ISF-304-00
ISO4

Installation Guide

Operation:

The ISO4 signal control device allows up to four irrigation controllers or other control devices to share one flow sensor by electrically isolating each flow output. The ISO4 is compatible with all CST flow sensors and most (2 wire) flow sensors producing a pulse output proportional to flow rate. It is not compatible with Hunter HFS devices.

ISO4 also provides a single output to operate a solenoid operated master valve, or other device, when operated by multiple controllers.

In addition, four control inputs are provided allowing the device to selectively block flow outputs to inactive controllers during operating cycles.

Example: Many irrigation controllers can read and react to unscheduled flow events. The control inputs allow the operating controller to switch off the flow signal to the inactive controllers preventing false alarms.

Control Logic:

If no 24 VAC control signal is applied to any of the four control inputs then all flow output channels are active. If 24 VAC is applied to control input A then flow output A is active and flow signals are blocked to flow outputs B,C, and D. If 24 VAC is applied to control input B, then flow output B is active but flow signals are blocked to flow outputs A, C and D. The same logic condition repeats for the remaining two control inputs. If more than one controller is active at the same time and 24 VAC is applied to more than one control input, then the corresponding flow outputs are active and blocked to the remaining inactive controller outputs. If all four control inputs receive 24 VAC, then all four flow outputs are active.

Simultaneously, the CONTROL IN terminals also operate the master valve. The 24 VAC Normally Closed (NC) Master Valve output from each controller is used as the control input to allow or block FLOW OUT signals. If a NC master valve is used, this also controls the operation of the master valve. When a NO master valve is used, an additional wire connection is made from a Pump Start terminal on the controller to the PS terminal on the appropriate control input. If the controller model used does not have a PS terminal, then check with the manufacturer for an alternative connection.

All flow and control I/Os are electrically isolated from each other and the power supply.

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Dimensions:

4” (101 mm) W X 7.125” (181 mm) L including mounting tabs X 1.25” (32 mm) H including height of terminal connectors

Enclosure

NEMA1 ABS enclosure with visible LEDs and exposed terminal connectors.

Electrical Specifications:

Power Supply Voltage 12- 24 VAC or VDC

Current Draw: 35 mA @ 24 VAC, not including load of the master valve solenoid

Signal Input: Up to 24 V pulse (~4.5 volt switch level)

Signal Output: Open collector (10 mA

Mounting Instructions:

The ISO4 is mounted in an NEMA 1enclosure rated for indoor use or protected locations. The preferred location is inside a controller pedestal or wall mounted electrical enclosure. The enclosure may be attached to any flat surface, vertical or horizontal, using mechanical hardware or double sided adhesive tape. Consideration should be given to wiring the device and viewing the LEDs for operating status.

Wiring Instructions

In most applications, the ISO4 is mounted in the pedestal or wall enclosure of one irrigation controller. Often, the other controllers are installed in the same location and can be easily wired to the I/O terminals through connecting conduits or wire troughs. If the other connected devices are not at the same location as the ISO4, be sure to install the correct number of conductors, type and size of wire from each device to the ISO4

- Flow sensor connection: a twisted pair of wires in a shielded cable rated for direct burial
- NC master valve connection: two wires with different color direct burial insulation sized to operate the valve solenoid at the distance from the controller
- NO master valve connection: three separate wires with different color direct burial insulation sized as above.

Caution: Make sure power is OFF to all components before wiring.
In addition to the hazard of electrical shock, mis-wiring the ISO4
with power ON may damage any or all of the connected devices.

- This device will work on either AC or DC power with nominal voltage between 12 and 24 volts. Many irrigation controllers are equipped with 24 VAC auxiliary output terminals. This may be used to power the ISO4 but check the manufacturers specifications to make sure it can supply enough current to operate the ISO4 plus the master valve solenoid.
- As an alternative, install a separate 24 VAC Power Supply with a sufficient current rating.
- If using in a control panel application where DC power is supplied, observe circuit polarity.
- The ISO4 uses screwless, spring type terminal connections. Use solid or stranded wire gauge size #14 to #20.

