QUICK START GUIDE

P2004386 REV 3

FOR FULL IOM,
SCAN BELOW

Technologic® IPC

QUICK START-UP GUIDE FOR ADVANCED IPC

Bell & Gossett

a xylem brand

INDEX

CAUTION:
UNINTENDED START. When the frequency converter is configured as **"Single Pump"** or **"Fixed Speed Follower"** and the **"Pipe Filling"** function is activated, the DI18 does not prevent the unit from starting (terminal 18 open). To prevent unintended motor start: press [OFF] button on the LCP.

1. SAFETY AND INSTRUCTIONS

OVERVIEW

This guide provides necessary information about safety and a quick reference for installing the Technologic Intelligent Pump Controller.

NOTE: Refer to the P2003509 Technologic Intelligent Pump Controller Installation, Operation, and Maintenance (IOM) Manual (current version) on the Xylem www.xylem.com/bellgossett website for complete information.

CAUTION:
Read this manual carefully before installing and using the product. Improper use of the product can cause personal injury and damage to property, and may void the warranty.

NOTICE:
Save this manual for future reference, and keep it readily available at the location of the unit.

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.

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

Safety message levels

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
• Product malfunction

Definitions

Safety message 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
Electrical Hazard:	The possibility of electrical risks if instructions are not followed in a proper manner
NOTICE:	• A potential situation which, if not avoided, could result in undesirable conditions • A practice not related to personal injury

Qualified personnel

WARNING:
This product is intended to be operated by qualified personnel only.

• Correct and reliable transport, storage, installation, operation, and maintenance are required for the trouble-free and safe operation of the frequency converter. Only qualified personnel are allowed to install or operate this equipment.

• Qualified personnel are defined as trained staff, who are authorized to install, commission, and maintain equipment, systems, and circuits in accordance with pertinent laws and regulations. Also, the personnel must be familiar with the instructions and safety measures that are described in this document.

• Persons with diminished capacities should not operate the product unless they are supervised or have been properly trained by a professional.

• Children must be supervised to ensure that they do not play on or around the product.

Safety precautions

WARNING:
HIGH VOLTAGE. Frequency converters contain high voltage when connected to AC mains. Installation, start-up and maintenance must be performed by qualified personnel only. Failure to comply could result in death or serious injury.

WARNING:
DISCHARGE TIME. Disconnect and lock out electrical power and wait for the minimum
waiting time specified below. Failure to wait the specified time after power has been removed before performing service or repair could result in death or serious injury.

Frequency converters contain DC-link capacitors that can remain charged even when the frequency converter is not powered. To avoid electrical hazards, stop motor and disconnect:

- AC mains
- Any permanent magnet type motors
- Any remote DC-link power supplies, including battery backups, ups and DC-link connections to other frequency converters.

Wait for the capacitors to discharge completely before performing any service or repair work. Refer to the following table for the minimum waiting time before doing service on the frequency converter:

Voltage (V)	Power range		Minimum waiting time (min)
	hp	kW	
200-240	0.5–5	0.37-3.7	4
200-240	7.5-60	5.5-45	15
380-480	0.5-10	0.37-7.5	4
380-480	15-125	11-90	15
380-480	150–450	110-315	20
380-480	500–600	355-530	40
525-690	0.5-10	0.37-7.5	7
525-690	15-60	11-45	15
525–690	75–400	55-400	20
525–690	450–600	450-560	40

Note: Highigh voltage may be present even when the warning LED indicator lights are off. Always verify with a voltmeter that all voltages have dissipated.

WARNING:
LEAKAGE CURRENT HAZARD. Follow national and local codes regarding protective earthing of equipment with a leakage current > 3.5 mA. Frequency converter technology implies high frequency switching at high power. This will generate a leakage current in the earth connection. A fault current in the frequency converter at the output power terminals might contain a DC component which can charge the filter capacitors and cause a transient earth current. The earth leakage current depends on various system configurations including RFI filtering, screened motor cables, and frequency converter power. Failure to ground the drive properly could result in death or serious injury.

EN/EC61800–5–1 (Power Drive System Product standard) requires special care if the leakage current exceeds 3.5 mA. Earth grounding must be reinforced in one of the following ways:

- Earth ground wire of at least 8 AWG or 10 mm2.
- Two separate earth ground wires both complying with the dimensioning rules.

WARNING:
UNINTENDED START. Before using the Genie, set DI18 to Stop (terminal 18 open) to prevent the unit from starting the motor. Keep terminal 18 open to avoid an unintended motor rotation. Apply the Start signal to the controller only when pump operation is desired.

WARNING:
UNINTENDED START. WINDMILLING! Unintended rotation of permanent magnet motors causes a risk of personal injury and equipment damage. Ensure permanent magnet motors are blocked to prevent unintended rotation.

WARNING:
EQUIPMENT HAZARD. Rotating shafts and electrical equipment can be hazardous. All electrical work must conform to national and local electrical codes. Installation, start-up, and maintenance must be performed by trained and qualified personnel. Wear safety glasses whenever working on electric control or rotating equipment. Failure to follow these guidelines could result in death or serious injury.

WARNING:
Only use original spare parts to replace any worn or faulty components. The use of unsuitable spare parts may cause malfunctions, damage, and injuries as well as void the guarantee.

WARNING:
INTERNAL FAILURE HAZARD. Risk of personal injury when the frequency converter
is not properly closed. Before applying power, ensure all safety covers are in place and securely fastened.

1.3 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:

- Hard hat
- Safety goggles, preferably with side shields
- 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 in the manual. See QR code on front page for more information.

Precautions before work

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

- Provide a suitable barrier around the work area, for example, a guard rail.
- Make sure that all safety guards are in place and secure.
- Make sure that you have a clear path of retreat.
- Make sure that the product cannot roll or fall over and injure people or damage property.
- Make sure that the lifting equipment is in good condition.
- Use a lifting harness, a safety line, and a breathing device as required.
- Allow all system and pump components to cool before you handle them.
- Make sure that the product has been thoroughly cleaned.
- Disconnect and lock out power before you service the pump.
- Check the explosion risk before you weld or use electric hand tools.

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.

1.3.1 Wash the skin and eyes

Follow these procedures for chemicals or hazardous fluids that have come into contact with your eyes or your skin:

Condition	Action
Chemicals or hazardous fluids in eyes	1. Hold your eyelids apart forcibly with your fingers. 2. Rinse the eyes with eyewash or running water for at least 15 minutes. 3. Seek medical attention.
Chemicals or hazardous fluids on skin	1. Remove contaminated clothing. 2. Wash the skin with soap and water for at least 1 minute. 3. Seek medical attention, if necessary.

1.4 Protecting the environment

Emissions and waste disposal

Observe the local regulations and codes regarding:

- Reporting of emissions to the appropriate authorities
- Sorting, recycling and disposal of solid or liquid waste
- Clean-up of spills

Exceptional sites

CAUTION: Radiation Hazard
Do NOT send the product to Xylem if it has been exposed to nuclear radiation, unless Xylem has been informed and appropriate actions have been agreed upon.

Recycling guidelines
Always follow local laws and regulations regarding recycling.

