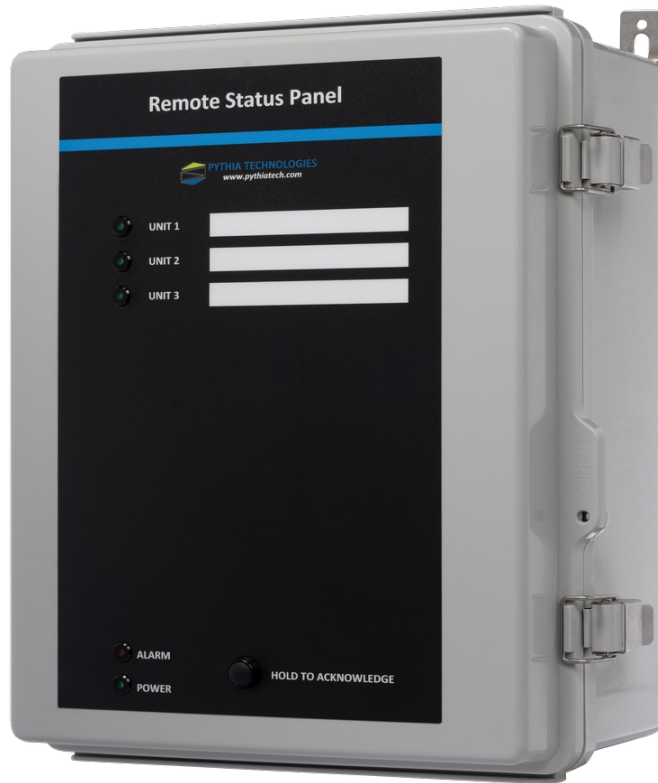




# GUIDE

**Generator Start Wiring Monitor**

**CS0-RSP-GWM-3-3**

**09/08/2026**

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## 1. Assembly

### 1.1 Front Panel

The CS0-RSP-GWM-3-3 monitors three independent ATS-to-generator start circuits. The front panel features three (3) UNIT LEDs — one per monitored ATS circuit — along with an ALARM LED, a POWER LED, and a HOLD TO ACKNOWLEDGE button, all housed in an ABS enclosure.



| Indicator           | Color / State | Meaning                                                |
|---------------------|---------------|--------------------------------------------------------|
| UNIT 1 LED          | GREEN — ON    | ATS #1-to-Generator #1 wiring is intact and supervised |
| UNIT 1 LED          | OFF           | Wiring fault or ATS #1 start request active            |
| UNIT 2 LED          | GREEN — ON    | ATS #2-to-Generator #2 wiring is intact and supervised |
| UNIT 2 LED          | OFF           | Wiring fault or ATS #2 start request active            |
| UNIT 3 LED          | GREEN — ON    | ATS #3-to-Generator #3 wiring is intact and supervised |
| UNIT 3 LED          | OFF           | Wiring fault or ATS #3 start request active            |
| ALARM LED           | RED — ON      | One or more fault conditions are active                |
| POWER LED           | GREEN — ON    | Panel is energized and operating normally              |
| HOLD TO ACKNOWLEDGE |               | Press and hold to silence audible alarm                |

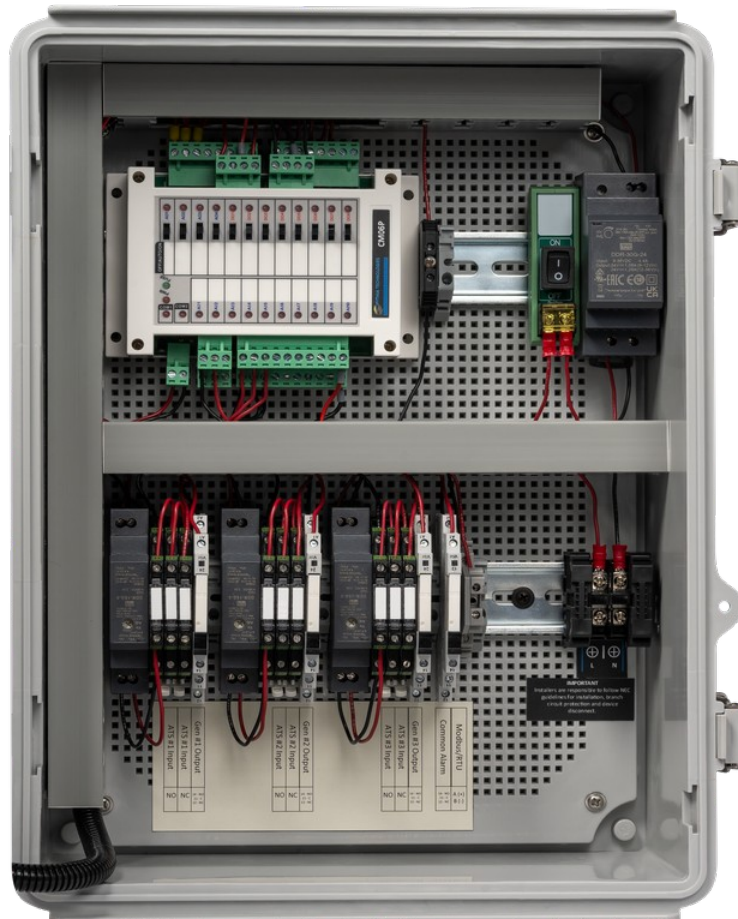
#### NOTE

Each UNIT LED corresponds to one independent ATS-to-generator circuit. A fault or start request on Unit 1 affects only Unit 1 — Units 2 and 3 are unaffected.



