WATEROUS

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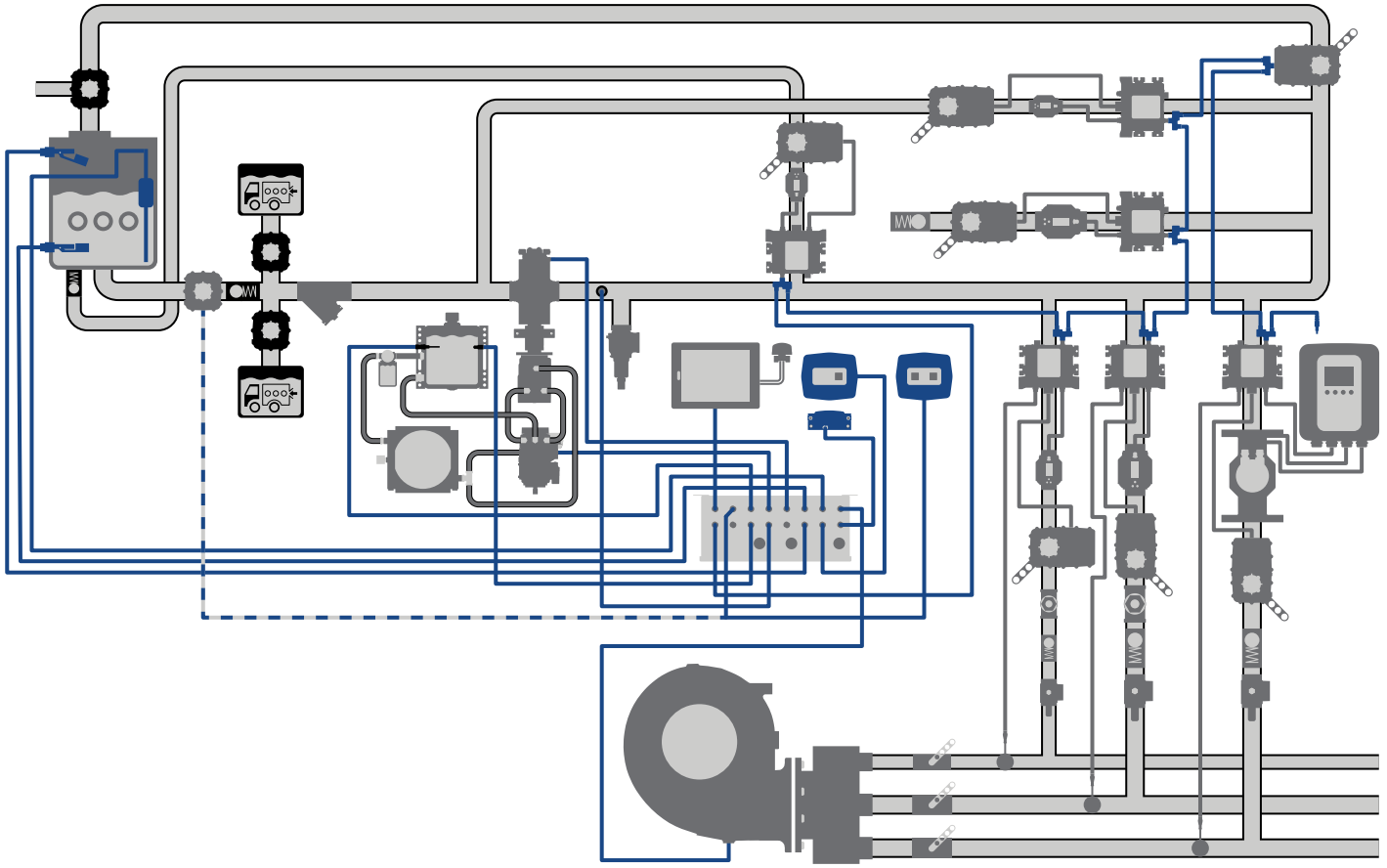
AQUIS™ ULTRAFLOW 300 Controls—Control Box
Installation and Operation



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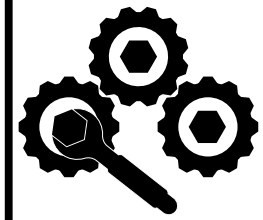
Safety Precautions

- Read and understand all the associated documentation before you begin operating or overhauling the equipment.
- Contact Waterous when you have questions about operating, maintaining, or overhauling the equipment.
- Read and understand all the notices and safety precautions.
- Do not operate the equipment when safety guards are removed.
- Do not modify the equipment.

NOTICE

Modification

- **Modifying the equipment can damage components and void your warranty.**
- **Do not modify the system or any of its components.**



NOTICE

Before Operation

- **Read and understand all the instructions provided.**
- **Check all fluid levels and replenish if necessary.**
- **Remove all shipping plugs and install the operation plugs or caps.**

Read and understand all notices following this symbol.

Use this document to install and operate your Waterous equipment. Understand the following conditions before continuing with the document:

- The instructions may refer to options or equipment that you may not have purchased with your system.
- The illustrations in this document are intended to convey concepts. Do not use the illustrations to determine physical attributes, placement, or proportion.
- Understand that your application may require additional steps, that are not described in the illustrations or instructions, to perform the installation.
- The equipment described in this document is intended to be installed by a person or persons with the necessary skills and knowledge to perform the installation.
- The equipment described in this document is intended to be operated by a person or persons with the basic knowledge of operating similar equipment.
- The information in this document is subject to change without notice.

This document is divided into the following sections:

SAFETY
This section describes general precautions and alert symbols in the document.

INTRODUCTION
This section is an overview of the document.

OVERVIEW
This section describes the components that make up the system.

INSTALLATION
This section describes the installation and initial setup procedures.

OPERATION
This section describes the equipment operation.

MAINTENANCE
This section describes any required maintenance.

Using this Document

Use the guidelines below when viewing this document.

Viewing the Document Electronically

- View this document in landscape orientation.
- Use the table of contents to navigate directly to that section.
- Text **with this appearance** is linked to a reference.

Printing the Document

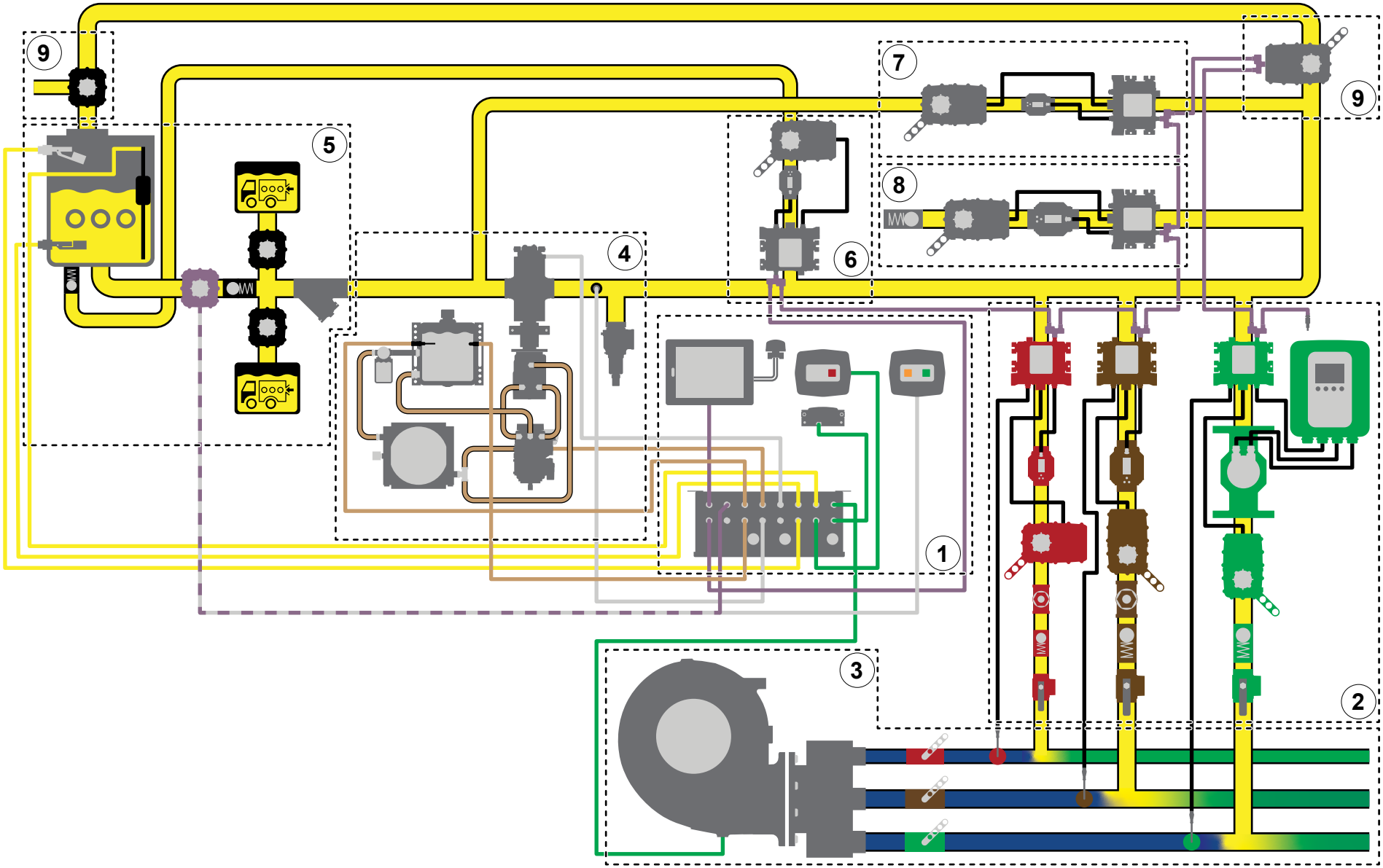
- This document is designed to be printed on both sides and in color.
- Use a 3-ring binder to store the document.

Additional Documentation

Additional documentation is available through the MyWaterous login at waterousco.com. Use your serial number to gain access to the service parts list (SPL) associated with your system. Dimensional drawings are available through the Waterous Service department.

Aquis UltraFlow Industrial Foam Proportioner System

Note: *Make sure that the installer-supplied UltraFlow plumbing cannot trap fluid and allows fluid to be drained from the system when required.*



Aquis UltraFlow Industrial Foam Proportioner System

The Aquis UltraFlow industrial foam proportioner system supplies concentrate into a solution-capable discharge line. A Tellurus™ control panel, or human machine interface (HMI), shows system activity and provides control of the system using a CANbus protocol. Foam concentrate is sourced from an on-board supply tank or an auxiliary source. The concentrate pump distributes concentrate though the discharge line assembly (DLA) using hydraulic components. The concentrate is then measured, controlled, and introduced into the solution-capable discharge line to produce foam solution. Understand that your application will include all or portions of the components described.

	Subsystem	Description
1	Control system	This monitors and controls the foam proportioner system. The components in this subsystem include: • Control panel—this displays system operation and provides control of the system. • Control box—this connects to various system components and contains the programmable logic controllers (PLCs). • Manual override panel—this disables the automatic control of the concentrate control valves. • Power relay panel—this enables and disables power to the DLA. • Concentrate source panel—this selects whether the concentrate is sourced from an on-board tank or an auxiliary supply. • Various cables—these provide communication and power to system components.
2	Discharge line assembly	This manages the concentrate injected into the solution-capable discharge. The system can control up to 19 DLAs. The components in this subsystem include: • Node controller—this connects to and controls the concentrate control valve, and reads the flowmeters and discharge pressure transducer. • CAN cable splitter—this connects the node controllers to one another and the control box. • DLA terminating resistor—this terminates the CAN connection on the last node controller or valve in the CAN chain. • Concentrate control valve—this controls the concentrate flow. • Magnetic flowmeter—this measures the concentrate flow. • Check valve—this prevents reverse fluid flow in the line. • Vacuum relief valve—this allows the DLA to drain by relieving the vacuum in the line. • Cal/Inject valve—this allows you to divert and collect water or concentrate when calibrating the system.
3	Solution-capable discharge	This includes the installer-supplied water pump, distribution manifold, plumbing, and additional components that produce water flow. Additional components in this subsystem include: • Paddlewheel flowmeter—this measures the water flow in the discharge. ***Note:*** *You can install the flowmeter upstream or downstream of where the concentrate is injected into the waterway.* • Water discharge pressure transducer—this measures the pressure at the pump discharge. ***Note:*** *Some applications do not allow for the discharge pressure to be measured at the pump, in those applications alternative measurement methods are used.* • Solution discharge pressure transducer—this measures the pressure at the solution-capable discharge.

Aquis UltraFlow Industrial Foam Proportioner System

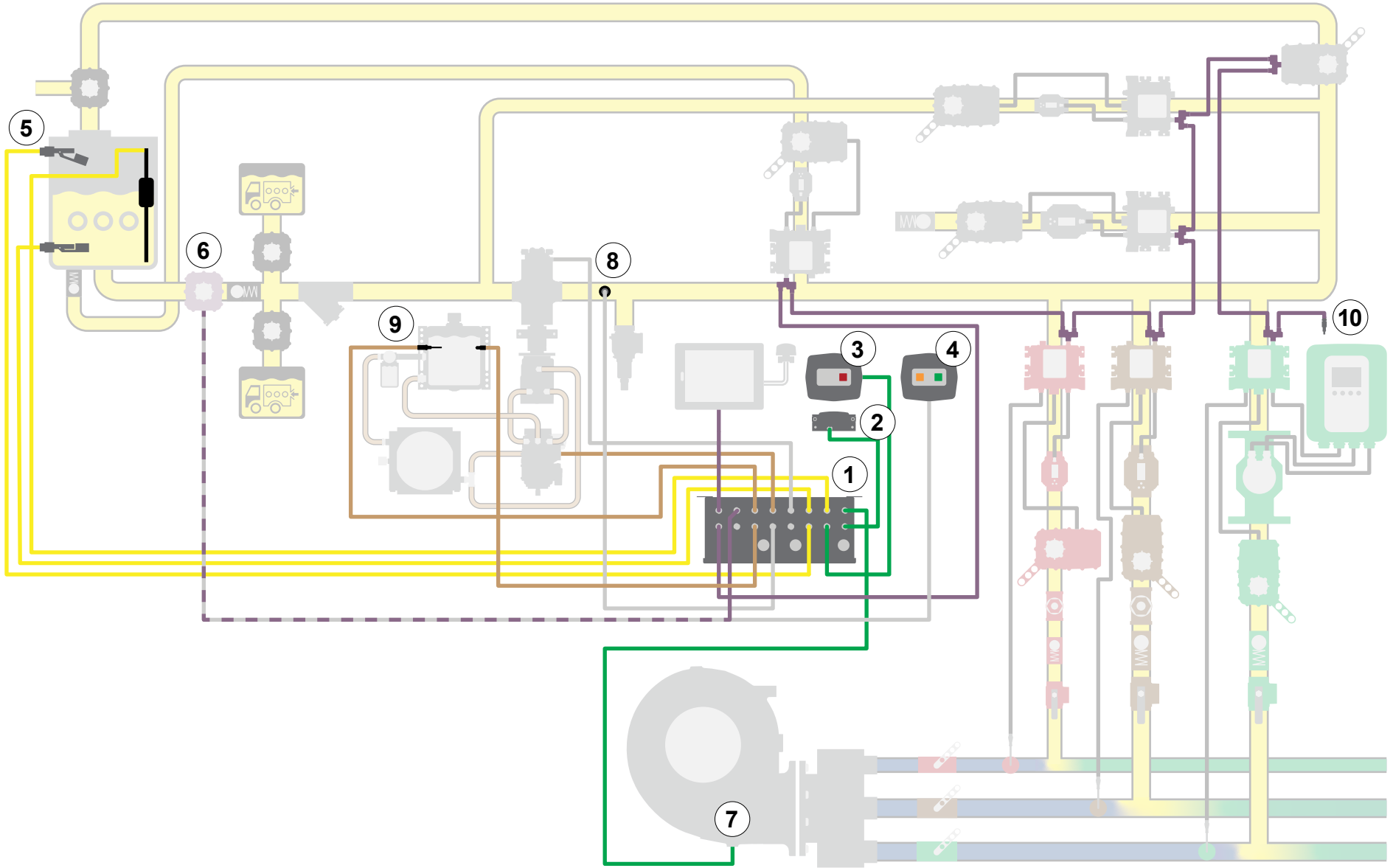
	Subsystem	Description
4	Concentrate pump	These components support, control, and power the concentrate pump. The components in this subsystem include: • Concentrate pump—this circulates the foam concentrate through the system. • Hydraulic motor—this drives the concentrate pump. • Hydraulic pump—this drives the hydraulic motor. • Hydraulic reservoir—this contains the hydraulic fluid supply. • Hydraulic filter—this filters the hydraulic fluid. • Hydraulic heat exchanger—this cools the hydraulic fluid. • Hydraulic temperature sensor—this measures the hydraulic fluid temperature. • Hydraulic level sensor—this monitors the hydraulic fluid level in the reservoir. • Concentrate discharge pressure transducer—this measures the pressure in the concentrate line. • Pressure relief valve—this limits the pressure in the concentrate discharge manifold by opening when the pressure reaches a predetermined level.
5	Concentrate supply	This contains components that hold or supply foam concentrate for the system. The components in this subsystem include: • Concentrate supply tank—this contains the on-board foam concentrate supply. • Tank-full sensor—this indicates a tank full condition to the system. • Tank-low sensor—this indicates a tank low condition to the system. • Tank level sensor—this is an installer supplied sensor and display that indicates the supply level in the tank. • On-board concentrate select valve—this signals which concentrate source the system is using. • Auxiliary concentrate select valves—these are installer-supplied valves that source concentrate from an auxiliary supply. • On-board concentrate check valve—this is an installer-supplied valve that protects the on-board concentrate select valve and concentrate supply tank from becoming pressurized. • Concentrate strainer—this collects debris that would otherwise flow through the system and potentially damage the concentrate pump.
6	Supply tank fill line	This allows you to fill the on-board tank from an external source. The components in this subsystem include: • Node controller—this connects to the fill valve and flowmeters. • Fill line control valve—this controls the concentrate flow. • Magnetic flowmeter—this measures the concentrate flow. • CAN cable splitter—this connects the node controllers to one another and the control box. • Check valve—this prevents reverse fluid flow in the line.

Aquis UltraFlow Industrial Foam Proportioner System

	Subsystem	Description
7	Low-flow bypass line	This returns a portion of the concentrate in the supply line back to the pump inlet when the desired concentrate output requires the pump to operate at an rpm that is lower than its capabilities. The components in this subsystem include: • Node controller—this connects to the low-flow control valve and flowmeters. • Low-flow valve—this controls the concentrate return flow. • Magnetic flowmeter—this measures the concentrate flow. • CAN cable splitter—this connects the node controllers to one another.
8	Transfer line	This allows you to transfer or relay concentrate from the apparatus to another location. The components in this subsystem include: • Node controller—this connects to and controls the concentrate control valve and flowmeters. • CAN cable splitter—this connects the node controllers to one another and the control box. • Concentrate control valve—this controls the concentrate flow. • Magnetic flowmeter—this measures the concentrate flow. • Check valve—this prevents reverse fluid flow in the line.
9	Priming line	This evacuates air from the concentrate pump inlet as the system primes before operation. The components in this subsystem include: • Priming valve—this opens to allow air to evacuate the line before operation. • CAN cable splitter—this connects the node controllers to one another and the control box. • Prime bypass valve—this is an installer-supplied valve that prevents contaminating the concentrate during training. When water is substituted for concentrate during training or testing, and there is concentrate in the supply tank, this bypass valve prevents water from contaminating the concentrate supply. ***Note:*** *You must drain any remaining water in the line before priming the system with concentrate to prevent contamination.*

Control Box and Components

The control box monitors and controls the foam proportioner system. It takes information from various sensors and inputs and uses CAN to transport concentrate throughout your application.