Waste and emissions guidelines
Do not dispose of equipment containing electrical components together with domestic waste.
Collect it separately in accordance with local and currently valid legislation.

CAUTION

Before using the Genie, set DI18 to Stop (terminal 18 open) to prevent the unit from starting the motor. Keep terminal 18 open to avoid an unintended motor rotation. Apply the Start signal to the controller only when pump operation is desired.

PREPARE FOR INSTALLATION

WARNING! Installation must be performed by a qualified technician.

- Suitable Environment – Ensure installation is indoors and the site temperature range is 0°C (32°F) to 40°C (104°F).
- Ensure properly sized safety devices are installed in the system such as pressure relief valves, compression tanks, pressure controls, temperature controls and flow controls.
- Ensure proper guards are installed when the system has potential to operate at extreme temperatures and/or pressures.

UNPACK THE UNIT

Remove all packing materials from the product. Inspect the product to determine if any parts have been damaged or are missing. Contact your sales representative if anything is out of order.

PREPARE THE MOUNTING LOCATION

- Ensure adequate supports are utilized to handle the weight of the system, piping and fluid.
- Ensure the suction and discharge pipes are supported independently by use of pipe hangers near the pump.
- Ensure there is adequate space around the unit to ensure proper cooling and allow for maintenance and service.

MOUNT THE UNIT

- Ensure the unit is properly lifted according to the pump Installation, Operation and Maintenance manual.
- Ensure all flange bolts are adequately torqued.
- For vertically mounted installations with the motor and controller in the horizontal position, ensure that adequate support for the motor and controller is provided.
- Refer to chapter 4 Mechanical Installations in the P2003509 IOM (current version) on the Xylem website for details of installations.

INSTALL WIRING

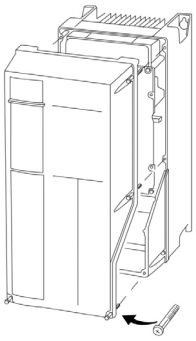
Electrical Hazard. Dangerous voltage.

Ensure all input power disconnects and circuit breakers are locked in the off position prior to installing the input power wiring.

NOTE: External fusing is required for units without a built in fused disconnect.

Electrical Hazard

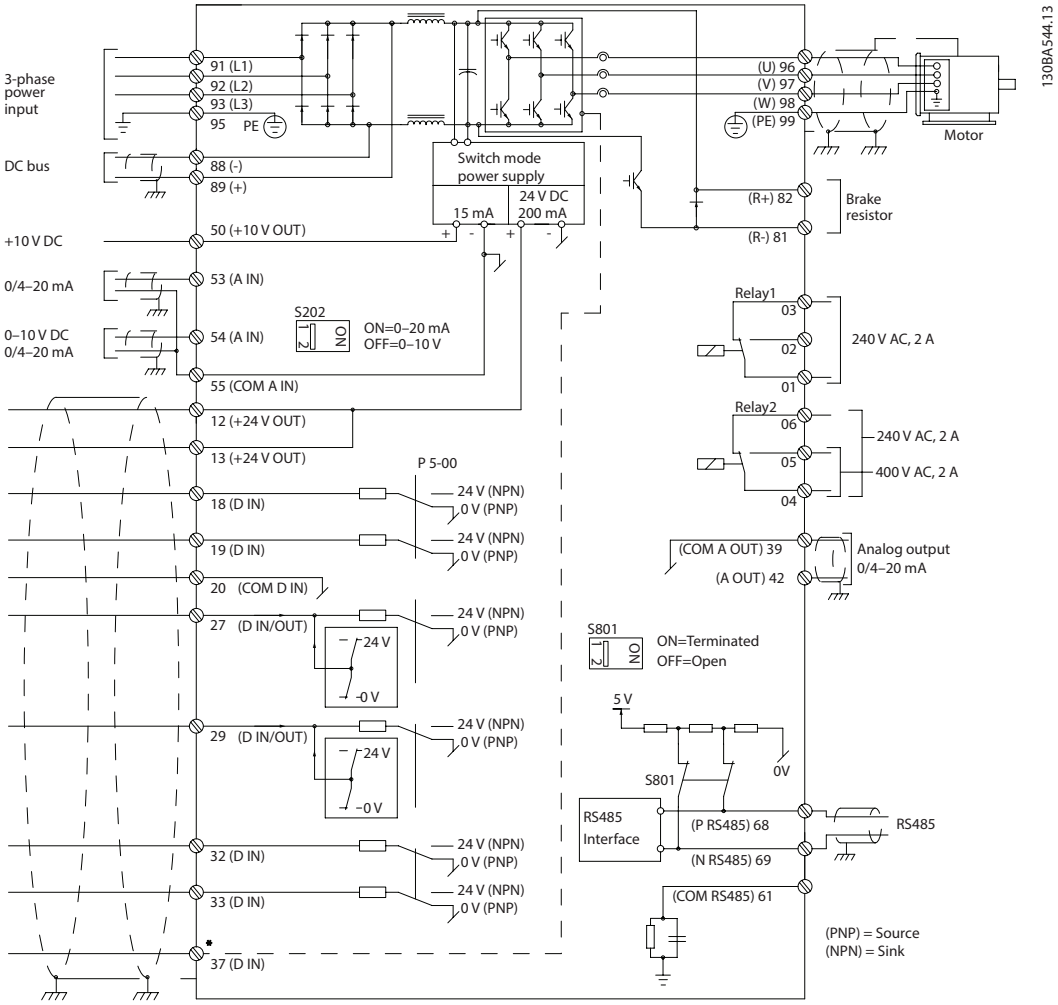
Ensure power wiring and fusing is installed according to NEC/CEC, state, local or municipal codes.



Remove the front cover to gain access to the power and control wiring terminals. Connect conduit runs from the disconnect or service panel to the drive and route the power wires through the conduit.

Refer to chapter 5 Electrical Installation and chapter 10 Technical Specifications in the P2003509 IOM (current version) on the Xylem website for details on wiring and routing.

2. BASIC ELECTRICAL CONNECTIONS



3. MOTOR AND INPUT (MAINS)

3.1 WIRING PROCEDURE

3.1.1 CONNECTING THE MOTOR

1. Strip a section of the outer cable insulation.
2. Position the stripped wire under the cable clamp, establishing mechanical fixation and electrical contact between the cable shield and ground.
3. Ground the cable to the nearest grounding terminal in accordance with the grounding instructions.
4. Connect the 3-phase motor wiring to terminals 96 (U), 97 (V), and 98 (W).
5. Torque the terminals in accordance with the torque requirements.
6. Follow motor manufacturer wiring requirements.

