

4NS Three Phase Duplex Control Panel

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1 Introduction and Safety

1.1 Introduction

1.1.1 Purpose of the manual

The purpose of this manual is to provide necessary information for:

- Installation
- Operation
- Maintenance



WARNING:

Carefully read the Instruction Manual to avoid serious personal injury and property hazards and to ensure safe use and proper care of this product.

NOTICE:

Save this manual for future reference, and keep it readily available at the location of the unit. The information contained in this manual is intended to assist operating personnel by providing information on the characteristics of the purchased equipment. It does not relieve the user of the responsibility to adhere to local codes and ordinances and the use of accepted practices in the installation, operation and maintenance of this equipment. Further information pertaining to the installation, operation, and maintenance of your TechnoForce e-MTV pump controller can be found in the IOMs for the associated equipment provided Maintenance section for a list of relevant manuals. Equipment cannot operate well without proper care. To keep this unit at top efficiency, follow the recommended installation and servicing procedures outlined in this manual.

1.2 Safety



WARNING:

- The operator must be aware of safety precautions to prevent physical injury.
 - Operating, installing, or maintaining the unit in any way that is not covered in this manual could cause death, serious personal injury, or damage to the equipment. This includes any modification to the equipment or use of parts not provided by Xylem. If there is a question regarding the intended use of the equipment, please contact a Xylem representative before proceeding.
 - Do not change the service application without the approval of an authorized Xylem representative.
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CAUTION:

You must observe the instructions contained in this manual. Failure to do so could result in physical injury, damage, or delays.

1.3 Safety terminology and symbols

About safety messages

It is extremely important that you read, understand, and follow the safety messages and regulations carefully before handling the product. They are published to help prevent these hazards:

- Personal accidents and health problems
- Damage to the product and its surroundings
- Product malfunction

Hazard levels

Hazard level	Indication
 DANGER:	A hazardous situation which, if not avoided, will result in death or serious injury
 WARNING:	A hazardous situation which, if not avoided, could result in death or serious injury
 CAUTION:	A hazardous situation which, if not avoided, could result in minor or moderate injury
NOTICE:	Notices are used when there is a risk of equipment damage or decreased performance, but not personal injury.

Special symbols

Some hazard categories have specific symbols, as shown in the following table.

Electrical hazard	Magnetic fields hazard
 Electrical Hazard:	 CAUTION:

1.4 Environmental safety

The work area

Always keep the station clean to avoid and/or discover emissions.

Waste and emissions regulation

Observe these safety regulations regarding waster and emissions:

- Appropriately dispose of all waste.
- Handle and dispose of the processed liquid in compliance with applicable environmental regulations.
- Clean up all spills in accordance with safety and environmental procedures.
- Report all environmental emissions to the appropriate authorities.

Electrical installation

For electrical installation recycling requirements, consult your local electric utility.

1.5 Recycling guidelines

Always follow local laws and regulations regarding recycling.

1.6 User safety

General safety rules

These safety rules apply:

- Always keep the work area clean.
- Pay attention to the risks presented by gas and vapors in the work area.
- Avoid all electrical dangers. Pay attention to the risks of electric shock or arc flash hazards.
- Always bear in mind the risk of drowning, electrical accidents, and burn injuries.

Safety equipment

Use safety equipment according to the company regulations. Use this safety equipment within the work area:

- Helmet
- Safety goggles
- Protective shoes
- Protective gloves
- Gas mask
- Hearing protection
- First-aid kit
- Safety devices

NOTICE:

Never operate a unit unless safety devices are installed. Also see specific information about safety devices in other chapters of this manual.

Electrical connections

Electrical connections must be made by certified electricians in compliance with all international, national, state, and local regulations. For more information about requirements, see sections dealing specifically with electrical connections.

