible materials and should require no maintenance other than an inspection **every 12 months** for leaks or deterioration, pipe connection and support fastening security, etc.

Wash System Fault Finding

Problem –	Wash water does not spray windows when switched on by control keypad
Possible causes:	a). The wash pump is not running b). The wash water control solenoid valves are not open c). The wash water tank is empty d). A pump isolating valve is shut
Solutions to a):	Check keypad wiper heater LED – if it lights, keypad is working. If LED does not light, check 24V supply to control module is present. If 24V is present, but still no light, replace keypad. Check the supply to the wash control module is present. If present, check wash control module “Pump Output” is working. If present and cables are connected but still no output, replace control module. Check pump motor is working. If not, replace pump/motor unit. Check pump/motor for mechanical freedom. If rotor is stiff to rotate, replace or free pump/motor unit. If motor running but no water being pumped, bleed the pump by unscrewing the top bleed nut.
Solutions to b):	Check keypad wiper heater LED – if it lights, keypad is working. If LED does not light, check 24V supply to control module. If 24V is present, but still no light, replace keypad. Check the supply to the wash control module is present. If present, check wash control module “Wash Output” is working. If signal is present and cables are connected but still no output, replace control module.. Check valve solenoid coil continuity. If continuity is fine but still not working, replace valve.
Solutions to c):	Check vessel’s water supply. Restore if OFF Check water supply solenoid valve will OPEN. If not check 115/230V supply to Wash Sledge control module is present. If present, check output at valve. If still no output, check relay function within Sledge Control module. Check valve solenoid coil continuity. If continuity is fine but still not working, replace valve. Check operation of vertical float switches and ensure free float mechanism as necessary. If float or switches is not working, replace switch unit
Solution to d):	Open isolating valve(s)

- Problem –** Wash water is not heated when heater is switched on
- Possible causes:**
- a). Ship's 115/230V power supply failure
 - b). Switch/cabling defective
 - c). Thermostat set incorrectly/defective
 - d). Immersion heater defective
- Solution to a):** Check ship's 115/230V supply from sledge terminal box is present. Restore power as necessary
- Solution to b):** Check switch and cabling connections. Replace/reconnect as necessary
- Solutions to c):** Check thermostat setting, if incorrect reset.
Check thermostat continuity. If not working, replace thermostat
- Solution to d):** Check element continuity. If not working replace heater complete

Problem Anti-freeze or Detergent additive injection function does not work when switched on.

- Possible causes:**
- a). Anti-freeze/Detergent additive tank is empty
 - b). Anti-freeze/Detergent additive supply solenoid valve not opening
 - c). Anti-freeze/Detergent additive metering valve not adjusted correctly

Solution to a): Fill tank with anti-freeze/detergent additive

Solutions to b): Check ship's 115/230V supply is present. Restore as necessary.
If power is present, check solenoid coil continuity.
If coil continuity is OK, replace valve.

Solution to c): Adjust metering valve setting as necessary

Problem – Air purging does not operate after wash water spray stops

- Possible Causes:**
- a). No air supply from ship's compressed air system
 - b). Air purge solenoid valve not opening

Solution to a): Check ship's air supply. Restore as necessary

Solutions to b): Check ship's 115/230V supply to control module is present.
If 115/230V is present, check control module output to solenoid valve/fuse and that cables are connected.
If all present but still no output, replace control module PCB card.
If all control output are working, check valve solenoid coil continuity.
If continuity is OK, replace valve.

Wash System Spares

A recommended spares list for the Wynn Marine Module MKI supplying 10 nozzles is shown below. It is recommended that in order that ship's staff can undertake maintenance and repairs to Wynn Marine equipment, this manual should be kept safely and up to date with a complete stock of recommended spare parts maintained onboard.

N.B. Spares holdings should be multiplied by the number of wash modules installed.

Description	Quantity	Part Number
Pump 115V, 10L/min	1	5010-121-115-61
1/4in Solenoid Valve Assembly	3	1588-694-24VDC
3kW Immersion Heater	1	5010-120
Float Switch Horizontal	3	5010-119
Float Switch Vertical	1	5010-118

Documentation

Whilst every effort is made to provide accurate information in good faith, no responsibility can be accepted by Wynn for inaccuracies and Wynn reserves the right to alter and amend specifications and designs without prior notice in line with our policy of continued improvement.

Spares Parts

To enable technical troubleshooting and ordering of spare parts, this manual should be kept in a safe place on board. It is also advisable to keep one set of spare parts on board for emergency use. Please contact Wynn directly or your local distributor / service centre for all order requirements.

Maintenance Schedules

Plan your maintenance work according to the schedule in this manual.

Our Commitment

We are committed to a 10 year product support programme. This ensures that any spare part will be available for any wiper at least 10 years after its purchase. It is strongly recommended that only genuine replacement parts manufactured by WYNN be used. This will guarantee that only suitable materials have been used and will ensure interchangeability of parts.

Quality and Testing

We are committed to the principles of Total Quality Management, ISO 9000. We manufacture our range of marine products to the highest standard and quality. We therefore maintain an ongoing schedule of product improvement and testing. To help us sustain such standards we maintain a salt-water test rig on which our products are taken, at random from the production line, and subjected to 3,000 hour continuous testing. We are sure you will receive many years trouble-free service from your Wynn product and hope you find this information pack comprehensive.

Guarantee

All Wynn equipment is tested before despatch from our works. The Windscreen Wiper System supplied has a 1 year warranty period provided the installation of the system and the subsequent maintenance is in accordance with the installation/maintenance instructions.

We cannot accept any responsibility for the installation of equipment, or damage to the equipment during installation, or normal wear and tear. The guarantee is negated if the equipment is not installed strictly observing the instructions set out in this manual, or not maintained as specified.

The Wiper System is very reliable but to ensure its continued smooth running we recommend that the following guidelines are adhered to:-

Monthly

- Check for wear on all parts subject to friction
- Visual inspection should be made of the blades to ensure that they are still in good condition and replace as soon as there are signs of wear or damage

Annually

- It is recommended that the blades are changed every 12 months

After the Wiper System has been operating in severe weather conditions it is advisable to thoroughly check the unit for signs of wear or damage.

This warranty excludes the wiper blades which are a consumable item and any replacements that are detailed in the manual as part of any regular maintenance requirement.

This guarantee is expressly in lieu of all other guarantees expressed or implied and of all other obligations of liabilities on our part, and we neither assume nor authorise any other person to assume for us any other liability in connection with the sale of our equipment. Faulty equipment must be returned, carriage paid, to our works for examination. Any legal action must be settled in the English courts under English law.

A worldwide network of agents supports Wynn's Marine product range. For details of the nearest Wynn agent please contact our Head Office. Wynn Agents operate in the following countries.

Argentina, Australia, Brazil, Canada, Chile, China, Croatia, Denmark, Egypt, Finland, France, Germany, Greece, Hong Kong, Iceland, India, Israel, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Oman, Peru, Poland, Portugal, Russia, Singapore, South Africa, Spain, Sweden, Taiwan, Turkey, Ukraine, U.S.A.



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