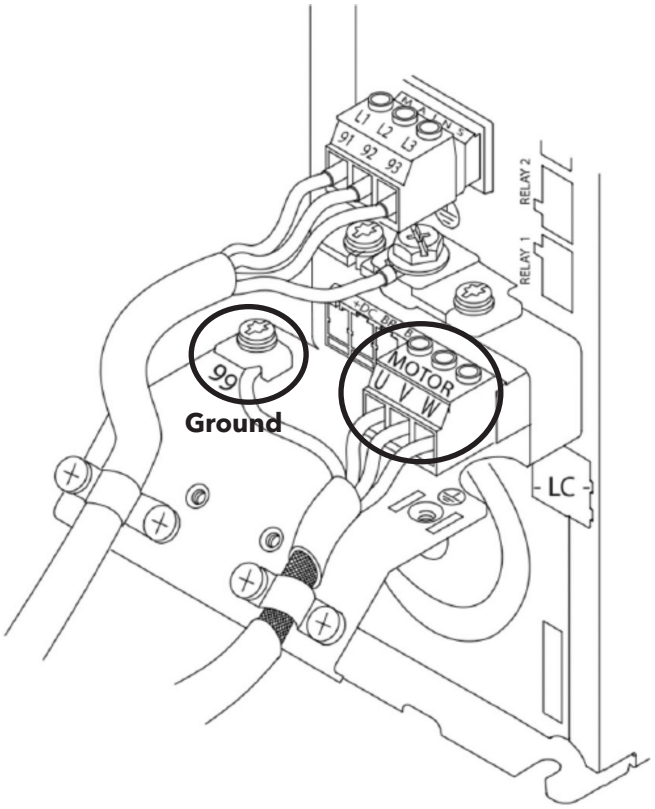
3.1.2 CONNECTING THE INPUT (MAINS)

1. Ensure that the input power source for the controller is locked in the off position.
2. Strip a section of the outer cable insulation.
3. Position the stripped wire under the cable clamp, establishing mechanical fixation and electrical contact between the cable shield and ground.
4. Connect the ground wire to the nearest grounding terminal in accordance with the grounding instructions.
5. Connect the 3-phase AC input power wiring to terminals 91 (R/L1), 92 (S/L2), and 93 (T/L3).
6. Torque the terminals in accordance with the torque requirements.

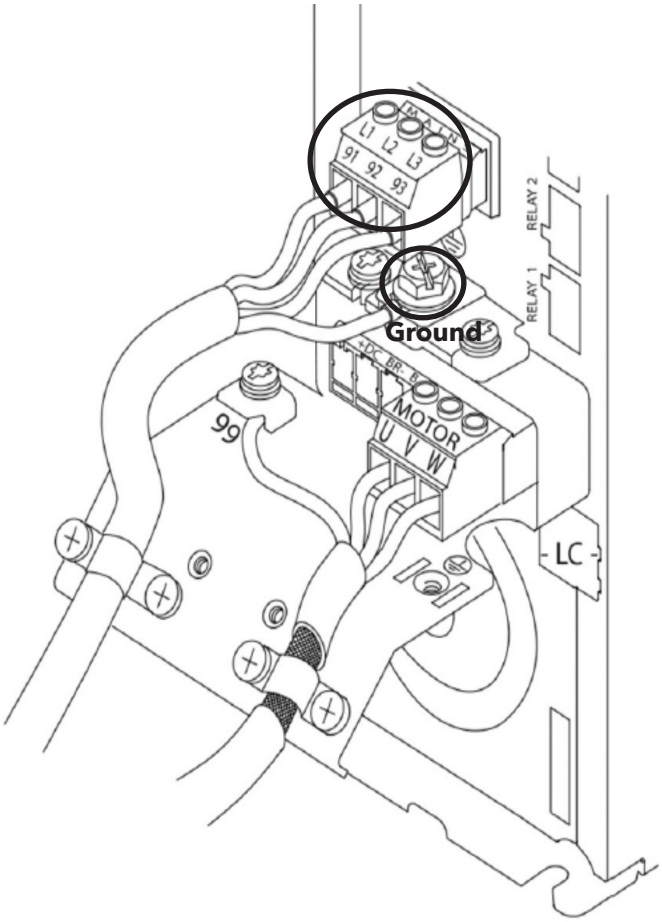
3.2 FRAME SIZES

3.2.1 A/B/C FRAME SIZE

Motor Output Terminals



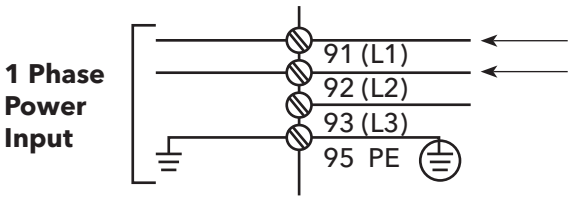
3-Phase Main Input Terminals (L1, L2, L3)



NOTE:
Refer to the P2003509 IOM (current version) on the Xylem website for the grounding (earthing) and torque requirements.

SINGLE PHASE INPUT DRIVES:

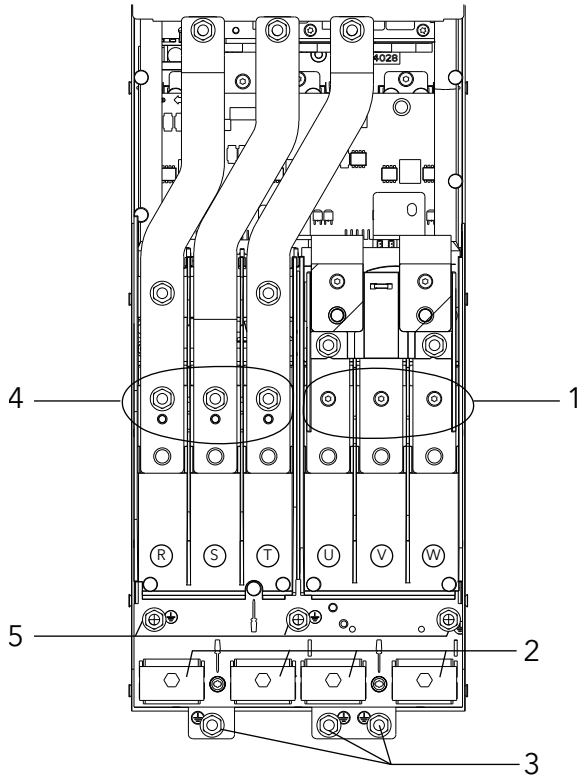
Connect single phase power wiring to L1, L2 and ground the cable.



NOTE:

Refer to the P2003509 IOM (current version) on the Xylem website for a specific A/B/C frame size consideration.

3.2.2 D FRAME SIZE



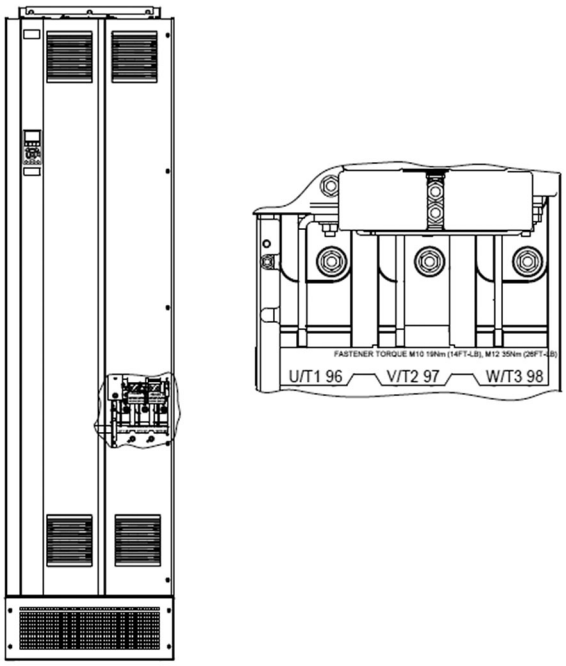
1 Motor output terminals 96 (U), 97 (V), 98 (W)
2 Cable clamps
3 Ground terminals for IP20 (Chassis)
4 Mains input terminals 91 (R/L1), 92 (S/L2), 93 (T/L3)
5 Ground terminals for IP21/54 (Type 1/12)

Note:

Refer to the P2003509 IOM (current version) on the Xylem website for a specific D frame size consideration.