Precautions during work

Observe these safety precautions when you work with the product or are in connection with the product:

- Never work alone.
- Always wear protective clothing and hand protection.
- Stay clear of suspended loads.
- Always lift the product by its lifting device.
- Beware of the risk of a sudden start if the product is used with an automatic level control.
- Beware of the starting jerk, which can be powerful.
- Rinse the components in water after you disassemble the pump.
- Do not exceed the maximum working pressure of the pump.
- Do not open any vent or drain valve or remove any plugs while the system is pressurized. Make sure that the pump is isolated from the system and that pressure is relieved before you disassemble the pump, remove plugs, or disconnect piping.
- Never operate a pump without a properly installed coupling guard.

Wash the skin and eyes

Do the following if chemicals or hazardous fluids have come into contact with your eyes or your skin:

If you need to wash your...	Then
Eyes	• Hold your eyelids apart forcibly with your fingers. • Rinse the eyes with eyewash or running water for at least 15 minutes. • Seek medical attention.
Skin	1. Remove contaminated clothing. 2. Wash the skin with soap and water for at least one minute. 3. Seek medical attentions, if required.

2 Transportation and Storage

2.1 Examine the delivery

2.1.1 Examine the package

1. Examine the package for damaged or missing items upon delivery.
2. Record any damaged or missing items on the receipt and freight bill.
3. If anything is out of order, then file a claim with the shipping company.
If the product has been picked up at a distributor, make a claim directly to the distributor.

2.1.2 Examine the unit

1. Remove packing materials from the product.
Dispose of all packing materials in accordance with local regulations.
2. To determine whether any parts have been damaged or are missing, examine the product.
3. If applicable, unfasten the product by removing any screws, bolts, or straps.
Use care around nails and straps.
4. If there is any issue, then contact a sales representative.

2.2 Transportation guidelines

Lifting methods



WARNING:

- Assembled units and their components are heavy. Failure to properly lift and support this equipment can result in serious physical injury and/or equipment damage. Lift equipment only at the specifically identified lifting points. Lifting devices such as eyebolts, slings, and spreaders must be rated, selected, and used for the entire load being lifted.
- Crush hazard. The unit and the components can be heavy. Use proper lifting methods and wear steel-toed shoes at all times.



CAUTION:

Care should be taken to prevent damage due to dropping or jolting when moving the controller. Transportation damage should be brought to the carrier's attention immediately upon receipt.

2.3 Storage guidelines

Storage location

The product must be stored in a covered and dry location protected from extreme cold, heat, dirt, and vibrations.

NOTICE:

Protect the product against humidity, heat sources, and mechanical damage.
Do not place heavy weights on the packed products.

Long-term storage

If the controller is stored for more than 6 months, these requirements apply:

- Store in a covered and dry location.
- Store the unit free from heat, dirt, and vibrations.
- Recommended storage includes but not limited to a tarp over the unit.

Extended storage of VFDs may require special attention prior to start-up. See manufacturer's IOM for details.

3 Product Description

3.1 4NS Series duplex control panel

The 4NS Series duplex control panels will control two pumps in sewage, wastewater, and dewatering applications. All panels are UL Listed for the United States and Canada and come with a five-year warranty.

Model	FLA Range
NSD39014	(9.0-14.0 FLA)
NSD31318	(13.0-18.0 FLA)
NSD31723	(17.0-23.0 FLA)
NSD32432	(24.0-32.0 FLA)
NSD33040	(30.0-40.0 FLA)
NSD33750	(37.0-50.0 FLA)
NSD34865	(48.0-65.0 FLA)
NSD365115	(65.0-115.0 FLA)

3.2 Enclosure Mounting: Type 4X rated

Mounting Brackets

A mounting bracket and screw pack are provided with the premium enclosures. To assemble, turn the enclosure upside down on a flat surface, place the mounting bracket over the square boss either horizontally or vertically, and fasten the mounting bracket with the 1/4"-20 x 0.5 SS, countersunk Phillips drive screws or vertically, with the mounting brackets in any configuration, using any acceptable fastening technique.

Covers/Doors

Covers/doors have a gasket pre-assembled to seal against the base.

NOTICE:

The control panel should not be mounted in a location that may be subject to submersion.