## 1.2 Inside / Internal

Opening the enclosure reveals the internal control board (CM06P), three relay assemblies for the independent ATS/generator circuits, the DC power supply and ON/OFF switch, and all terminal blocks. Terminal groups are clearly labeled from left to right: ATS #1, Gen #1, ATS #2, Gen #2, ATS #3, Gen #3, Common Alarm, Modbus/RTU, and Power Input.



### 1.3 Back Panel (Mounting Holes)

The enclosure is provided with four (4) keyhole-style mounting brackets — two at the top and two at the bottom — for secure wall or panel mounting. All mounting hardware attaches to the enclosure back.



## 2. Safety Warnings

### **QUALIFIED PERSONNEL ONLY**

Installation, wiring, and servicing of this panel must be performed by a qualified, licensed electrician or electrical engineer familiar with NEC requirements.

- De-energize ALL circuits before making wiring connections.
- Verify circuits are de-energized with a calibrated voltage tester before touching any terminal.
- Follow all applicable national and local electrical codes.
- This panel does not provide branch-circuit protection. Install appropriate overcurrent protective devices per NEC requirements.
- The generator output relay contacts are rated for generator remote-start circuits only. Do not connect high-voltage loads to the relay outputs.

### **FAIL-SAFE OPERATION — READ BEFORE WIRING**

The CS0-RSP-GWM-3-3 is designed as a FAIL-SAFE device:

- Generator output relays are normally CLOSED when the panel is powered and wiring is healthy.
- Loss of panel power will cause ALL three generator output relays to OPEN simultaneously, which is interpreted by generators as a start command.
- A wiring fault or ATS start request on Unit N opens ONLY the Gen #N relay. The other units are unaffected.
- Ensure generators are ready to accept remote start commands before energizing this panel.
- Test all wiring and generator responses in a controlled environment before placing the system in service.

### **NOTE**

This product is designed to facilitate compliance with NEC Article 700.10(D)(3) for monitoring of generator engine start wiring in emergency systems. The installer is responsible for ensuring all applicable code requirements are met.

## 3. Mounting

### 3.1 Location Requirements

Select a mounting location that meets all of the following criteria:

- Indoor or outdoor location within the operating temperature range:  $-30^{\circ}\text{C}$  to  $45^{\circ}\text{C}$  ( $-22^{\circ}\text{F}$  to  $113^{\circ}\text{F}$ )
- Within 1,000 ft. of each Automatic Transfer Switch (ATS)
- Accessible for wiring, inspection, and alarm acknowledgment
- Mounted to a structurally sound wall or panel rated for the enclosure weight
- Protected from direct water spray if mounted outdoors (enclosure is IP67 rated)
- Clear of heat sources, vibration, and corrosive atmospheres

### 3.2 Mounting Instructions

The enclosure uses four (4) keyhole-slot mounting brackets. Follow these steps:

1. Mark the four mounting hole locations on the wall surface, using the enclosure bracket pattern as a template. The panel is 20" H  $\times$  16.1" W.
2. Install four (4) appropriate fasteners (screws, anchors, or bolts) into the wall — leave fastener heads slightly proud to allow keyhole engagement.
3. Lift the enclosure onto the fasteners, engaging the keyhole slots.
4. Slide the enclosure downward to lock into the keyhole slots.
5. Tighten all four fasteners securely to prevent movement.
6. Verify the enclosure is level and secure before proceeding to wiring.

#### NOTE

Install conduit fittings and pull wiring before final tightening of the enclosure if conduit entry is required through the bottom of the enclosure.

## 4. Wiring

Recommended wire: Belden 6300UE 18AWG for all dry contact/relay signal wiring and Belden 6300FE for communications wiring. All connections are made to clearly labeled terminal blocks inside the enclosure.

| Terminal Block | Contacts    | Description                                                              |
|----------------|-------------|--------------------------------------------------------------------------|
| ATS #1 Output  | 5V+         | +5VDC supervision signal output to ATS #1 relay Common                   |
| ATS #1 Output  | DO NOT USE  | Internal monitoring only — do not connect external wiring                |
| ATS #1 Input   | NO / NC     | Supervised inputs from ATS #1 relay (NO and NC contacts)                 |
| Gen #1 Output  | NO / C / NC | Generator #1 remote start relay output (form C)                          |
| ATS #2 Output  | 5V+         | +5VDC supervision signal output to ATS #2 relay Common                   |
| ATS #2 Output  | DO NOT USE  | Internal monitoring only — do not connect external wiring                |
| ATS #2 Input   | NO / NC     | Supervised inputs from ATS #2 relay (NO and NC contacts)                 |
| Gen #2 Output  | NO / C / NC | Generator #2 remote start relay output (form C)                          |
| ATS #3 Output  | 5V+         | +5VDC supervision signal output to ATS #3 relay Common                   |
| ATS #3 Output  | DO NOT USE  | Internal monitoring only — do not connect external wiring                |
| ATS #3 Input   | NO / NC     | Supervised inputs from ATS #3 relay (NO and NC contacts)                 |
| Gen #3 Output  | NO / C / NC | Generator #3 remote start relay output (form C)                          |
| Common Alarm   | NO / C / NC | Common alarm relay output (form C) — any unit in alarm drives this relay |
| Modbus/RTU     | A(+) / B(–) | RS-485 Modbus/RTU communications                                         |
| Power Input    | +Vin / –Vin | 12–36VDC from generator battery                                          |



### DE-ENERGIZE BEFORE WIRING

Remove power from ALL connected circuits — including the generator battery — before making wiring connections.

