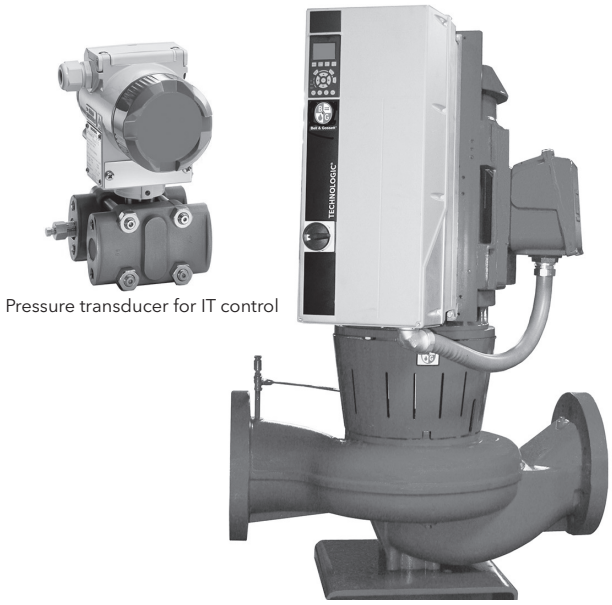
QUICK START MANUAL

P2001748 REV B



Pressure transducer for IT control

Integrated Technologic® with Sensorless Control (ITSC) and Integrated Technologic (IT) Control

Bell & Gossett

a xylem brand

Integrated Technologic with Sensorless Control (ITSC)

Overview

This guide provides a quick reference for installing the Integrated Technologic with sensorless control (ITSC).

NOTE: This guide does not provide detailed installation, safety or operational instructions. See the Technologic, Pump, Motor or Integrated Technologic Installation, Operation, and Maintenance (IOM) Manuals for complete information.

Prepare for Installation

WARNING! Installation must be performed by a qualified technician

- Suitable Environment – Ensure installation is indoors and the site temperature range is 0ºC (32ºF) to 40ºC (104ºF).
- 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.

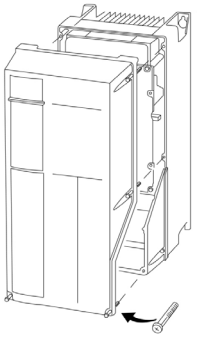
Install Wiring

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

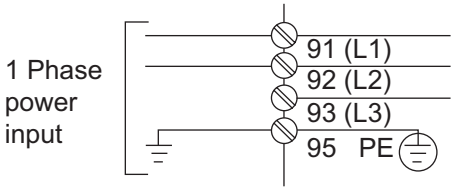
Note: External fusing is required for units without a built in fused disconnect.

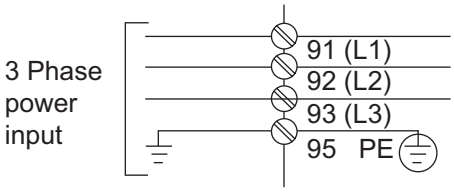
Ensure power wiring and fusing is installed according to NEC/CEC, state, local or municipal codes.

Ground currents are higher than 3mA. A dedicated ground from the service entrance to drive is required.



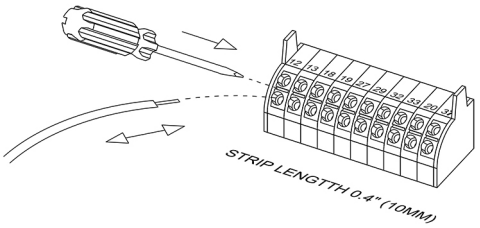
- Remove the front cover to gain access to the power and control wiring terminals.
- Connect conduit runs from the disconnect or service panel to the drive and route the power wires through the conduit.
- Connect input power wires to the drive terminals labeled L1, L2 on the input side of the disconnect and ⏚ (Ground) for 1 phase input power or to the drive terminals labeled L1, L2, L3 on the input side of the disconnect and ⏚ (Ground) for 3 phase input power.



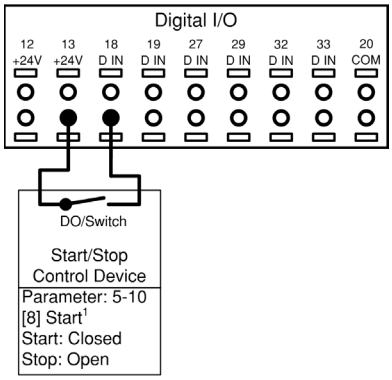


Refer to the Technologic Pump Controller IOM for details on wire sizing and routing.

