



# PROMATION ENGINEERING

*Precision Actuation for Industry*

## Installation & Operation Manual

This IOM is for the following  
ProMation Engineering Products:

PBU600-120P-4

PBU600-120P-4 with Status

120VAC Proportional

PBU602-120P-4

PBU602-120P-4 with Status

PBU604-120P-4

PBU604-120P-4 with Status

PBU606-120P-4

PBU606-120P-4 with Status

PBU602-230P-4

PBU602-230P-4 with Status

230VAC Proportional

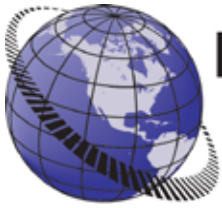
PBU604-230P-4

PBU604-230P-4 with Status

PBU606-230P-4

PBU606-230P-4 with Status





**PBU600**

The battery backup system (PBU) is housed in a NEMA 4X enclosure with a clear front access door to allow instantaneous visual confirmation of the operation of the system. This product requires connection to a 120V or 230V supply to power the backup unit.



**PBU600 with Status Option**

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FM-PBU Proportional Series Rev J 011323

## Product shipping information

1. The PBU system is shipped in two separate enclosures. This is done to prevent shipping damage to both the fiberglass enclosure as well as to sensitive components associated with the heavier control panel and battery back up system.
2. BOX 1 contains the fiberglass enclosure. Do NOT use sharp objects when opening the carton as you may damage the clear lexan door attached to the enclosure cabinet.
3. BOX 2 contains the main face plate panel, battery system and control electronics.

**4. This unit is shipped with the battery system disconnected. Follow the instructions below to correctly reconnect the battery to the power unit. Failure to follow the connection sequence will prevent the battery unit from starting.**

## Product installation

1. Mount the cabinet either indoors or outdoors protected from direct sunlight or other high heat sources. The cabinet mounts with the latches to the RIGHT, and hinge to the LEFT. The suggested EMT entry location is shown on page 16 in the dimensional drawing. Make all conduit penetrations per local code and perform all wire pulls prior to installing the main control panel (see mounting data on page 13).

2. After the enclosure is properly mounted, install the four corner standoffs using a 3/8" socket or a nut driver. There are two (2) 2" long hex standoffs connected together for EACH corner of the enclosure. These are located inside the enclosure when shipped. DO NOT OVERTIGHTEN!

3. Turn the main panel over to reveal the back side of the plate. Remove the sliding battery compartment cover from the APC unit.

4. Tilt the entire assembly to slide the battery out of the enclosure. This will give you access to the battery terminals.

5. **Connect the battery.** Connect the positive (red) wire to the red battery terminal. Connect the negative (black) wire to the black battery terminal.

6. Slide the battery back into the enclosure, and replace the slide cover. Careful not to pinch the battery wires in the process.

7. Set the signal select DIP switch for the proper signal response. (1 ON = 2-10vdc, 1 OFF = 4-20mA) (**DEFAULT IS SET FOR 4-20mA**).

**This switch MUST be positioned correctly before mounting the panel into the main enclosure... it is NOT accessible after the panel is mounted.**

8. Install the panel onto the four standoff posts from step 2 (above) using 10-32 x 1/2" PH screws from parts bag.

9. Make wiring connections (see pages 6-12). After power is applied to the PBU, press the "Enable" button on the front panel to start the system. Note that the Optional Indicators and Connections are not functional unless the unit is ordered "with Status".



# Installation and Application Notes

After installation and wiring are complete, apply power and PRESS the START button to enable the battery system.

Place the FAIL POSITION SELECTOR switch in the desired mode (Fail OPEN or Fail CLOSED) based on the requirements of the site.

Indicator lamps show when Power is applied, which Fail position has been selected, when the Battery is Charging, and when the system is running on Battery Power. Units with the factory installed "with Status" option also include two extra lamps: Open End of Travel and Closed End of Travel. [Indicator lenses unscrew to access the lamps. Lamps are T-2 style and PRESS straight in, do NOT twist. Lamps are 120v for 24v & 120v models, and 230v for 230v models.]

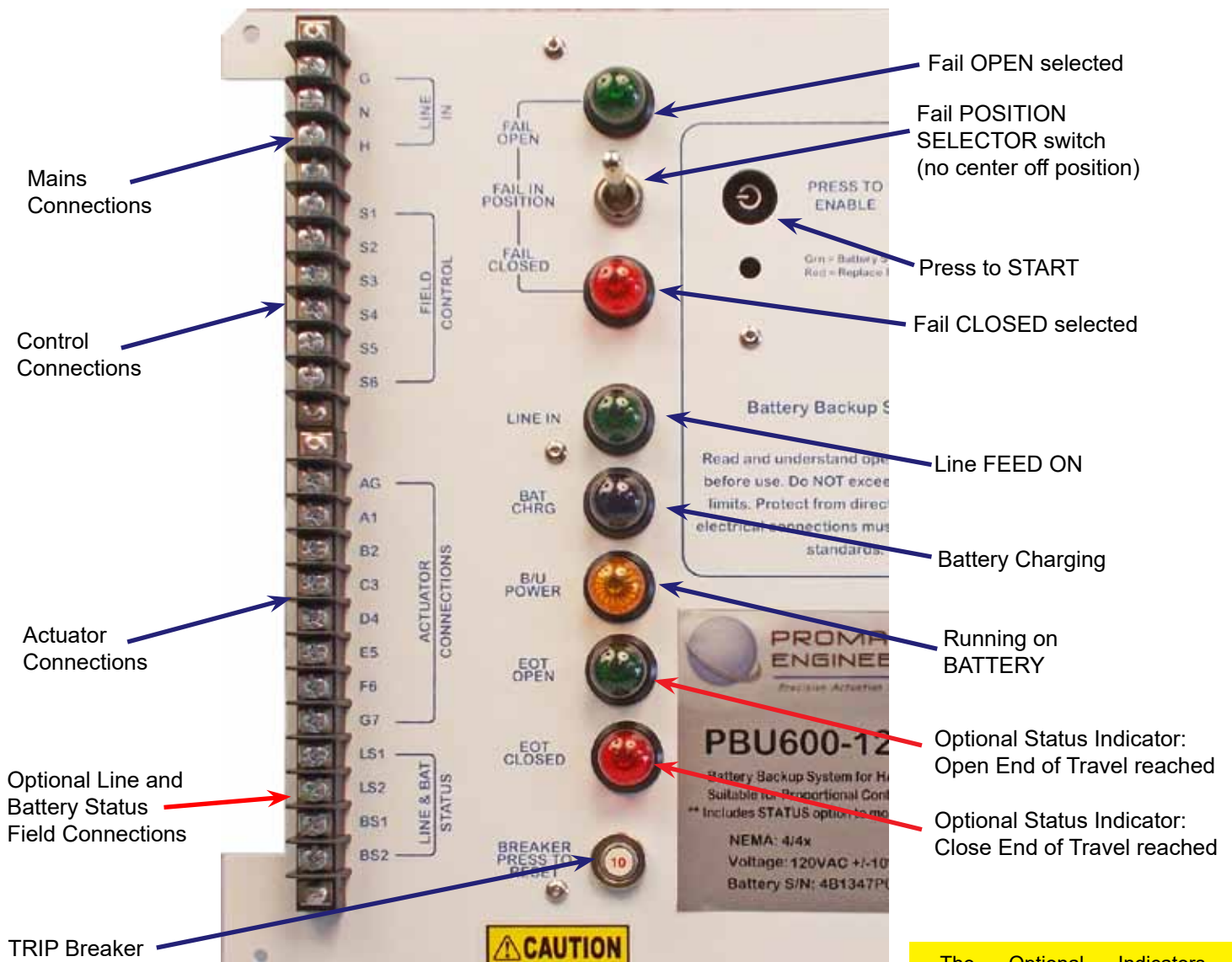
**After the battery has been connected to the power unit, there is LIVE voltage present on the back of the main panel even after the main power has been disconnected. Handle appropriately!**

Overloading the backup system will TRIP the breaker. This is a PRESS to RESET type and is NOT self resetting.