- Verify zero voltage at all terminals with a calibrated tester before touching any conductor.

### 4.1 Power Input

The panel is powered from the generator battery system, providing continuous supervision even when utility power is lost. An internal DIN-rail mounted ON/OFF rocker switch and fused terminal are factory-installed on the power input circuit inside the enclosure.

4.1.1 Internal Power Switch

The panel is equipped with a DIN-rail mount single-channel rocker switch module. Key specifications:

| Parameter              | Specification                                                 |
|------------------------|---------------------------------------------------------------|
| Rated Voltage          | 250VAC or 50VDC                                               |
| Rated Current          | 10A per channel                                               |
| Switch Type            | ON–OFF rocker switch                                          |
| Terminal Pitch         | 7.62 mm (0.3"), removable cover, M3 metric screw              |
| Wire Range             | 14–16 AWG / 1.5–2.5 mm² conductor cross-section               |
| DIN Rail Compatibility | 35 mm, 32 mm, and 15 mm width rails                           |
| Certifications         | UL 94-V0 certified housing; CE, CQC certified terminal blocks |

Figure 4.1 — Internal DIN-Rail Power ON/OFF Switch



4.1.2 Power Connection Procedure

Follow these steps to connect DC power to the panel:

7. Ensure the internal power switch is in the OFF position before making connections.
8. Connect the positive (+) conductor from the 12–36VDC source to the “+Vin” power input terminal.
9. Connect the negative (–) conductor to the “–Vin” terminal.
10. Verify all connections are secure and conductors are fully seated in the terminal screws.
11. Turn the internal power switch to the ON position to energize the panel.

 **OVERCURRENT PROTECTION REQUIRED**

Install an appropriately rated fuse or circuit breaker in the positive (+) DC conductor upstream of the panel, per NEC Article 700 and applicable local codes.

- Maximum upstream overcurrent device: 10A.
- The internal switch is rated 10A / 50VDC — do not exceed these ratings.

**NOTE**

The panel must be powered from the generator battery to ensure continuous supervision of the wiring — do not power from utility-only sources.

Power supply input range: 12–36VDC. Verify the battery voltage is within this range before connecting.

Use 14–16 AWG wire for the power input conductors to match the switch module terminal rating.

The ATS relay must be configured for normally closed operation.

## 4.2 ATS Connections (Units 1, 2, and 3)

The panel supervises the 3-wire engine start circuit between each ATS and its paired generator. The wiring procedure is identical for all three units — repeat the steps below for ATS #1, ATS #2, and ATS #3, substituting the unit number throughout.

**NOTE**

Each ATS unit (#1, #2, #3) is independently wired and independently monitored. A start request or wiring fault on one unit does not affect the other units.

**For each ATS unit (repeat for Unit 1, Unit 2, and Unit 3):**

12. Run a single conductor from panel terminal “ATS #X Output — 5V+” to the Common (C) terminal of the ATS #X engine start relay.
13. At the ATS, install a short jumper wire connecting the relay Common (C) to the Normally Open (NO) terminal.
14. Run a single conductor from the ATS relay Normally Open (NO) terminal back to panel terminal “ATS #X Input — NO”.
15. Run a single conductor from the ATS relay Normally Closed (NC) terminal to panel terminal “ATS #X Input — NC”.
16. Verify the panel input type for this unit is configured for Normally Closed (NC) operation (Modbus register 4011 for Unit 1, 4012 for Unit 2, 4013 for Unit 3). This is the factory default.

**DO NOT USE — INTERNAL TERMINAL**

Each ATS Output group contains a terminal labeled “DO NOT USE” — one per unit.

- Do NOT connect any external wiring to these terminals.
- Connecting external wiring here WILL damage the panel and VOID the warranty.

**NOTE**

If an ATS/Generator pair (Unit 1, 2, or 3) will not be used, that unit's supervision circuit must still be satisfied at the panel terminal block, or the panel will report a wiring fault and open that unit's generator output relay.

Install a jumper wire directly from 'ATS #X Output — 5V+' to 'ATS #X Input — NO', and a second jumper from 'ATS #X Output — 5V+' to 'ATS #X Input — NC'. This holds the unused unit's UNIT X LED GREEN and its Gen #X output relay CLOSED without requiring a physical ATS connection.

### 4.3 Generator Output Connections

The panel provides three (3) independent form-C relay outputs, one per ATS/generator pair. Gen #1 Output is driven only by the ATS #1 circuit, Gen #2 only by ATS #2, and Gen #3 only by ATS #3.