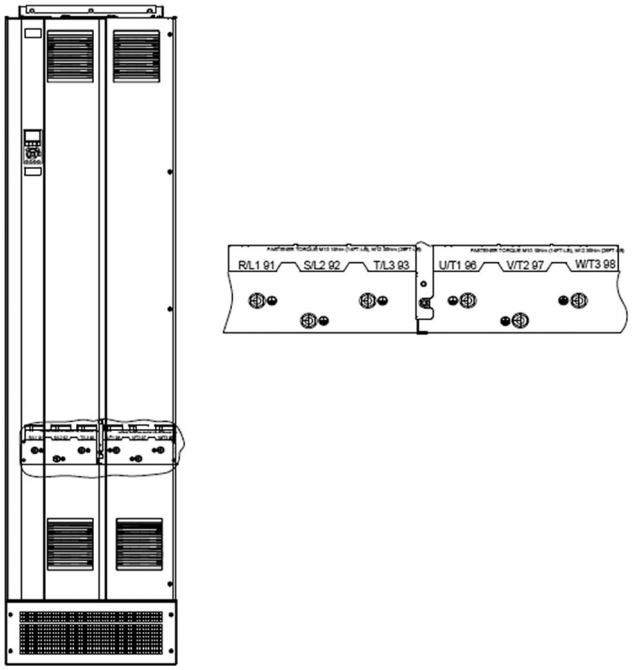
3.2.3 E FRAME SIZE

Motor Connection:



Example: E1h AC Motor terminals

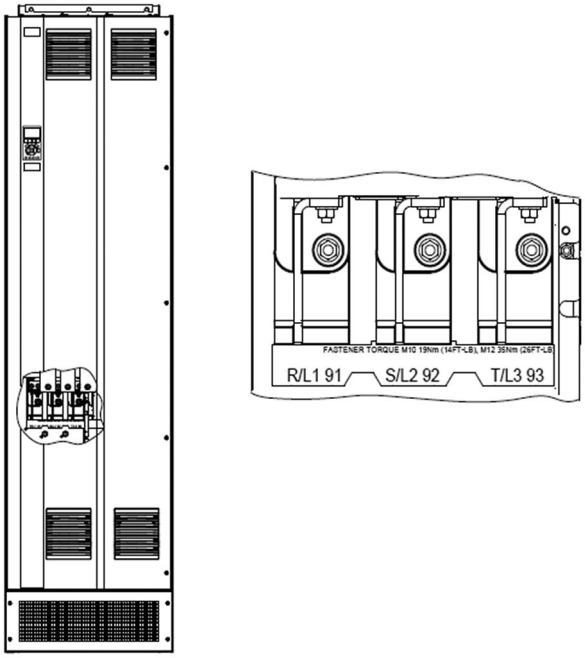
Ground Connection:



Example: E1h Ground terminals

NOTE:
Refer to P2005048 Technologic IPC E1 & E3 Frames Addendum (current version) on the Xylem website for E1 & E3 frame-size details.

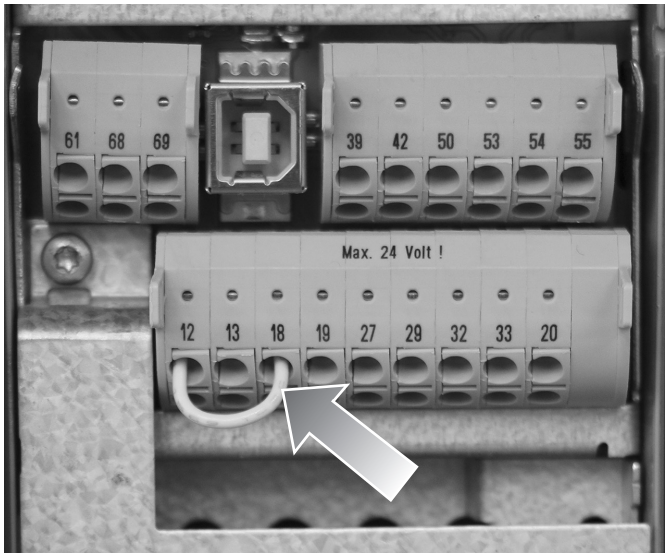
Power Connection:



Example: E1h AC Main terminals

4. CONTROL WIRING

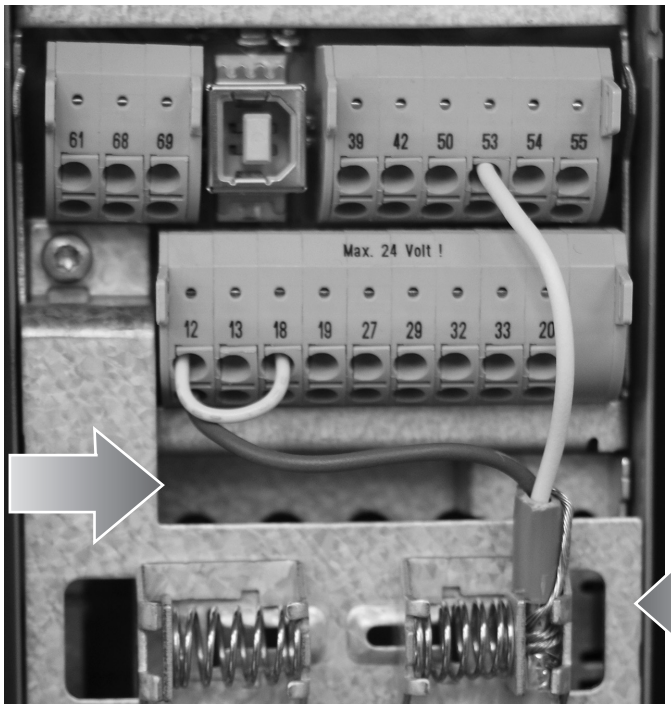
4.1 SINGLE-PUMP CONTROL WIRING



Install Jumper wires on:

Terminal 12 and 18

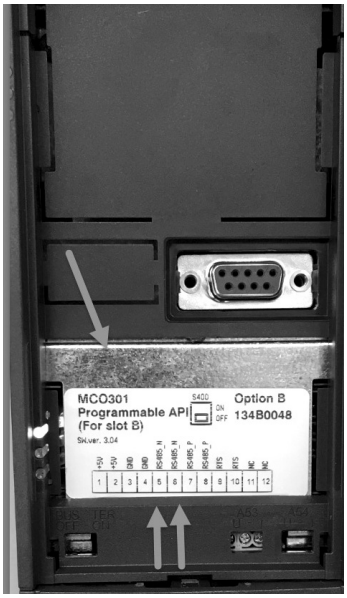
The IPC requires a start command on terminal 18. To apply a start signal connect a jumper wire between terminals 18 (DI 18, parameter 5-10) and 12 (24V dc). A start command is given to the controller when terminal 18 is connected to 24V.