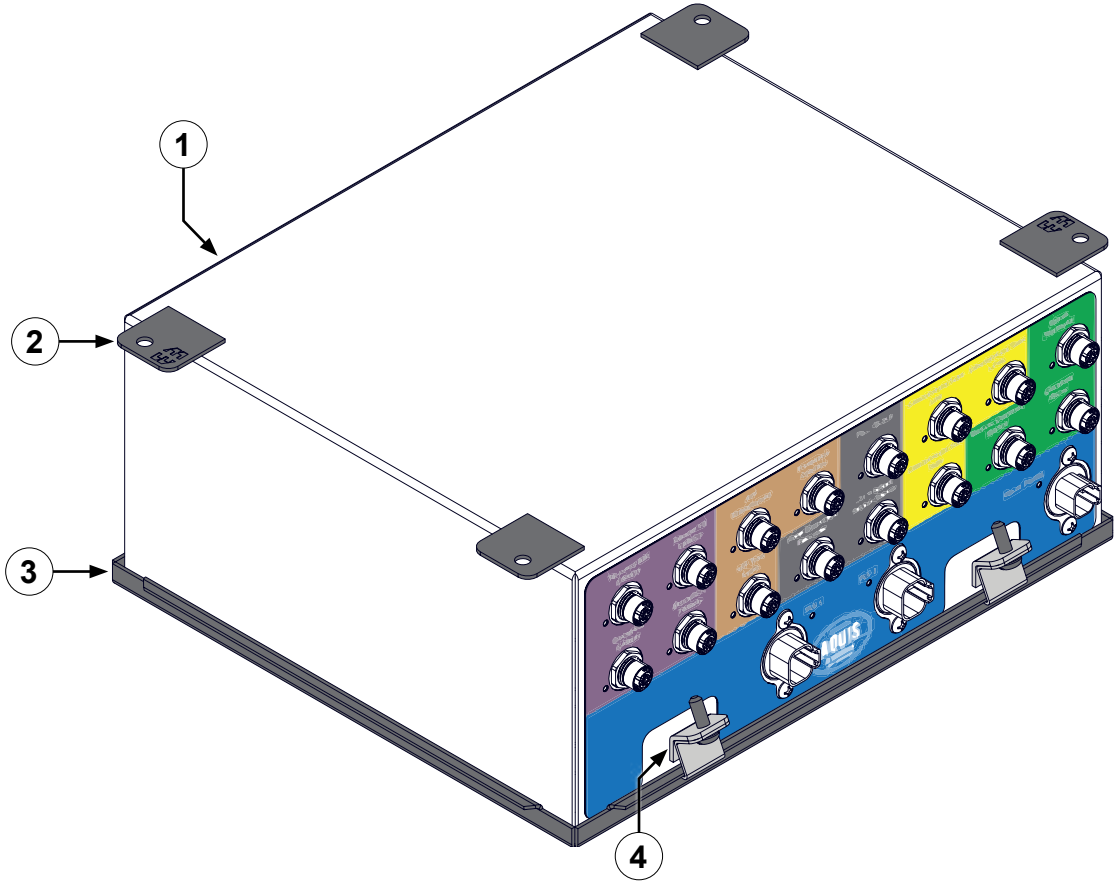


Control Box and Components

	Subsystem	Description
1	Control box	This connects to various components in the system and contains the PLC.
2	Power relay panel	This power relay enables and disables power to the DLA.
3	Manual override panel	This disables the automatic control of the concentrate control valves.
4	Concentrate source panel	This selects whether the concentrate is sourced from an on-board tank or an auxiliary supply.
5	Supply tank level sensors	This signals to the control box whether the supply tank is at full or low. Alternatively, an installer-supplied system can display an approximate supply level.
6	On-board concentrate select valve	This is an open/close indicating valve and additional components that source concentrate from an on-board tank. A signal is provided to the system to ignore the on-board tank sensors when sourcing concentrate from an auxiliary supply.
7	Water discharge pressure transducer	This measures the pressure at the pump discharge.
8	Solution discharge pressure transducer	This measures the pressure at the solution-capable discharge.
9	Hydraulic control	This monitors and controls the hydraulic system.
10	Terminating resistor	This connects to the female connector on the CAN cable splitter on the last DLA in the system.

Control Box

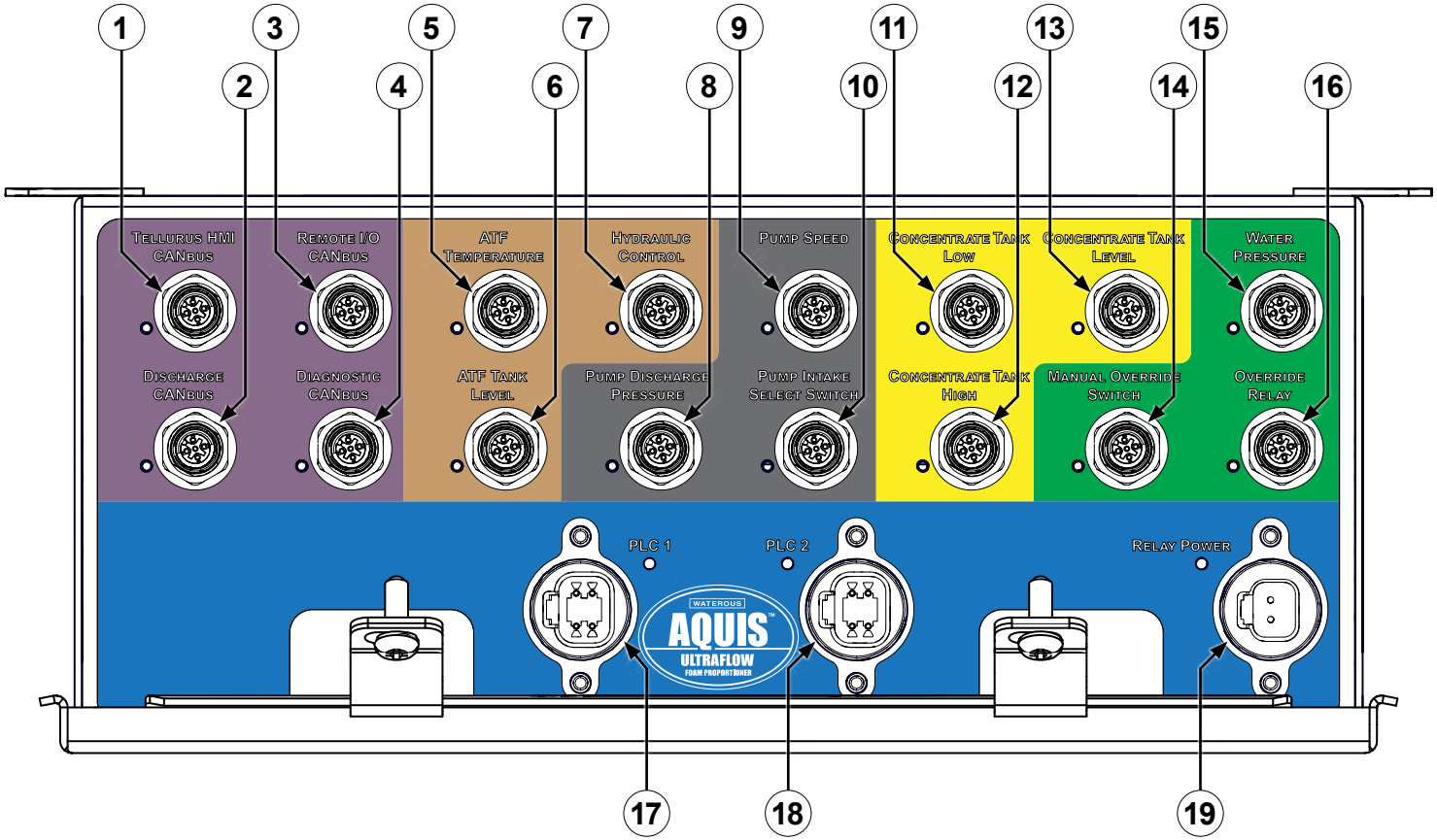
The control box connects to various components to monitor and control the foam proportioner system. It contains a main PLC with an option for a secondary backup PLC.



Control Box

	Feature	Description
1	Control box	This houses control electronics and PLCs.
2	Mounting tabs	These mount the box on the apparatus.
3	Cover	This is the sealed IP67 rated cover for the box.
4	Cover latches	These secure the cover to the box.

Control Box Connectors

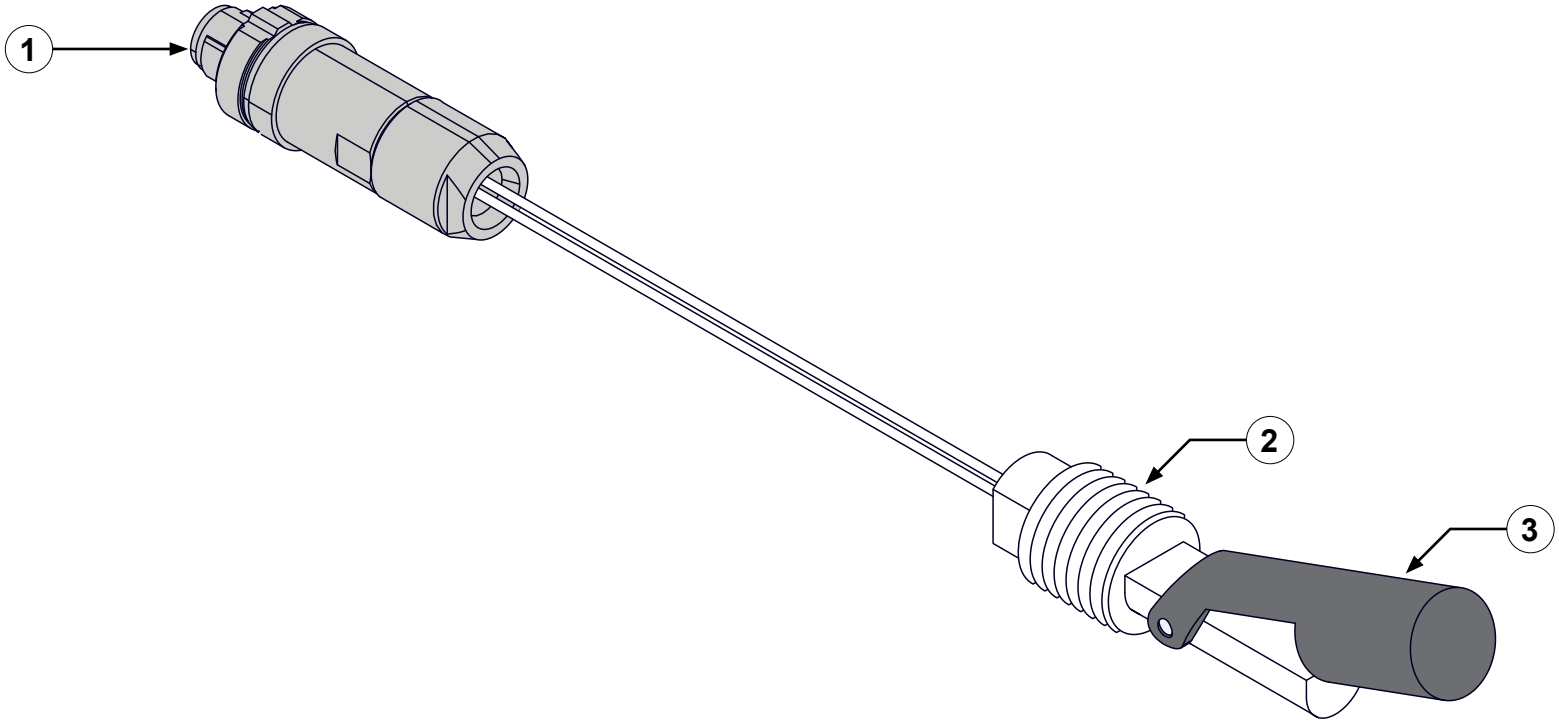


Control Box Connectors

	Feature	Description
1	Tellurus HMI CANbus	This communicates the CAN signal to the control panel.
2	Discharge CANbus	This communicates the CAN signal to the node controllers on each DLA.
3	Remote I/O CANbus	This communicates the CAN signal to the on-board concentrate select valve and any additional node controllers for options required in your application.
4	Diagnostic CANbus	This communicates the CAN signal to diagnostic equipment or external CAN truck control systems for remote monitoring or control.
5	Hydraulic temperature sensor	This measures the hydraulic fluid temperature in the reservoir tank.
6	Hydraulic level sensor	This monitors the hydraulic fluid level in the reservoir.
7	Hydraulic control	This controls the hydraulic pump that powers the hydraulic motor.
8	Pump discharge pressure	This measures the pressure in the concentrate manifold after the concentrate pump.
9	Pump speed	This measures the concentrate pump speed.
10	Pump intake select switch	This signal is provided by the apparatus to determine if the concentrate is sourced from an on-board or auxiliary supply. This connector is not used if the system includes the supplied on-board concentrate select valve or does not include an on-board concentrate supply tank.
11	Concentrate tank low	This connects to a tank level switch that indicates the concentrate supply in the tank is low.
12	Concentrate tank high	This connects to a tank level switch that indicates the concentrate supply tank is full.
13	Concentrate tank level	This is an optional installer-supplied sensor that indicates the concentrate supply level in the tank.
14	Manual override panel—optional	This disables the automatic control of the concentrate control valves.
15	Water pressure transducer	This measures the water pump discharge pressure.
16	Power relay panel—optional	This 200 A power relay enables and disables power to the DLAs—disabling automatic control.
17	PLC 1—power input	This provides power to the primary PLC in the control box.
18	PLC 2—power input—optional	This provides power to the secondary PLC in the control box.
19	Relay power—input—optional	This provides control to the 200 A power relay for toggling between automatic and manual DLA valve control.

Concentrate Level Switch

The switch activates and deactivates as the foam concentrate level in the tank changes.

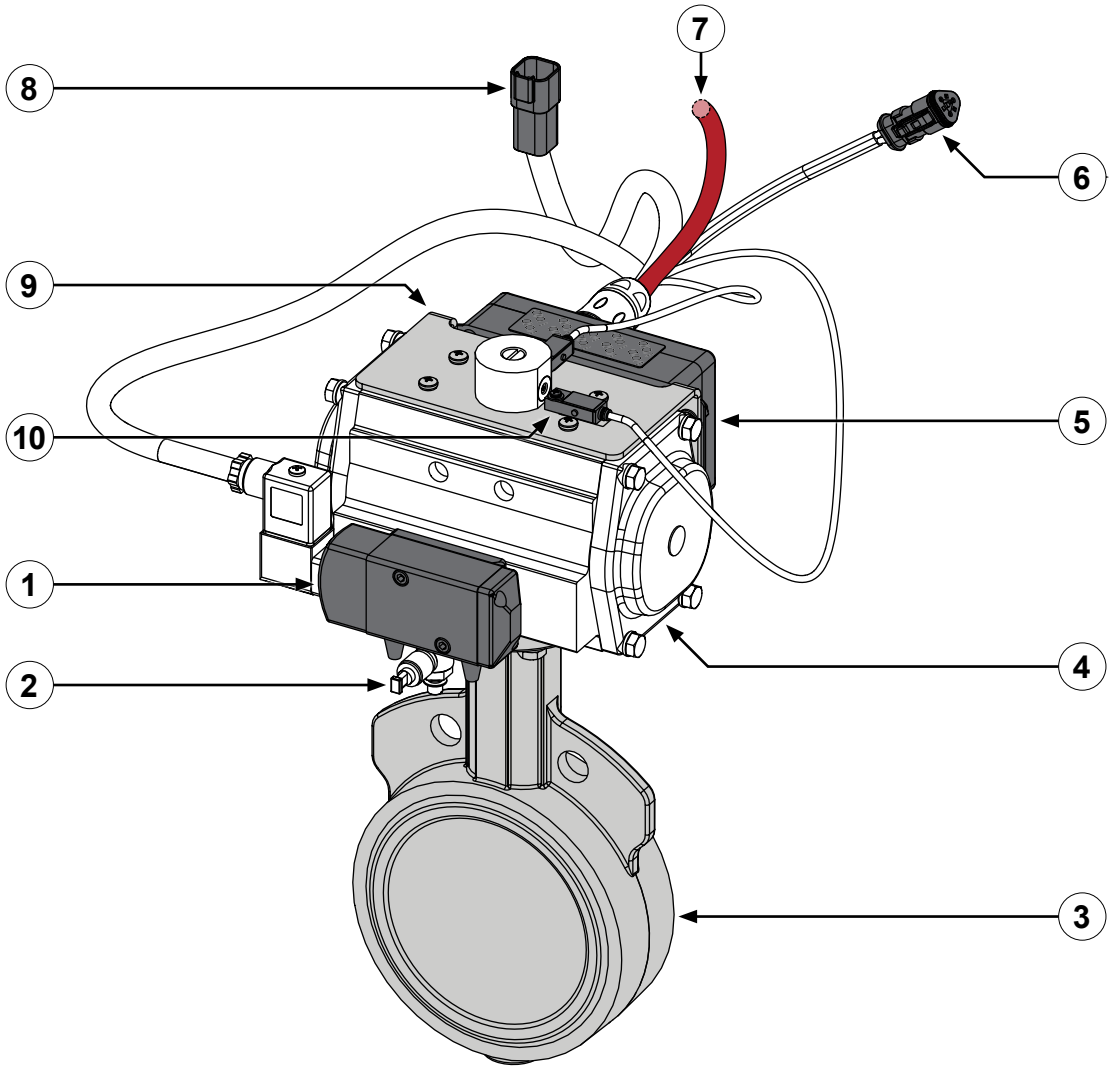


Concentrate Level Switch

	Feature	Description
1	M12 connector	This connects to the sensor cable from the control box and power.
2	Body	This threads into the tank—1/4 NPT.
3	Float	This determines the foam concentrate level in the tank.

On-Board Concentrate Select Valve

The valve automatically opens and closes depending on the concentrate source selected by the system.

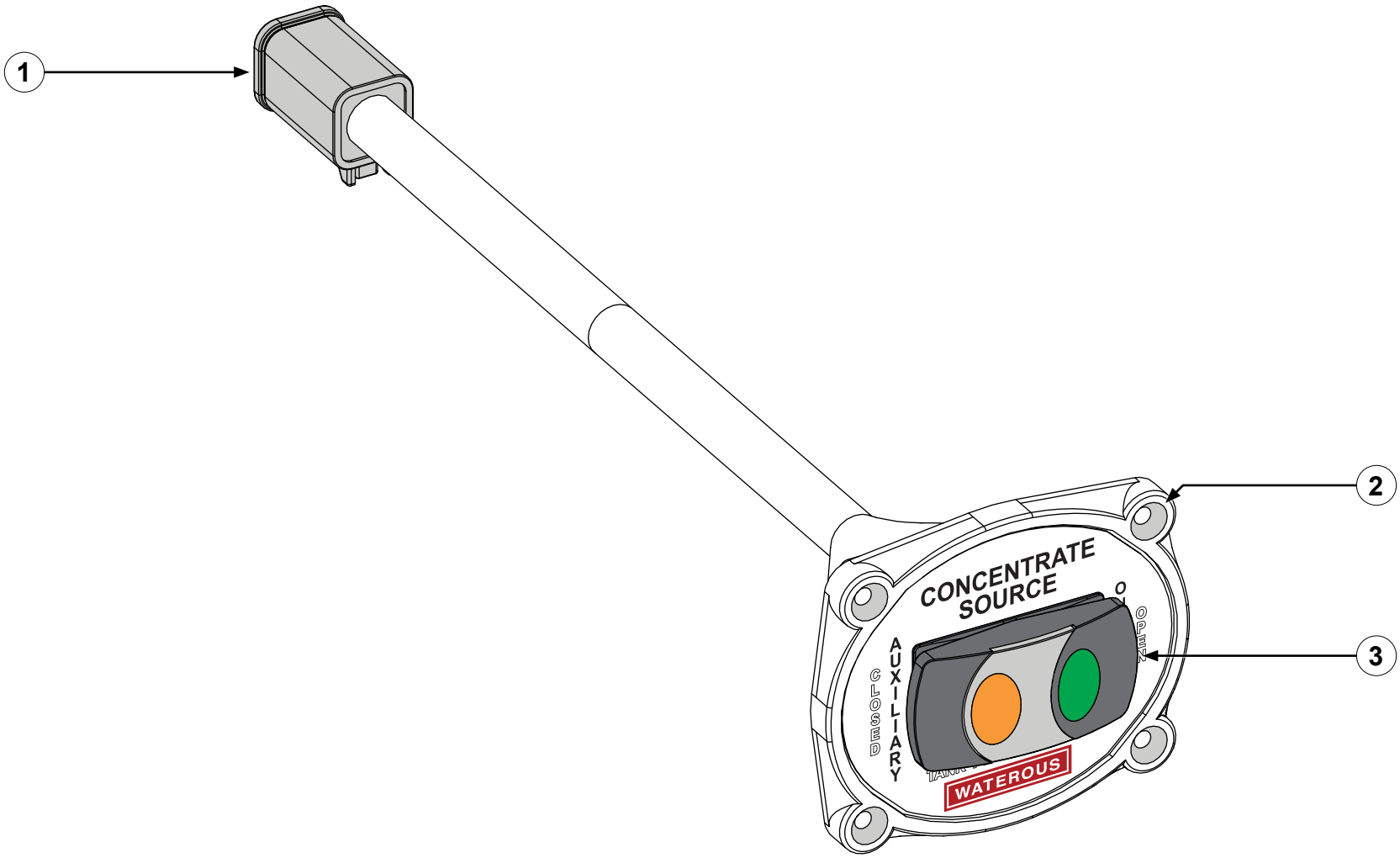


On-Board Concentrate Select Valve

	Feature	Description
1	Solenoid valve	This moves the pneumatic actuator.
2	Regulator valve	This controls the actuation speed of the valve. Set the actuation speed after installing the valve by turning the adjustment knob and locking it into position.
3	Valve	This allows the system to use the on-board concentrate supply tank.
4	Pneumatic actuator	This controls the position of the valve.
5	Controller	This houses the electronics and controls the operation.
6	CAN connector	This connects to the remote I/O CANbus connector on the control box.
7	Power wire	This connects to apparatus power.
8	Manual panel connector	This connects to the concentrate source panel.
9	Mounting bracket	This mounts the controller on the valve assembly.
10	Proximity sensors	These sense the position of the valve.