**For each generator (Gen #1, Gen #2, Gen #3):**

17. Run a 3-conductor cable from the panel “Gen #X Output” terminal block to the generator’s remote start terminal strip.
18. Connect panel “C” (Common) to the generator remote start Common.
19. Connect panel “NO” (Normally Open) or “NC” (Normally Closed) to match the generator’s required input state — refer to the generator control panel documentation.

#### NOTE

Relay contacts are rated for low-voltage generator remote start circuits only.

Gen #N relay opens ONLY when ATS #N issues a start request or a wiring fault is detected on Unit N. The other generator relays are not affected.

All three generator relays OPEN simultaneously only on panel power loss.

Generator relay contacts are CLOSED under normal conditions (panel powered, wiring healthy) and OPEN on ATS start request, wiring fault, or panel power loss.

### 4.4 Common Alarm Output

The common alarm relay output is shared across all three units. Any unit in alarm drives this relay, making it useful for BMS tie-in or remote annunciation.

20. Connect alarm notification wiring to the “Common Alarm” terminal block (NO / C / NC).
21. Use NO or NC contacts depending on the receiving device’s input requirements.

## 5. Power-Up & Verification

Complete all wiring and inspect all connections before applying power. Perform the following steps in order:

22. Verify all terminal connections are secure and correctly wired per Section 4.
23. Verify the ATS relay jumper (C to NO) is installed at each ATS terminal strip.
24. Verify all generator remote start wiring is correct and that generators are configured to accept remote start commands.
25. Apply 12–36VDC to the Power Input terminals.
26. Turn the internal power switch to the ON position.
27. Observe the POWER LED — it should illuminate GREEN within a few seconds.
28. Observe the UNIT 1, UNIT 2, and UNIT 3 LEDs — each should illuminate GREEN when its ATS circuit wiring is healthy.
29. Verify the ALARM LED is OFF (no fault conditions).

| LED    | Expected State | Indicates                                           |
|--------|----------------|-----------------------------------------------------|
| POWER  | GREEN          | Panel is energized                                  |
| UNIT 1 | GREEN          | ATS #1 engine start wiring is intact and supervised |
| UNIT 1 | OFF            | Wiring fault detected on ATS #1 circuit             |
| UNIT 2 | GREEN          | ATS #2 engine start wiring is intact and supervised |
| UNIT 2 | OFF            | Wiring fault detected on ATS #2 circuit             |
| UNIT 3 | GREEN          | ATS #3 engine start wiring is intact and supervised |
| UNIT 3 | OFF            | Wiring fault detected on ATS #3 circuit             |
| ALARM  | OFF            | No fault conditions detected                        |

### NOTE

Each UNIT LED is independent. A single LED off on power-up indicates a problem with only that circuit — the others may be healthy.

If any UNIT LED fails to illuminate GREEN on power-up, recheck the ATS wiring for that circuit. See Section 7 (Troubleshooting) for guidance.

### 5.1 LED Test Mode

To verify all LEDs and the audible alarm are functional:

30. Press and hold the HOLD TO ACKNOWLEDGE button for approximately 5 seconds.
31. All LEDs will illuminate and the audible alarm will sound.
32. Release the button to return to normal operation.

## 6. Operation

### 6.1 Normal Operation

Under normal conditions (panel powered, no ATS start requests, all wiring intact):

- POWER LED is GREEN.
- UNIT 1, UNIT 2, and UNIT 3 LEDs are GREEN.
- ALARM LED is OFF.
- All three generator output relays are in the CLOSED (energized) position.
- The panel continuously outputs +5VDC through each ATS relay circuit, supervising all three wiring paths in real time and independently.

### 6.2 ATS Start Request (Per Unit)

The three ATS circuits operate independently. When ATS #N requests a generator start under normal wiring conditions:

33. The ATS #N relay changes state, removing the +5VDC supervision signal from the Unit N Normally Open (NO) input — the +5VDC is NOT passed through to the generator.
34. The panel detects the loss of the +5VDC signal on Unit N and activates the Gen #N output relay only.
35. Gen #N output relay OPENS, signaling Generator #N to start. Generators #(N±1) are not affected.
36. UNIT N LED turns OFF, ALARM LED turns ON — this is normal and expected during a start request.

#### NOTE

A start request on ATS #1 opens only Gen #1. ATS #2 opens only Gen #2. ATS #3 opens only Gen #3.

Each ATS circuit is fully independent — multiple ATSs can be in start request simultaneously without affecting each other.

### 6.3 Fault Conditions

The panel independently detects the following wiring fault conditions on each ATS engine start circuit:

| Fault Type           | Description                                                               |
|----------------------|---------------------------------------------------------------------------|
| Open Wire            | The supervision conductor between panel and ATS is broken or disconnected |
| Short to Ground      | The supervision conductor is shorted to the ground                        |
| Short to Battery (+) | The supervision conductor is shorted to positive voltage                  |

When a fault is detected on Unit N:

- The UNIT N LED extinguishes (turns OFF).
- The ALARM LED illuminates RED.
- The audible alarm activates.
- The Gen #N output relay OPENS, initiating a start command on Generator #N only.

- Units on other circuits remain unaffected.