For Booster or DP Applications, install Transducer cable on:

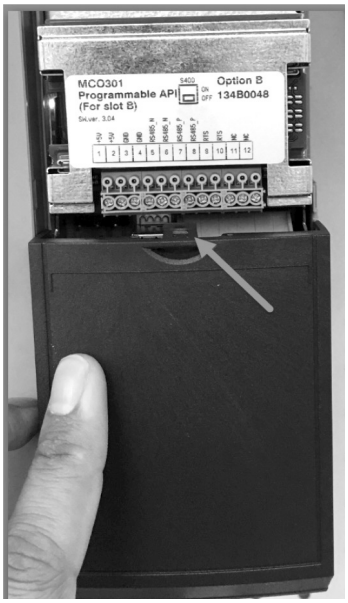
- Brown/Red on terminal 12 (24V)
- White/Black on terminal 53 (4-20MA)
- Place ground shield between spring clip and shielded cable.

4.2 MULTI-PUMP CONTROL WIRING



Connect communication wires to the bottom of this card

Carefully remove the plastic cover by unlocking the tab on the top of the drive and releasing.



Carefully remove bottom cover by unlocking tab

Connect Wires

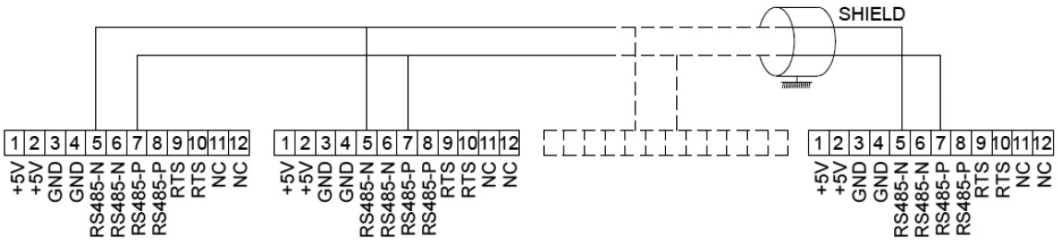
Terminal #5 to Terminal #5

Terminal #7 to Terminal #7

If using more than two controllers, follow the same wiring instructions for the additional drive.

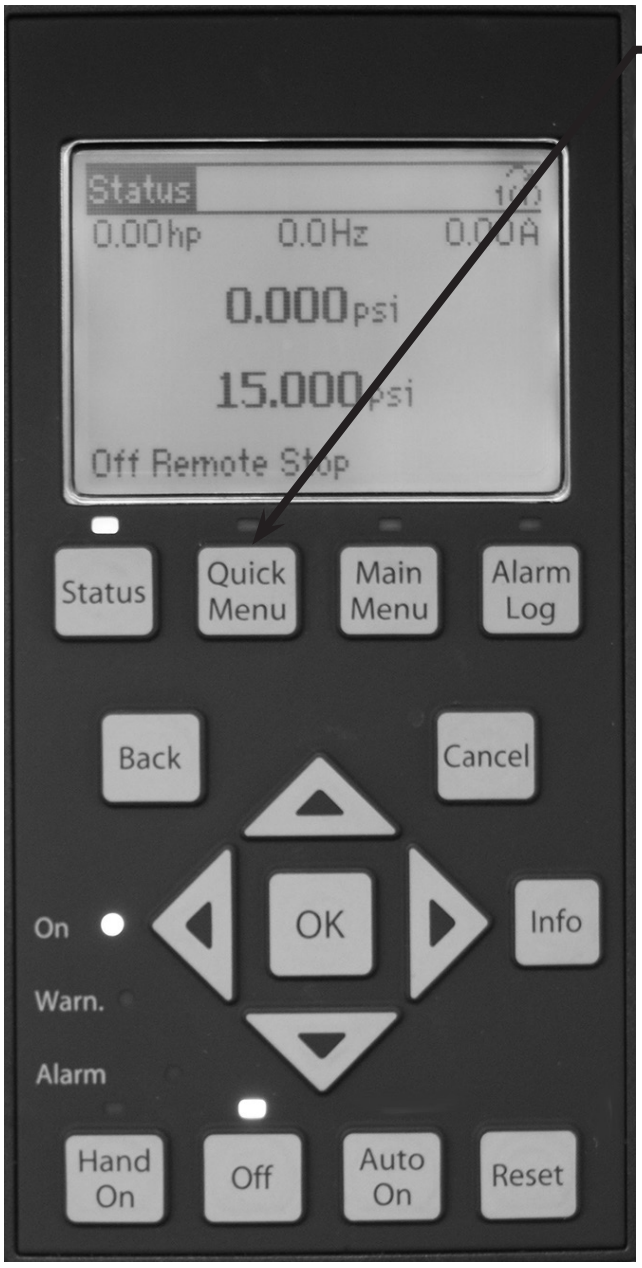
Refer to chapter 6 MCO301 Programmable API in the P2003509 IOM (current version) on the Xylem website for additional multi-control wiring configurations.

Re-install covers and keypad and begin commissioning



5. SETUP AND COMMISSIONING

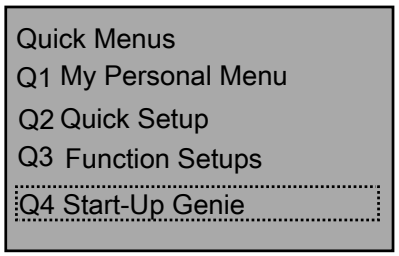
1. Power on drive(s)
2. Complete Programming.



Select Quick Menu

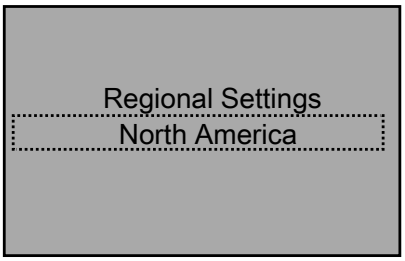
Select Parameter 04
"Start-Up Genie"

You are now able to start the Start-Up Genie

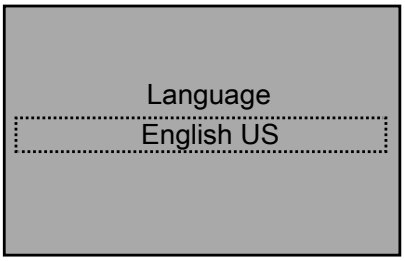


Set DI18 to Stop (terminal 18 open)

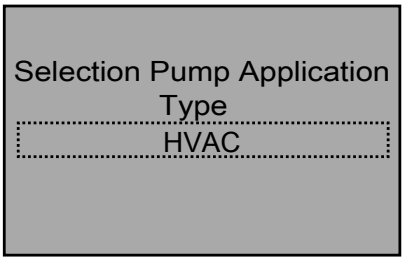
CAUTION: Before proceeding, set DI 18 to Stop (terminal 18 open) to prevent the unit from starting the motor.
[OK]