**It is possible to connect multiple proportional control actuators to a single PBU PROVIDED THE TOTAL ACTUATOR DEMAND DOES NOT EXCEED THE RATING OF THE PBU. Reference page 12 for details.**

The Line Status and Battery Status are dry form C contacts rated at 8A, 250 vac/30vdc.

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**PBU600 with Status**

The Optional Indicators and Connections are not functional unless the unit is ordered "with Status".

## P Series Sizing and Performance Chart - Proportional Actuators

Actuator	Torque Output	Runtime (Seconds)	Current Draw (Amps)	PBU Model 2-10vdc/4-20mA	Capacity Used @ Full Runtime	Replacement Battery
P1-120PN4	300	12	0.6	PBU600-120P-4	0.4%	RBC-35
P1.A-120PN4	300	20	0.6	PBU600-120P-4	0.4%	RBC-35
P2-120PN4-AC	800	15	1.0	PBU600-120P-4	1.1%	RBC-35
P3-120PN4-AC	1335	22	1.2	PBU600-120P-4	1.8%	RBC-110
P4-120PN4-AC	3500	16	1.9	PBU602-120P-4	1.8%	RBC-110
P5-120PN4-AC	4400	22	2.0	PBU602-120P-4	2.6%	RBC-110
P6-120PN4-AC	5800	28	2.1	PBU602-120P-4	8.0%	RBC-110
P7-120PN4-AC	8900	46	3.1	PBU604-120P-4	9.9%	RBC-17
P8-120PN4-AC	13250	46	3.3	PBU604-120P-4	10.1%	RBC-17
P9-120PN4-AC	17500	58	3.3	PBU604-120P-4	12.7%	RBC-17
P10-120PN4-AC	22000	58	4.0	PBU604-120P-4	13.2%	RBC-17
P11-120PN4-AC	26500	58	4.5	PBU604-120P-4	13.5%	RBC-17
P12-120PN4-AC	31000	58	4.0	PBU604-120P-4	13.2%	RBC-17
P13-120PN4-AC	40000	80	4.2	PBU604-120P-4	18.3%	RBC-17
P1-230PN4	300	12	0.3	PBU602-230P-4	0.4%	RBC-51
P1.A-230PN4	300	20	0.3	PBU602-230P-4	0.4%	RBC-51
P2-230PN4-AC	800	15	0.5	PBU602-230P-4	1.3%	RBC-51
P3-230PN4-AC	1335	22	1.0	PBU602-230P-4	2.6%	RBC-51
P4-230PN4-AC	3500	16	1.1	PBU602-230P-4	3.3%	RBC-51
P5-230PN4-AC	4400	22	1.1	PBU602-230P-4	4.6%	RBC-51
P6-230PN4-AC	5800	28	1.1	PBU602-230P-4	6.7%	RBC-51
P7-230PN4-AC	8900	46	1.4	PBU604-230P-4	8.5%	RBC-51
P8-230PN4-AC	13250	46	1.6	PBU604-230P-4	9.6%	RBC-51
P9-230PN4-AC	17500	58	2.1	PBU604-230P-4	12.1%	RBC-51
P10-230PN4-AC	22000	58	2.3	PBU604-230P-4	16.1%	RBC-51
P11-230PN4-AC	26500	58	2.5	PBU604-230P-4	19.3%	RBC-51
P12-230PN4-AC	31000	58	2.4	PBU604-230P-4	16.1%	RBC-51
P13-230PN4-AC	40000	80	2.4	PBU604-230P-4	22.2%	RBC-51

## PL Series Sizing and Performance Chart - Proportional Actuators

Actuator	Force (lbs)	Full Stroke (mm)	Running Speed (mm/sec)	Runtime (sec @ 60Hz Full Travel)	Current Draw (Amps)	PBU Model 2-10vdc/ 4-20mA	Capacity Used @ Full Runtime	Replacement Battery
PL550-120PN4	550	50	0.6	84	0.5	PBU606-120P-4	14%	RBC-35
PL680-120PN4	680	32	0.8	26	0.6	PBU600-120P-4	0.4%	RBC-35
PL1100-120PN4	1100	50	0.6	84	0.5	PBU606-120P-4	14%	RBC-35
PL1800-120PN4	1800	50	1.1	46	1.0	PBU600-120P-4	1.1%	RBC-35
PL2000-120PN4	2000	50	.8	63	1.2	PBU600-120P-4	1.8%	RBC-110
PL2200-120PN4	2200	100	0.5	200	0.5	PBU606-120P-4	33.3%	RBC-35
PL4400-120PN4	4400	100	0.5	200	0.5	PBU606-120P-4	33.3%	RBC-35
PL550-230PN4	550	50	0.6	84	0.7	PBU606-230P-4	16.8%	RBC-35
PL680-230PN4	680	32	0.8	26	0.3	PBU602-230P-4	0.4%	RBC-51
PL1100-230PN4	1100	50	0.6	84	0.7	PBU606-230P-4	16.8%	RBC-35
PL1800-230PN4	1800	50	1.1	46	0.5	PBU602-230P-4	1.3%	RBC-51
PL2000-230PN4	2000	50	.8	63	1.0	PBU602-230P-4	2.6%	RBC-51
PL2200-230PN4	2200	100	0.5	200	1.3	PBU606-230P-4	39.9%	RBC-35
PL4400-230PN4	4400	100	0.5	200	0.7	PBU606-230P-4	39.9%	RBC-35

## PBU Series Sequence of Operation - Proportional Actuators

The back up system is wired in series between the mains power and the actuator. Under normal operation, power supplied to the PBU H & N terminals will illuminate the green "**LINE IN**" indicator light, and provide charging voltage to the battery system. While Mains power is present, The remotely generated analog control signal (either 2-10vdc or 4-20mA) is passed through the PBU and on to the actuator. The actuator will follow that control signal. While under mains power the blue "**BAT CHARGING**" indicator light will illuminate and the yellow "**B/U POWER**" indicator light will be off. While under mains power, the position of the "**FAIL POSITION SELECT**" switch is irrelevant. Power is supplied through the back-up system cabinet and the actuator heater is enabled. No current is being drawn from the battery system during this mode of operation. Optional indicator lights can be wired to show actuator end of travel status. These lamps are active as long as the battery system is running or Mains power is present. Optional STATUS contacts can be used for remote health indicators of LINE voltage coming into the PBU and if the Battery System is operating.