**NOTE**

Activating only the affected generator output ensures that generator power is available from that circuit even if the ATS cannot issue its own start command due to the wiring fault. This per-unit behavior is required for NEC Article 700.10(D)(3) compliance.

## 6.4 Panel Power Loss

If the panel loses input power (12–36VDC):

- All three generator output relays de-energize (OPEN) simultaneously, sending a start command to all three generators.
- All LEDs extinguish.
- This fail-safe behavior ensures all generators start even if panel power is lost.

## 6.5 Latching Mode (Optional)

By default, generator output relays automatically reset to their normal (CLOSED) state when the fault condition clears. Latching mode, when enabled for a unit, causes that relay to remain activated (open / start command) after the fault clears until manually acknowledged.

- Latching is configured independently per unit via Modbus configuration registers DI1LATH (4021), DI2LATH (4022), DI3LATH (4023).
- Default state: Latching DISABLED — relays reset automatically when the fault clears.
- When latching is enabled: press and hold the HOLD TO ACKNOWLEDGE button to reset the latched relay after the fault condition clears.
- Latching is useful in applications where confirmation of fault investigation is required before allowing a generator to stop.

**NOTE**

Refer to Appendix A and Section 8.1 for complete latching configuration register addresses.

## 6.6 Alarm Acknowledgment

The audible alarm can be silenced without clearing the fault condition:

37. Press and hold the HOLD TO ACKNOWLEDGE button on the front panel.
38. The audible alarm will silence.
39. The ALARM LED will remain illuminated RED until all fault conditions are corrected.
40. Once all faults are resolved and wiring is restored to a healthy state, the ALARM LED will extinguish automatically.

## 7. Troubleshooting

| Symptom                                              | Likely Cause                                        | Corrective Action                                                                                        |
|------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| POWER LED is OFF                                     | No DC power, blown fuse, or loose wiring            | Check +Vin/–Vin terminals. Verify 12–36VDC source. Check upstream fuse or breaker.                       |
| UNIT X LED is OFF (no alarm)                         | Open wire or disconnected terminal on that circuit  | Check all conductors on Unit X from panel to ATS. Verify terminal screws are tight.                      |
| ALARM LED is RED immediately on power-up             | Wiring fault; short or open on supervised circuit   | Check ATS relay jumper (C-to-NO) on affected unit. Isolate and test each conductor.                      |
| ALARM LED is RED; one generator running unexpectedly | Panel detected wiring fault and activated that unit | Correct wiring fault on the affected circuit. Other units should be unaffected.                          |
| ALL generators start unexpectedly                    | Panel power lost or all circuits faulted            | Check panel power input. All relays de-energize on panel power loss — this is normal fail-safe behavior. |
| Audible alarm will not silence                       | Button not held long enough                         | Press and HOLD the HOLD TO ACKNOWLEDGE button. Do not just press and release.                            |
| ALARM LED re-activates after silence                 | Fault condition has not been corrected              | Identify and correct the wiring fault. The alarm will clear once the fault is resolved.                  |
| Modbus communication failure                         | Incorrect address/baud or RS-485 wiring issue       | Verify A(+)/B(–) connections. Default: ID 254, 8-N-1, 19200. Check RS-485 termination.                   |

### NOTE

For technical support, contact Pythia Technologies at 740.363.2272 or support@pythiatech.com. Have the model number (CS0-RSP-GWM-3-3), panel serial number, and a description of the issue ready when calling.

## 8. Protocols

### 8.1 Modbus/RTU (Standard)

Modbus/RTU is standard on every CS0-RSP-GWM-3-3 panel. Connect the RS-485 A(+) and B(–) terminals using Belden 6300FE 18AWG (or equivalent) cable. Default settings: unit ID 254, 19200 baud, 8 data bits, no parity, 1 stop bit.

All points are holding registers, read with Modbus function 03 and written with function 06 or 16, 16-bit unsigned. Register numbers in this guide are 1-based (register 1001 is address 1000 on the wire). Registers 1001 to 3002 are read-only. Registers 4000 to 4026 are configuration values stored in the panel and survive power cycles.

#### NOTE

The complete Modbus register listing is provided in Appendix A at the end of this guide. Settings can be adjusted using the Pythia Tech configuration tool or any standard Modbus tool (e.g., WinTech ModScan at <https://www.win-tech.com/html/demos.htm>).

### 8.2 Modbus/TCP (Optional MS0-MBT Adapter)

The optional Modbus/TCP adapter presents the same register map as Modbus/RTU — unit ID 254, TCP port 502. No register remapping occurs. All register addresses and values described in Section 8.1 and Appendix A apply directly over TCP.

#### NOTE

Default Modbus/TCP IP address: 192.168.0.7, subnet: 255.255.255.0. Contact Pythia Technologies for ordering information.

### 8.3 BACnet/IP (Optional MS0-MB Adapter)

The optional MS0-MB adapter connects to the panel's Modbus/RTU port and presents the panel as a BACnet/IP device. The adapter ships pre-loaded with the panel configuration file BootCS0RSPGWM.xml. Site settings (IP address, BACnet device instance, and BBMD entry if required) are configured on the adapter's web pages under System, and are stored in the adapter separately from the configuration file.