- Ensure input power connections are properly torqued.
- Route control wiring to the drive. Use shielded cable for control wiring.
- Do not run control wiring in the same conduit as power wiring.
- Connect the control wires by using a flat blade screwdriver to open the spring terminal as shown.
- Hold the spring terminal open and insert the control wire. Release the screwdriver to close the spring terminal and secure the connection.



REQUIRED CONNECTION: The factory default settings for the controller require a start signal on DI18.

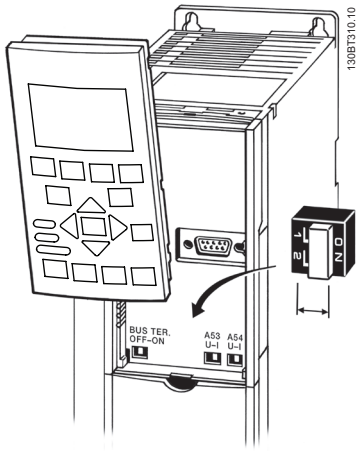


1 – Factory default settings

NOTE: If using a transducer for feedback, set the analog input configuration switches A53 (AI53) or A54 (AI54) under the keypad.
U = 0-10V (voltage input), I = 4-20mA (current input)

Transducer voltage or current input can be verified at pars. 16-61 Terminal 53 Switch Setting and 16-63 Terminal 54 Switch Setting.

Current input is required for B&G provided sensors.



	Terminal Number	Parameter Number	Default Setting or Function	Description
Relay	01, 02, 03	5-40 Relay 1	[160] No Alarm	Form C Relay Outputs
	04, 05, 06	5-40 Relay 2	[5] Running	
Digital I/O	12, 13	-	+24V DC	24 V dc used for digital inputs and external transducers.
	18	5-10	[8] Start	Start/Stop
	19	5-11	[0] No Operation	Unused digital input
	27	5-12	[0] No Operation	Unused digital input
	29	5-13	[0] No Operation	Unused digital input
	32	5-14	[0] No Operation	Unused digital input
	33	5-15	[0] No Operation	Unused digital input
	20	-	Common	Common for digital inputs and 24V supply
Analog I/O	39	-	AO Common	Common for analog output
	42	6-50	4-20mA Motor Freq	Analog output
	50	-	+10V	10V DC analog supply voltage. 15mA maximum.
	53	6-1*	Delta P / Pressure Input	Analog input 53
	54	6-2*	Flow Input	Analog input 54
	55	-	AI Common	Common for analog input
Comm.	61	-	Shield Connection	RC filter for cable shield
	68	8-**	+	RS485 Interface +
	69	8-**	-	RS485 Interface -

Check Installation

- Complete the Pre-startup Checklist found in the Integrated Technologic IOM.
- Perform pre-start procedures outlined in the pump IOM.

Apply Power

WARNING. The pump may start if a start signal is present on DI18.

- Unlock and turn on disconnects and breakers to apply power.

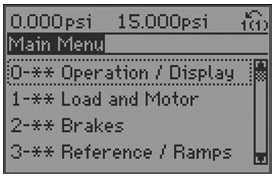
Configure Parameters

- The controller is programmed with 4 different set-ups that configure the controller for 4 different applications.

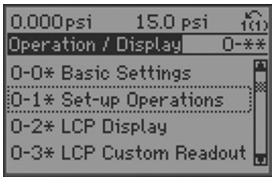
Set-up 1	Delta P or Pressure control with wired transducer. Setpoint = 15 psi. Transducer connected to AI53. AI53 is configured for a 40 psi Delta P transducer.
Set-up 2	Flow control with wired flow sensor. Setpoint = 150 GPM. Sensor connected to analog input AI54. AI54 is configured for a 4000 GPM flow sensor.
Set-up 3	Sensorless pressure control. The controller setpoint is preconfigured at the factory based on the order request.
Set-up 4	Sensorless flow control. The controller setpoint is preconfigured at the factory based on the order request.

NOTE: Program setup is based upon chart above for sensored or sensorless operation. Per the factory default settings, the ITSC integrated active set-up is Setup 3.