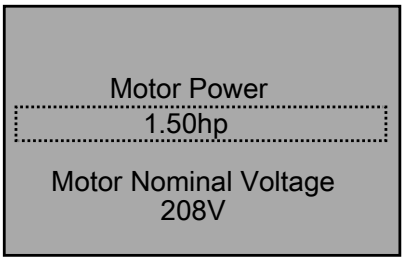
For Regional Settings Select North America or International



Select English US as Language and proceed with the down arrow

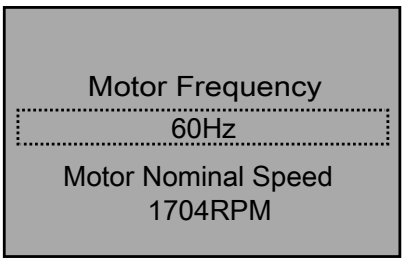


Select HVAC for Pump Application



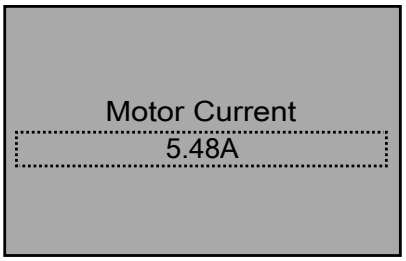
Select Motor Horsepower

Select Motor Voltage

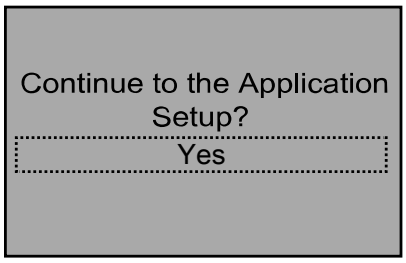


Select Motor Frequency

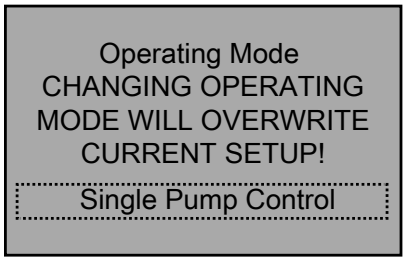
Select Motor Nominal Speed



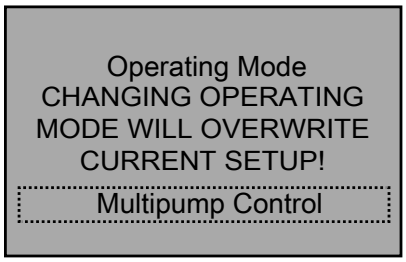
Input Motor Current



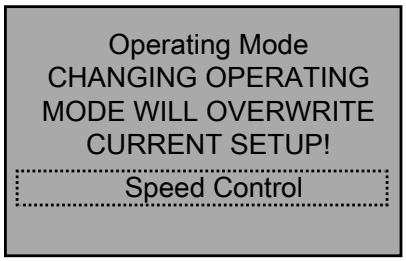
Select Yes to Continue to the Application Setup



Select either Single Pump, Multi-Pump, Or Speed Control for your application. Follow the programming for single pump application below.



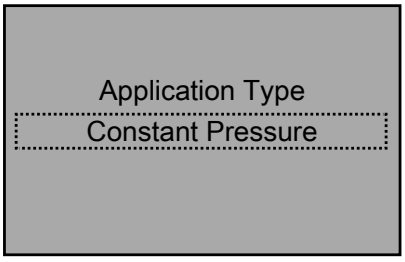
For Multi-Pump Programming, continue to page 17.



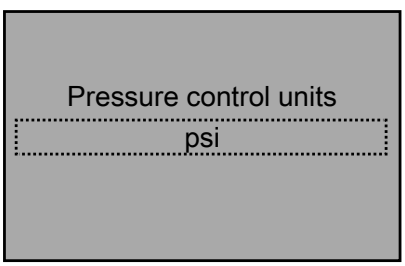
For Speed Control Programming continue to page 19.

6. PUMP PROGRAMMING

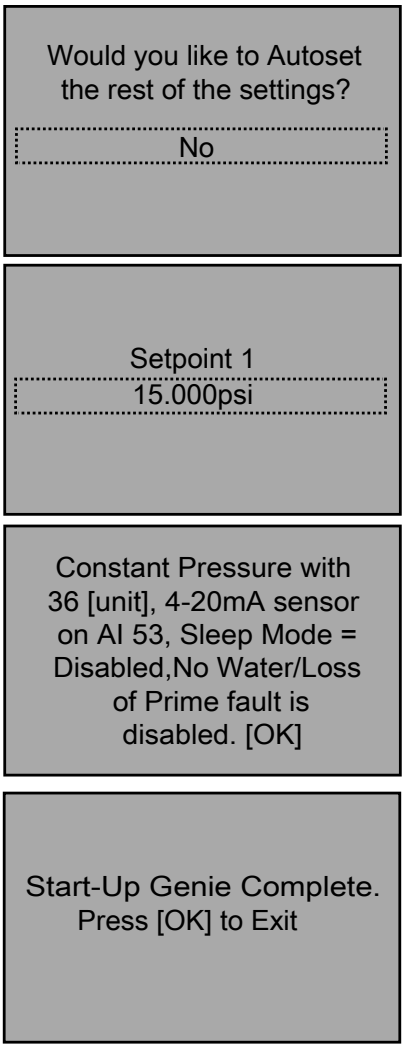
6.1 SINGLE-PUMP PROGRAMMING



Select Constant Pressure for Application type



Select PSI for pressure control units



Select Yes to Autoset the rest of the settings.

For Simplex configuration, here are the parameters that will get autoset:

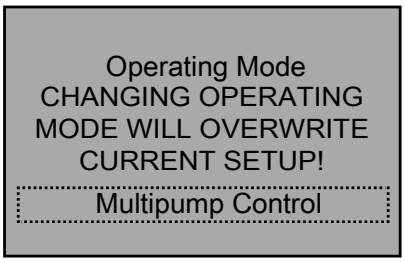
Autoset Configuration	Constant Pressure
Transducer Max Feedback	36 [unit]
Transducer Type	4-20mA
Feedback 1 Source	AI 53
Sleep Mode	Disabled
No Water/Loss of Prime Fault	Disabled

Proceed with the down arrow. Verify that Pressure Transducer is 300 PSI, you are wired in on Analog Input 53, that your sleep frequency is 30 Hz, and your restart difference is 10 [unit], the No Water loss of prime fault is enabled, and your restart time is 10 Minutes.

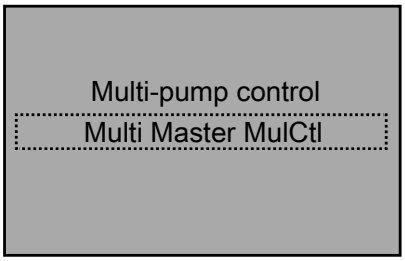
Check Pump and Motor Rotation by selecting Hand On. If motor is running backwards, power down drive, wait five minutes, and rotate motor wires from the drive. Once rotation is verified, select Off.

Select Auto On. Verify Unit meets desired PSI.