The adapter polls the panel every 5 seconds (project and version registers every 60 seconds). Three settings are writable: Input Delay (AV 1), Buzzer (BV 27), and Unit 1 to 6 Latching (BV 21–BV 26). A value written to one of these objects is sent to the panel immediately and stored there, surviving both panel power cycles and adapter reboots. All other objects are read-only — the Unit Input Type objects are read-only because the panel program logic owns them.

Panel Communications (BV 1) reports the health of the Modbus link between the adapter and the panel. It goes Active (Alarm) after 30 seconds of failed polls and returns to Inactive (Normal) on the next successful poll.

#### NOTE

A Quick Start Guide for the MS0-MB adapter is included with each panel. Refer to that guide for adapter web interface setup, firmware updates, and advanced configuration.

On a 3-pair panel, the BACnet objects for units 4 to 6 (BV 6–BV 8, BV 12–BV 14, BV 18–BV 20, BV 24–BV 26) read Normal/Inactive at all times. They are present because the same adapter configuration file serves both 3-pair and 6-pair panels.

The complete BACnet object listing is provided in Appendix A, Section A.2, at the end of this guide.

## 8.4 SNMP (Optional Adapter)

SNMP is available as an optional adapter. The MIB file and full OID listing will be published with the adapter documentation. Contact Pythia Technologies at 740.363.2272 or support@pythiatech.com for availability.

## 9. Specifications

| CS0-RSP-GWM-3-3 — Technical Specifications |                                                                                                                                                                                                                   |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Model</b>                               | CS0-RSP-GWM-3-3                                                                                                                                                                                                   |
| <b>Description</b>                         | Generator Start Wiring Monitor — 3 ATS inputs, 3 Generator outputs (one per ATS)                                                                                                                                  |
| <b>Standard</b>                            | Meets or exceeds UL 508A Open Industrial Control Panel                                                                                                                                                            |
| <b>NEC Compliance</b>                      | Designed to facilitate NEC Article 700.10(D)(3) compliance                                                                                                                                                        |
| <b>Configuration</b>                       | 3 ATS inputs, 3 generator outputs (one per ATS, independently monitored)                                                                                                                                          |
| <b>Input Power</b>                         | 12–36VDC (from generator battery system)                                                                                                                                                                          |
| <b>Max Wiring Distance</b>                 | 1,000 ft. from panel to each ATS                                                                                                                                                                                  |
| <b>Enclosure</b>                           | ABS, IP67, UL94-V0                                                                                                                                                                                                |
| <b>Dimensions</b>                          | 20" H × 16.1" W × 7.9" D                                                                                                                                                                                          |
| <b>Operating Temp.</b>                     | –30°C to 45°C / –22°F to 113°F                                                                                                                                                                                    |
| <b>Relative Humidity</b>                   | 5–95%, non-condensing                                                                                                                                                                                             |
| <b>Generator Output Relays</b>             | Form C (NO/C/NC), one per ATS; normally closed, opens on that circuit's fault or start request; all open on panel power loss                                                                                      |
| <b>Common Alarm Relay</b>                  | Form C (NO/C/NC); driven by any active unit alarm                                                                                                                                                                 |
| <b>Supervision Signal</b>                  | +5VDC per unit; detects open wire, short-to-ground, short-to-battery                                                                                                                                              |
| <b>Relay Fail-Safe</b>                     | All output relays OPEN (start command) on panel power loss                                                                                                                                                        |
| <b>Communications (Std)</b>                | Modbus/RTU; 19200 baud, 8-N-1, Unit ID 254                                                                                                                                                                        |
| <b>Communications (Opt)</b>                | Modbus/TCP; BACnet/IP (MS0-MB adapter, 30 objects: unit status, contact state, input type, latching, summary alarm, buzzer, input delay; delay, buzzer, and latching writable); SNMP (MIB published with adapter) |
| <b>Additional Configs</b>                  | Larger configurations available: up to 6 ATS inputs. Contact Pythia Technologies.                                                                                                                                 |
| <b>Recommended Wiring</b>                  | Belden 6300UE 18AWG (signal/relay); Belden 6300FE 18AWG (RS-485)                                                                                                                                                  |
| <b>Front Panel LEDs</b>                    | 3 × UNIT (GREEN), 1 × ALARM (RED), 1 × POWER (GREEN)                                                                                                                                                              |
| <b>Audible Alarm</b>                       | Built-in buzzer; silenced via HOLD TO ACKNOWLEDGE button                                                                                                                                                          |
| <b>Contact</b>                             | Pythia Technologies — 740.363.2272 — sales@pythiatech.com                                                                                                                                                         |

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## Appendix A — Protocol Reference

### A.1 Modbus Register Listing

Device: MBT3.IO | Default Modbus Address: 254 | Protocol: Modbus/RTU (8-N-1, 19200 baud)

Register numbers are 1-based. Register 1001 = address 1000 on the wire (Modbus PDU). Read with function 03; write with function 06 or 16. Contact input registers 1001–1006 show the raw contact state; LED/relay status registers 2001–2006 show the processed unit status.

