Remote Digital Display Alarm Indicator

Combined Installation & Operation Manual

For PureAire Oxygen, CO_2, and Universal Monitors · EPU-Series · ST-48 (legacy)

Part #: 99091, 99183, 99185, 99186, 99187, 99189
99193, 99215, 99219, 99237, 99250, 99252
99255, 99256

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1. Overview

The Remote Digital Display Alarm Indicator continuously displays the reading of a PureAire gas monitor using the monitor's built-in 4–20 mA output. It provides two user-settable alarms with LED and horn annunciation, a fault indication, and a pass-through output that can drive a second display or a PLC for simultaneous status indication in multiple locations.

Connection cable: use 18 AWG, three-conductor, shielded control and instrumentation cable, Belden 8770 or equivalent. Maximum cable length is 250 feet.

Mounting, controls, startup, and alarm setting (Sections 2, 4, 5, and 7) are identical for all monitors. Wiring and calibration differ by monitor — use the sections shown below.

Monitor connected to the display	Wiring	Zero & span
Oxygen deficiency, CO_2, O_2 analyzer, and gas-detector monitors, including the Universal Monitor	§ 3.1	§ 6.1
EPU-Series Toxic/Combustible gas monitors (ppm and 0–100% LEL ranges)	§ 3.2	§ 6.2
ST-48 LEL monitor — legacy product, replaced by the EPU-Series	§ 3.3	§ 6.3

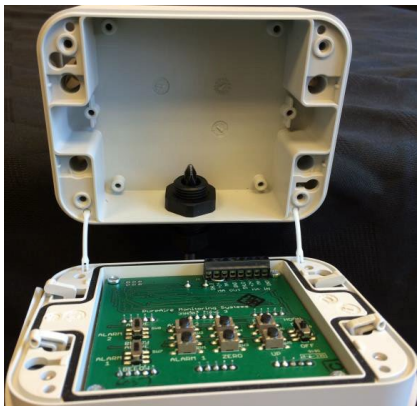
2. Mounting (all monitors)

1. Open the two side doors to expose the front-panel screws.
2. Loosen the 4 screws and separate the front panel from the case.
3. Mount the case flush to a wall or other flat surface using the 4 through-holes, then reattach the front panel.

NOTE: The front cover can be removed by gently pulling the plastic hinges free (they stay attached to the cover). To reattach, push the hinges back into the case.

Front of display — side doors closed

Side doors opened — front-panel screws (4)