**When the mains power is lost**, charging power is no longer supplied to the battery system. The green "LINE IN" indicator light is turned off, and the battery system automatically generates modified-sine wave line voltage to provide power for the actuator. The blue "BAT CHARGING" indicator light is turned off, and the yellow "B/U POWER" indicator light is turned on. The "FAIL POSITION SELECT" switch becomes active, and depending on its position, drives the actuator either fully OPEN or fully CLOSED via its own signal generator. During this mode of operation, the remote analog control signal (if present or not) is irrelevant. The battery system will provide ample power to drive the actuator more than 5 full torque cycles. However, once the actuator reaches its end-of-travel limit switch, power drain from the back-up system is reduced to the requirements of the yellow "B/U POWER" indicator light. After 15 minutes, the battery system turns itself off and waits for the mains power to return. The design of the ProMation P Series actuators provides automatic locking of the actuator position after the battery system shuts down. Normal operation is resumed when mains power returns.

**It is possible to connect multiple proportional control actuators to a single PBU PROVIDED THE TOTAL ACTUATOR DEMAND DOES NOT EXCEED THE RATING OF THE PBU. Reference page 12 for details.**

# Wiring Diagram for PBU600-120P-4 for P1/P1.A and PL680 Series

## Proportional Control

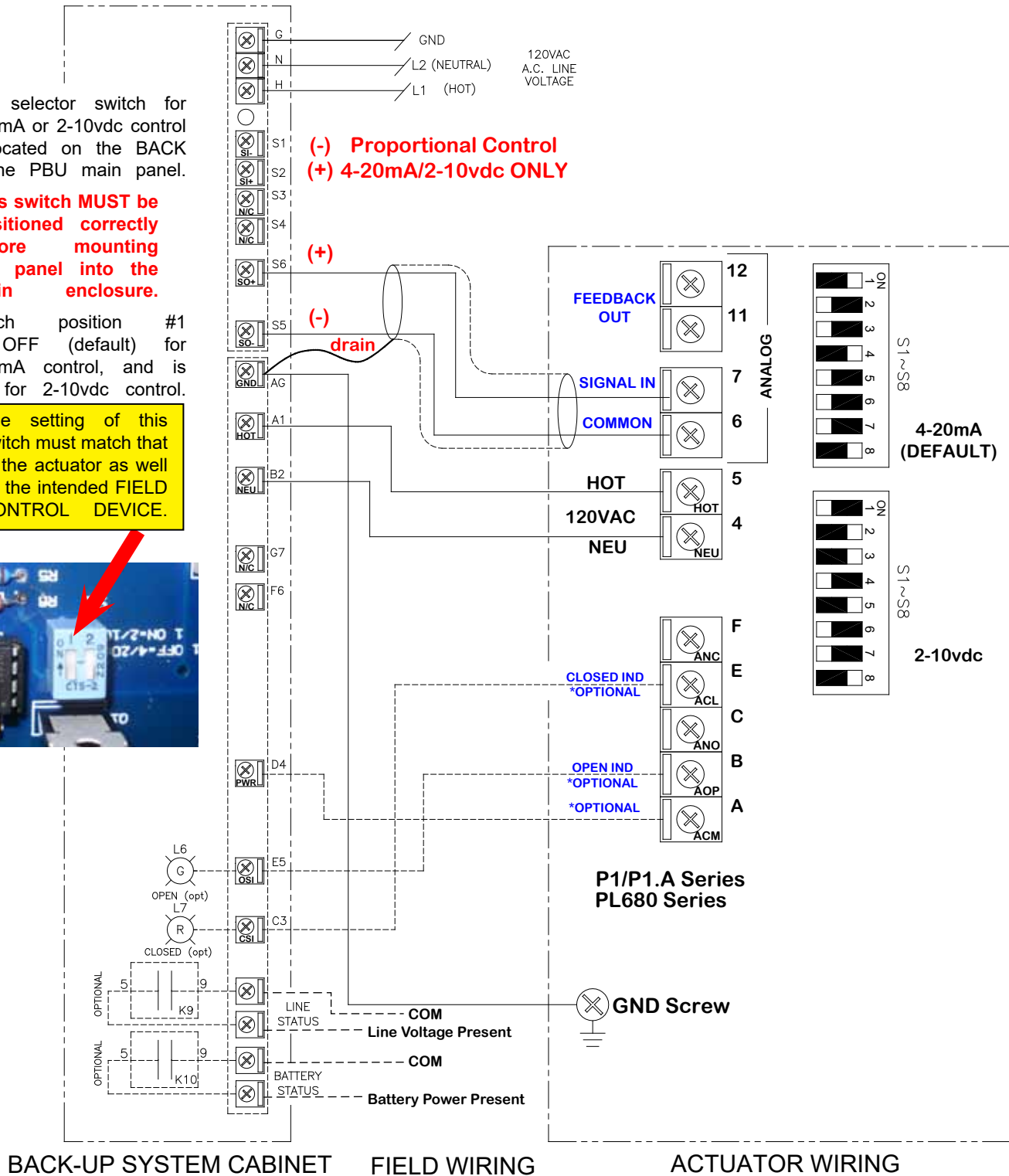
(120vac)

The selector switch for 4-20mA or 2-10vdc control is located on the BACK of the PBU main panel.

**This switch MUST be positioned correctly before mounting the panel into the main enclosure.**

Switch position #1 is OFF (default) for 4-20mA control, and is ON for 2-10vdc control.

The setting of this switch must match that of the actuator as well as the intended FIELD CONTROL DEVICE.



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# Wiring Diagram for PBU600, 602, 604-120P-4 for P2~13; PL1800 and PL2000 Series