6.2 MULTI-PUMP PROGRAMMING

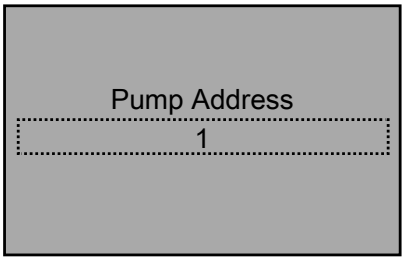


Select Multipump control



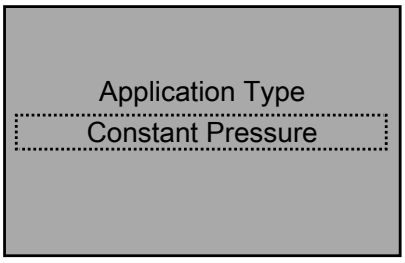
Select Multi Master Multi Control

Note: Other multi pump configurations are described in the IOM

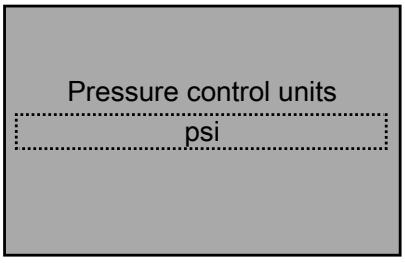


Select Pump Address for each pump

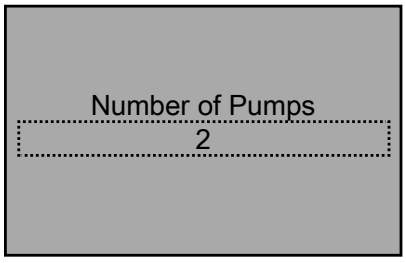
For each, use a unique address: 1, 2, 3, or 4



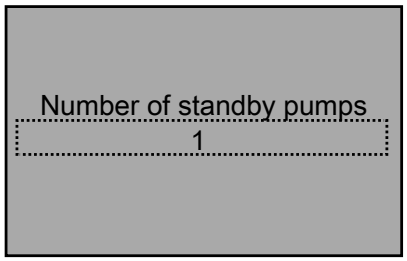
Select Constant Pressure for Application Type



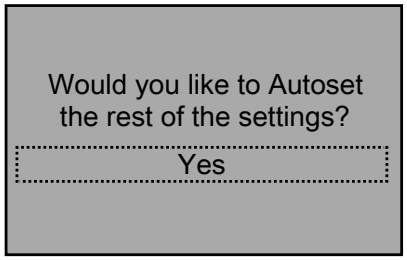
Select psi for Pressure control units



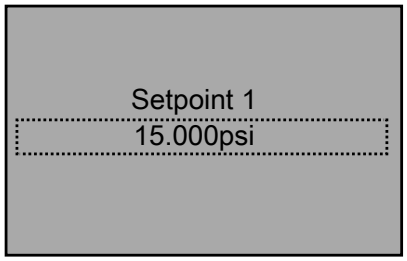
Select Number of Pumps



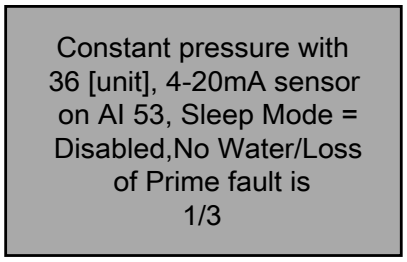
Select Number of Standby Pumps

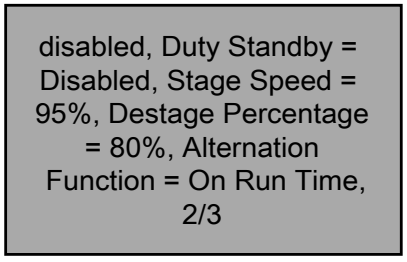


Select Yes to Autoset the rest of the settings.



Select Set point PSI

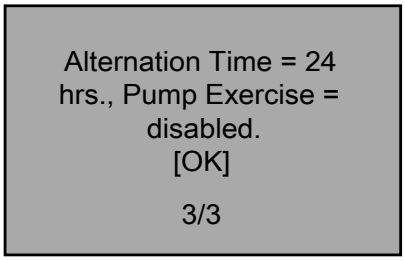




For Multi-Control configuration here are the parameters that will get autoset:

Autoset Configuration	Constant Pressure
Transducer Max Feedback	36 [unit]
Transducer Type	4-20mA
Feedback 1 Source	AI 53
Sleep Mode	Disabled
No Water/Loss of Prime Fault	Disabled
Duty Standby	Disabled
Stage Speed	95%
Destage Percentage	80%
Alternation Function	On Run Time
Alternation Time	24 Hrs
Pump Exercise	Disabled

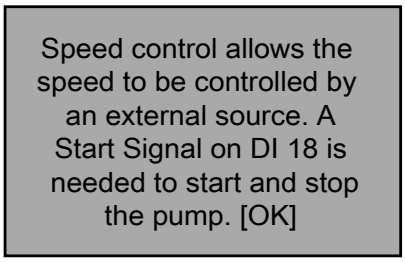
Acknowledge Auto Set Settings by pressing the down arrow and cyclying through each of the three screens.



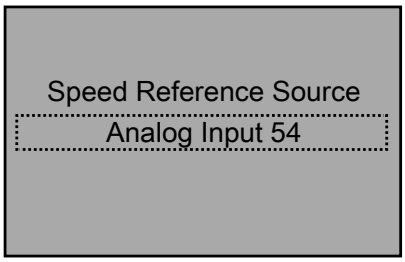
For further Multi-Pump Setups, Feedback Setup, Pump Protection Setup, Flow Compensation, Pipe Fill Setup, please refer to the IOM.

Select OK to verify Genie is completed.

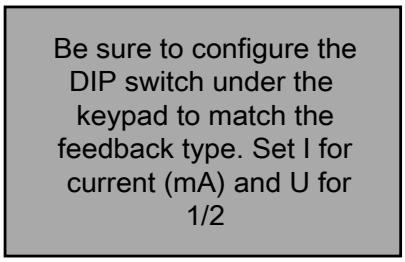
6.3 SPEED CONTROL PROGRAMMING



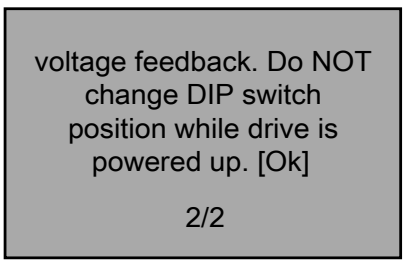
Acknowledge that speed control will require a start and stop signal on Digital Input 18

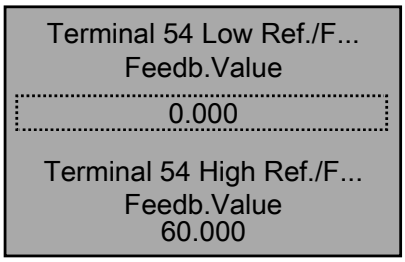


Select your Analog Input reference source

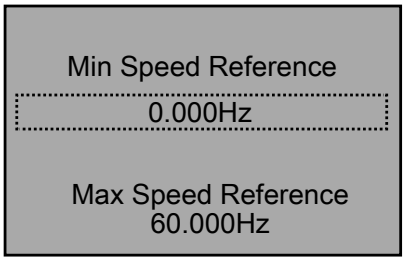


Acknowledge that your DIP switch is properly set and proceed with the down arrow.