Case through-holes and hinges

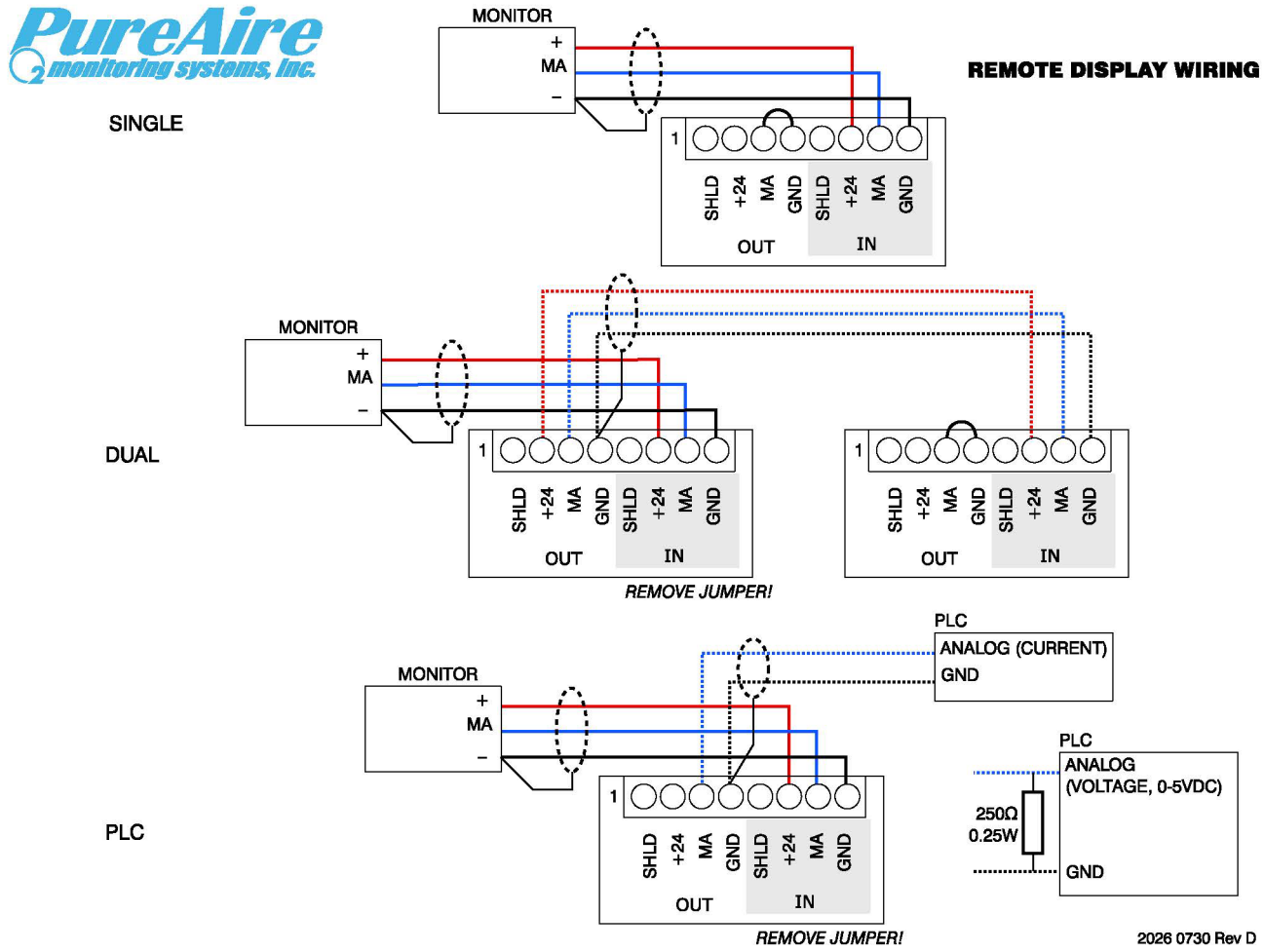
3. Wiring

Wire the display to the monitor's 24 VDC power and 4–20 mA output using the shielded cable specified in Section 1. Terminate the cable shield at one end only (typically at the monitor). Find your monitor below.

IMPORTANT: Do not remove the factory jumper on the display's OUT terminal block unless you are connecting a second Remote Display or a PLC.

3.1 Oxygen, Carbon Dioxide, & Universal monitors

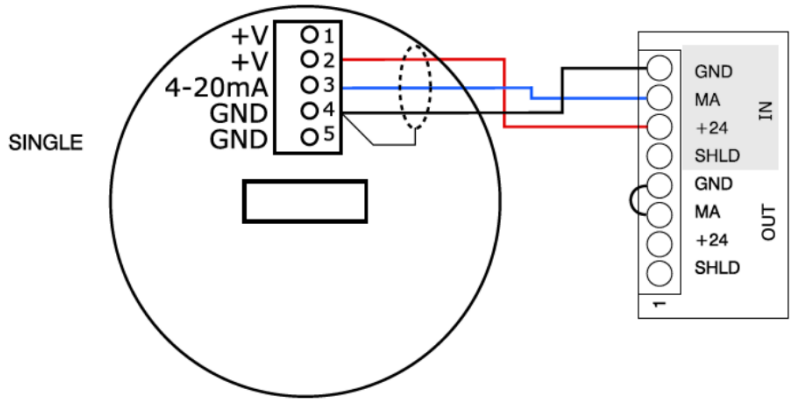
Connect the monitor's +V, MA, and GND terminals to +24, MA, and GND on the display's IN terminal block. For a second display or a PLC, remove the OUT jumper on the first display and connect as shown. For a 0–5 VDC voltage-input PLC, install a 250 Ω, 0.25 W resistor across the PLC input.



Single display (top), two displays (middle), display + PLC (bottom)

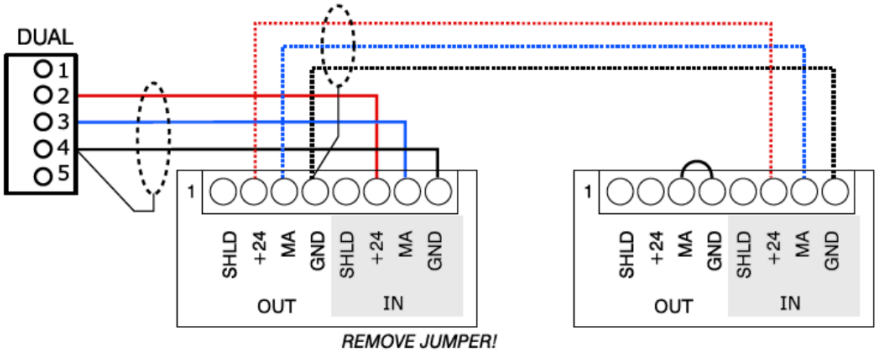
3.2 EPU-Series Toxic/Combustible

Single display: wire the monitor's PWR to +24, the 4–20 mA output to MA, and GND to GND on the display's IN terminal block. Leave the OUT jumper in place.