## Proportional Control

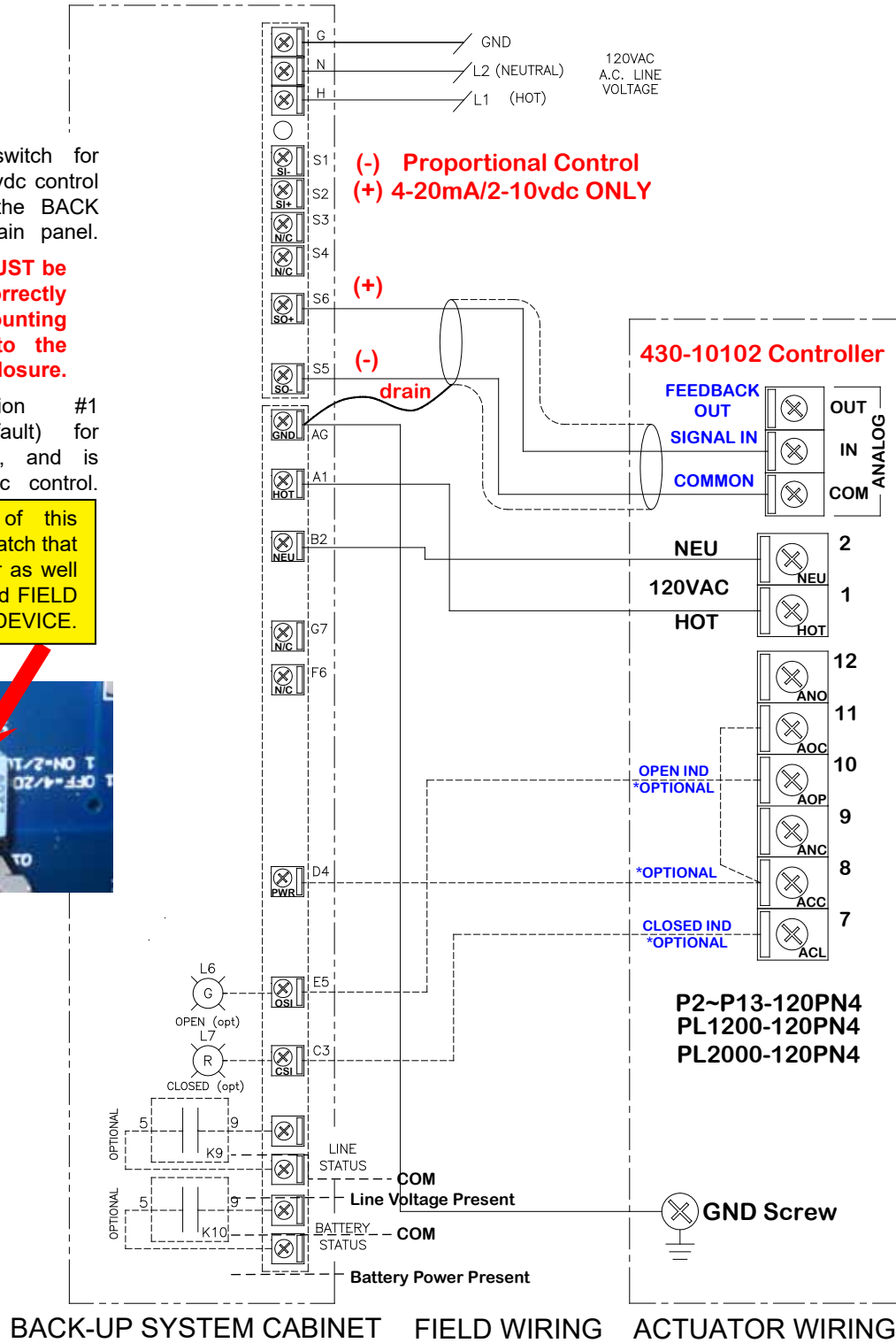
(120vac)

The selector switch for 4-20mA or 2-10vdc control is located on the BACK of the PBU main panel.

**This switch MUST be positioned correctly before mounting the panel into the main enclosure.**

Switch position #1 is OFF (default) for 4-20mA control, and is ON for 2-10vdc control.

The setting of this switch must match that of the actuator as well as the intended FIELD CONTROL DEVICE.



# Wiring Diagram for PBU606-120P-4 for PL550, PL1100, PL2200 and PL4400 Series

## Proportional Control

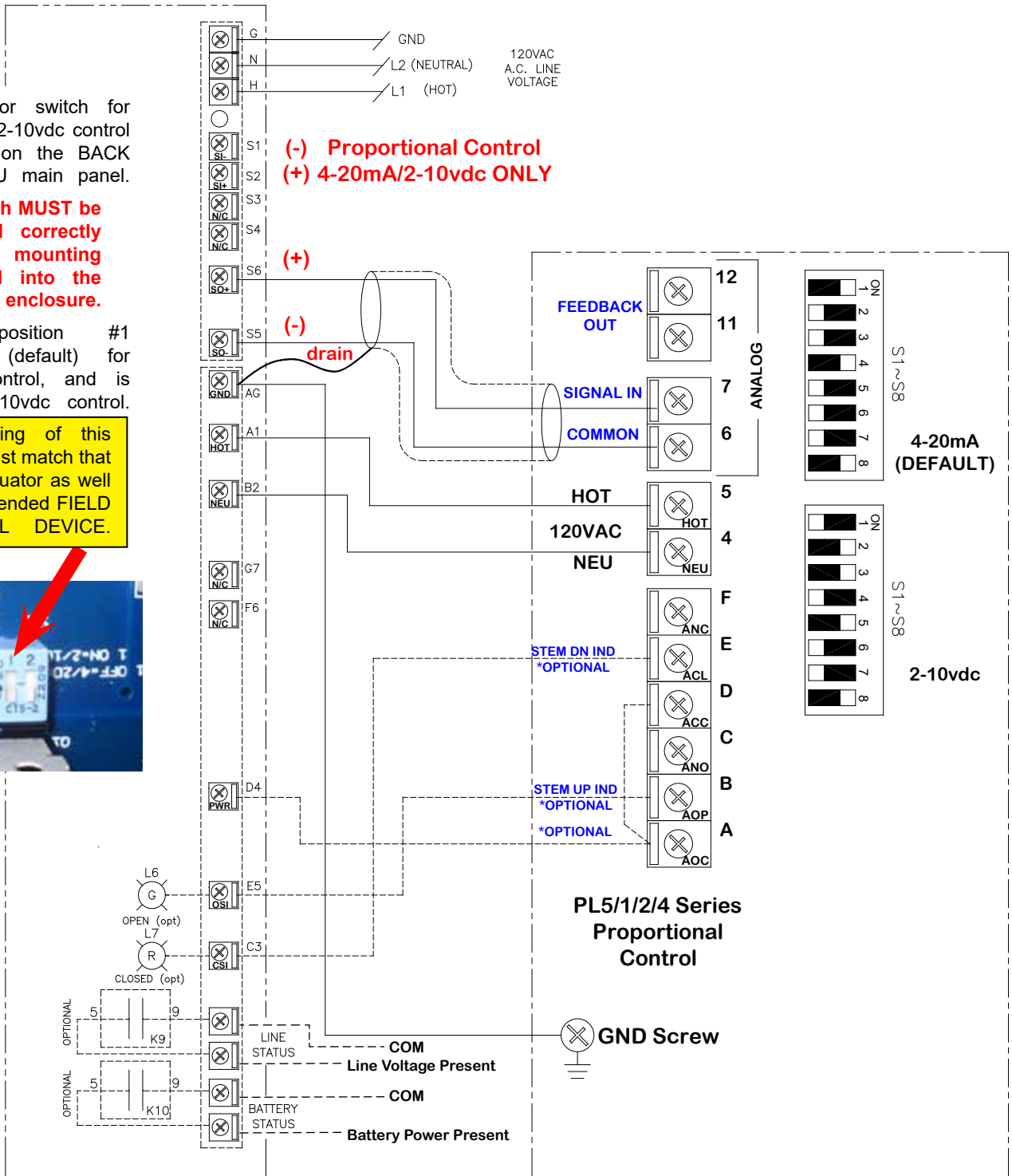
(120vac)

The selector switch for 4-20mA or 2-10vdc control is located on the BACK of the PBU main panel.

**This switch MUST be positioned correctly before mounting the panel into the main enclosure.**

Switch position #1 is OFF (default) for 4-20mA control, and is ON for 2-10vdc control.

The setting of this switch must match that of the actuator as well as the intended FIELD CONTROL DEVICE.