| Register                                                     | Block Name | R/W | Description                                                                 |
|--------------------------------------------------------------|------------|-----|-----------------------------------------------------------------------------|
| <b>Discrete Inputs (Read-Only) — 0 = Off / 1 = On</b>        |            |     |                                                                             |
| 1001                                                         | DI1        | R   | Unit 1 contact input — ATS #1 engine start circuit                          |
| 1002                                                         | DI2        | R   | Unit 2 contact input — ATS #2 engine start circuit                          |
| 1003                                                         | DI3        | R   | Unit 3 contact input — ATS #3 engine start circuit                          |
| 1004                                                         | DI4        | R   | Unit 4 contact input — not used on 3-pair panel                             |
| 1005                                                         | DI5        | R   | Unit 5 contact input — not used on 3-pair panel                             |
| 1006                                                         | DI6        | R   | Unit 6 contact input — not used on 3-pair panel                             |
| 1010                                                         | DI10       | R   | ACK button — 0 = Released, 1 = Pressed                                      |
| <b>Discrete Outputs (Read-Only) — 1 = Normal / 0 = Alarm</b> |            |     |                                                                             |
| 2001                                                         | DO1        | R   | Unit 1 green LED & Gen #1 relay output (Default: 1 = Normal / relay CLOSED) |
| 2002                                                         | DO2        | R   | Unit 2 green LED & Gen #2 relay output (Default: 1 = Normal / relay CLOSED) |
| 2003                                                         | DO3        | R   | Unit 3 green LED & Gen #3 relay output (Default: 1 = Normal / relay CLOSED) |
| 2004                                                         | DO4        | R   | Unit 4 — not used on 3-pair panel                                           |
| 2005                                                         | DO5        | R   | Unit 5 — not used on 3-pair panel                                           |
| 2006                                                         | DO6        | R   | Unit 6 — not used on 3-pair panel                                           |
| 2009                                                         | AO1        | R   | Buzzer output — 0 = Off, 1 = On                                             |
| 2011                                                         | AO3        | R   | Summary alarm LED — 0 = Off, 1 = On                                         |
| 2012                                                         | AO4        | R   | Summary alarm relay — 0 = Normal, 1 = Alarm                                 |
| <b>Project Variables (Read-Only)</b>                         |            |     |                                                                             |
| 3001                                                         | AV1        | R   | Project number — value: 8                                                   |
| 3002                                                         | AV2        | R   | Project version — value: 2                                                  |
| <b>Configuration Variables (Read / Write)</b>                |            |     |                                                                             |
| 4000                                                         | DV1        | R/W | Buzzer disable — 0 = Enabled (default), 1 = Disabled                        |
| 4001                                                         | AV3        | R/W | Input delay in seconds — 1–300 (default: 1)                                 |
| 4011                                                         | DI1CONN    | R/W | Unit 1 input type — 0 = Normally Open, 1 = Normally Closed (default)        |
| 4012                                                         | DI2CONN    | R/W | Unit 2 input type — 0 = Normally Open, 1 = Normally Closed (default)        |

| Register | Block Name | R/W | Description                                                          |
|----------|------------|-----|----------------------------------------------------------------------|
| 4013     | DI3CONN    | R/W | Unit 3 input type — 0 = Normally Open, 1 = Normally Closed (default) |
| 4014     | DI4CONN    | R/W | Unit 4 input type — not used on 3-pair panel                         |
| 4015     | DI5CONN    | R/W | Unit 5 input type — not used on 3-pair panel                         |
| 4016     | DI6CONN    | R/W | Unit 6 input type — not used on 3-pair panel                         |
| 4021     | DI1LATH    | R/W | Unit 1 latching — 0 = Disabled (default), 1 = Enabled                |
| 4022     | DI2LATH    | R/W | Unit 2 latching — 0 = Disabled (default), 1 = Enabled                |
| 4023     | DI3LATH    | R/W | Unit 3 latching — 0 = Disabled (default), 1 = Enabled                |
| 4024     | DI4LATH    | R/W | Unit 4 latching — not used on 3-pair panel                           |
| 4025     | DI5LATH    | R/W | Unit 5 latching — not used on 3-pair panel                           |
| 4026     | DI6LATH    | R/W | Unit 6 latching — not used on 3-pair panel                           |

**NOTE**

Registers for units 4–6 are present because the same panel firmware serves both 3-pair and 6-pair panels. On a 3-pair panel, units 4–6 are internally normally closed and will never generate an alarm.

Latching (DI1LATH–DI3LATH): when enabled, the generator relay for that unit remains open after the fault clears until the front panel ACK button is pressed. The ACK button (register 1010) is read-only — it cannot be written via Modbus.

Input Delay (register 4001) is the qualification time in seconds that a fault condition must persist before the alarm output is activated. Default is 1 second. This setting applies globally to all units.

## A.2 BACnet Objects Listing

Objects served by the optional MS0-MB adapter loaded with BootCS0RSPGWM.xml. See Section 8.3 for adapter behavior, polling, and writable-object details.