EACH OF THESE NUMBERED INSTRUCTIONS IS DIAGRAMED ON THE FOLLOWING PAGES

Power Supply

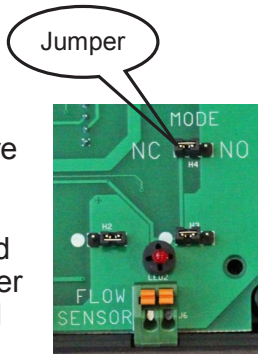
1. Supply power the POWER terminals on the upper left side of the ISO4. Observe polarity by connecting the Hot or Load (+) wire from the supply to the **L** terminal and the Neutral or Common (-) wire to the **C** terminal.

Flow Sensor

2. Connect field wiring from the flow sensor to FLOW SENSOR IN terminals on the lower left side of the unit. Observe electrical polarity.

3. The four pair terminal strip labelled FLOW OUT contains the isolated terminal pairs labeled A, B, C, and D to connect to the irrigation controller's flow sensor inputs. Connect sensor pair A to the first controller, sensor pair B to the second controller and so on, observing polarity.

Master Valve



The ISO4 will isolate either a NC or NO master valve. The selection is made by the position of a jumper on the circuit board. Take the top off the enclosure by removing the four black screws in the corners of the top to expose the circuit board. Locate the jumpers near the FLOW SENSOR terminals. The default selection is to operate a NC master valve (solenoid must be energized to open the valve). To select NO master valve operation, pull the black jumper straight up off the left and center pins. Then push it down onto the center and right pins.

4. Connect field wiring from the master valve to the MASTER VALVE OUT terminals on the lower right side of the ISO4. There is no polarity to these connections.

Control Inputs

These 12 terminals labelled CONTROL IN have two functions. These terminals are the connection point for the master valve wiring from each controller. They are also used to control the input to activate or block the flow output signal from the ISO4 depending on which controller is operating.

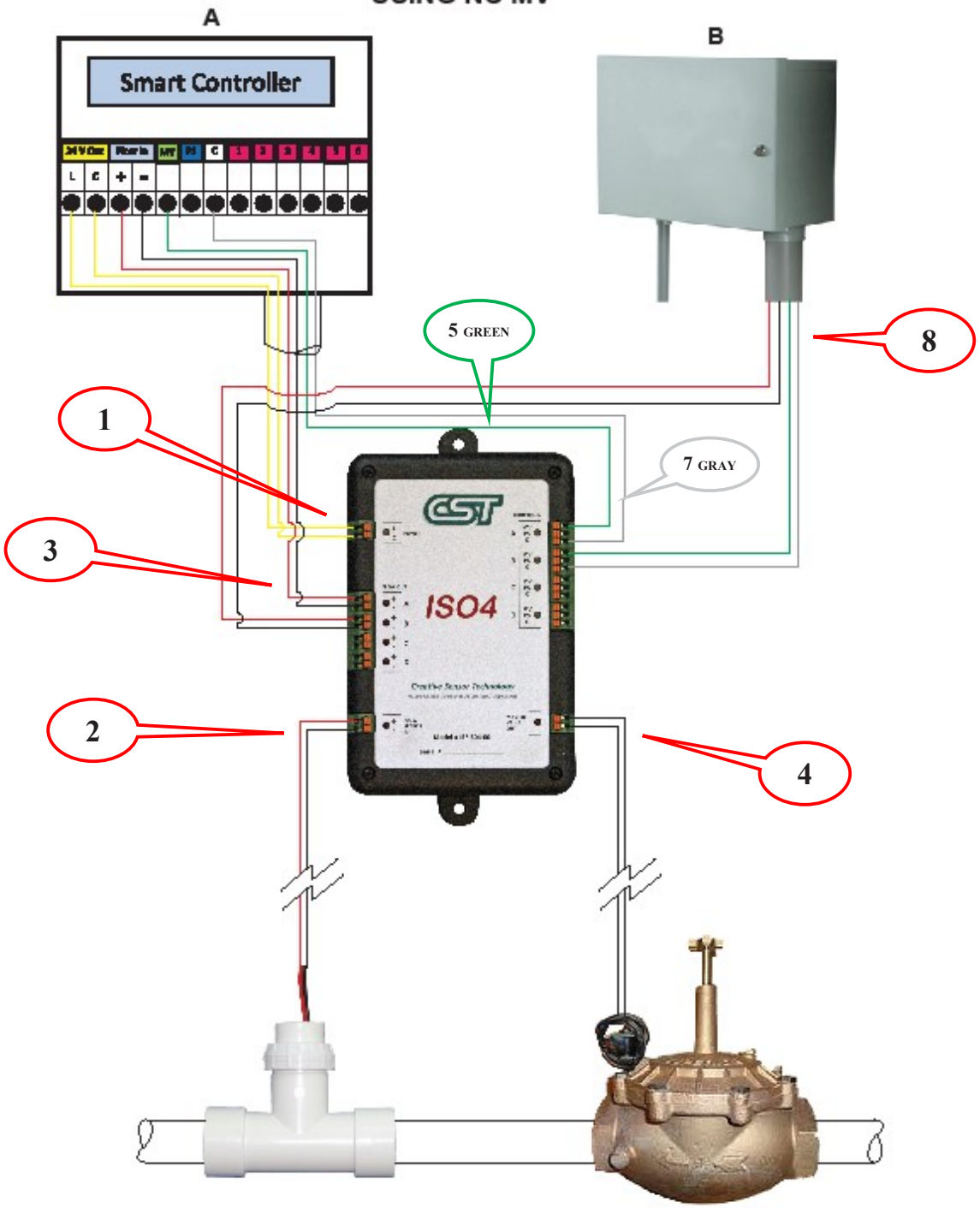
5. <u>If using a NC master valve</u>, connect the master valve power or (+) terminal of the A controller to the MV terminal at A.