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# Wiring Diagram for PBU602-230P-4 for P1/P1.A and PL680 Series

## Proportional Control

(230vac)

The selector switch for 4-20mA or 2-10vdc control is located on the BACK of the PBU main panel.

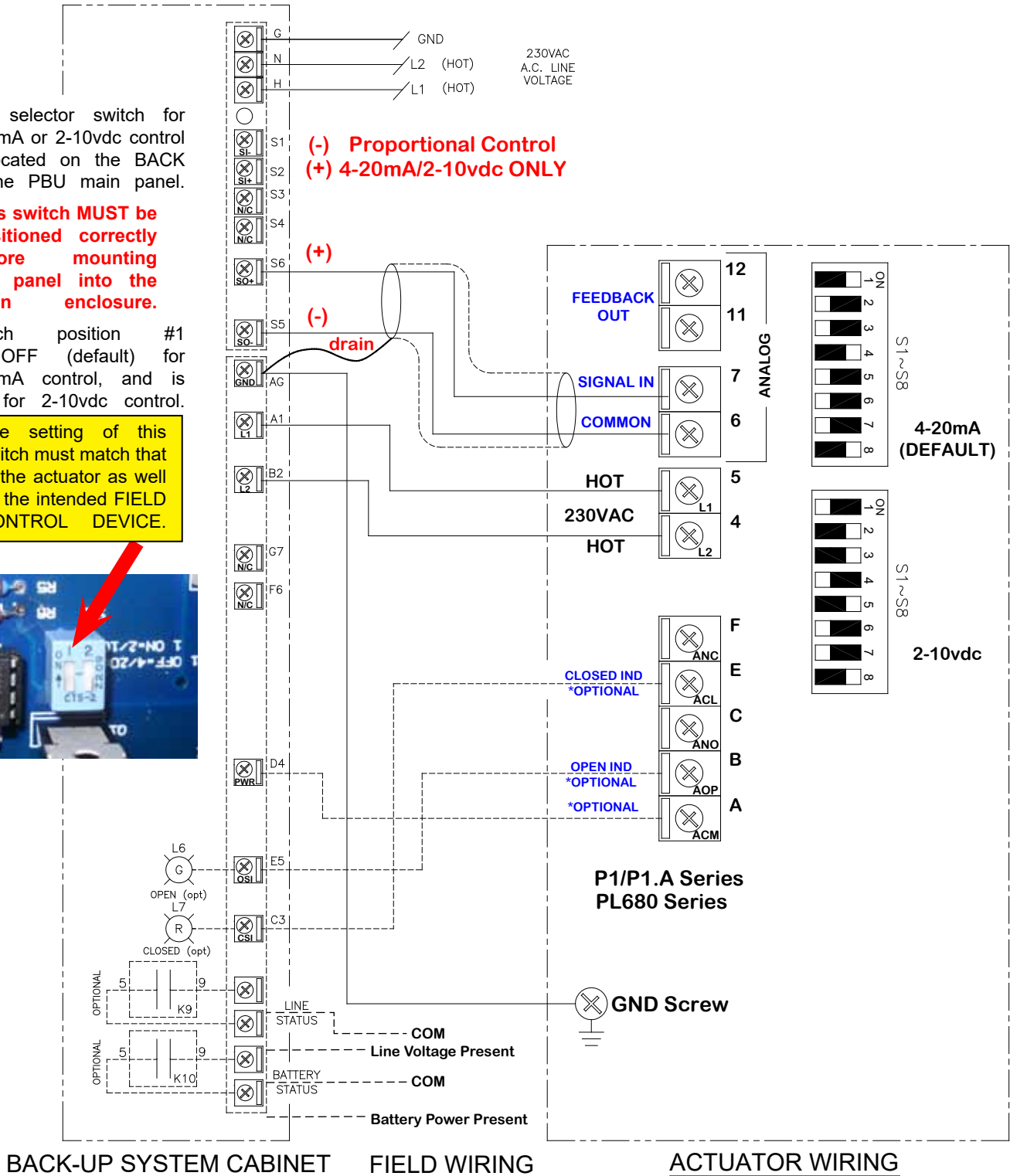
**This switch MUST be positioned correctly before mounting the panel into the main enclosure.**

Switch position #1 is OFF (default) for 4-20mA control, and is ON for 2-10vdc control.

The setting of this switch must match that of the actuator as well as the intended FIELD CONTROL DEVICE.



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# Wiring Diagram for PBU602, 604-230P-4 for P2~13; PL1800 and PL2000 Series

## Proportional Control

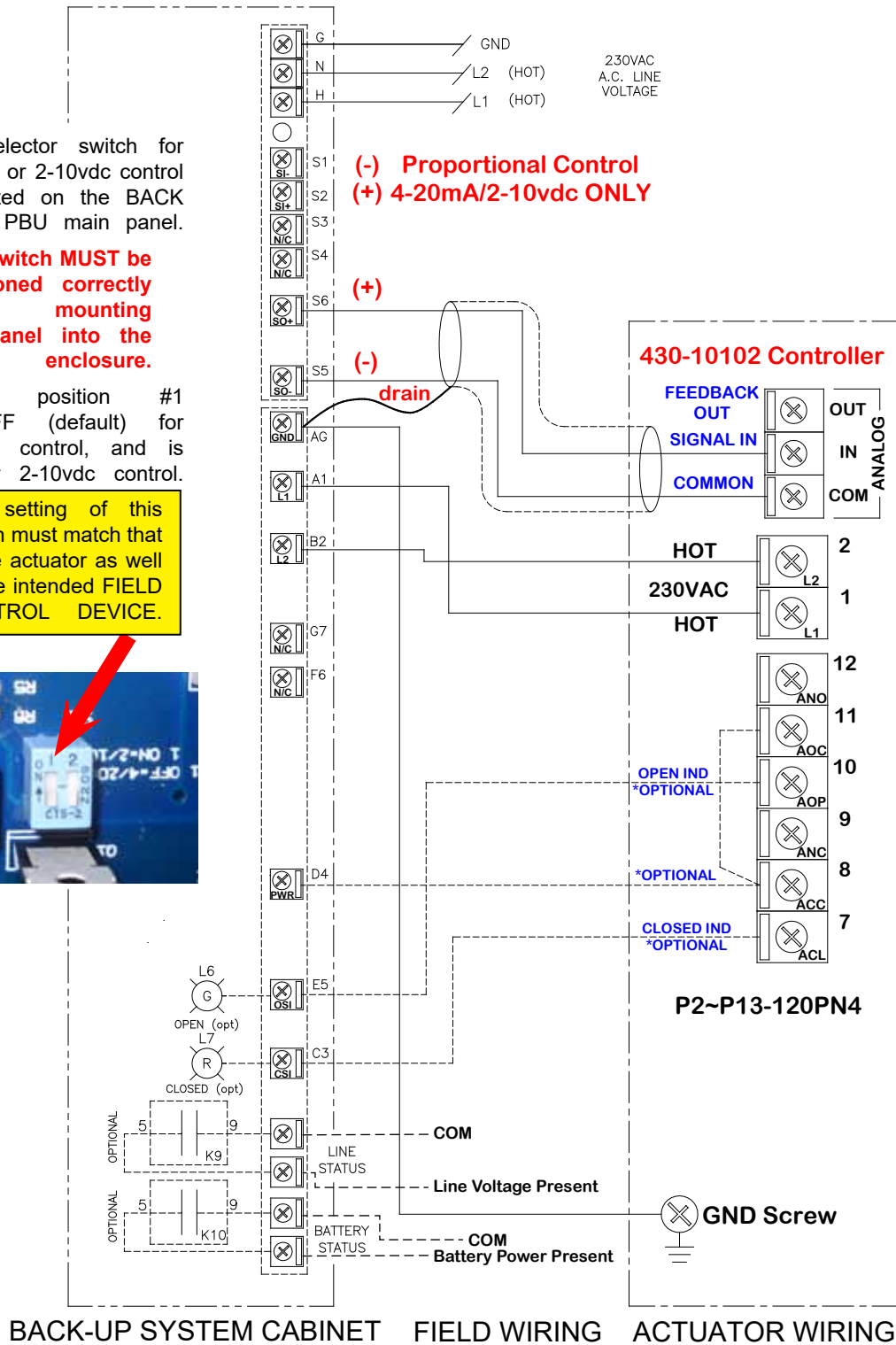
(230vac)