Concentrate Source Panel

The concentrate source panel allows you to manually select the concentrate source and indicates the current concentrate source.



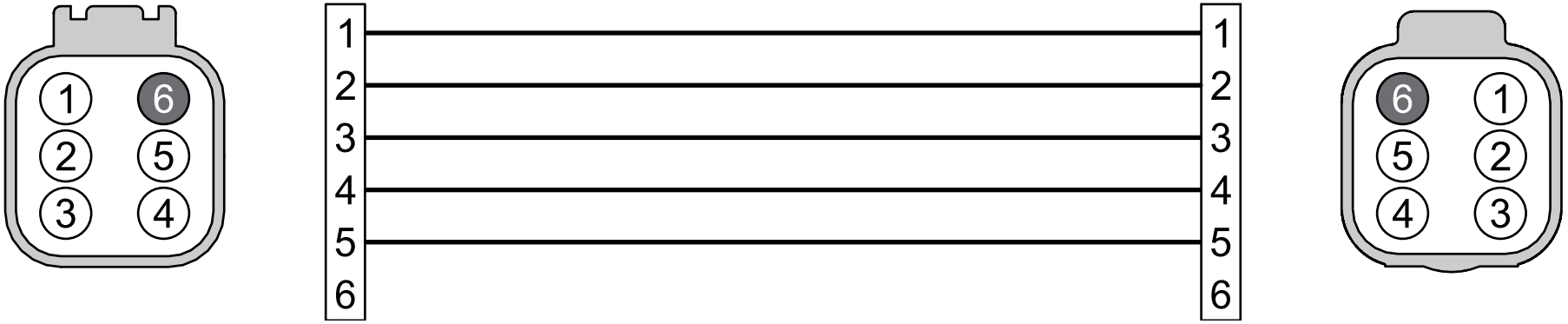
Concentrate Source Panel

	Feature	Description
1	Connector	This connects to the on-board concentrate select valve.
2	Mounting holes	These mount the concentrate source panel on the apparatus.
3	Switch	This switches the concentrate source to on-board or auxiliary.

Concentrate Source Extension Cable—Installer-Supplied

	Feature	Description
1	Connector	This connects to the manual panel connector on the on-board concentrate select valve.
2	Connector	This connects to the connector on the concentrate source panel.

Concentrate Source Extension Cable—Schematic



Connector	
1	(+) Auxiliary (closed) LED
2	On-board (open) switch
3	Ground
4	Auxiliary (closed) switch
5	(+) On-board (open) LED
6	Plugged

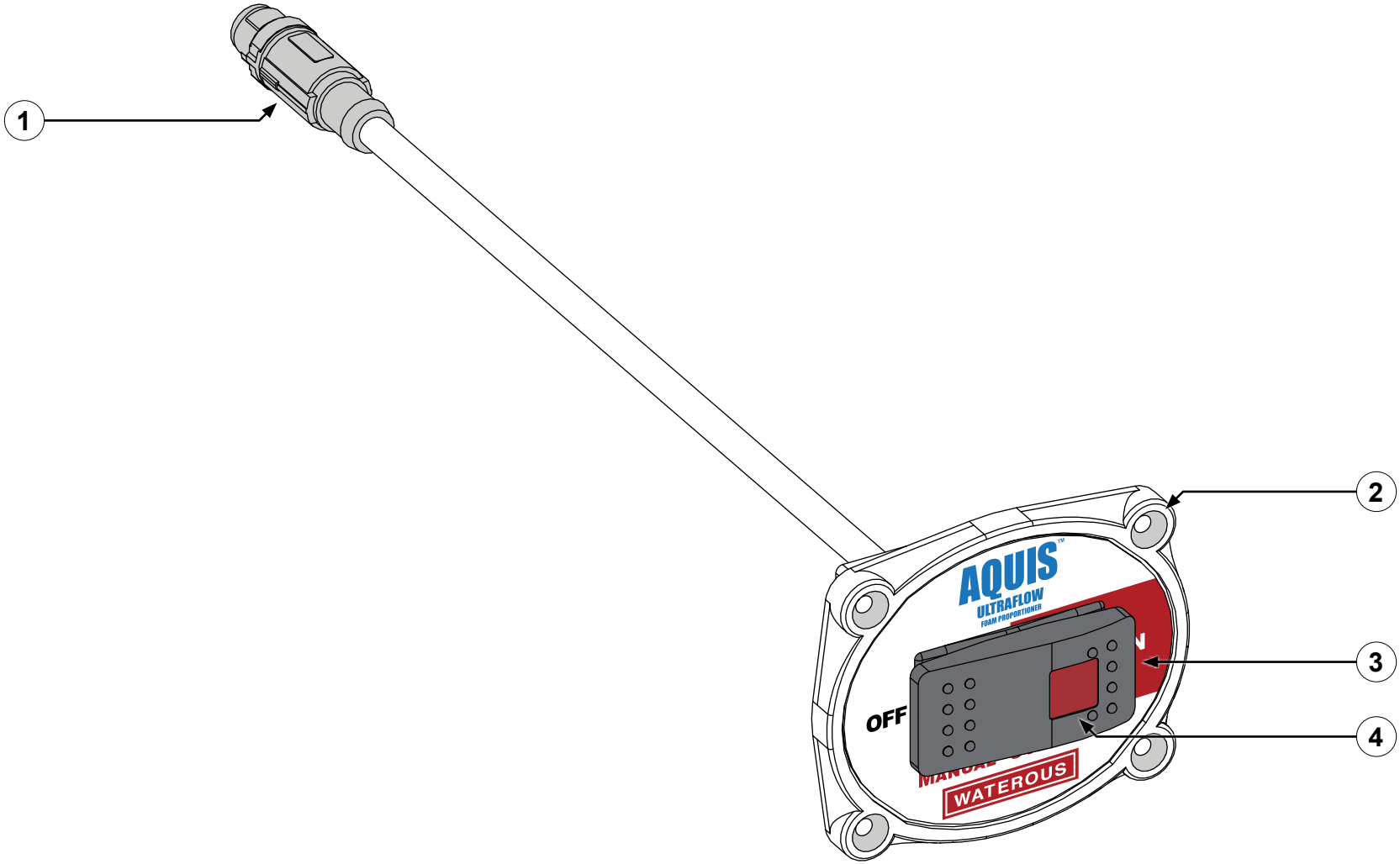
DT06-6S or equivalent

Connector	
1	(+) Auxiliary (closed) LED
2	On-board (open) switch
3	Ground
4	Auxiliary (closed) switch
5	(+) On-board (open) LED
6	Plugged

DT04-6P or equivalent

Manual Override Panel

The optional manual override panel disables the automatic control of the concentrate control valves.

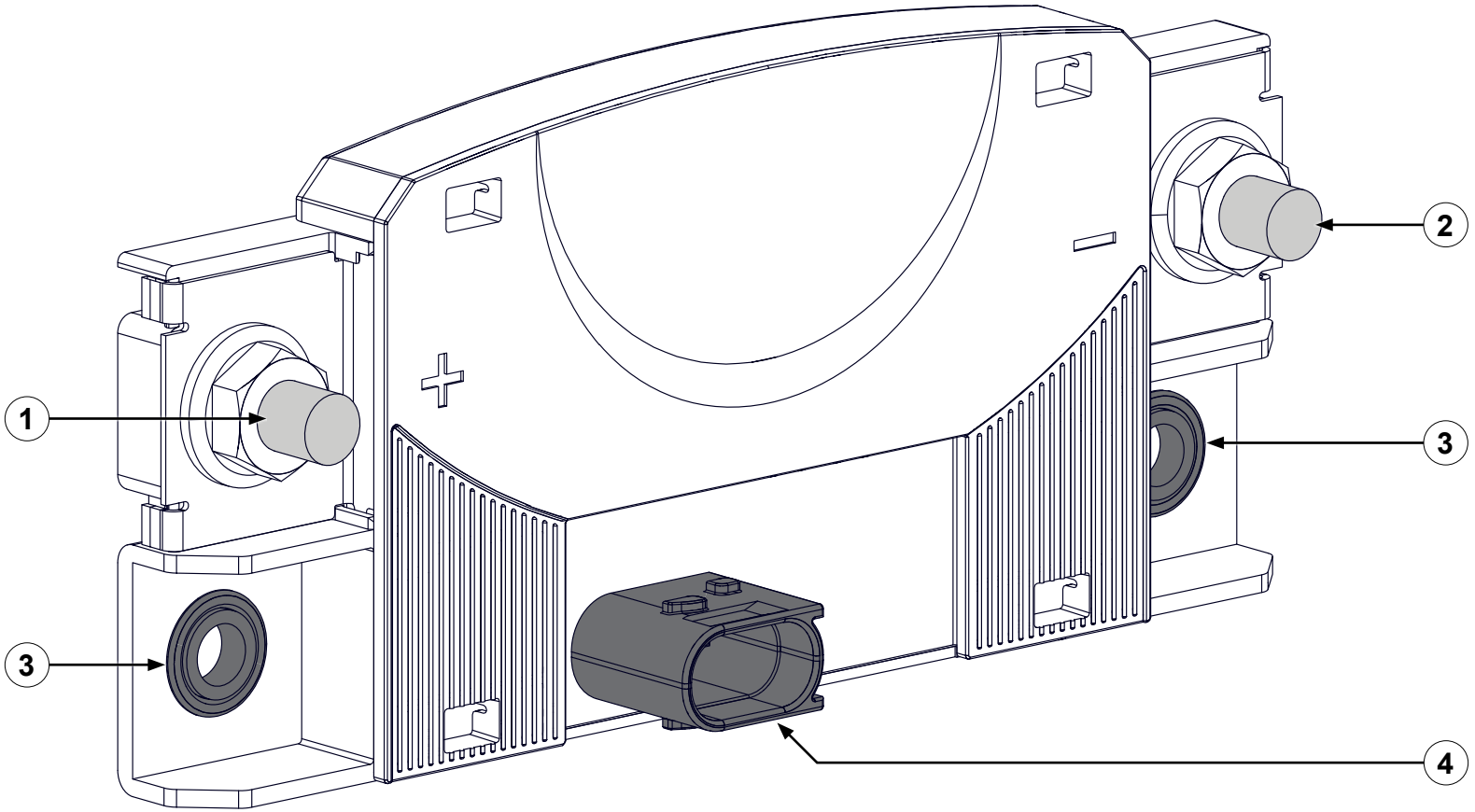


Manual Override Panel

	Feature	Description
1	M12 connector	This connects to the control box.
2	Mounting holes	These mount the manual override panel on the apparatus.
3	Switch	This switches the manual override *ON* or *OFF*.
4	Switch LED	This illuminates when the manual override is turned on.

Power Relay Panel

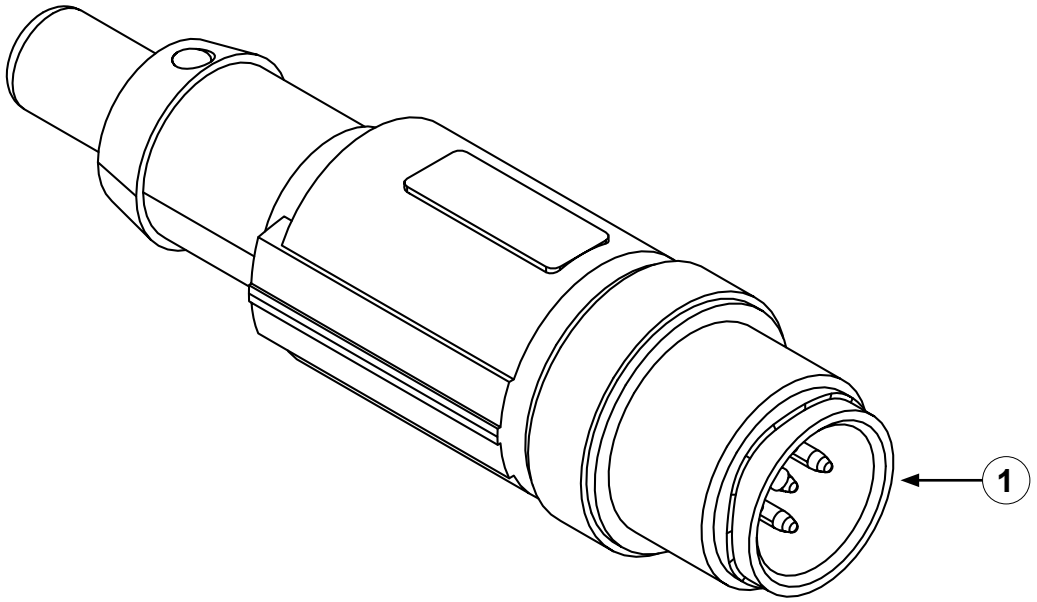
The optional power relay works with the manual override panel to disable automatic control of the concentrate control valves.



Power Relay Panel

	Feature	Description
1	Power input post (+)	This connects to the bus power.
2	Power output post (–)	This connects to the DLA power.
3	Mounting holes	These mount the power relay panel on the apparatus.
4	Connector	This connects to the cable from the control box.

Terminating Resistor



	Feature	Description
1	Terminating resistor	This connects to the node connector on the CAN cable splitter on the last DLA in the system.

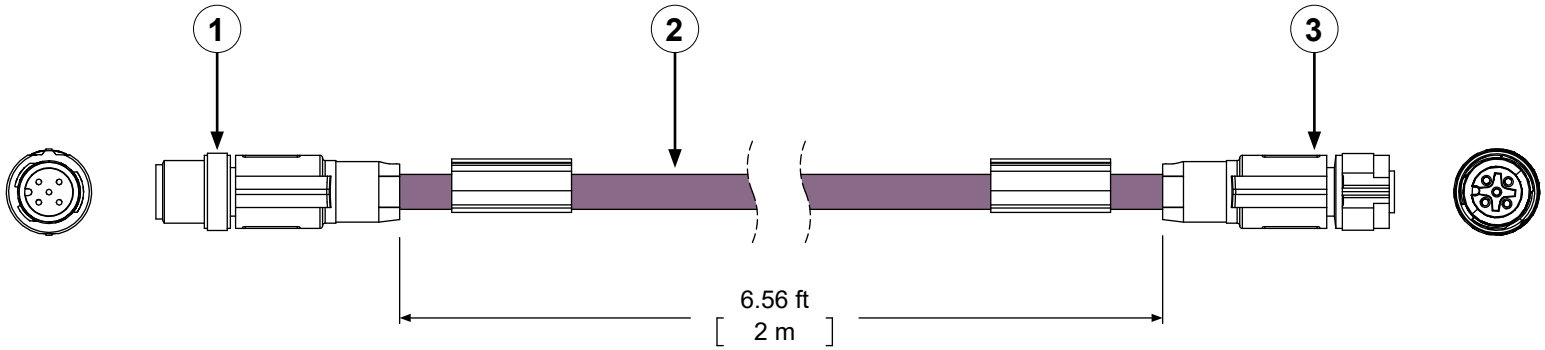
CAN Cable Splitter

The CAN cable splitter communicates data between the CAN connections. It is typically violet.

	Feature	Description
1	CAN output—male	This connects to the next node in the chain or the terminating resistor.
2	CAN input—female	This connects to the previous node in the chain or the discharge CANbus connector on the control box.
3	Node connector—female	This connects to the node controller.

2.0 Meter CAN Cable

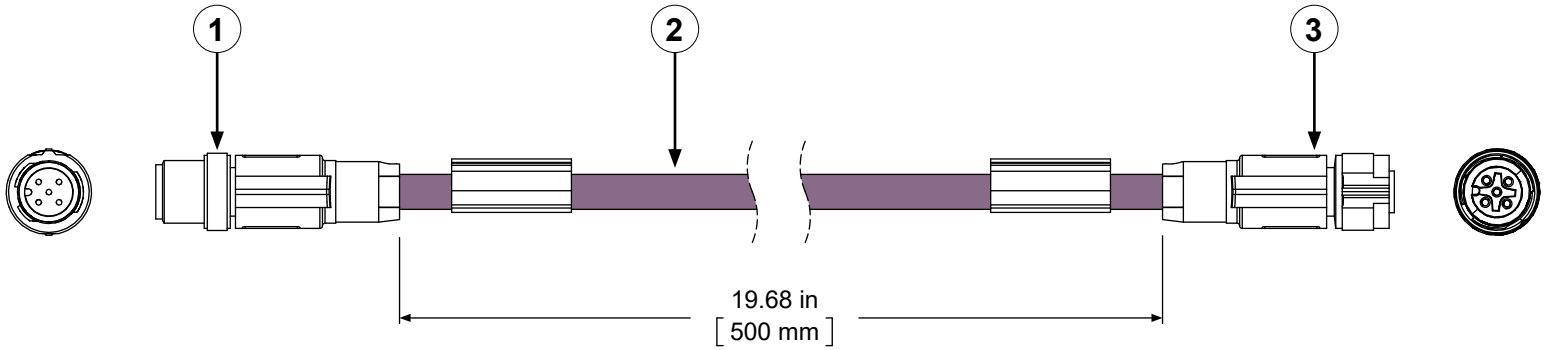
The CAN cable communicates data between the CAN connections. It is typically violet. The CAN cable is not interchangeable with the sensor cable. You can connect two or more cables together to achieve a desired length.



	Feature	Description
1	M12 connector	This is a male connector.
2	Cable	This is a violet cable jacket.
3	M12 connector	This is a female connector.

0.5 Meter CAN Cable

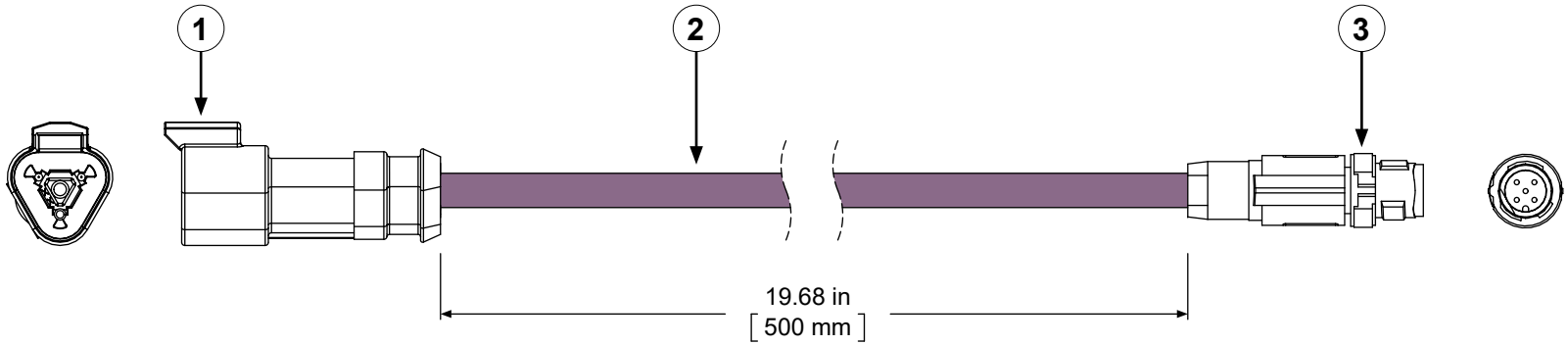
The CAN cable communicates data between the CAN connections. It is typically violet. The CAN cable is not interchangeable with the sensor cable. You can connect two or more cables together to achieve a desired length.



	Feature	Description
1	M12 connector	This is a male connector.
2	Cable	This is typically a violet cable jacket.
3	M12 connector	This is a female connector.

CAN Concentrate Cable

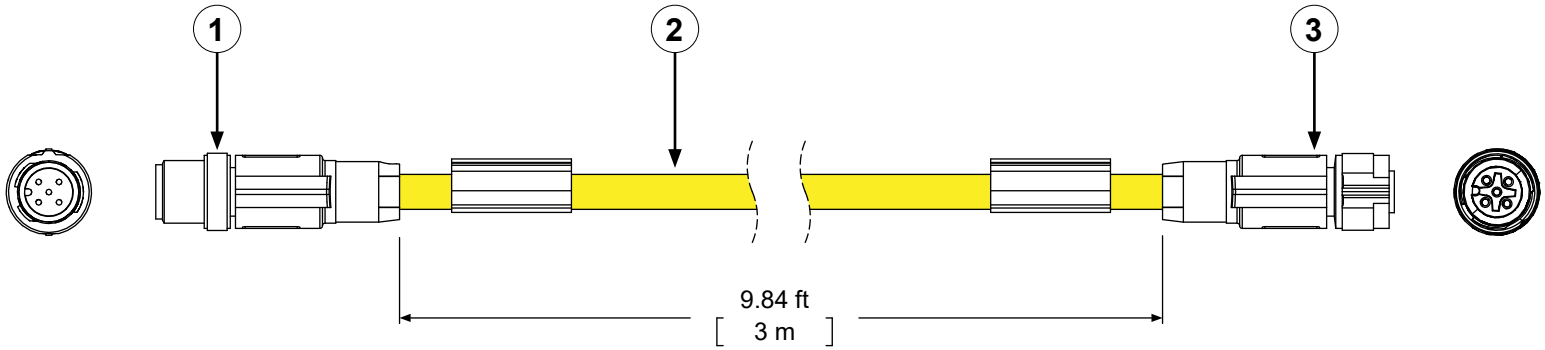
The CAN cable communicates data between the on-board concentrate select valve and the control box. It is typically violet. You can connect two or more CAN cables together to achieve a desired length.