4 Installation

4.1 Panel Installation:

1. Caution: To maintain the Type 4X rating, make all wiring connections with seal-tight cable grips or conduit connections.
2. Three-phase panels: Wire transformer for incoming voltage per instructions attached to the transformer.
3. Set motor protectors to FLA of motors.
4. Run pump cables and floats cables through conduit. Make field connections as shown on the wiring schematic.
5. Run power line conductor through the conduit, wire to terminals per enclosed schematic.
6. Branch circuit protection is to be provided by the installer.
7. Panel circuit breakers are shipped in the closed position.
8. Ensure floats are accurately mounted at the correct levels.

NOTICE:

Floats shall have free range of motion without touching each other or other equipment.

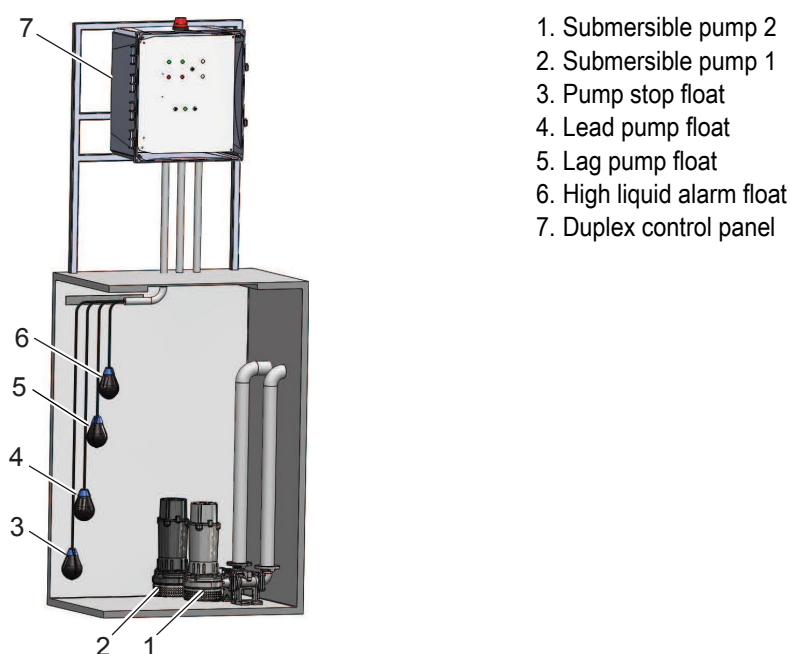


Figure 1: Typical Installation of 4NS Duplex Control Panel

4.2 Remote monitoring dry contacts:

Normally Open dry contacts for high level, Pump 1 run, Pump 2 run, Pump 1 fault, and Pump 2 fault.

NOTICE:

Refer to wiring schematic for proper termination.

5 Operation

5.1 Sequence of operation:

1. When the “Stop” and “Lead” float contact closes, Pump 1 will energize and the Pump 1 run light will illuminate. Pump 1 will remain operational until the “Stop” float opens.
2. The next time the “Stop” and “Lead” floats are closed, the automatic pump alternation circuit will energize Pump 2 and the Pump 2 run light will illuminate. Pump 2 will remain operational until the “Stop” float opens.
3. If the fluid level continues to rise after the first pump has been energized, the “Lag” float will close. When the “Lag” float has been closed, the second pump will turn on. Both pumps will remain operational until the “Stop” float opens.
4. If the level continues to rise, the “High” float will alarm. This will illuminate the 360-degree visible beacon and sound an 85 decibel at 10’ buzzer.

6 Troubleshooting

Caution: Before checking electrical connections within the control or attempting to replace any components, turn off all branch circuits supplying power to the main control panel.

Alarm Circuit:

To test the alarm light and buzzer, press the "Test" button on the front panel. If either the light or buzzer does not indicate, replace the light bulb or buzzer with the same type.

Control Board and Fuse:

If the "Power On" light is not illuminating on the front panel, check the voltage at TS1-1 and TS1-2 with a voltage meter. The voltage should read 120VAC. If voltage is present, check the fuse in the fuse box. If the fuse is blown, replace the fuse with the same type. The dry contacts are rated for 120 VAC or 24 VDC, 1 amp max.