The selector switch for 4-20mA or 2-10vdc control is located on the BACK of the PBU main panel.

**This switch MUST be positioned correctly before mounting the panel into the main enclosure.**

Switch position #1 is OFF (default) for 4-20mA control, and is ON for 2-10vdc control.

The setting of this switch must match that of the actuator as well as the intended FIELD CONTROL DEVICE.



# Wiring Diagram for PBU606-230P-4 for PL550, PL1100, PL2200 and PL4400 Series

## Proportional Control

(230vac)

The selector switch for 4-20mA or 2-10vdc control is located on the BACK of the PBU main panel.

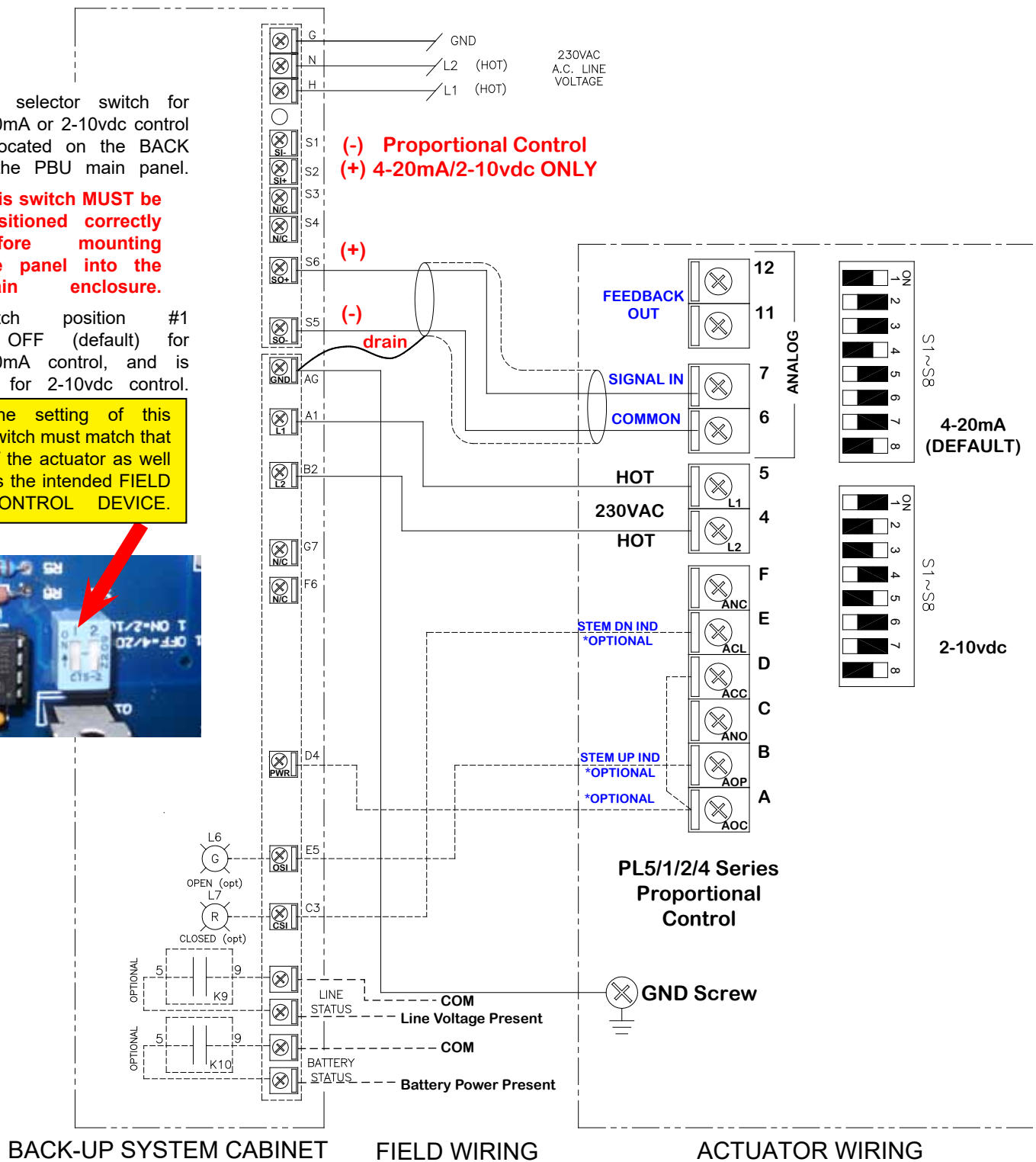
**This switch MUST be positioned correctly before mounting the panel into the main enclosure.**

Switch position #1 is OFF (default) for 4-20mA control, and is ON for 2-10vdc control.

The setting of this switch must match that of the actuator as well as the intended FIELD CONTROL DEVICE.