	Feature	Description
1	DT04-3P-CE04 connector	This connects to the CAN connector on-board concentrate select valve.
2	Cable	This is a violet cable jacket.
3	M12 connector	This connects to the remote I/O CANbus connector on the control box.

3.0 Meter Sensor Cable

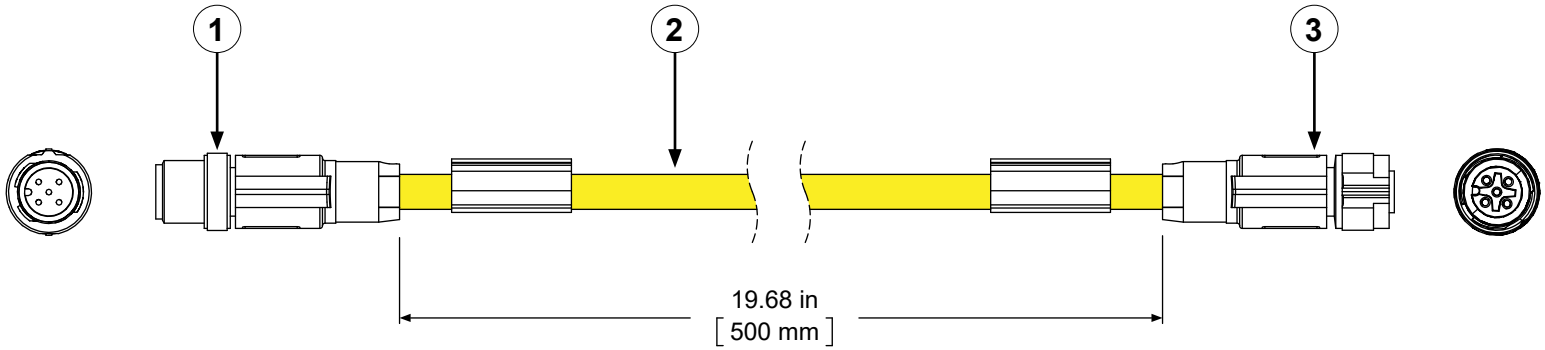
The sensor cable communicates data between the various connections. It is typically yellow, gray, or black. The sensor cable is not interchangeable with the CAN cable. You can connect two or more cables together to achieve a desired length.



	Feature	Description
1	M12 connector	This is a male connector.
2	Cable	This is typically a yellow, gray, or black cable jacket.
3	M12 connector	This is a female connector.

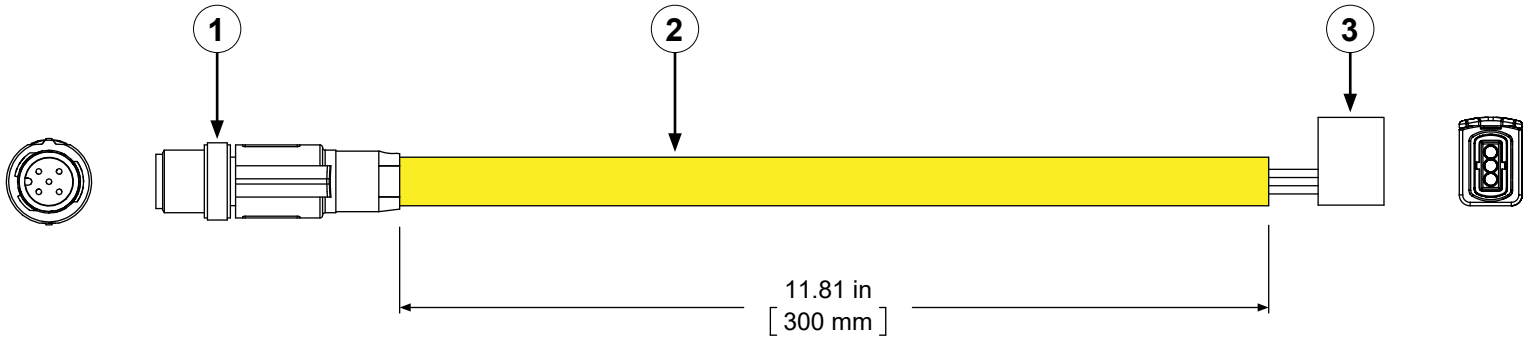
0.5 Meter Sensor Cable

The sensor cable communicates data between the various connections. It is typically yellow, gray, or black. The sensor cable is not interchangeable with the CAN cable. You can connect two or more cables together to achieve a desired length.



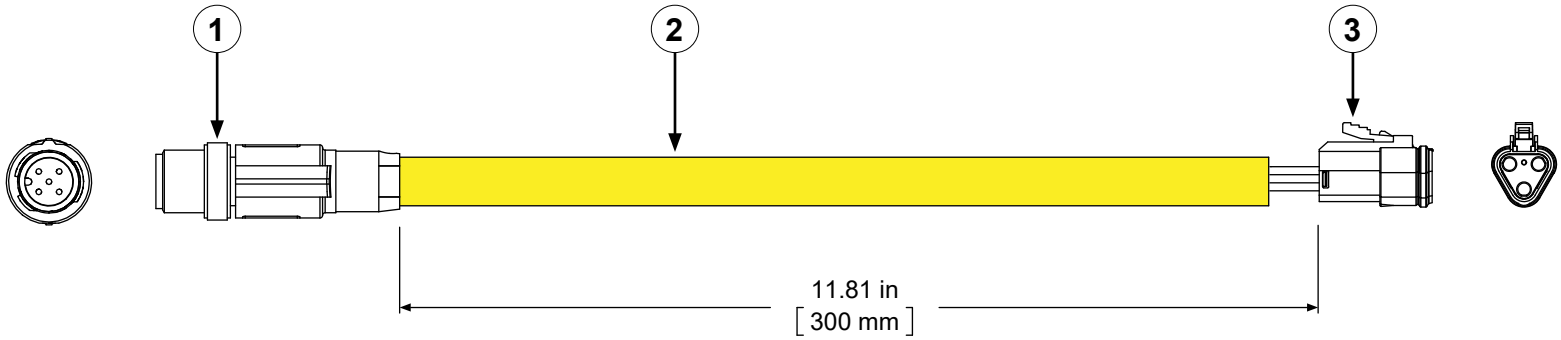
	Feature	Description
1	M12 connector	This is a male connector.
2	Cable	This is typically a yellow, gray, or black cable jacket.
3	M12 connector	This is a female connector.

Manual Override Power Relay Panel Cable



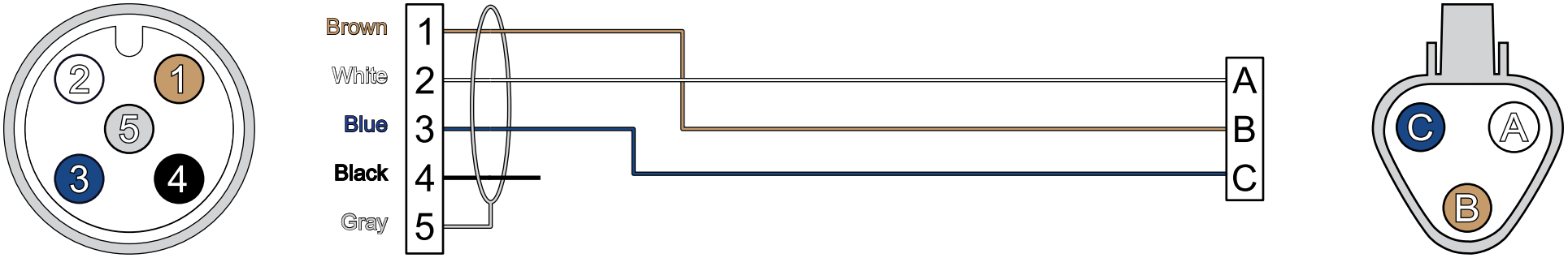
	Feature	Description
1	M12 connector	This connects to the override relay connector on the control box or a sensor cable connected to the control box.
2	Cable	This is a yellow cable jacket.
3	Connector	This connects to the power relay panel connector.

Concentrate Pump Cable



	Feature	Description
1	M12 connector	This connects to the concentrate pump connector on the control box or a sensor cable connected to the control box.
2	Cable	This is a yellow cable jacket.
3	Connector	This connects to the speed sensor connector on the concentrate pump.

Concentrate Pump Cable—Schematic



M12 Connector	
1	Vcc, +24 V
2	Signal
3	Ground
4	N/C
5	Shield

Phoenix Contact—1405879 or equivalent

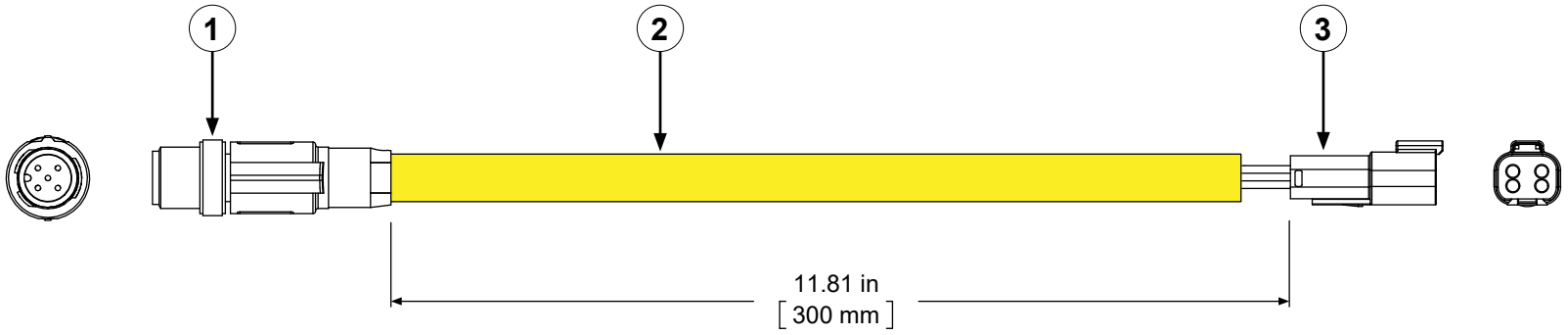
Connector	
A	Signal
B	Vcc, +24 V
C	Ground

Shell—934452102 (1)

Wedge—934482003 (1)

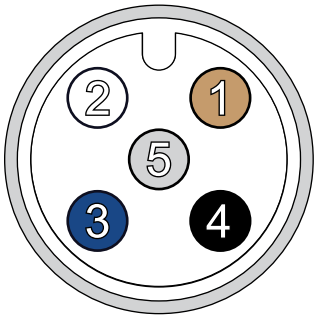
Sockets—match to counterpart or equivalents

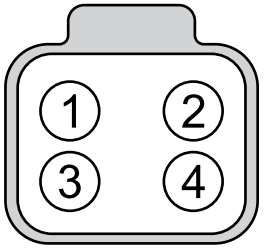
Hydraulic Pump Cable



	Feature	Description
1	M12 connector	This connects to the hydraulic pump connector on the control box or a sensor cable connected to the control box.
2	Cable	This is a yellow cable jacket.
3	Connector	This connects to the swashplate connector on the hydraulic pump.

Hydraulic Pump Cable—Schematic





M12 Connector	
1	PWM out—AB
2	PWM out—CD
3	PWM return—AB
4	PWM return—CD
5	Shield

Phoenix Contact—1405879 or equivalent

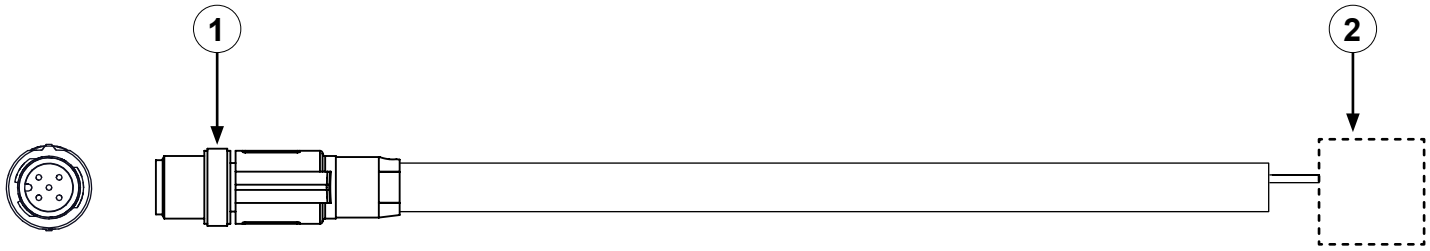
Connector	
1	PWM out—AB
2	PWM out—CD
3	PWM return—AB
4	PWM return—CD

Shell—934453102 (1)

Wedge—934483003 (1)

Sockets—match to counterpart or equivalents

Concentrate Tank Level Cable—Installer-Supplied



	Feature	Description
1	M12 connector	This connects to the tank level connector on the control box or a sensor cable connected to the control box.
2	Tank level sensor connector	This connects to the installer-supplied tank level system.

Concentrate Tank Level Cable—Schematic

M12 Connector	
1	Vcc, +24 V
2	Reserved
3	Signal—4–20 mA
4	Reserved
5	Shield

Phoenix Contact—1405879 or equivalent

Installation Overview

This equipment is intended to be installed by a person or persons with the basic knowledge of installing similar equipment. Contact Waterous with questions about installing the equipment. The installation may require the following tasks and abilities:

- Locating, drilling, and cutting features into the apparatus.
- Routing and securing the wiring.
- Calibration and final testing.

Preparing for the Installation

Before operation: *Read and understand all instructions provided. Check all fluid levels and replenish them if needed. Remove all shipping plugs and install the operation plugs or caps.*

Use the following guidelines before, during, and after the installation.

- Read and understand all the installation instructions before installing the equipment.
- Prepare a suitable, well-lit area and gather all the necessary tools before you begin the installation.
- Make sure that you remove any shipping plugs or caps before installing the component.
- Make sure that you bring all fluids to operating levels before using the equipment.

Modifying the Equipment

Modification: *May cause equipment damage and void the warranty. Do not modify the system or any of its components.*

This equipment is intended to operate as designed. Do not remove, modify, or change the components in the system. Doing so will void the warranty. Contact Waterous for more information.

Optional Equipment

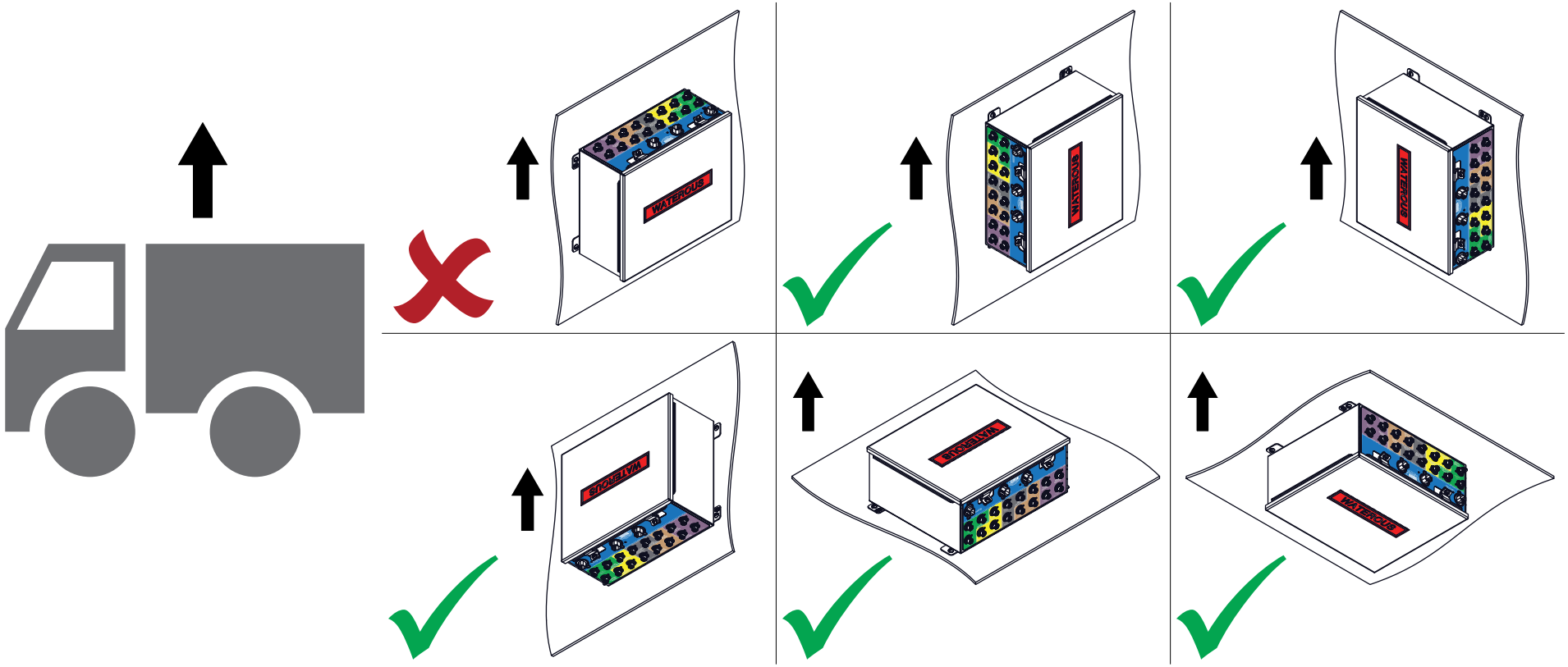
Be aware that the installation instruction may include optional equipment not included in your application.

Determining Cable and Wire Routing

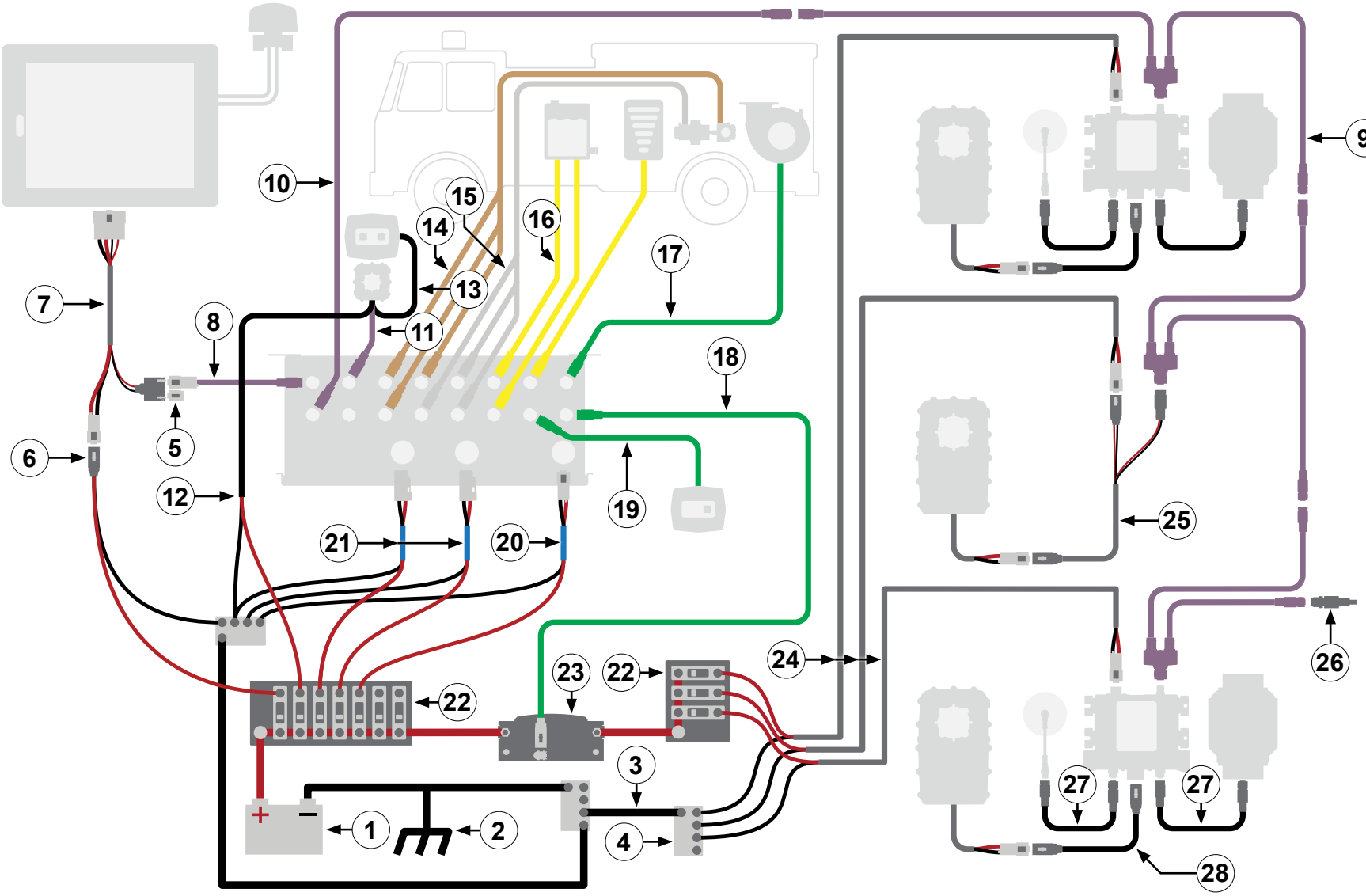
Use the *Wiring Best Practices* document, available at waterousco.com, as a guide to select and route wiring for your application.