6. <u>If using a NO master valve</u>, connect the master valve power terminal as above. Then connect the Pump Start terminal of the controller to the PS terminal at A. If the controller does not have a PS terminal, consult controller manufacturer for alternate connection.

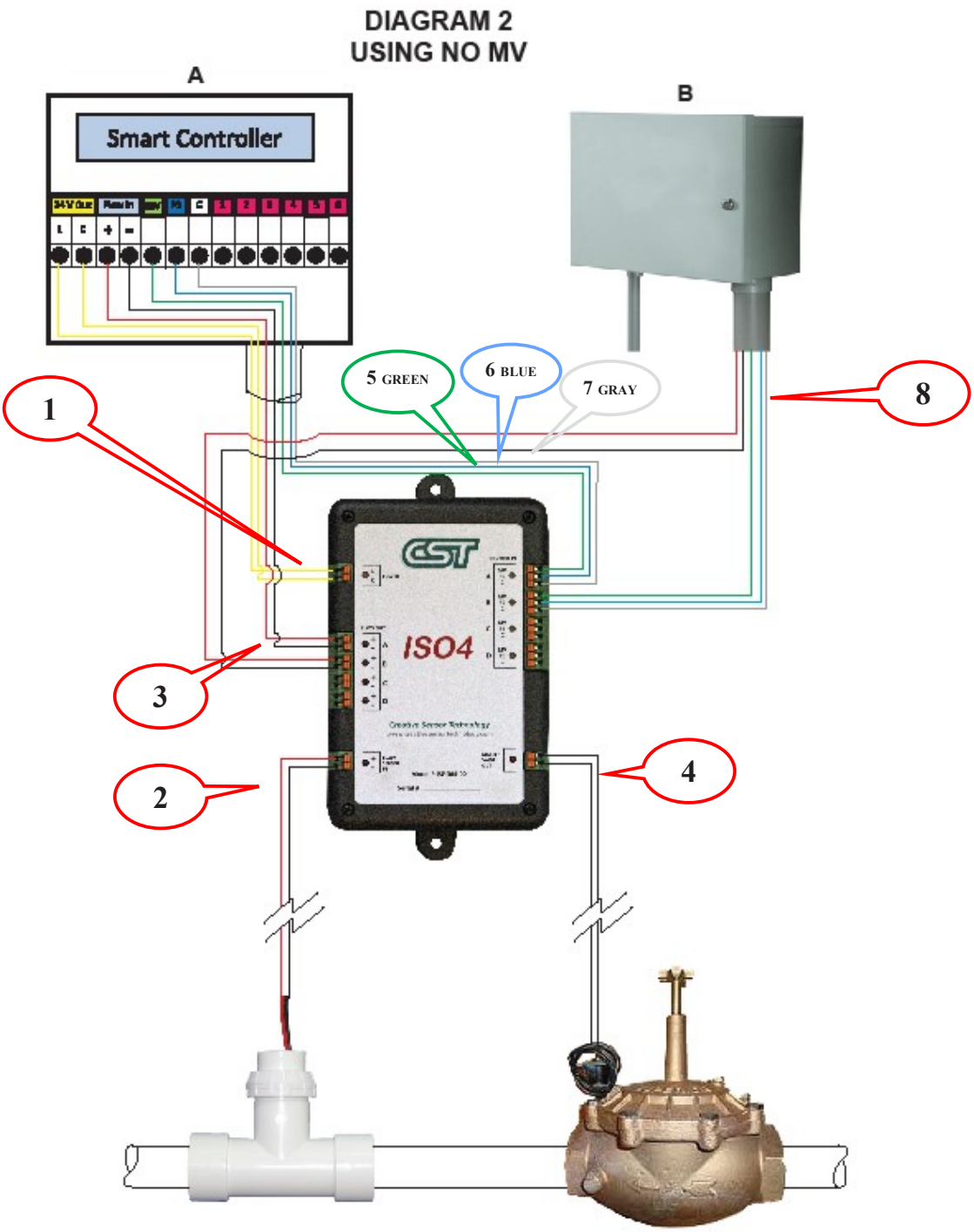
7. Next, connect the MV Common terminal of the controller to the C terminal at A. (In most cases, the master valve common is the same as the zone valve common.)