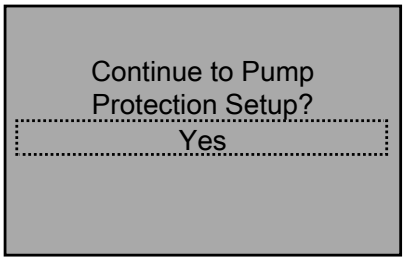




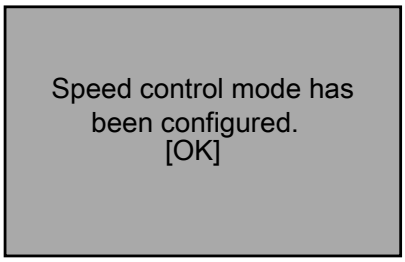
Input your minimum and maximum reference speeds



Input your minimum and maximum speed references



Select no for pump protection setup.



Click Ok to Continue.

WIRING FOR SPEED CONTROL

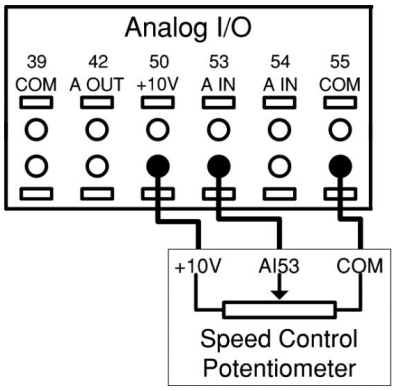


FIGURE 1 Connections for external speed signal

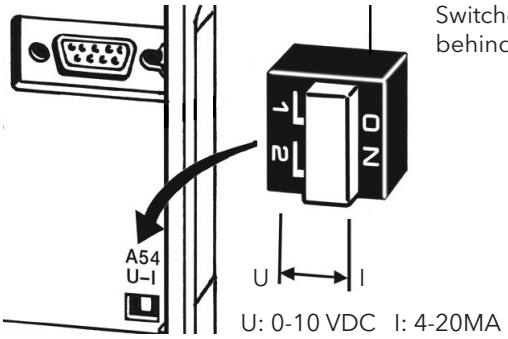


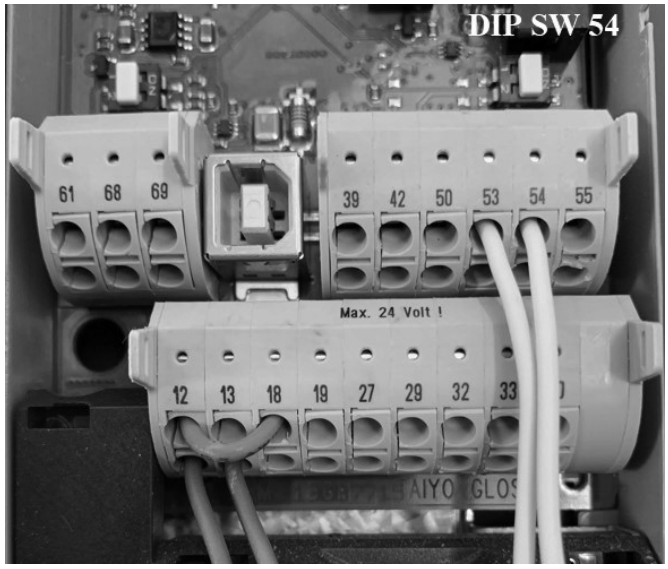
FIGURE 2 Analog Input DIP Switch 54.

1. Sending a 4-20 MA input signal to the drive using analog input #53. You will wire your 4-20MA signal into Terminal #53 and common on Terminal #55.

2. Sending a 0-10VDC input signal to the drive using analog input #54. You will wire your 0-10VDC signal into Terminal #54 and common on Terminal #55. DIP switch is defaulted to 0-10VDC on analog input #54.

6.4. DIFFERENTIAL FEEDBACK SETUPS FOR TWO CURRENT-INPUT PRESSURE TRANSDUCERS

- Select 4-20 mA current input for DIP SW 54 (switch to the right-side position).
- Install the White/Black cable of the first Transducer on terminal 53 and of the second Transducer on terminal 54.
- Install the Brown/Red cables of both Transducers on terminal 12 or 13 (24V)
- Place ground shields between spring clip and shielded cables.



- Set up the following parameters:

Parameter	Description	Setup 1
0-23	Display Line 2 Large	Feedback[Unit]
1-00	Configuration Mode	Closed Loop
6-17	Terminal 53 Live Zero	Enabled
6-27	Terminal 54 Live Zero	Enabled
20-00	Feedback 1 Source	Analog Input 53
20-01	Feedback 1 Conversion	Linear
20-02	Feedback 1 Source Unit	psi
20-03	Feedback 2 Source	Analog Input 54
20-04	Feedback 2 Conversion	Linear
20-05	Feedback 2 Source Unit	psi
20-06	Feedback 3 Source Unit	No function
20-12	Reference/Feedback Unit	psi
20-20	Feedback Function	Difference
20-21	Setpoint 1	(Set Point value)

Different feedback value is the difference between the feedback 1 value and feedback 2 value.

Notice - Industrial Control Protocols

Certain Industrial Control Protocols do not offer security protections at protocol level and may be exposed to additional Cybersecurity risk. Customer security precautions including physical security measures are an important layer of defense in such cases. Xylem's Technologic IPC is designed with the consideration that it would be deployed and operated in a physically secure location.

- Xylem suggests that physical access to cabinets and/or enclosures containing Technologic IPC and the associated system should be restricted, monitored and logged at all times.
- Xylem recommends that customers inventory and document all industrial equipment running on their premises including model name, software version, and how devices are connected to each other and the local network.
- Xylem recommends creating and maintaining offline copies of configuration backups to all equipment involved in controlling critical processes.
- In cases where control commands for Xylem equipment are issued from SCADA or building management systems, Xylem recommends a regular check by operators to ensure the integrity of communications between these systems and Xylem equipment.
- Physical access to the communication lines should be restricted to prevent any attempts of wiretapping, sabotage. Best practice is to use metal conduits for the communication lines running between one cabinet to another cabinet.
- People with unauthorized physical access to the device could cause serious disruption of the device functionality. A combination of physical access controls to the location should be used, such as locks, card readers, and/or guards etc.
- Xylem's Technologic IPC supports the following physical access ports:
  - o RJ45 connector for removable keypad as well as MODBUS® RTU communications
  - o RJ45 for MODBUS TCP communications
  - o Terminal block for MODBUS RTU and other Digital IOs
- Xylem suggests access to above physical ports need to be restricted.

Xylem Product Cybersecurity

Xylem values your system security and the availability of your critical services. For more information on Xylem cybersecurity practices or to contact the cybersecurity team please visit xylem.com/security.

7. TECHNICAL SUPPORT

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