Determining the Control Box Location and Orientation

- Never mount the control box with the connectors facing upward.
- Consider the cable and hose routing.
- Consider accessibility during operation and maintenance.
- Consider the space required to remove the cover and access the box interior.



Electrical and Cable Connections



Electrical and Cable Connections

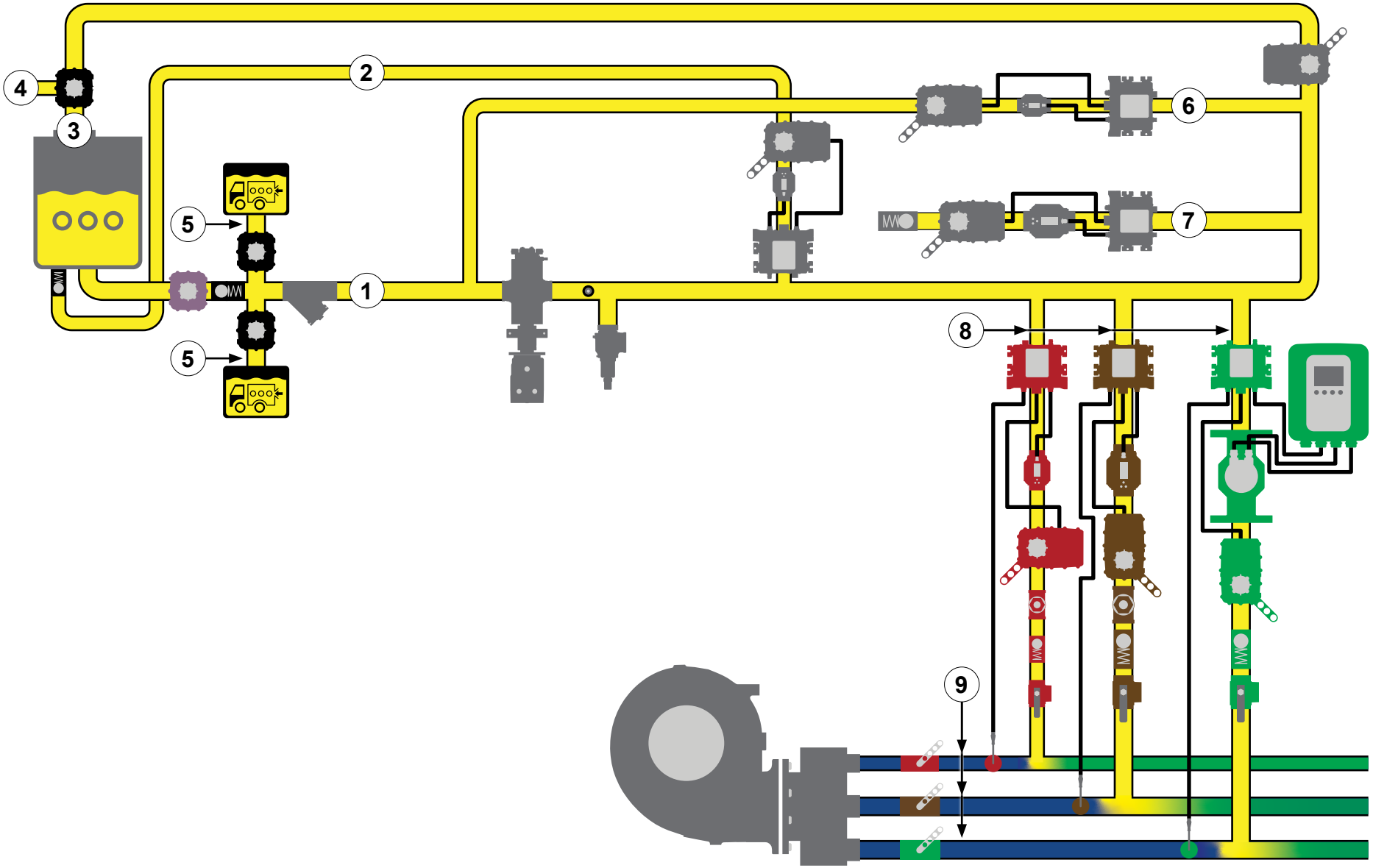
	Feature	Description
1	Apparatus power	This supplies power to the system—installer-supplied.
2	Frame ground	This connects the negative (–) terminal to the apparatus frame—installer-supplied.
3	Negative terminal wire	This connects to, or through, terminal blocks to the negative (–) terminal on the apparatus battery—installer-supplied.
4	Terminal block	This allows you to distribute multiple power circuits from one supply—installer-supplied.
5	Terminating resistor	This terminates the CAN connection on the Tellurus HMI cable.
6	HMI power cable	This supplies power to the control panel and requires a 5 A circuit breaker—installer-supplied.
7	Tellurus HMI cable	This connects the control panel to power and CAN.
8	Tellurus CAN cable	This connects the control panel to the control box.
9	CAN cable splitter	This connects the node controllers to one another.
10	CAN cable	This provides an extension to the CAN cable splitter.
11	Concentrate source CAN cable	This connects the on-board concentrate select valve to the control box.
12	Concentrate source power cable	This supplies power to the on-board concentrate select valve—installer-supplied.
13	Concentrate source extension cable	This extends the length between the on-board concentrate select valve and the concentrate source panel—optional, installer-supplied.
14	Hydraulic pump cable	These harnesses connect to sensors that monitor the hydraulic fluid level and temperature as well as control the hydraulic pump.
15	Foam pump cable	These harnesses connect to sensors that monitor the concentrate pump speed and discharge pressure as well as monitor the pump intake select switch. They are used if the on-board concentrate select valve is not utilized and the intake select switch is installer-supplied.
16	Concentrate supply sensor cables	These harnesses connect the concentrate supply sensors. The sensing method is determined by the installer and the sensor or high/low switches are installer-supplied.
17	Sensor cable	This connects to the water discharge pressure transducer on the water pump.
18	Manual override power relay cable	This connects to the power relay that disables power to the DLAs.
19	Manual override panel cable	This connects the manual override panel to the control box.
20	Power relay cable	This supplies power to the power relay panel and requires a 5 A circuit breaker—installer-supplied.
21	PLC cable	This supplies power to the PLC and requires a 5 A circuit breaker—installer-supplied.
22	Breaker box	This organizes the circuit breakers and distributes apparatus power—installer-supplied.
23	Power relay panel—200 A	This is a 200 A power relay that enables and disables power to the DLAs.
24	DLA cable	This supplies power to the DLA and requires a 10 A circuit breaker per DLA—installer-supplied.

	Feature	Description
25	Priming valve power cable	This connects the priming valve to power and CAN control.
26	Terminating resistor	This terminates the CAN connection on the last node controller in the CAN chain.
27	Sensor cable	This connects the flowmeter (magnetic or paddlewheel) to the node controller.
28	Valve motor cable	This connects the DLA control valve to the node controller.

Notes

Plumbing Layout

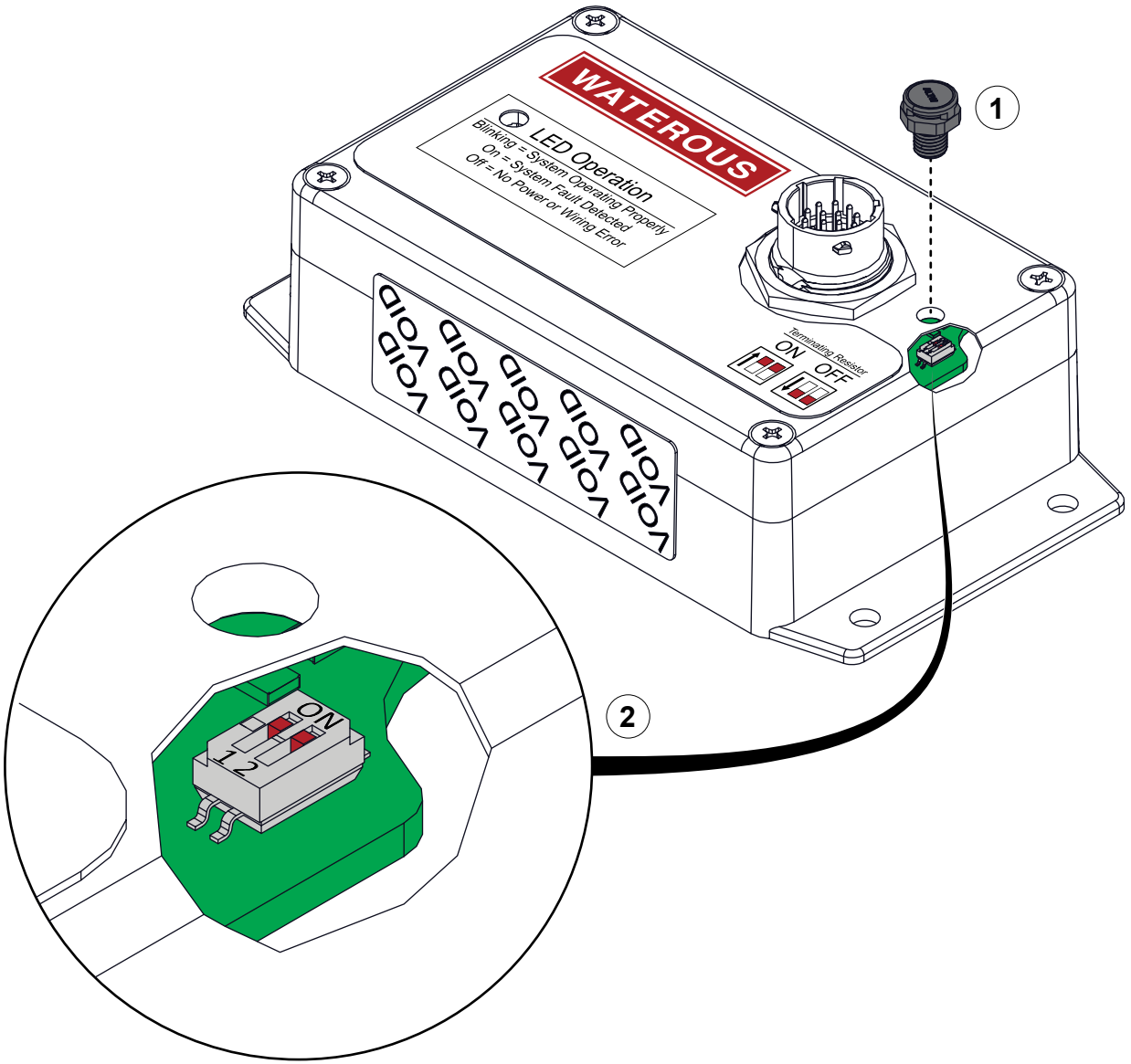
Use the illustration as a guide to lay out the plumbing connections for your application.



Plumbing Layout

	Feature	Description
1	Concentrate supply line	This transports concentrate around the system.
2	Supply tank fill line	This allows you to fill the on-board tank from an auxiliary source.
3	Priming line	This evacuates air from the concentrate pump inlet as the system primes before operation.
4	Priming bypass line	This prevents contamination to the concentrate during testing and training. When water is substituted for concentrate during training or testing and there is concentrate in the supply tank, this bypass valve diverts water from the supply tank to prevent concentrate contamination. It is also important to make sure that you drain any remaining water in the line before priming the system with concentrate.
5	Auxiliary supply line	This allows you to source concentrate from an external source.
6	Low-flow bypass line	This returns a portion of the pumped concentrate in the supply line back to the pump inlet when the desired concentrate output requires the pump to operate at an rpm that is lower than its capabilities.
7	Transfer line	This line allows you to transfer or relay concentrate to another location.
8	DLA	This manages the concentrate injected into the solution-capable discharge.
9	Solution-capable discharge	This transports clear water and is capable of creating a foam solution.

Setting the On-Board Concentrate Select Valve Terminating Resistor



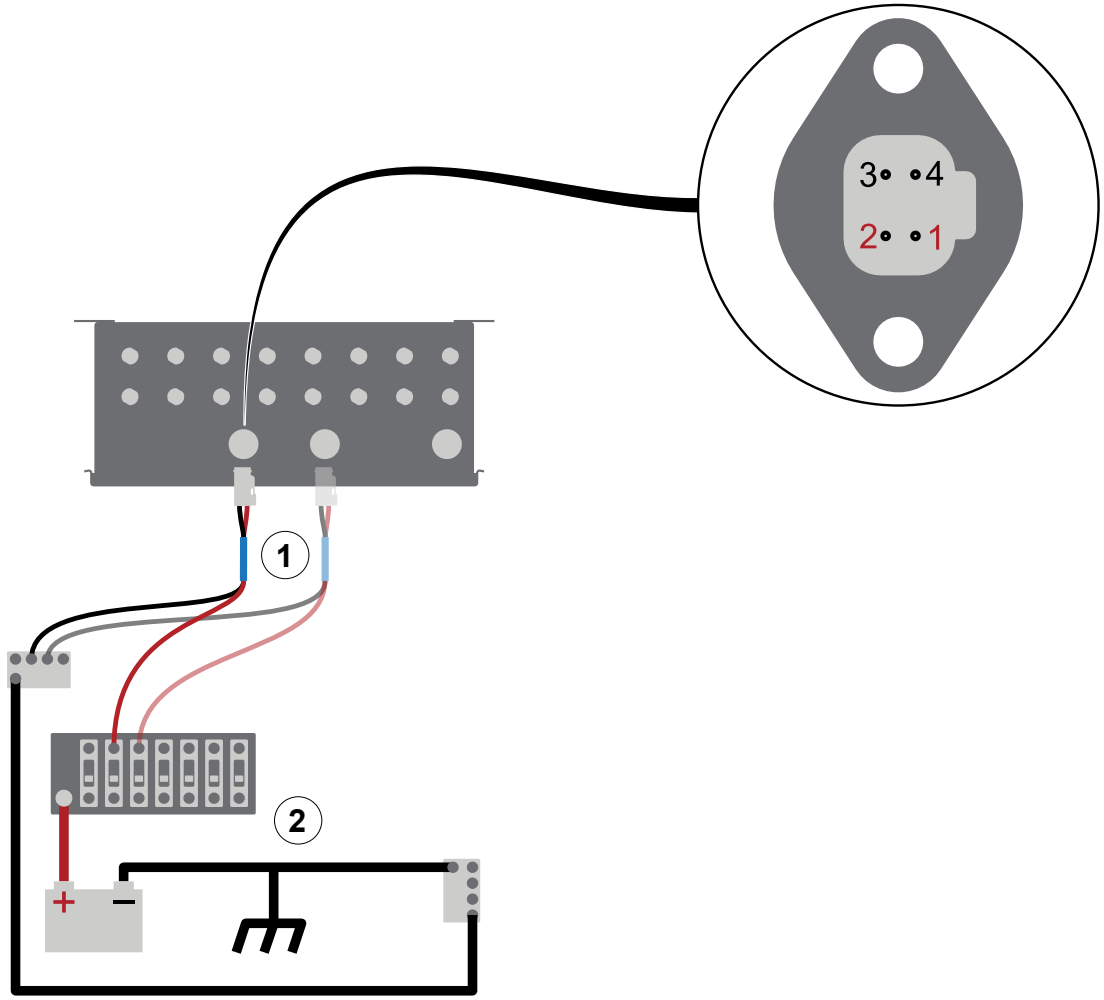
Use the illustration and instructions to set the CAN terminating resistor on the on-board concentrate select valve. If this is the last component in the CAN network, terminate the CAN signal and do not use an external terminating resistor.

1. Remove the vent plug.
2. Set the terminating resistor dip switches according to your application:
   - Terminate CANbus = 

   - Pass through CANbus = 

3. Install the vent plug.

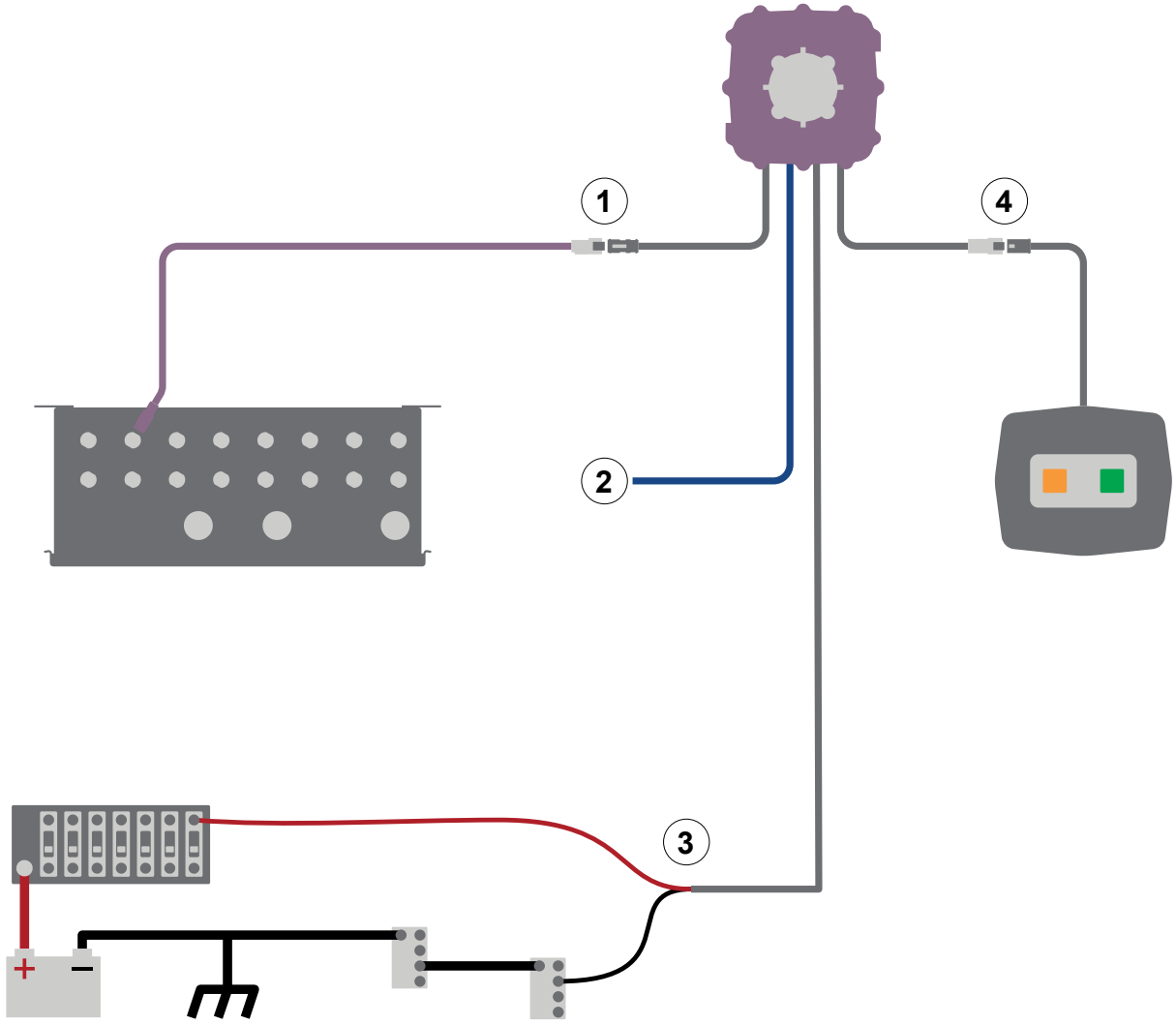
Connecting Power to the Control Box



Use the illustration and instructions to power the control box. All hardware required to power the control box is provided by the installer. Before you begin, determine the number of PLCs within the control box and prepare a wire harness for each.

1. Locally source a DT06-2S connector, its components, and the appropriate wire for each plug. Connect the 2 Vcc wires to pin 1 and pin 2. Connect the ground wires to pin 3 and pin 4.
2. Connect the Vcc wires from each PLC wire harness to a separate 5 A circuit breaker and the ground wires to chassis ground.