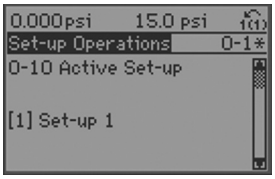
- Select the application set-up by setting parameter 0-10 to match the application as follows:



- Press Main Menu
- Select 0-** by pressing OK
- Select 0-1* and press OK



- Press OK to edit 0-10 Active Set-up
- Select the desired Set-up using the arrow keys and press OK to save the change.



- Press Status to return to the status screen
- Use My Personal Menu to configure the application parameters.

- Press Quick Menus
- Press OK to select My Personal Menu
- Set the parameters in My Personal Menu based on the application requirements.

Collect System Data

- B&G Drive Part # _____
- Drive Part # _____
- Drive Serial # _____
- Motor Part # _____
- Pump Part # _____
- Nameplate Motor Power _____
- Nameplate Motor Voltage _____
- Nameplate Motor Current _____
- Nameplate Motor Speed _____

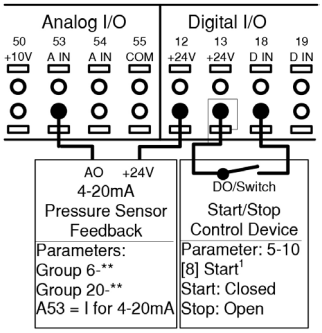
My Personal Menu parameters are shown in the following table:

		Wired Delta P / Pressure	Wired Flow	Sensorless Pressure	Sensorless Flow	
Parameter Number	**Parameter Name**	**Set-up 1 Defaults**	**Set-up 2 Defaults**	**Set-up 3 Defaults**	**Set-up 4 Defaults**	**Parameter Description**
20-21	Setpoint 1	15.0	150.0	15.0	150.0	Process setpoint
20-00	Feedback 1 Source	Analog input 53	Analog Input 54	Sensorless Pressure	Sensorless Flow	Transducer feedback input
20-12	Ref/Feedb Unit	psi	GPM	psi	GPM	Transducer feedback units
20-13	Min Ref/Feedb.	0.0		0.0		Min feedback value for the transducer
20-14	Max Ref/Feedb.	40.0	4000.0	200.0	4000.0	Max feedback value for the transducer
3-41	Ramp 1 Up Time	10 s				Ramp up time (0 to full speed)
3-42	Ramp 1 Down Time	10 s				Ramp down time (full speed to 0)
20-93	PID Prop Gain	5				Proportional correction gain for PID
20-94	PID Integration Time	3.3 s				Integration time for the PID controller
22-80	Flow Compensation	Disabled		Enabled	Disabled	Flow compensation (friction head loss) function
22-81	Square-Linear Cure Approx.	100%				Adjusts shape of the flow compensation control curve.
22-84	Speed at No Flow [Hz]	0.0 Hz		NA	0.0 Hz	Speed needed for minimum head at no flow. Use when flow compensation is enabled.
22-86	Speed at Design Point	60.0 Hz		NA	60.0 Hz	Speed needed to maintain the design point. Use when flow compensation is enabled.
22-87	Pressure at No Flow Speed	0.00				Pressure at no flow speed. Use when flow compensation is enabled.
22-89	Flow at Design Point	NA	NA	0.000	NA	System flow at the design point. Use when flow compensation is enabled.
5-10	Digital Input 18	Start				DI 18 function
5-11	Digital Input 19	No Operation				DI 19 function
5-12	Digital Input 27	No Operation				DI 27 function
6-50	Terminal 42 Output	Speed 4-20mA				Analog output function
5-40	Function Relay	Relay 1: No Alarm Relay 2: Running				Relay 1 and 2 function

Notes:

- Max value of par. 16-54 Feedback 1 [Unit] that is displayed by par. 0-20 Display Line 1.1 Small is limited by par. 20-14 Maximum Reference/Feedb.
- Par. 22-89 Flow at Design Point is not visible if par. 22-82 Work Point Calculation is disabled.

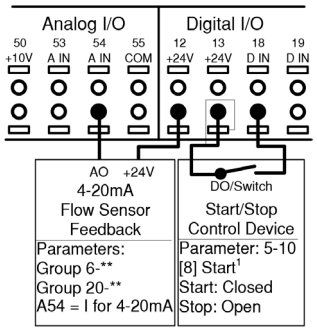
- If using Set-up 1, a Delta P or pressure sensor is required at AI53. Wire a 4-20mA Delta P or pressure sensor as shown:



1 – Factory default settings
Setup 1 is reserved for Pressure Sensor Feedback

Par. 6-17 Terminal 53 Live Zero in Setup 1 is required to set to Enabled after the sensor is installed and configured.