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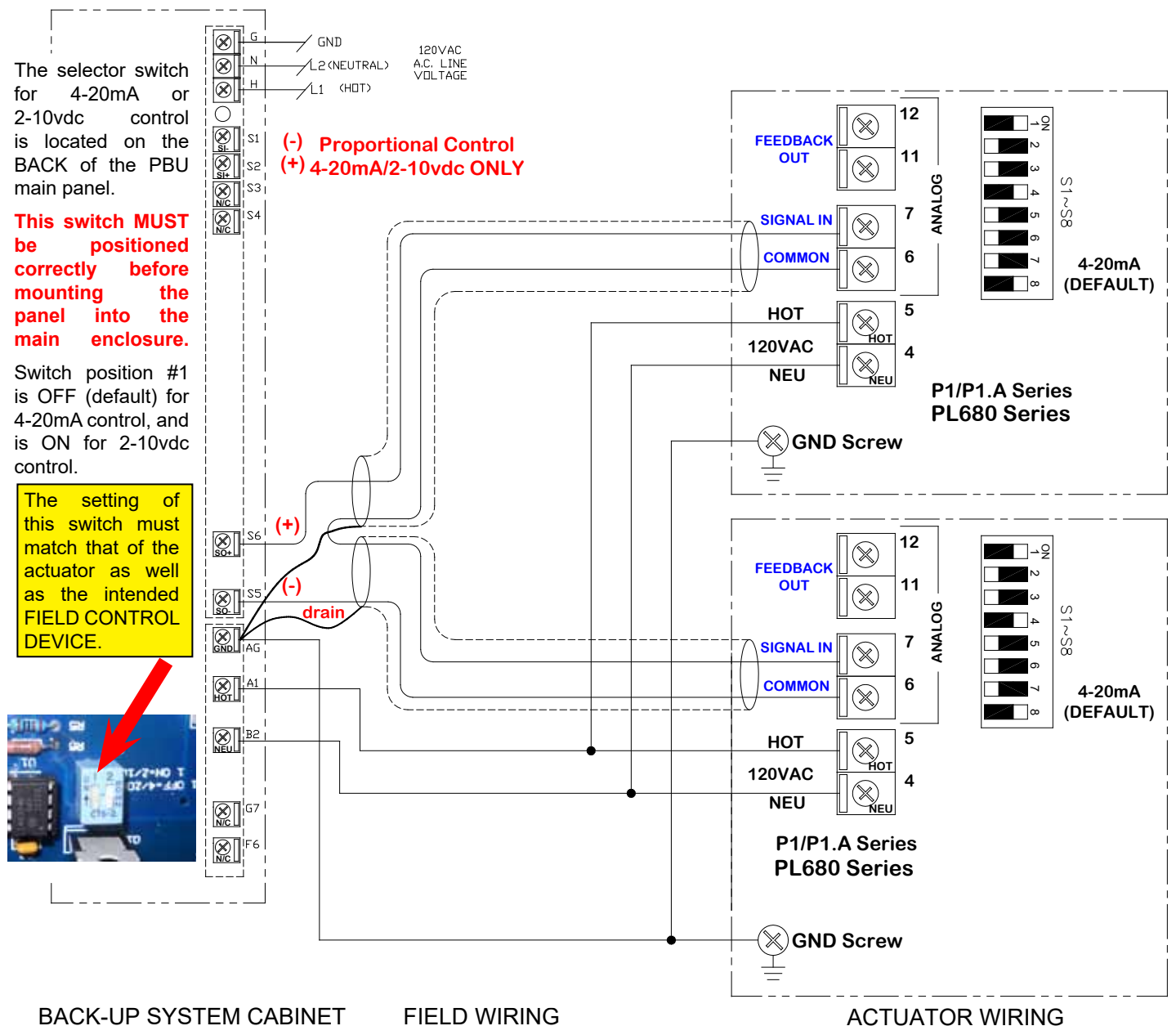
# Connecting Multiple Proportional Control Actuators To A Single PBU Unit

**CAUTION!** Check actuator START current demand for each actuator being connected to a single PBU unit. ADD the STARTING currents together, then check the Sizing and Performance Charts on pages 4-5 to determine which PBU model will support the requirement. Do NOT exceed the rating of the PBU. This will cause premature battery failure, breaker tripping, low actuator torque, and unreliable actuator operation.

**IMPORTANT!** NOTE that there is only ONE FIELD CONTROL point provided on the PBU. This means any actuator(s) connected to the PBU will be required to OPERATE on the SAME CONTROL LOOP. Actuators may be set to operate in series (4-20mA control), or in parallel (2-10vdc control).

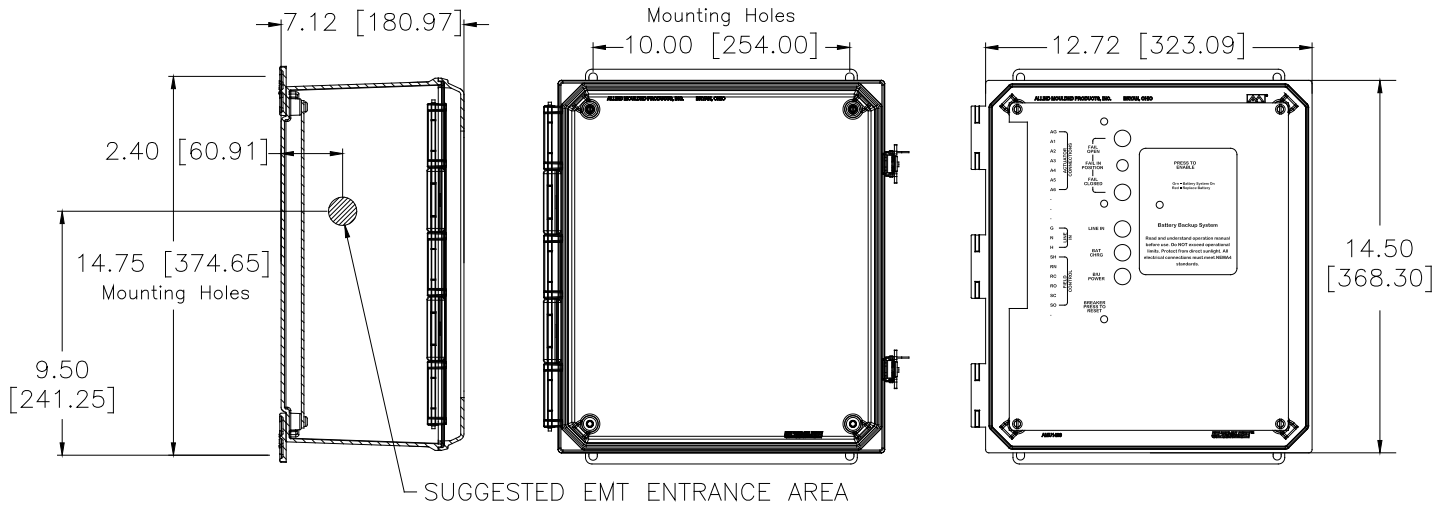
Follow the wiring diagram below (example is 120vac) to connect multiple 4-20mA actuators to a single PBU unit.

PBU600-120P-4 w/ 2x P1-120PN4 shown (4-20mA mode)