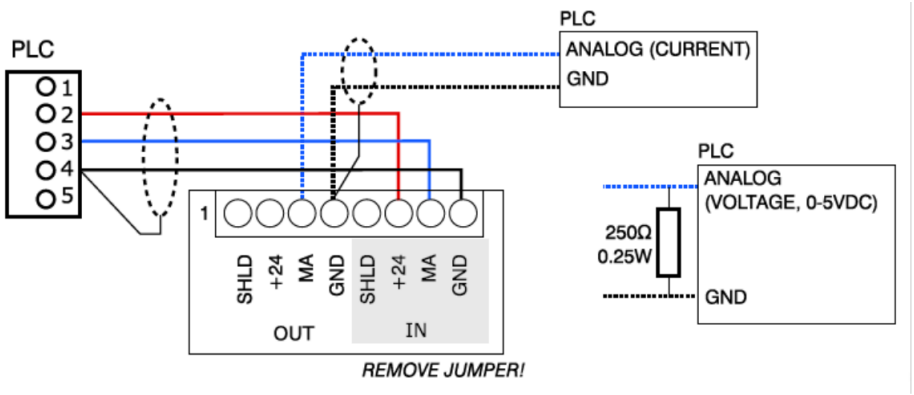
Dual displays (one EPU-Series monitor feeding two displays in series):

1. Wire the monitor to the IN terminal block of the first display as above.
2. Remove the factory jumper on the OUT terminal block of the first display.
3. Wire OUT (+24, MA, GND, SHLD) of the first display to IN (+24, MA, GND, SHLD) of the second. Leave the jumper on the second (final) display in place.



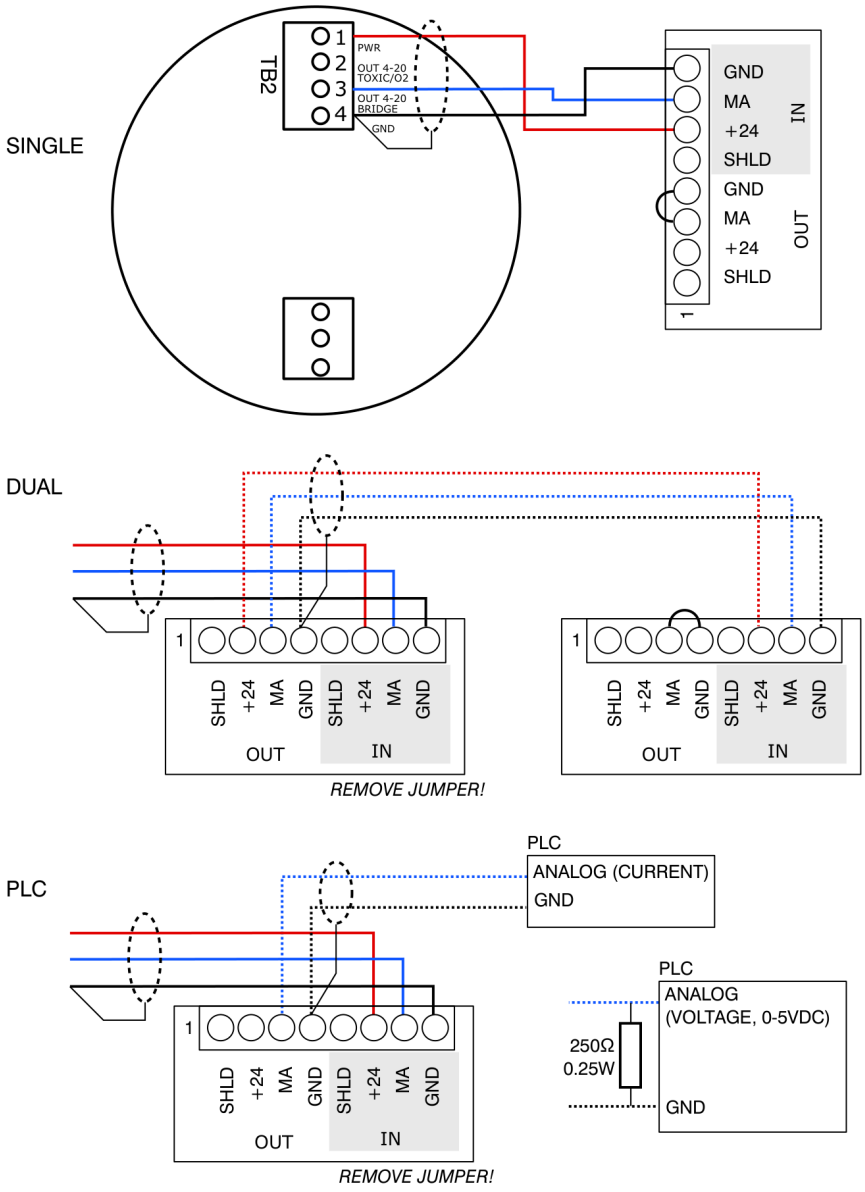
PLC connection: wire the monitor to IN as above and remove the OUT jumper.