- If using Set-up 2, a flow sensor is required at AI54. Wire a 4-20mA flow sensor as shown:



1 – Factory default settings
Change par. 0-10 to Setup 2 for Flow Sensor Feedback

Par. 6-27 Terminal 54 Live Zero in Setup 2 is required to set to Enabled after the sensor is installed and configured.

Control wire grounding:

- Cable shield: refer to IOM.
- Bare wire: in cases where the transducer is mounted on ungrounded piping, connect the drain (base wire) to the spring loaded cable strain relief clamp found below the control terminal at the drive side.

Initialization

CAUTION: Initialization restores the unit to factory default settings. Any programming, motor data, localization, and monitoring records will be lost. Uploading data to the LCP provides a backup prior to initialization.

The parameters in the table below are required to be matched up with the motor nameplate to avoid damaging motor after an initialization.

Parameter Number	Parameter Name	Set-up 1	Set-up 2	Set-up 3	Set-up 4	Unit
1-21	Motor Power [HP]	Motor Power value	Motor Power value	Motor Power value	Motor Power value	hp
1-22	Motor Voltage	Motor Voltage value	Motor Voltage value	Motor Voltage value	Motor Voltage value	V
1-24	Motor Current	Motor Current value	Motor Current value	Motor Current value	Motor Current value	A
1-25	Motor Nominal Speed	Motor Nominal Speed value	Motor Nominal Speed value	Motor Nominal Speed value	Motor Nominal Speed value	RPM

Refer to the Technologic Pump Controller IOM for details on initialization.

Integrated Technologic (IT)

Overview

This guide provides a quick reference for installing the Integrated Technologic for use with Delta P, flow, or pressure sensor.

NOTE: This guide does not provide detailed installation, safety or operational instructions. See the Technologic, Pump, Motor or Integrated Technologic Installation, Operation, and Maintenance (IOM) Manuals for complete information.

Prepare for Installation

WARNING! Installation must be performed by a qualified technician

- Suitable Environment – Ensure installation is indoors and the site temperature range is 0ºC (32ºF) to 40ºC (104ºF).
- 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.

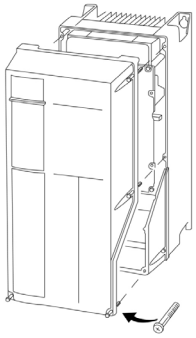
Install Wiring

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

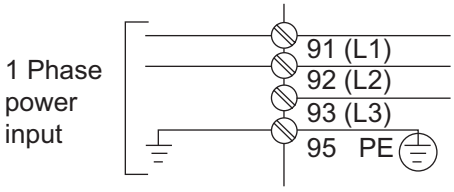
Note: External fusing is required for units without a built in fused disconnect.

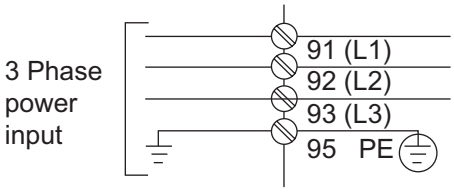
Ensure power wiring and fusing is installed according to NEC/CEC, state, local or municipal codes.

Ground currents are higher than 3mA. A dedicated ground from the service entrance to drive is required.



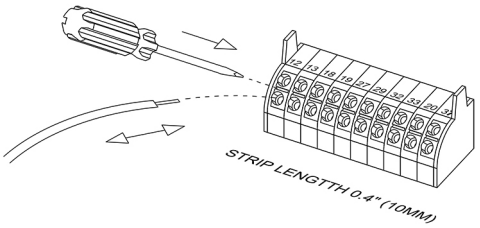
- Remove the front cover to gain access to the power and control wiring terminals.
- Connect conduit runs from the disconnect or service panel to the drive and route the power wires through the conduit.
- Connect input power wires to the drive terminals labeled L1, L2 on the input side of the disconnect and ⏚ (Ground) for 1 phase input power or to the drive terminals labeled L1, L2, L3 on the input side of the disconnect and ⏚ (Ground) for 3 phase input power.