Installing the On-Board Concentrate Select Valve



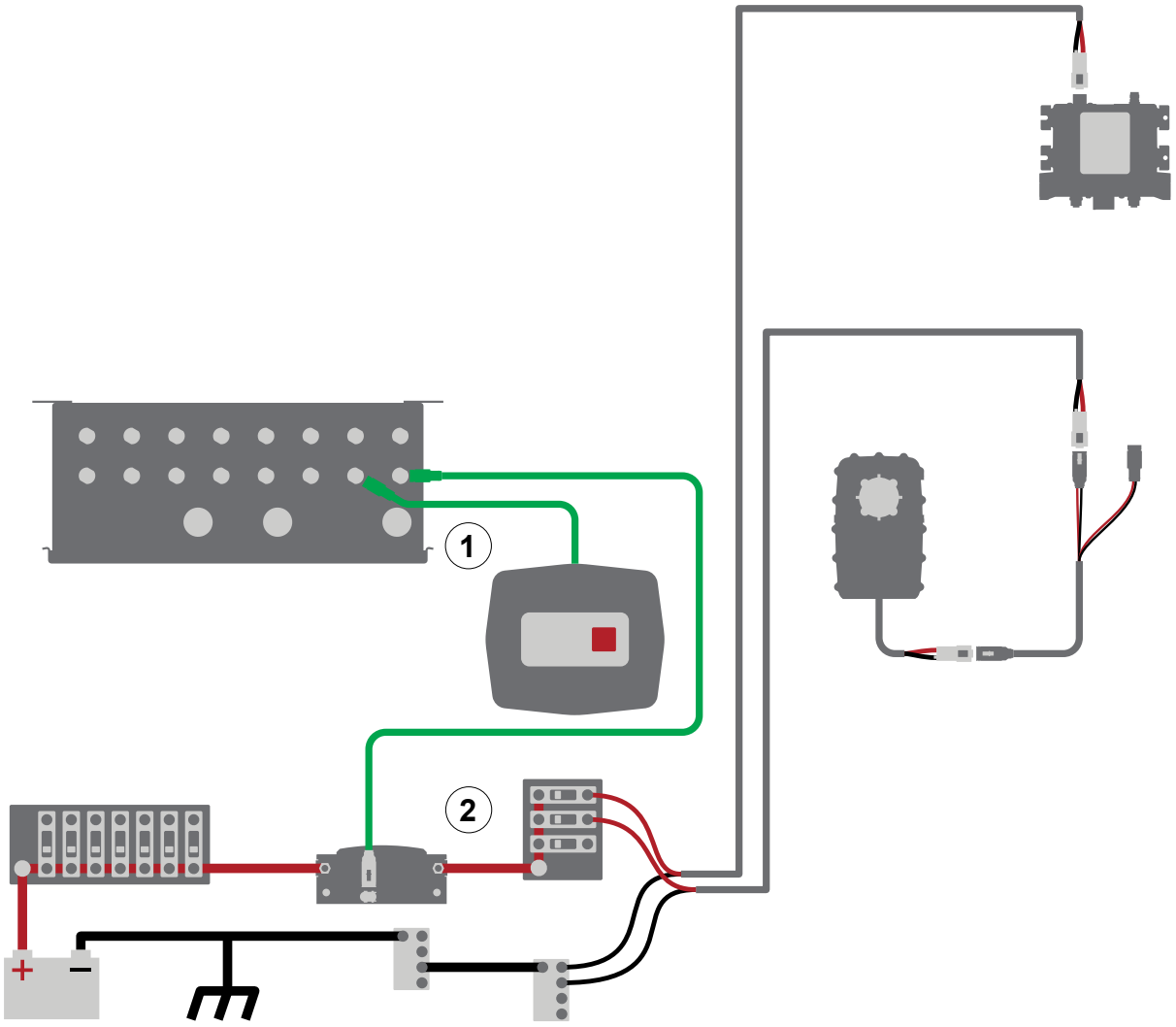
Use the illustration and instructions to connect the on-board concentrate select valve and concentrate source panel.

1. Connect the CAN connector to the control box—remote I/O connector.
2. Connect the solenoid valve to the compressed air supply.

   Note: *A clean and dry air supply is required for consistent operation.*
3. Connect the power wire to power and ground from the apparatus:
   - Power (12–24 Vdc) = red or white
   - Ground = black
4. Connect the panel connector on the valve to the concentrate source panel.

   Note: *If your application requires an additional pressure mode switch, use the optional splitter cable to connect it to the system.*
5. Adjust the regulator valve so that the on-board concentrate select valve fully opens or closes between 3 and 5 seconds.

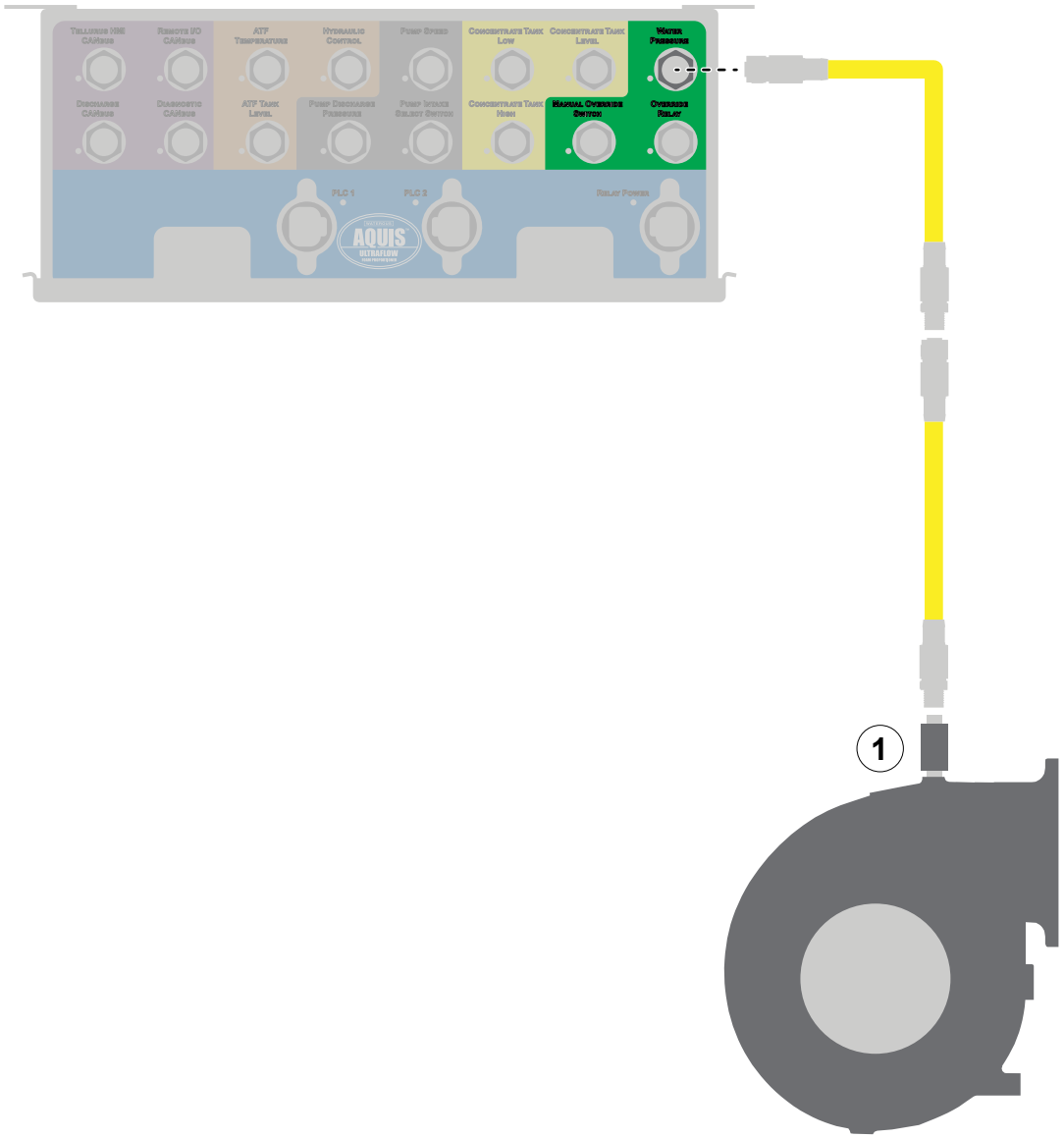
Installing the Optional Manual Override



Use the illustration and instructions to connect the optional manual override panel and power relay panel.

1. To install the manual override panel, do the following:
   - Install the manual override panel onto the apparatus.
   - Connect the cable to the control box—manual override switch connector.
2. To install the power relay panel, do the following:
   - Install the power relay panel onto the apparatus.
   - Connect the power input post to apparatus power.
   - Connect the power output post to the DLA breaker box.
   - Use the manual override power relay cable to connect the power relay panel to the control box—override relay connector.
3. After overriding and manually repositioning the valve, check that it is operating as expected. If needed, refer to the manufacturer's instructions to recalibrate the valve actuator to a new home position.

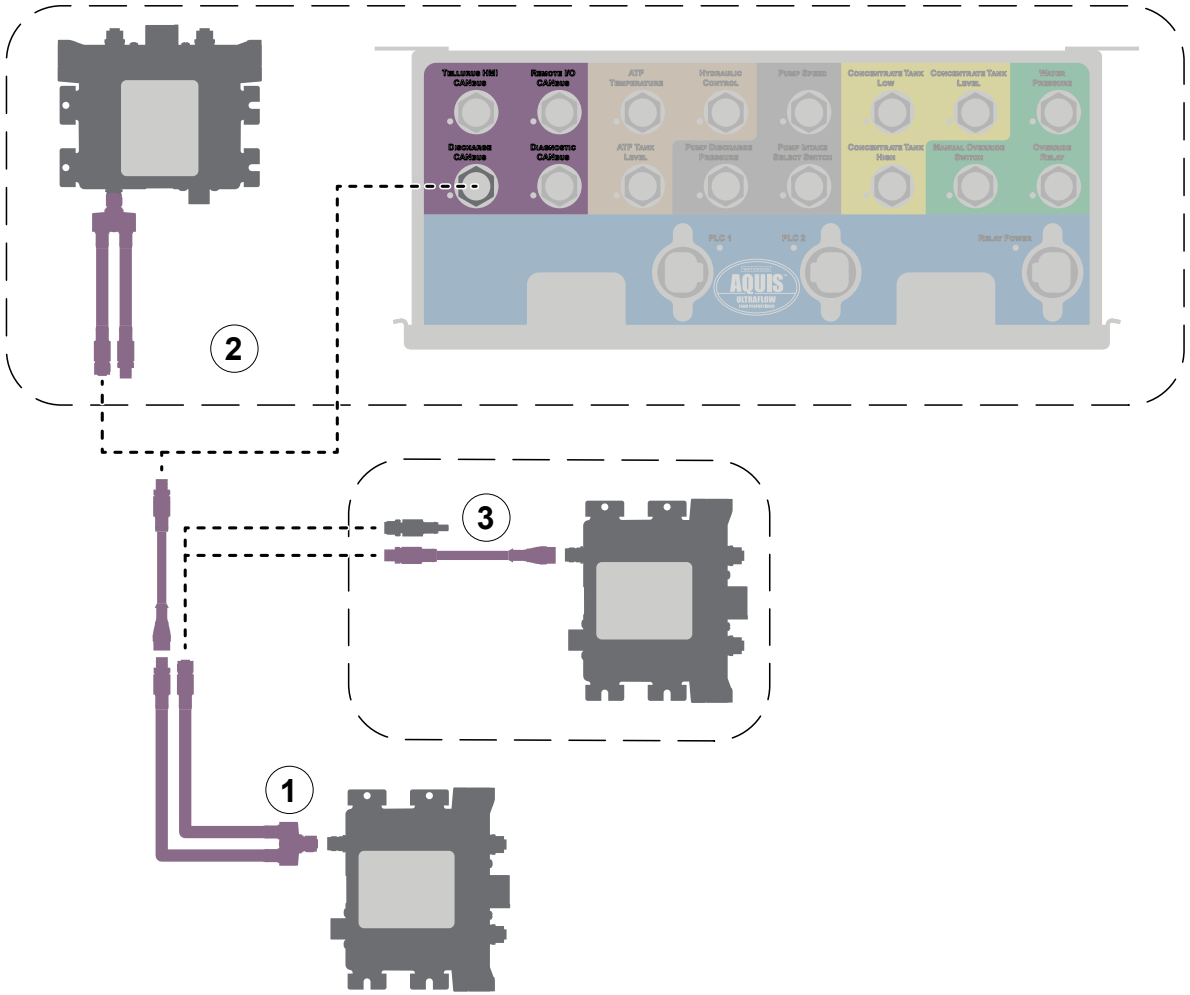
Connecting the Pump Discharge Pressure Sensor



Use the illustration and instructions to connect the pump discharge pressure sensor.

1 Use a sensor cable to connect the pump pressure sensor to the control box—pump pressure connector.

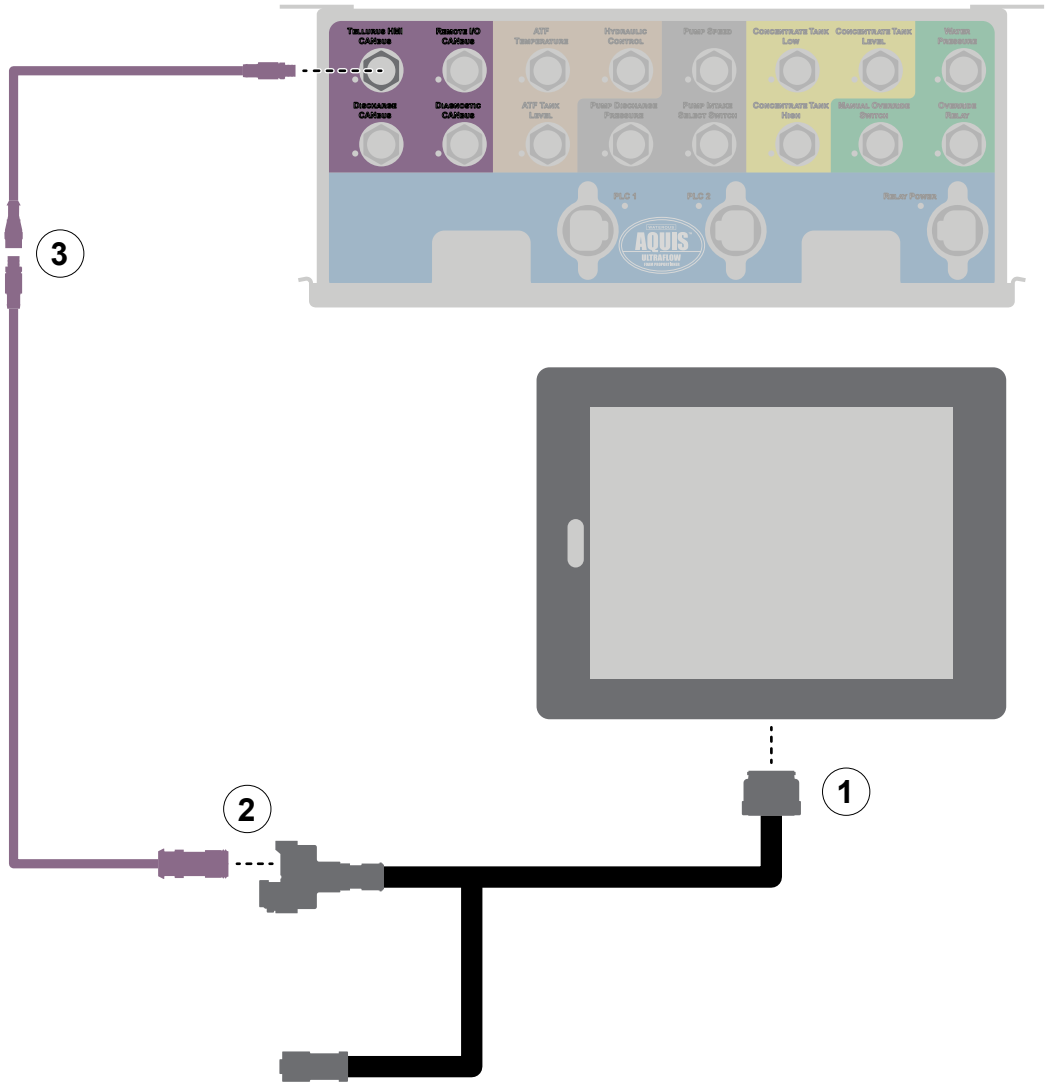
Connecting the Node Controllers



Use the illustration and instructions to connect the node controllers to the control box.

1. Connect the CAN cable splitter to the CAN connector on the node controller.
2. Connect the CAN cable splitter to an upstream node controller or to the control box—discharge CANbus connector.
3. Connect the CAN cable splitter to the next downstream node controller, or to a terminating resistor if this is the last downstream node controller in the system.

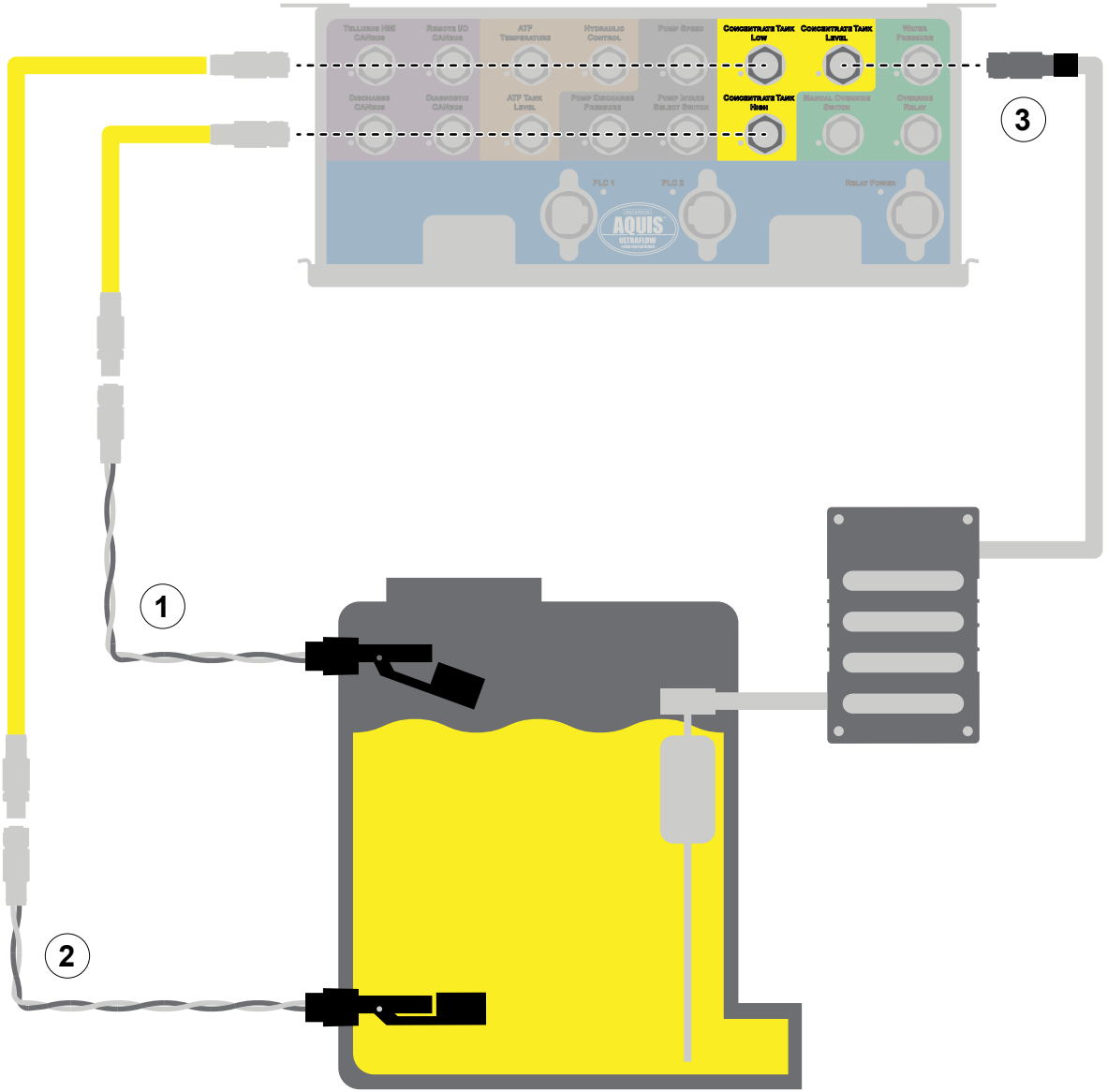
Connecting the Control Panel



Use the illustration and instructions to connect the control panel to the control box.

1. Connect the compatible connector on the Tellurus HMI cable to the control panel connector.
2. Connect the compatible connector on the Tellurus HMI cable to the Tellurus CAN cable.
3. Connect the Tellurus CAN cable to the control box—Tellurus HMI CANbus connector.