1. Current-input PLC: connect MA (OUT) to the PLC analog current input and GND (OUT) to the PLC analog ground.
2. Voltage-input PLC (0–5 VDC): place a 250 Ω, 0.25 W resistor across the PLC input and GND, then connect MA (OUT) and GND (OUT) across the resistor.



3.3 ST-48 (legacy)

The ST-48 has been replaced by the EPU-Series; the following applies to existing ST-48 installations. Connect TB2-1 (PWR) to +24, TB2-3 (OUT 4–20 BRIDGE) to MA, and TB2-4 (GND) to GND on the display's IN terminal block. Dual-display and PLC connections are made from the OUT terminal block exactly as in Section 3.2.



4. Switches and controls (all monitors)

1. Alarm adjusting switches (ALARM 1 / ALARM 2) — select which alarm level to adjust. Normally set at the factory.

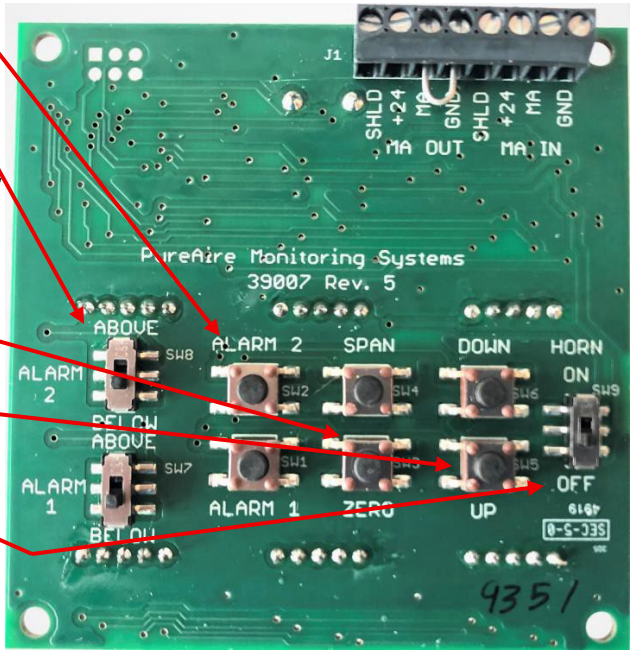
2. Alarm polarity switches (ABOVE / BELOW) — set when the alarms activate. Oxygen-deficiency monitors: BELOW (alarm when the reading falls below the setpoint). Toxic gas and LEL monitors, including the EPU-Series and ST-48: ABOVE. Normally set at the factory.

3. Range auto-adjustment buttons (ZERO / SPAN) — automatically set the display's zero and full-scale readings while the monitor is sending a fixed 4 mA or 20 mA signal (see Section 6).

4. Alarm adjusting buttons (UP / DOWN) — raise or lower the alarm setpoints.

5. Horn On/Off switch (HORN) — in the ON position any alarm sounds the internal horn; set to OFF to disable it.

Do not remove the jumper on terminal block J1 unless connecting a second remote display or a PLC (Section 3).



Display main board — switch and button locations are silk-screened (ALARM 1/2, ZERO, SPAN, UP, DOWN, HORN)

5. Startup and operation (all monitors)

After wiring the display, turn on power to the monitor. During monitor warm-up the display reads **FLt** and the yellow FAULT LED is lit; this clears automatically when warm-up completes and the display then mirrors the monitor's live reading. Warm-up takes about **4 minutes** for Oxygen and ST-48 monitors, and **45 seconds** for the Universal/EPU-Series.

During warm-up

After warm-up (fault cleared)

6. Setting the zero and full-scale range

CAUTION: entering the monitor's setup menus disables the real-time readings.