Floats:

The control board has individual float status indicators that will illuminate when the floats are in the closed position. Check floats for entanglement, and a full range of motion. Replace damaged floats.

7 Warranty

7.1 Limited consumer warranty

Warranty. For goods sold for personal, family or household purposes, Seller warrants the goods purchased hereunder (with the exception of membranes, seals, gaskets, elastomer materials, coatings and other “wear parts” or consumables all of which are not warranted except as otherwise provided in the quotation or sales form) will be free from defects in material and workmanship for a period of one (1) year from the date of installation or two (2) years from the product date code, whichever shall occur first, unless a longer period is provided by law or is specified in the product documentation (the “Warranty”).

Except as otherwise required by law, Seller shall, at its option and at no cost to Buyer, either repair or replace any product which fails to conform with the Warranty provided Buyer gives written notice to Seller of any defects in material or workmanship within ten (10) days of the date when any defects or non-conformance are first manifest. Under either repair or replacement option, Seller shall not be obligated to remove or pay for the removal of the defective product or install or pay for the installation of the replaced or repaired product and Buyer shall be responsible for all other costs, including, but not limited to, service costs, shipping fees and expenses. Seller shall have sole discretion as to the method or means of repair or replacement. Buyer’s failure to comply with Seller’s repair or replacement directions shall terminate Seller’s obligations under this Warranty and render this Warranty void. Any parts repaired or replaced under the Warranty are warranted only for the balance of the warranty period on the parts that were repaired or replaced.

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To make a warranty claim, check first with the dealer from whom you purchased the product or call +1-847-966-3700 for the name and location of the nearest dealer providing warranty service.

7.2 Commercial warranty

Warranty. For goods sold to commercial buyers, Seller warrants the goods sold to Buyer hereunder (with the exception of membranes, seals, gaskets, elastomer materials, coatings and other “wear parts” or consumables all of which are not warranted except as otherwise provided in the quotation or sales form) will be (i) be built in accordance with the specifications referred to in the quotation or sales form, if such specifications are expressly made a part of this Agreement, and (ii) free from defects in material and workmanship for a period of one (1) year from the date of installation or two (2) years from the date of manufacture, whichever shall occur first, unless a longer period is specified in the product documentation (the “Warranty”).

Except as otherwise required by law, Seller shall, at its option and at no cost to Buyer, either repair or replace any product which fails to conform with the Warranty provided Buyer gives written notice to Seller of any defects in material or workmanship within ten (10) days of the date when any defects or non-conformance are first manifest. Under either repair or replacement option, Seller shall not be obligated to remove or pay for the removal of the defective product or install or pay for the installation of the replaced or repaired product and Buyer shall be responsible for all other costs, including, but not limited to, service costs, shipping fees and expenses. Seller shall have sole discretion as to the method or means of repair or replacement. Buyer’s failure to comply with Seller’s repair or replacement directions shall terminate Seller’s obligations under this Warranty and render the Warranty void. Any parts repaired or replaced under the Warranty are warranted only for the balance of the warranty period on the parts that were repaired or replaced. Seller shall have no warranty obligations to Buyer with respect to any product or parts of a product that have been: (a) repaired by third parties other than Seller or without Seller’s written approval; (b) subject to misuse, misapplication, neglect, alteration, accident, or physical damage; (c) used in a manner contrary to Seller’s instructions for installation, operation and maintenance; (d) damaged from ordinary wear and tear, corrosion, or chemical attack; (e) damaged due to abnormal conditions, vibration, failure to properly prime, or operation without flow; (f) damaged due to a defective power supply or improper electrical protection; or (g) damaged resulting from the use of accessory equipment not sold or approved by Seller. In any case of products not manufactured by Seller, there is no warranty from Seller; however, Seller will extend to Buyer any warranty received from Seller’s supplier of such products.

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Xylem |'zīləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

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