### BACnet/IP Object List — MS0-MB Adapter (BootCS0RSPGWM.xml)

| Object                                                      | Name              | Description                        | Register | R/W | Active / Inactive |
|-------------------------------------------------------------|-------------------|------------------------------------|----------|-----|-------------------|
| <b>Analog Value Objects</b>                                 |                   |                                    |          |     |                   |
| AV 1                                                        | Input Delay       | Input delay 1–300 seconds          | 4001     | R/W | seconds           |
| AV 2                                                        | Panel Project     | CM06P project number (8)           | 3001     | R   | no units          |
| AV 3                                                        | Panel Version     | CM06P project version (2)          | 3002     | R   | no units          |
| <b>Binary Value Objects — Summary &amp; Communications</b>  |                   |                                    |          |     |                   |
| BV 1                                                        | Panel Comms       | Modbus RTU link to panel           | —        | R   | Alarm / Normal    |
| BV 2                                                        | Summary Alarm     | Summary alarm relay                | 2012     | R   | Alarm / Normal    |
| <b>Binary Value Objects — Unit Status (LED &amp; Relay)</b> |                   |                                    |          |     |                   |
| BV 3                                                        | Unit 1 Status     | Unit 1 green LED and relay         | 2001     | R   | Normal / Alarm    |
| BV 4                                                        | Unit 2 Status     | Unit 2 green LED and relay         | 2002     | R   | Normal / Alarm    |
| BV 5                                                        | Unit 3 Status     | Unit 3 green LED and relay         | 2003     | R   | Normal / Alarm    |
| BV 6                                                        | Unit 4 Status     | Unit 4 — not used on 3-pair        | 2004     | R   | Normal / Alarm    |
| BV 7                                                        | Unit 5 Status     | Unit 5 — not used on 3-pair        | 2005     | R   | Normal / Alarm    |
| BV 8                                                        | Unit 6 Status     | Unit 6 — not used on 3-pair        | 2006     | R   | Normal / Alarm    |
| <b>Binary Value Objects — Contact Input State</b>           |                   |                                    |          |     |                   |
| BV 9                                                        | Unit 1 Input      | Unit 1 contact state               | 1001     | R   | On / Off          |
| BV 10                                                       | Unit 2 Input      | Unit 2 contact state               | 1002     | R   | On / Off          |
| BV 11                                                       | Unit 3 Input      | Unit 3 contact state               | 1003     | R   | On / Off          |
| BV 12                                                       | Unit 4 Input      | Unit 4 — not used on 3-pair        | 1004     | R   | On / Off          |
| BV 13                                                       | Unit 5 Input      | Unit 5 — not used on 3-pair        | 1005     | R   | On / Off          |
| BV 14                                                       | Unit 6 Input      | Unit 6 — not used on 3-pair        | 1006     | R   | On / Off          |
| <b>Binary Value Objects — Input Type Configuration</b>      |                   |                                    |          |     |                   |
| BV 15                                                       | Unit 1 Input Type | 0=Normally Open, 1=Normally Closed | 4011     | R   | NC / NO           |
| BV 16                                                       | Unit 2 Input Type | 0=Normally Open, 1=Normally Closed | 4012     | R   | NC / NO           |
| BV 17                                                       | Unit 3 Input Type | 0=Normally Open, 1=Normally        | 4013     | R   | NC / NO           |

| Object                                               | Name              | Description           | Register | R/W | Active / Inactive  |
|------------------------------------------------------|-------------------|-----------------------|----------|-----|--------------------|
|                                                      |                   | Closed                |          |     |                    |
| BV 18                                                | Unit 4 Input Type | Not used on 3-pair    | 4014     | R   | NC / NO            |
| BV 19                                                | Unit 5 Input Type | Not used on 3-pair    | 4015     | R   | NC / NO            |
| BV 20                                                | Unit 6 Input Type | Not used on 3-pair    | 4016     | R   | NC / NO            |
| <b>Binary Value Objects — Latching Configuration</b> |                   |                       |          |     |                    |
| BV 21                                                | Unit 1 Latching   | 0=Disabled, 1=Enabled | 4021     | R/W | Enabled / Disabled |
| BV 22                                                | Unit 2 Latching   | 0=Disabled, 1=Enabled | 4022     | R/W | Enabled / Disabled |
| BV 23                                                | Unit 3 Latching   | 0=Disabled, 1=Enabled | 4023     | R/W | Enabled / Disabled |
| BV 24                                                | Unit 4 Latching   | Not used on 3-pair    | 4024     | R/W | Enabled / Disabled |
| BV 25                                                | Unit 5 Latching   | Not used on 3-pair    | 4025     | R/W | Enabled / Disabled |
| BV 26                                                | Unit 6 Latching   | Not used on 3-pair    | 4026     | R/W | Enabled / Disabled |
| <b>Binary Value Objects — Buzzer</b>                 |                   |                       |          |     |                    |
| BV 27                                                | Buzzer            | 0=Enabled, 1=Disabled | 4000     | R/W | Disabled / Enabled |

**NOTE**

Binary Value present value follows the register value: 1 = Active, 0 = Inactive.

Panel Communications (BV 1) is set by the adapter's device status report, not by a register: 0=OK, 1=timeout, 2=Modbus exception, 3=line fault. Any non-zero value shows Active (Alarm).

Object names, descriptions, state text, and units are those served by the adapter and will appear as shown in a BACnet client's discovery.

### A.3 SNMP Objects Listing

SNMP is available as an optional adapter. This section will list the published MIB and full OID table once the SNMP adapter configuration file is built. Contact Pythia Technologies at 740.363.2272 or support@pythiatech.com for availability.