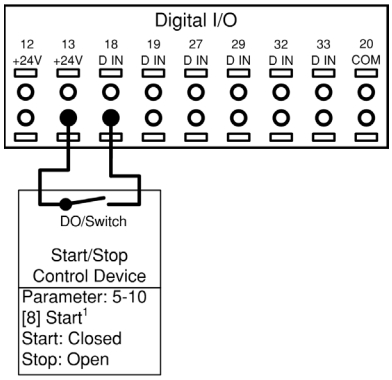


Refer to the Technologic Pump Controller IOM for details on wire sizing and routing.

- Ensure input power connections are properly torqued.
- Route control wiring to the drive. Use shielded cable for control wiring.
- Do not run control wiring in the same conduit as power wiring.
- Connect the control wires by using a flat blade screwdriver to open the spring terminal as shown.
- Hold the spring terminal open and insert the control wire. Release the screwdriver to close the spring terminal and secure the connection.



REQUIRED CONNECTION: The factory default settings for the controller require a start signal on DI18.

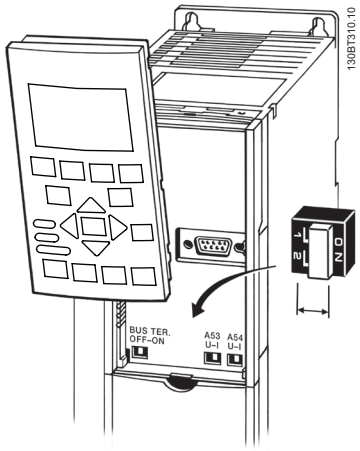


1 – Factory default settings

NOTE: If using a transducer for feedback, set the analog input configuration switches A53 (AI53) or A54 (AI54) under the keypad.
U = 0-10V (voltage input), I = 4-20mA (current input)

Transducer voltage or current input can be verified at pars. 16-61 Terminal 53 Switch Setting and 16-63 Terminal 54 Switch Setting.

Current input is required for B&G provided sensors.



	Terminal Number	Parameter Number	Default Setting or Function	Description
Relay	01, 02, 03	5-40 Relay 1	[160] No Alarm	Form C Relay Outputs
	04, 05, 06	5-40 Relay 2	[5] Running	
Digital I/O	12, 13	-	+24V DC	24 V dc used for digital inputs and external transducers.
	18	5-10	[8] Start	Start/Stop
	19	5-11	[0] No Operation	Unused digital input
	27	5-12	[0] No Operation	Unused digital input
	29	5-13	[0] No Operation	Unused digital input
	32	5-14	[0] No Operation	Unused digital input
	33	5-15	[0] No Operation	Unused digital input
	20	-	Common	Common for digital inputs and 24V supply
Analog I/O	39	-	AO Common	Common for analog output
	42	6-50	4-20mA Motor Freq	Analog output
	50	-	+10V	10V DC analog supply voltage. 15mA maximum.
	53	6-1*	Delta P / Pressure Input	Analog input 53
	54	6-2*	Flow Input	Analog input 54
	55	-	AI Common	Common for analog input
Comm.	61	-	Shield Connection	RC filter for cable shield
	68	8-**	+	RS485 Interface +
	69	8-**	-	RS485 Interface -

Check Installation

- Complete the Pre-startup Checklist found in the Integrated Technologic IOM.
- Perform pre-start procedures outlined in the pump IOM.

Apply Power

WARNING. The pump may start if a start signal is present on DI18.

- Unlock and turn on disconnects and breakers to apply power.

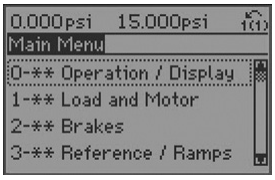
Configure Parameters

- The controller is programmed with 2 different set-ups that configure the controller for 2 different applications.

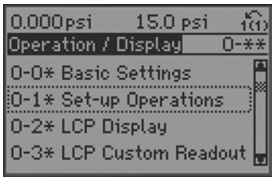
Set-up 1	Delta P or Pressure control with wired transducer. Setpoint = 15 psi. Transducer connected to AI53. AI53 is configured for a 40 psi Delta P transducer.
Set-up 2	Flow control with wired flow sensor. Setpoint = 150 GPM. Sensor connected to analog input AI54. AI54 is configured for a 4000 GPM flow sensor.

NOTE: Program setup is based upon chart above for sensored operation. Per the factory default settings, the IT integrated active set-up is Setup 1.

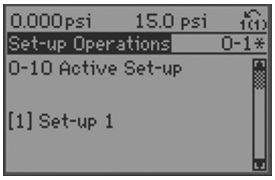
- Select the application set-up by setting parameter 0-10 to match the application as follows:



- Press Main Menu
- Select 0-** by pressing OK



- Select 0-1* and press OK
- Press OK to edit 0-10 Active Set-up
- Select the desired Set-up using the arrow keys and press OK to save the change.