Set the zero and full scale in the field after installation to compensate for the cable length between the monitor and the display. The display side of the procedure is the same for every monitor: latch the monitor's output at 4 mA and press **ZERO** on the back of the display for 3 seconds, then latch the output at 20 mA and press **SPAN** for 3 seconds – 4 mA corresponds to zero and 20 mA to the full scale of both the monitor and the remote display. Only the monitor's menu navigation differs. Both AL1 and AL2 LEDs illuminate during the zero step — this is normal.

6.1 Oxygen & Universal monitors (joystick menu)

1. On the monitor, enter the password and select the "Set 4-20mA loop" menu.
2. Push the joystick right to select "Set 4mA Zero", then right again to activate it — the output is now 4 mA. Press **ZERO** on the display for 3 seconds; the display resets to zero. Fine-tune with the joystick up/down if needed, then push left once to exit.
3. Push the joystick down to select "Set 20mA Span", then right to activate it — the output is now 20 mA. Press **SPAN** on the display for 3 seconds; the display resets to full scale (25.0 on 0–25% oxygen monitors). Fine-tune with the joystick until the display matches the monitor.

4. Push the joystick left until the monitor returns to its main measuring screen.

6.2 EPU-Series Toxic/Combustible (magnetic wand menu)

1. Wand over the RIGHT key to reach the password screen and enter your password (factory default 557). Wait for "Passcode Accepted".
2. Wand RIGHT to "4-20 mA Loop", then RIGHT again — the screen shows "Set 4mA Zero".
3. Wand RIGHT to activate — the output latches at 4 mA. Press **ZERO** on the display for 3 seconds; the display resets to zero. Fine-tune with UP/DOWN in the monitor menu, then wand LEFT to exit the sub-menu.
4. Wand DOWN to "Set 20mA Span", then RIGHT — the output latches at 20 mA. Press **SPAN** on the display for 3 seconds; the display resets to full scale (100 on a 0–100% LEL monitor, or the top of the ppm range). Fine-tune with UP/DOWN if needed.
5. Wand LEFT repeatedly to exit the menus; the monitor returns to measuring mode.

6.3 ST-48 (legacy — magnetic wand menu)

1. Hold the wand at the NEXT key for 5 seconds until the key-sequence screen appears, then wand over UP four times.
2. Wand DOWN to "Output Zero" and wand EDIT. Select CHANNEL 2 (wand DOWN, then EDIT) — the output is now 4 mA.
3. Press **ZERO** on the display for 3 seconds; the display resets to zero. Fine-tune with UP/DOWN, then wand NEXT to exit the zero menu.
4. Wand DOWN to "Output Span" and wand EDIT — the output is now 20 mA. Press **SPAN** on the display for 3 seconds; the display resets to 100. Fine-tune with UP/DOWN.
5. When done, wand NEXT; the monitor reboots and returns to measuring.

CAUTION: if ZERO is pressed while the monitor is in measuring mode, the display shows "Err" and no readings are recorded. If SPAN is pressed in measuring mode, the display immediately re-spans to full scale and the calibration above must be repeated. NEVER press SPAN in the measuring mode.

7. Setting the internal alarms (all monitors)

The display has two user-selectable alarms with distinct horn tones. To change a setpoint: press and hold **ALARM 1** (or **ALARM 2**) for 2 seconds to enter the alarm change mode — the current setting is shown with the right-most decimal point lit for Alarm 1 (left-most for Alarm 2). Adjust with **UP / DOWN**, then hold the same alarm button for 2 seconds to return to monitoring. Unless otherwise specified, alarms are factory preset as follows; all levels can be changed in the field.

Monitor / range	Alarm 1	Alarm 2
Oxygen monitors 0–25%, 0–30%, 0–95%	19.5%	18%
Oxygen monitors 0–1000 ppm	20 ppm	40 ppm
Carbon dioxide monitors	50 ppm × 100	100 ppm × 100
LEL 0–100% (EPU-Series and ST-48)	20% LEL	40% LEL
Gas detectors 0–1 ppm	0.25 ppm	0.50 ppm
Gas detectors 0–3 ppm	0.5 ppm	1.0 ppm
Gas detectors 0–9 ppm	1.5 ppm	3.0 ppm
Gas detectors 0–30 ppm	10 ppm	20 ppm
Gas detectors 0–75 ppm	25 ppm	50 ppm
Gas detectors 0–200 ppm	50 ppm	100 ppm

Alarm polarity: oxygen-deficiency monitors alarm when the reading falls BELOW the setpoint; toxic gas and LEL monitors (including the CO2, Universal, EPU-Series, and ST-48) alarm ABOVE the setpoint. Polarity is set at the factory — see Section 4, item 2.