8. Repeat these connections to the CONTROL IN terminals for each controller isolated by the ISO4.

DIAGRAM 1
USING NC MV



Remember to change the master valve jumper as noted on page 3



LED Operation

Using NC master valve

1. On power up:
   The **POWER** LED blinks red/green three times then remains ON.
   The **FLOW SENSOR IN** LED blinks three times and remains OFF.
   All 4 **FLOW OUT** LEDs blink three times then remain ON
2. When flow occurs:
   The **FLOW SENSOR IN** LED turns ON
   The active **FLOW OUT** LEDs turn ON, blinking at lower flow becoming steady at high flow
3. When any controller turns on a schedule, the corresponding **CONTROL IN** LED turns ON red
   The **FLOW OUT** LED with the same letter stays ON and all other LEDs turn OFF
   The **MASTER VALVE OUT** LED turns ON
4. If more than one controller is operating at the same time, the **CONTROL IN** LEDs and the **FLOW OUT** LEDs with the letter designation for operating controllers turn ON.
5. When one or more controllers detect an abnormal flow condition, it turns off the **CONTROL IN** signal and the LED turns OFF.
   The **MASTER VALVE OUT** LED turns OFF
   The **FLOW SENSOR IN** LED should turn OFF
   The **FLOW OUT** LEDs turn OFF

Using NO master valve

1. On power up:
   The **POWER** LED blinks red/green three times then remains ON.
   The **FLOW SENSOR IN** LED blinks three times and remains OFF.
   All 4 **FLOW OUT** LEDs blink three times then remain ON
2. When flow occurs:
   The **FLOW SENSOR IN** LED turns ON, blinking at lower flow becoming steady at high flow
   The active **FLOW OUT** LEDs turn ON
3. When any controller turns on a schedule, the corresponding **CONTROL IN** LED turns ON green, activated by the PS terminal connection.
   The **FLOW OUT** LED with the same letter stays ON and all other LEDs turn OFF
   The **MASTER VALVE OUT** LED stays OFF
4. If more than one controller is operating at the same time, the **CONTROL IN** LEDs and the **FLOW OUT** LEDs with the letter designation for operating controllers turn ON.
5. When one or more controllers detect an abnormal flow condition, it activates the **CONTROL IN** logic through the MV terminal connection and the LED turns to red.
   The **MASTER VALVE OUT** LED turns ON.
   The **FLOW SENSOR IN** LED should turn OFF
   The **FLOW OUT** LEDs turn OFF
6. If more than one controller detects an abnormal flow condition, then more than one **CONTROL IN** would turn ON red.