- Press Status to return to the status screen
- Use My Personal Menu to configure the application parameters.

- Press Quick Menus
- Press OK to select My Personal Menu
- Set the parameters in My Personal Menu based on the application requirements.

Collect System Data

- B&G Drive Part #_____
- Drive Part #_____
- Drive Serial #_____
- Motor Part #_____
- Pump Part #_____
- Nameplate Motor Power_____
- Nameplate Motor Voltage_____
- Nameplate Motor Current_____
- Nameplate Motor Speed_____

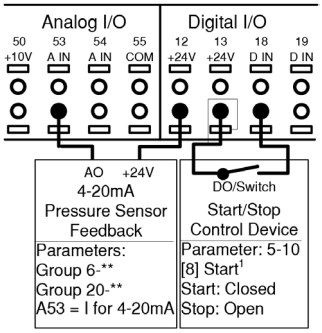
My Personal Menu parameters are shown in the following table:

		Wired Delta P / Pressure	Wired Flow	
Parameter Number	**Parameter Name**	**Set-up 1 Defaults**	**Set-up 2 Defaults**	**Parameter Description**
20-21	Setpoint 1	15.0	150.0	Process setpoint
20-00	Feedback 1 Source	Analog input 53	Analog Input 54	Transducer feedback input
20-12	Ref/Feedb Unit	psi	GPM	Transducer feedback units
20-13	Min Ref/Feedb.	0.0		Min feedback value for the transducer
20-14	Max Ref/Feedb.	40.0	4000.0	Max feedback value for the transducer
3-41	Ramp 1 Up Time	10 s		Ramp up time (0 to full speed)
3-42	Ramp 1 Down Time	10 s		Ramp down time (full speed to 0)
20-93	PID Prop Gain	5		Proportional correction gain for PID
20-94	PID Integration Time	3.3 s		Integration time for the PID controller
22-80	Flow Compensation	Disabled		Flow compensation (friction head loss) function
22-81	Square-Linear Cure Approx.	100%		Adjusts shape of the flow compensation control curve.
22-84	Speed at No Flow [Hz]	0.0 Hz		Speed needed for minimum head at no flow. Use when flow compensation is enabled.
22-86	Speed at Design Point	60.0 Hz		Speed needed to maintain the design point. Use when flow compensation is enabled.
22-87	Pressure at No Flow Speed	0.00		Pressure at no flow speed. Use when flow compensation is enabled.
22-89	Flow at Design Point	N/A		System flow at the design point. Use when flow compensation is enabled.
5-10	Digital Input 18	Start		DI 18 function
5-11	Digital Input 19	No Operation		DI 19 function
5-12	Digital Input 27	No Operation		DI 27 function
6-50	Terminal 42 Output	Speed 4-20mA		Analog output function
5-40	Function Relay	Relay 1: No Alarm Relay 2: Running		Relay 1 and 2 function

Notes:

- Max value of par. 16-54 Feedback 1 [Unit] that is displayed by par. 0-20 Display Line 1.1 Small is limited by par. 20-14 Maximum Reference/Feedb.
- Par. 22-89 Flow at Design Point is not visible if par. 22-82 Work Point Calculation is disabled.

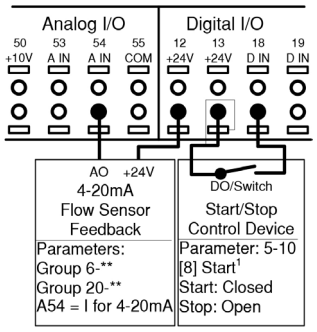
- If using Set-up 1, a Delta P or pressure sensor is required at AI53. Wire a 4-20mA Delta P or pressure sensor as shown:



1 – Factory default settings
Setup 1 is reserved for
Pressure Sensor Feedback

Par. 6-17 Terminal 53 Live Zero in Setup 1 is required to set to Enabled after the sensor is installed and configured.

- If using Set-up 2, a flow sensor is required at AI54. Wire a 4-20mA sensor as shown:



1 – Factory default settings
Change par. 0-10 to Setup 2
for Flow Sensor Feedback

Par. 6-27 Terminal 54 Live Zero in Setup 2 is required to set to Enabled after the sensor is installed and configured.