Connecting the Concentrate Supply Level Sensors

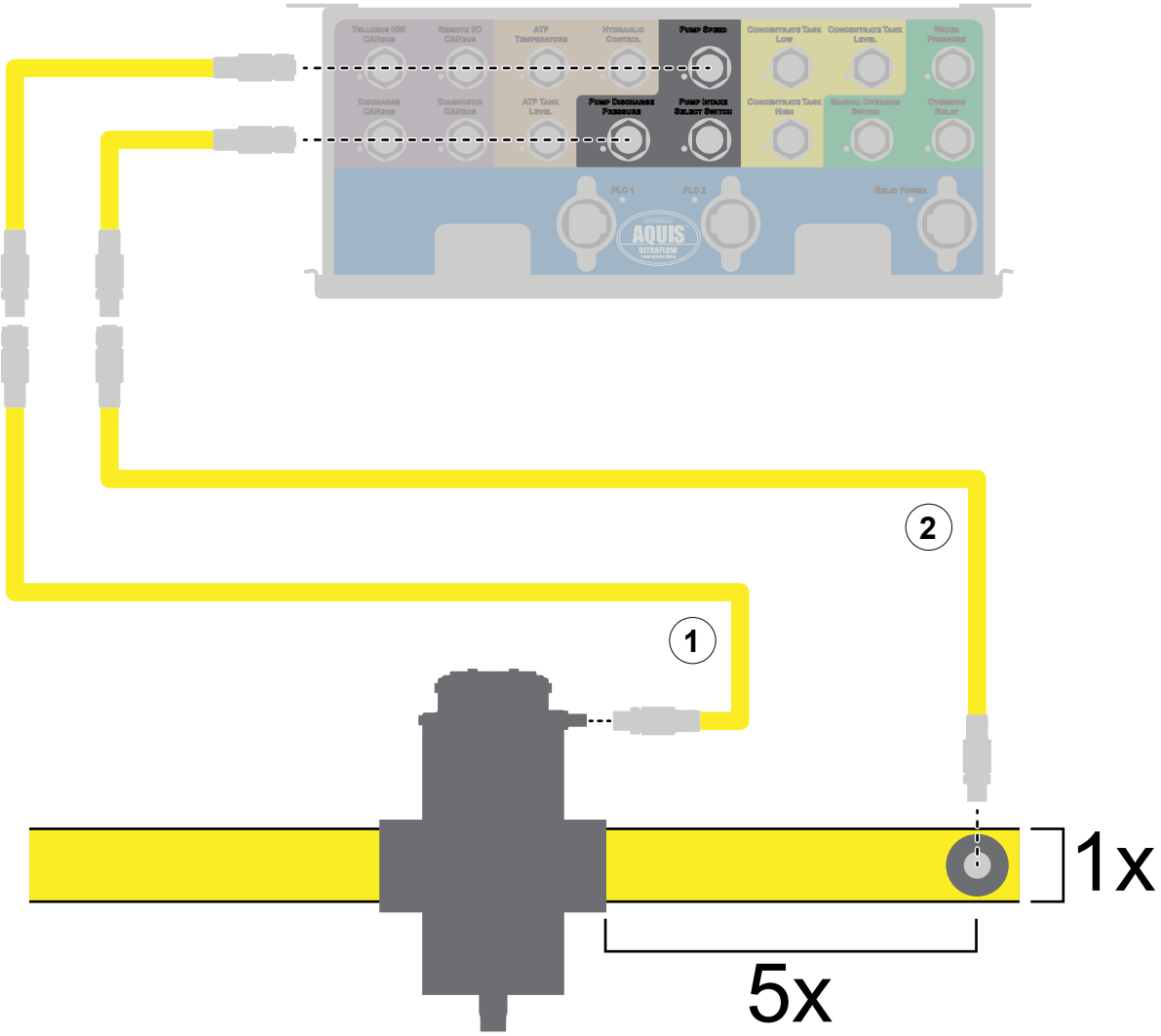


Use the illustration and instructions to connect the concentrate supply level sensors.

1. Use a sensor cable to connect the tank high switch to the control box—concentrate tank high connector.
2. Use a sensor cable to connect the tank low switch to the control box—concentrate tank low connector.
3. Optionally, you can install a locally sourced tank level sensor and panel indicator. Use the field-wireable M12 connector and shrink wrap, supplied in the install kit, to provide an environmental seal between the connector and installer-provided cable. To assemble the cable, refer to: **"Concentrate Tank Level Cable—Installer-Supplied" on page 40.**

   Note: *Refer to the manufacturer's instructions to install the sensor and indicator.*

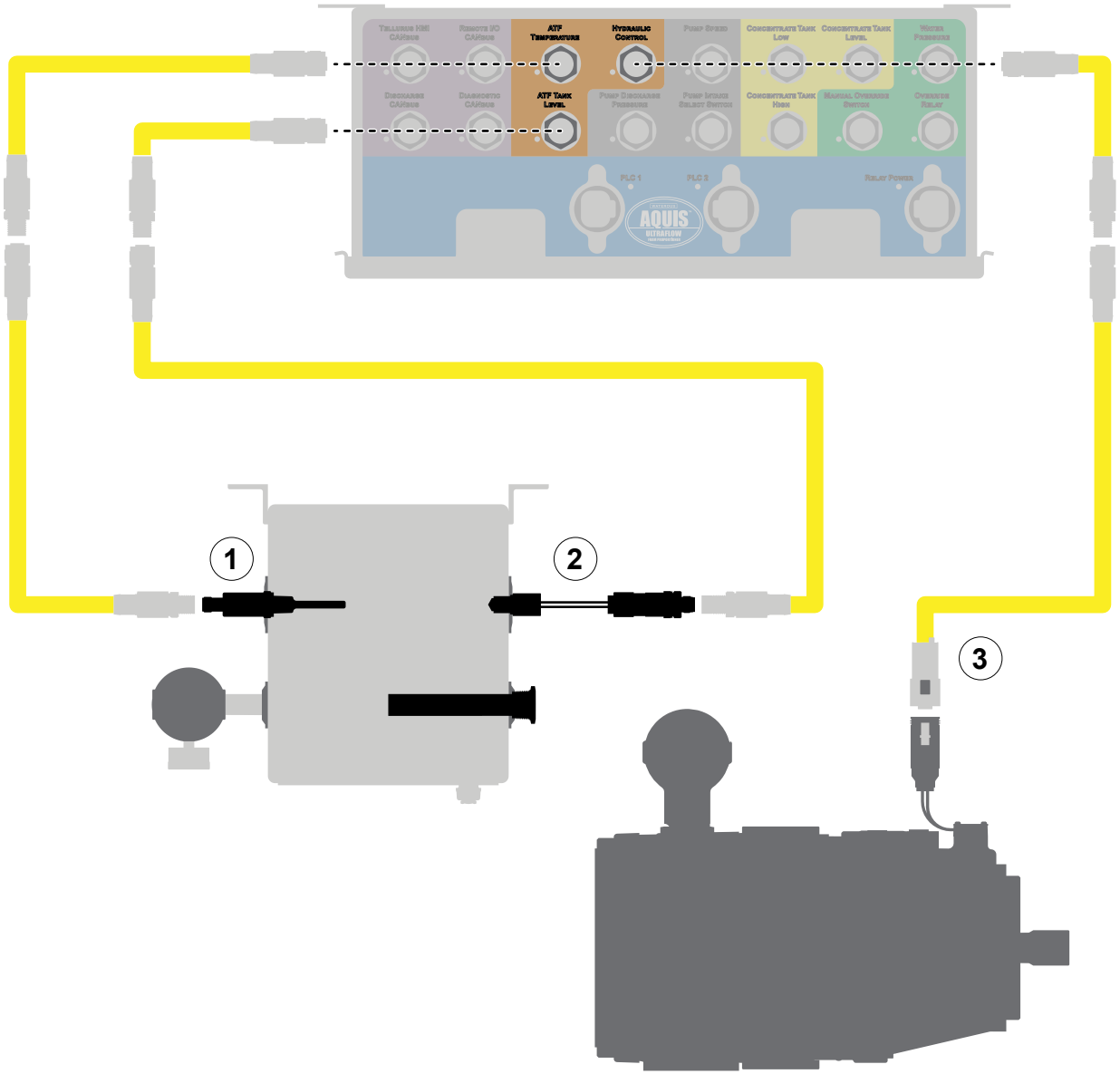
Connecting the Concentrate Pump and Pressure Sensor



Use the illustration and instructions to connect the concentrate pump speed sensor and concentrate line pressure sensor to the control box.

1. Use a sensor cable to connect the concentrate pump speed sensor to the control box—pump speed connector.
2. Use a sensor cable to connect the concentrate line pressure sensor to the control box—pump discharge pressure connector.

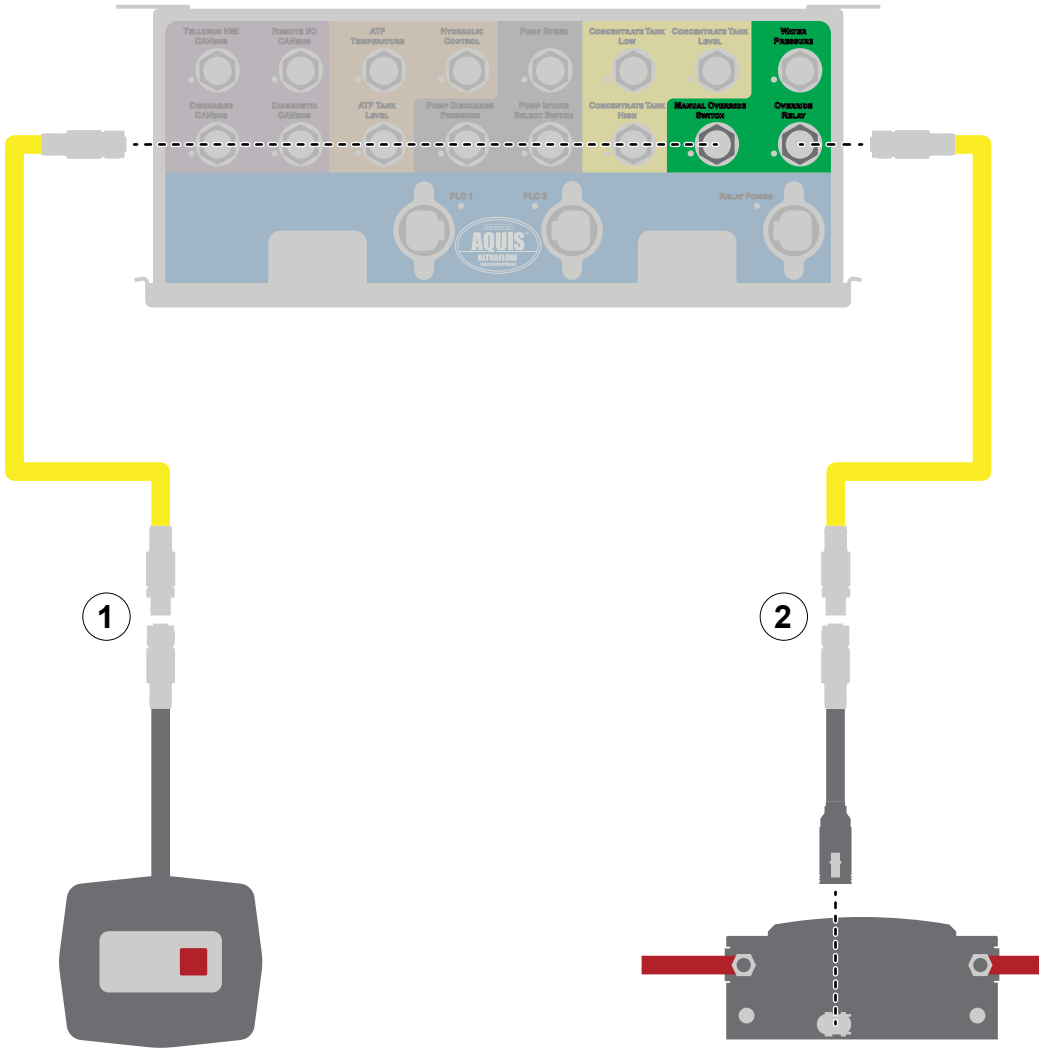
Connecting the Hydraulic Sensors and Hydraulic Pump



Use the illustration and instructions to connect the hydraulic sensors and hydraulic pump to the control box.

1. Use a sensor cable to connect the temperature sensor to the control box—ATF temperature connector.
2. Use a sensor cable to connect the level sensor to the control box—ATF tank level connector.
3. Use the hydraulic pump cable to connect the hydraulic motor to the control box—hydraulic control connector.

Connecting the Manual Override



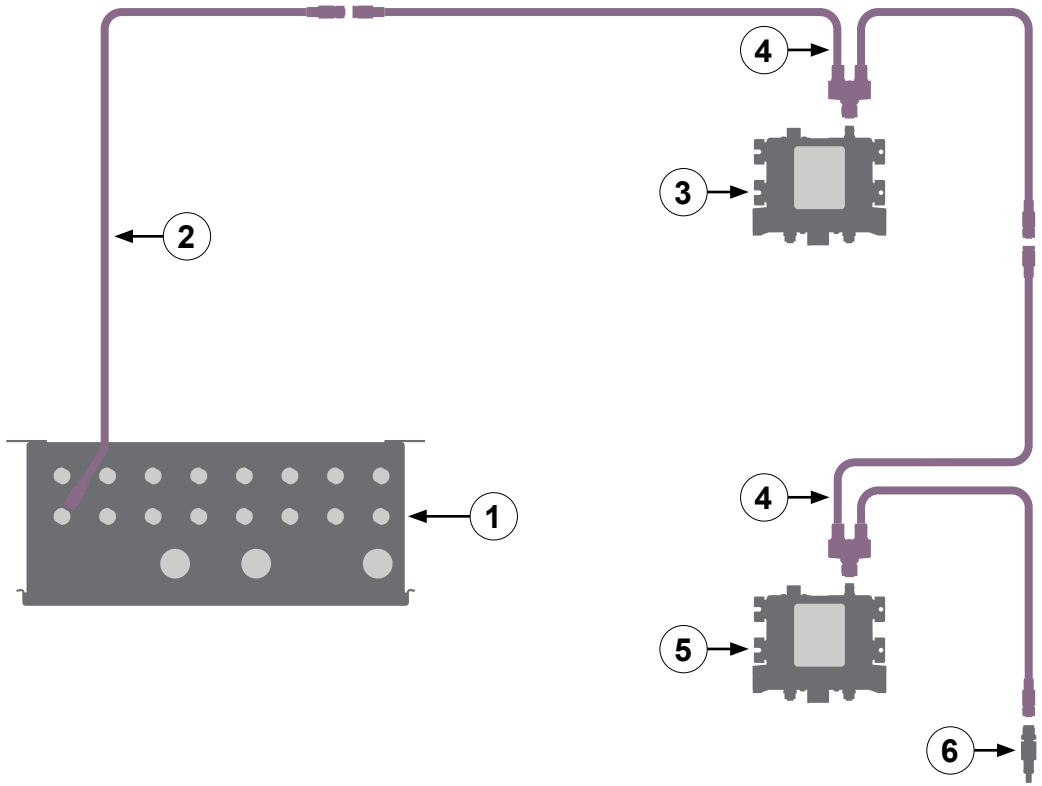
Use the illustration and instructions to connect the optional manual override panel and power relay panel.

1. Use the cable on the manual override panel to connect the panel to the control box—manual override switch connector.
2. Use the manual override power relay cable to connect the power relay panel to the control box—override relay connector.

Notes

Connecting to a Node Controller

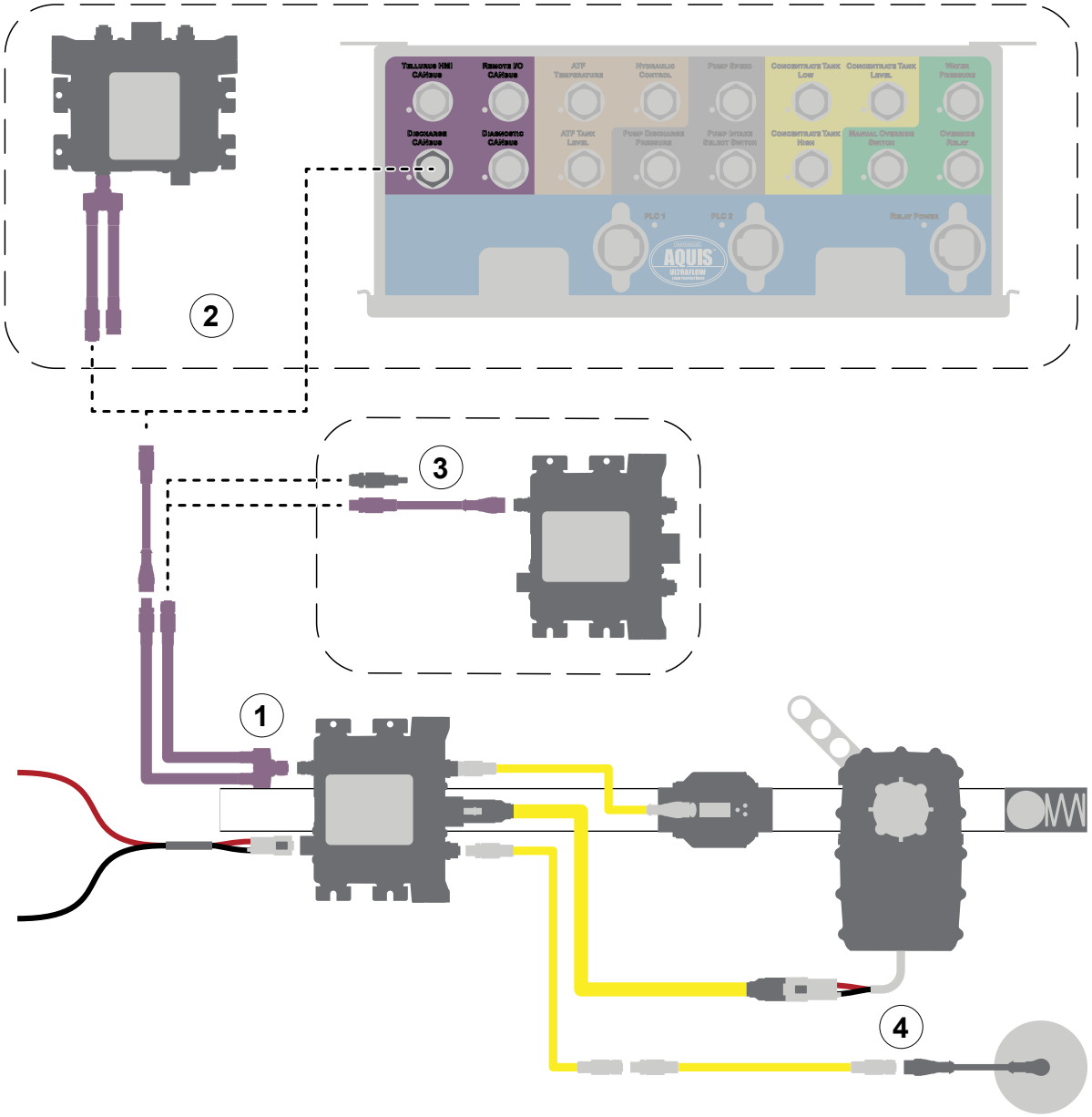
Use the illustration and table to understand the various cable connections between a node controller and the control box.



Connecting to a Node Controller

	Feature	Description
1	Control box	This connects to various components in the system and contains the PLCs.
2	CAN cable	This connects the node controllers to one another and the control box.
3	Node controller	This connects to the concentrate control valve, flowmeters, and additional DLAs.
4	CAN cable splitter	This passes CAN commands to the next node controller in the chain.
5	Node controller—last in the system	This is the last node controller in the system, which requires a terminating resistor.
6	Terminating resistor	This terminates the CAN signal and is installed on the last node controller in the system.

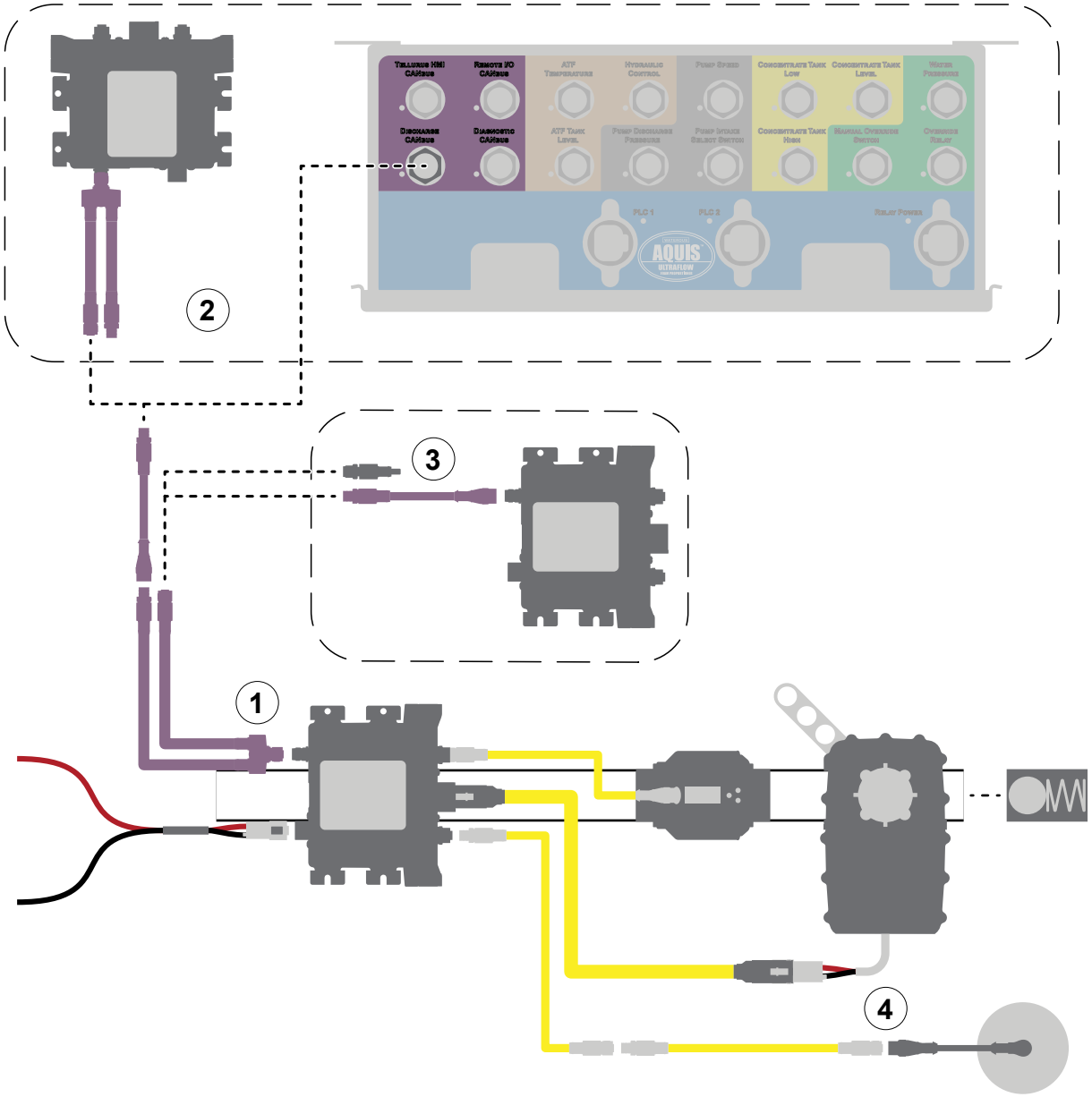
Connecting the 1-Inch DLA and Paddlewheel Flowmeter



Use the illustration and instructions to connect the 1-inch DLA to the control box and the paddlewheel flowmeter to the node controller.

1. Connect the CAN cable splitter to the CAN connector on the node controller.
2. Connect the CAN cable splitter to an upstream node controller or to the control box—discharge CANbus connector.
3. Connect the CAN cable splitter to the next downstream node controller, or to a terminating resistor if this is the last downstream node controller in the system.
4. Use a sensor cable to connect the paddlewheel flowmeter to the node controller.

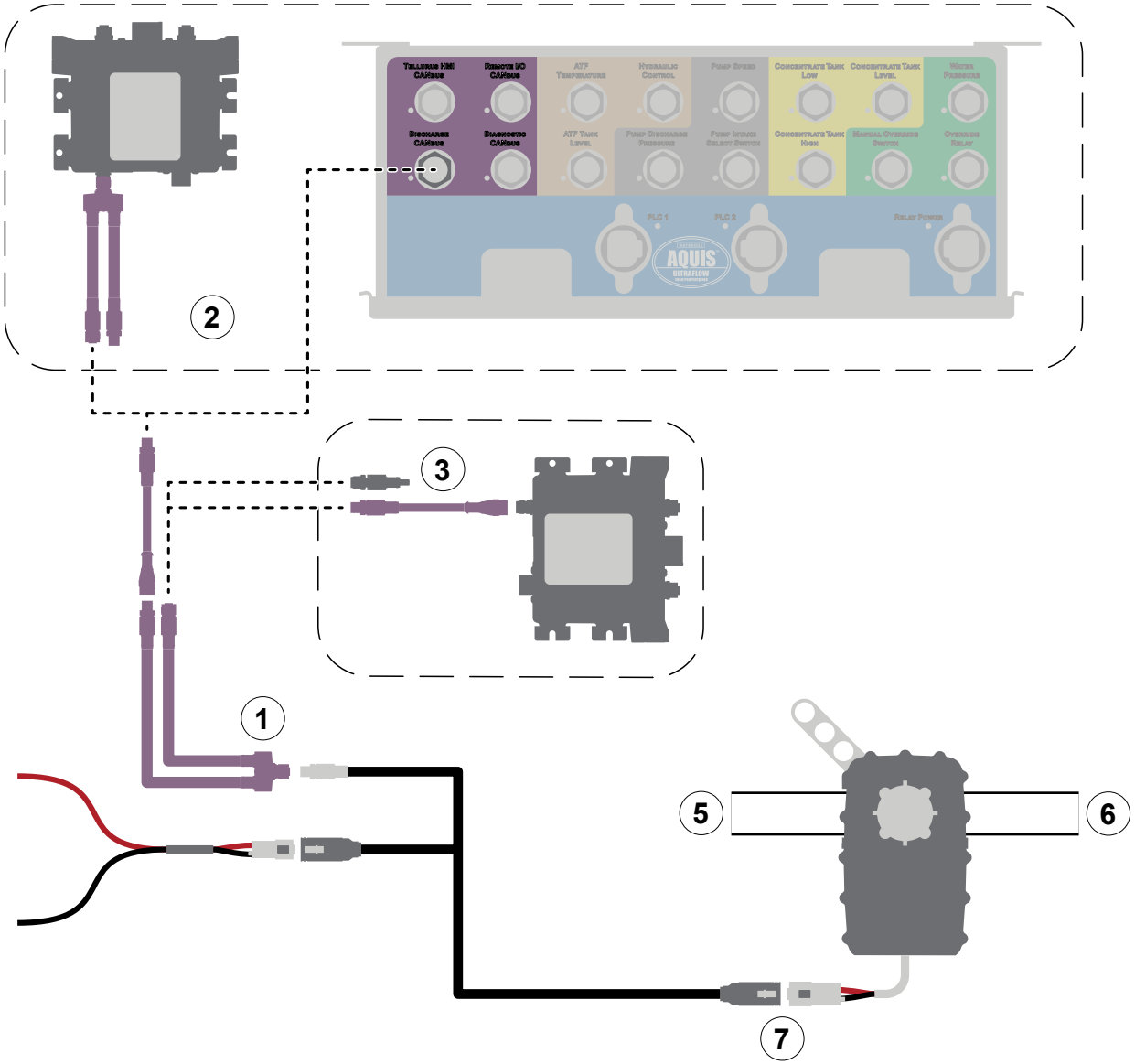
Connecting the 2-Inch DLA and Paddlewheel Flowmeter



Use the illustration and instructions to connect the 2-inch DLA to the control box and the paddlewheel flowmeter to the node controller.

1. Connect the CAN cable splitter to the CAN connector on the node controller.
2. Connect the CAN cable splitter to an upstream node controller or to the control box—discharge CANbus connector.
3. Connect the CAN cable splitter to the next downstream node controller, or to a terminating resistor if this is the last downstream node controller in the system.
4. Use a sensor cable to connect the paddlewheel flowmeter to the node controller.

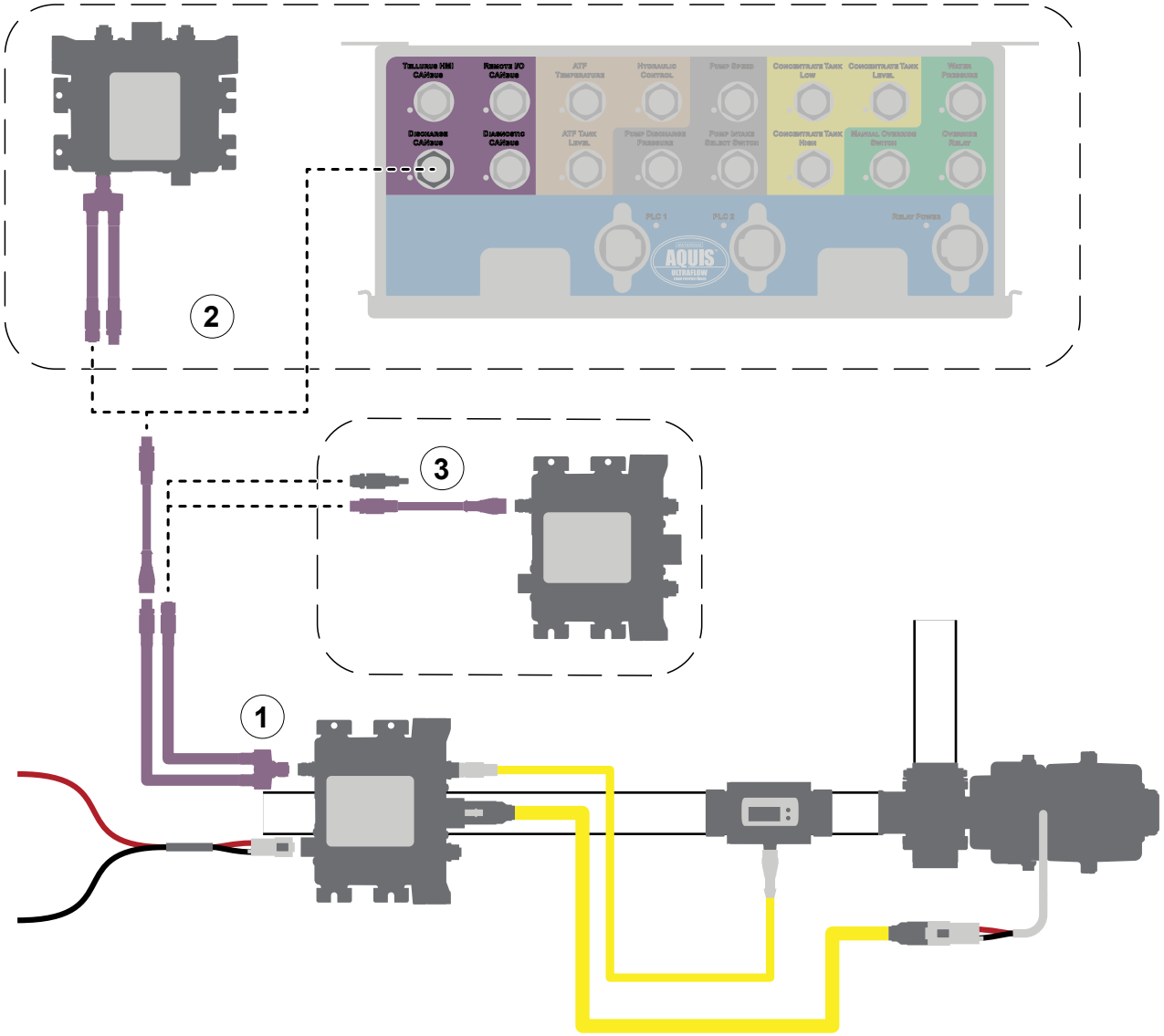
Connecting the Priming Valve



Use the illustration and instructions to connect the priming valve to the control box.

1	Connect the CAN cable splitter to the CAN connector on the priming valve power cable.
2	Connect the CAN cable splitter to an upstream node controller or to the control box—discharge CANbus connector.
3	Connect the CANbus splitter cable to next downstream node controller, or to a terminating resistor if this is the last downstream node controller in the system.
4	Locally source a DT06-2S connector and an appropriate cable to connect apparatus power to the priming valve motor cable. Power the priming valve motor through a 10 A circuit breaker.
5	Connect the priming valve inlet to the discharge side of the concentrate pump.
6	Connect the priming valve outlet to the concentrate supply tank through the installer-supplied prime-bypass valve.
7	Connect the priming valve motor cable to the priming valve.

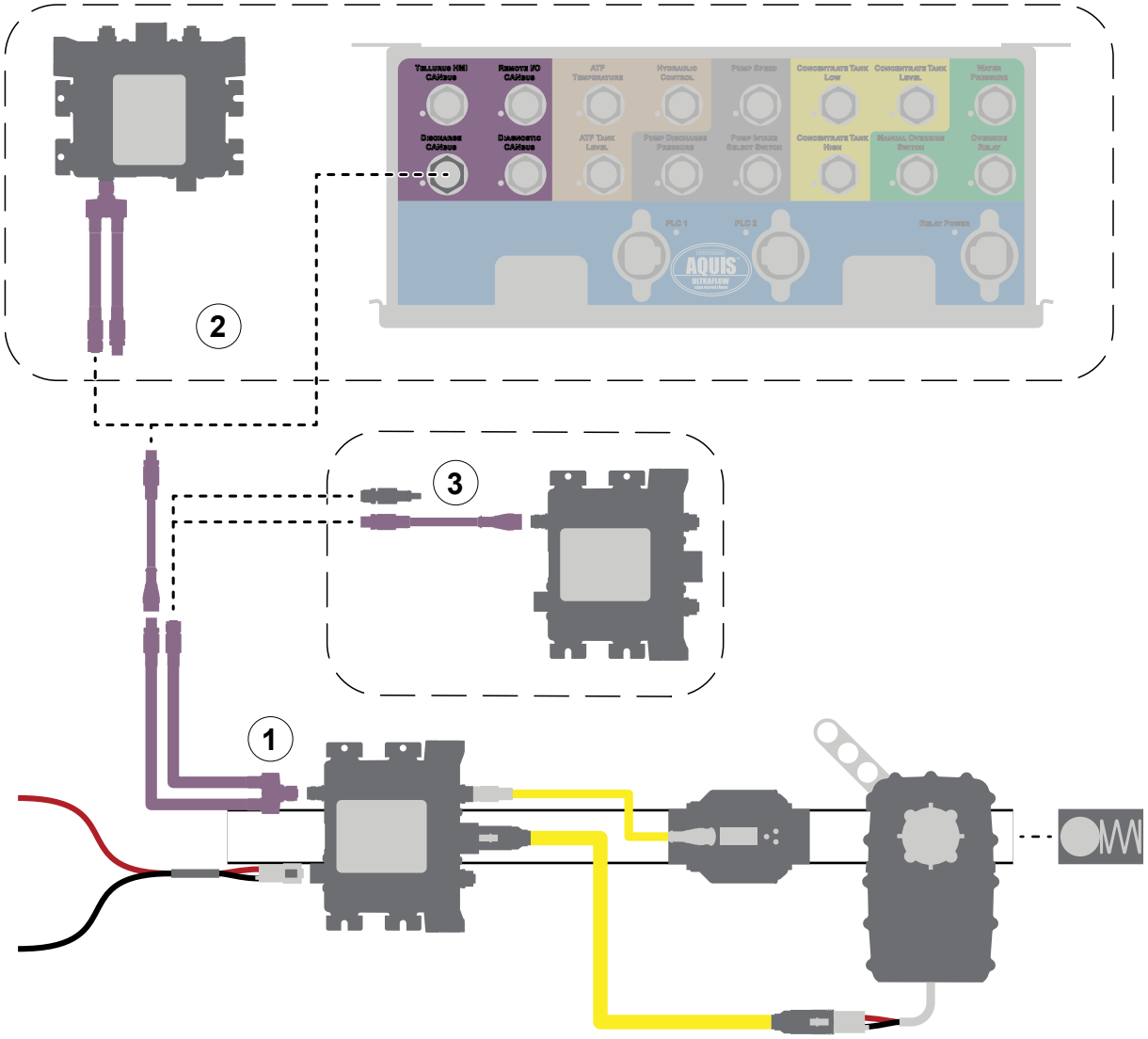
Connecting the Low-Flow Bypass Line



Use the illustration and instructions to install the low-flow bypass line. To connect to the apparatus plumbing, refer to: **"Plumbing Layout" on page 48.**

1	Connect the CAN cable splitter to the CAN connector on the node controller.
2	Connect the CAN cable splitter to an upstream node controller or to the control box—discharge CANbus connector.
3	Connect the CAN cable splitter to the next downstream node controller, or to a terminating resistor if this is the last downstream node controller in the system.

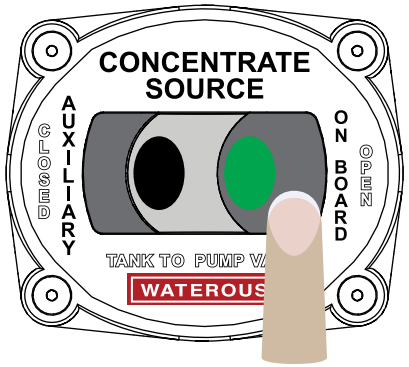
Connecting the Supply Tank Fill Line



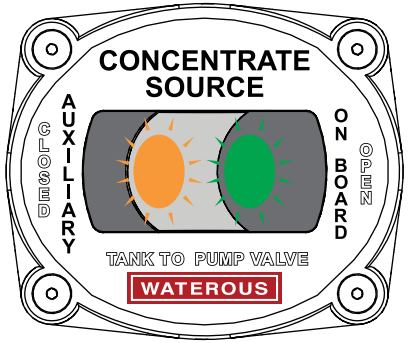
Use the illustration and instructions to install the supply tank fill line. To connect to the apparatus plumbing, refer to: **"Plumbing Layout" on page 48.**

1	Connect the CAN cable splitter to the CAN connector on the node controller.
2	Connect the CAN cable splitter to an upstream node controller or to the control box—discharge CANbus connector.
3	Connect the CAN cable splitter to the next downstream node controller, or to a terminating resistor if this is the last downstream node controller in the system.

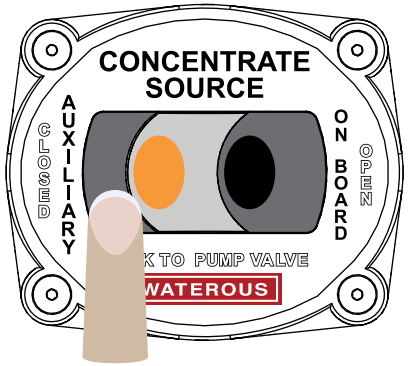
Using the Concentrate Source Panel



1



2



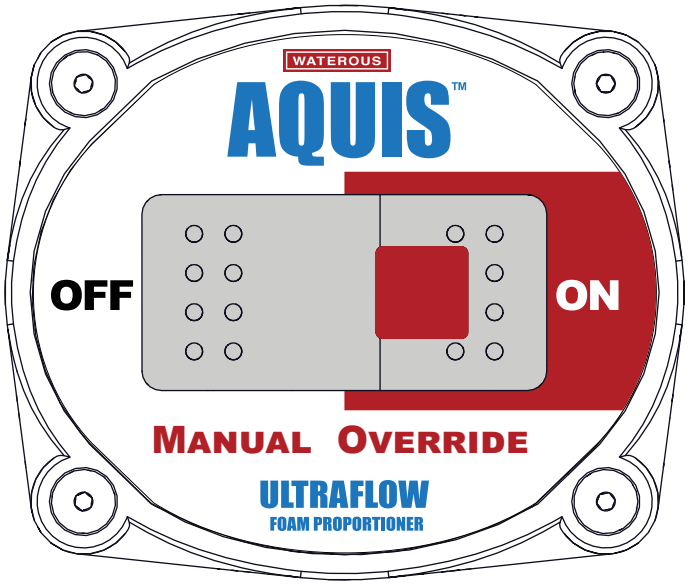
3

Use the illustrations and instructions to manually select the concentrate source. The default state of the panel is *AUXILIARY*, which indicates that the on-board concentrate select valve is closed.

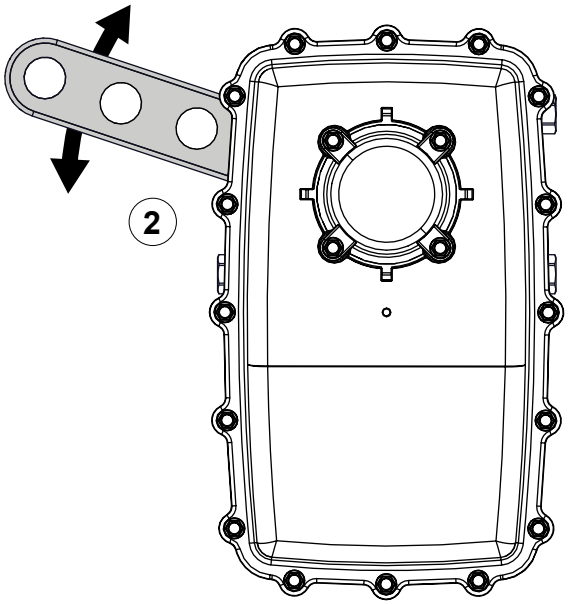
1. Enable the on-board concentrate source by pressing the *ON-BOARD* switch. The green LED flashes as the valve opens and fully illuminates as the selection is achieved.
2. If the system is unable to achieve the on-board selection, both LEDs will flash and attempt to return to *AUXILIARY*.

   Depending on the error condition, the on-board concentrate source can still be selected by pressing and holding the switch for three seconds, or by tapping the switch three times in three seconds. The system will ignore the proximity sensors and attempt to open the valve again.
3. Enable the auxiliary concentrate source by pressing the *AUXILIARY* switch. The amber LED flashes as the valve closes and fully illuminates as the selection is achieved.

Enabling the Manual Override



1



Use the illustrations and instructions to activate the manual override.

Note: *After manually repositioning the valve actuator, you may need to recalibrate it. Refer to the manufacturer's instructions to recalibrate the home position for the valve.*

It is recommended to test the manual override and DLA operation on a regular basis as part of a routine truck inspection.

1	Use the switch to activate the manual override.
2	Slowly move the valve actuator to the desired position.

Maintenance Schedule

No scheduled maintenance is required for the control system. However, it is recommended that you periodically inspect the system to reveal excess debris buildup, worn components, or any developing leaks. Consider environmental conditions, hours of operation, and other factors specific to your application to develop a suitable maintenance schedule.

WATEROUS

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