Control wire grounding:

- Cable shield: refer to IOM.
- Bare wire: in cases where the transducer is mounted on ungrounded piping, connect the drain (base wire) to the spring loaded cable strain relief clamp found below the control terminal at the drive side.

Initialization

CAUTION: Initialization restores the unit to factory default settings. Any programming, motor data, localization, and monitoring records will be lost. Uploading data to the LCP provides a backup prior to initialization.

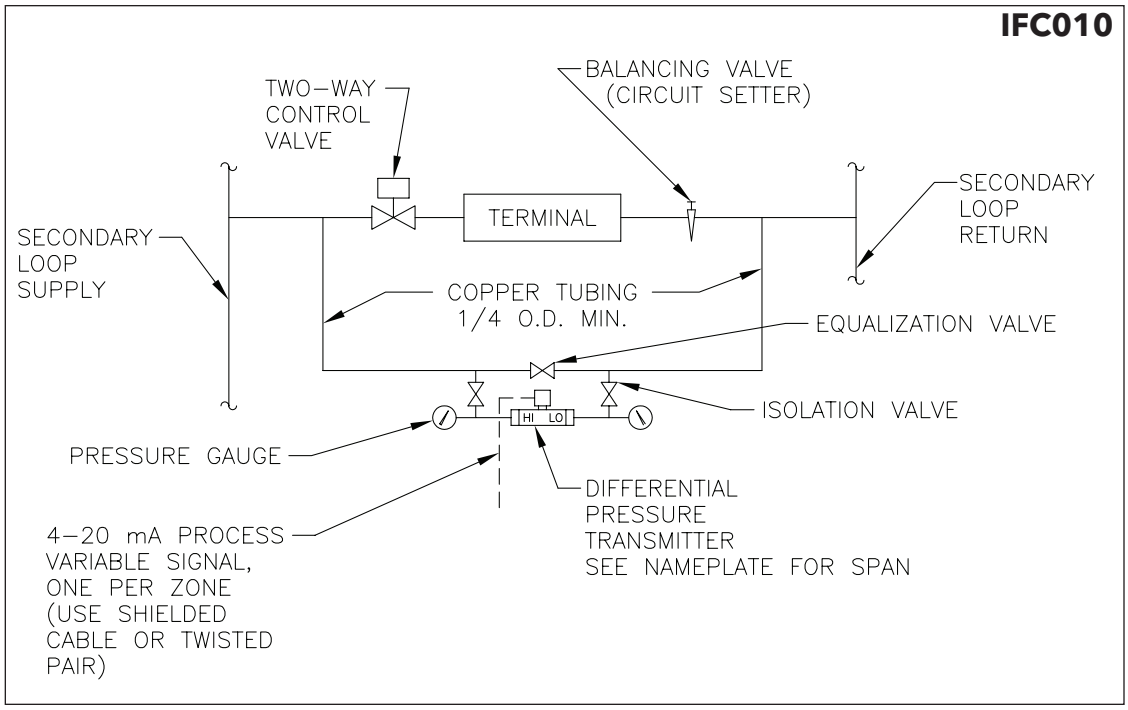
The parameters in the table below are required to be matched up with the motor nameplate to avoid damaging motor after an initialization.

Parameter Number	Parameter Name	Set-up 1	Set-up 2	Set-up 3	Set-up 4	Unit
1-21	Motor Power [HP]	Motor Power value	Motor Power value	Motor Power value	Motor Power value	hp
1-22	Motor Voltage	Motor Voltage value	Motor Voltage value	Motor Voltage value	Motor Voltage value	V
1-24	Motor Current	Motor Current value	Motor Current value	Motor Current value	Motor Current value	A
1-25	Motor Nominal Speed	Motor Nominal Speed value	Motor Nominal Speed value	Motor Nominal Speed value	Motor Nominal Speed value	RPM

Refer to the Technologic Pump Controller IOM for details on initialization.

Drawing

Differential Pressure Transmitter Installation



Part	Pressure range PSI (kPa)
S100089	0 - 40 (0 - 276)
S100091	0 - 70 (0 - 483)
S100092	0 - 100 (0 - 689)

NOTES:

1) Ground shield at control panel only!
2) Purge air from tubing prior to start up using vent valves on transmitter.
3) Open equalization valve to balance pressure, close prior to system start up.
4) Isolation valves, equalization valve and pressure gauges recommended, but not supplied.

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