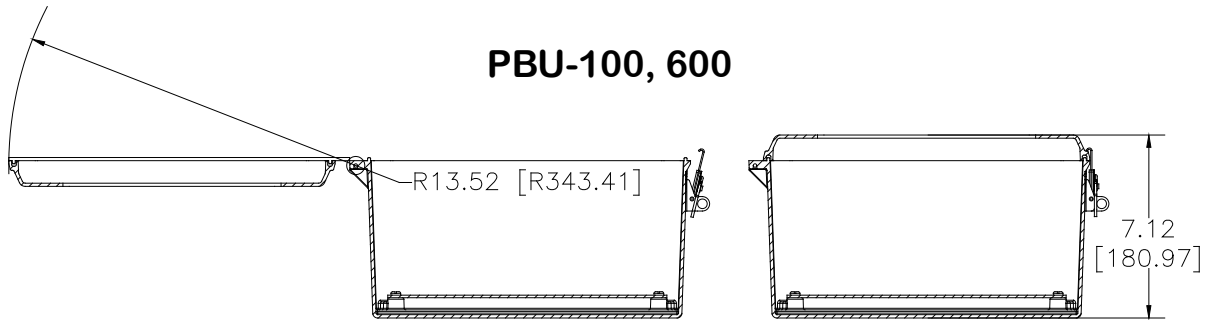


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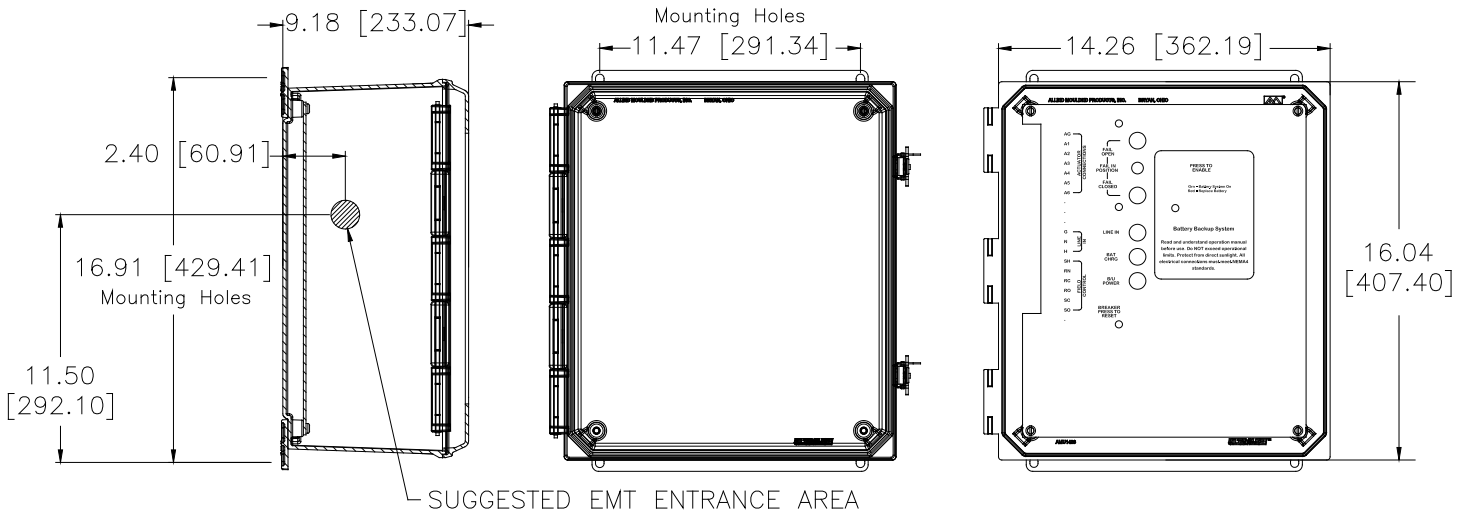
# Mounting Dimensional Data



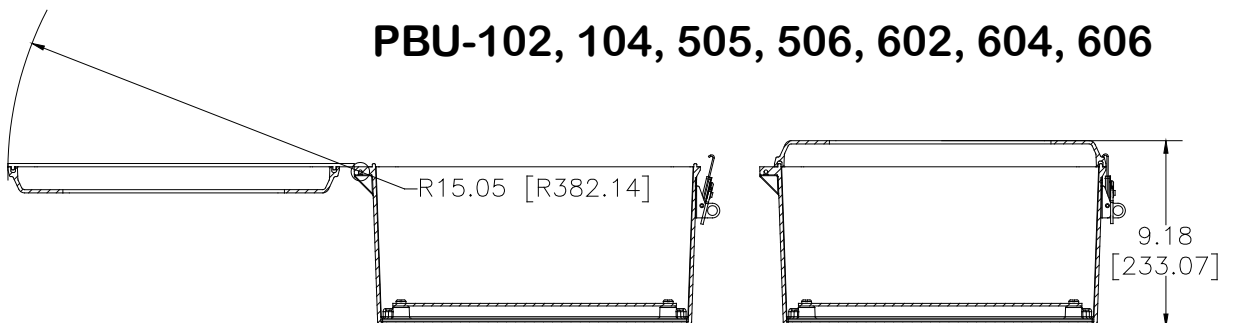
## PBU-100, 600



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## PBU-102, 104, 505, 506, 602, 604, 606



# Technical Specifications

		PBU600-120	PBU600-24	
<u>Input:</u>	Nominal input voltage: Mains Input Voltage Range:	120vac 88-139vac	120vac 88-139vac	
	Input Frequency:	50/60Hz +/- 1Hz (auto sensing)		
<u>Output:</u>	Nominal Output voltage:	120vac	24vac	
	Power Capacity: Waveform Type:	350VA/ 210 Watts Stepped approximation to a sinewave		
<u>Batteries:</u>	Typical backup time at half-load: Type:	5.6 minutes Maintenance-Free sealed lead-acid Suspended electrolyte: Leakproof		
	Typical recharge time:	16 hours **		
<u>Filtering</u>	Full time multi-pole noise filtering:	5% IEEE surge let-through. Response time meets UL 1449		

		PBU602-120	PBU602-24	PBU602-230
<u>Input:</u>	Nominal input voltage: Mains Input Voltage Range:	120vac 88-139vac	120vac 88-139vac	230vac 186-268vac
	Input Frequency:	50/60Hz +/- 1Hz (auto sensing)		
<u>Output:</u>	Nominal Output voltage:	120vac	24vac	230vac
	Power Capacity: Waveform Type:	550VA/ 300 Watts Stepped approximation to a sinewave		
<u>Batteries:</u>	Typical backup time at half-load: Type:	13.4 minutes Maintenance-Free sealed lead-acid Suspended electrolyte: Leakproof		
	Typical recharge time:	24 hours **		
<u>Filtering</u>	Full time multi-pole noise filtering:	5% IEEE surge let-through. Response time meets UL 1449		

		PBU604-120	PBU604-24	PBU604-230
<u>Input:</u>	Nominal input voltage: Mains Input Voltage Range:	120vac 88-139vac	120vac 88-139vac	230vac 186-268vac
	Input Frequency:	50/60Hz +/- 1Hz (auto sensing)		
<u>Output:</u>	Nominal Output voltage:	120vac	24vac	230vac
	Power Capacity: Waveform Type:	750VA/ 540 Watts Stepped approximation to a sinewave		
<u>Batteries:</u>	Typical backup time at half-load: Type:	11.8 minutes Maintenance-Free sealed lead-acid Suspended electrolyte: Leakproof		
	Typical recharge time:	16 hours **		
<u>Filtering</u>	Full time multi-pole noise filtering:	5% IEEE surge let-through. Response time meets UL 1449		

\*\* The time to recharge to 90% of full battery capacity following a discharge to shutdown using a load rated for 1/2 the full load rating of the UPS.



# Technical Specifications

		PBU606-120	PBU606-24	PBU606-230
<u>Input:</u>	Nominal input voltage: Mains Input Voltage Range:	120vac 88-139vac	120vac 88-139vac	230vac 186-268vac
	Input Frequency:	50/60Hz +/- 1Hz (auto sensing)		
<u>Output:</u>	Nominal Output voltage:	120vac	24vac	230vac
	Power Capacity: Waveform Type:	750VA/ 540 Watts Stepped approximation to a sinewave		
<u>Batteries:</u>	Typical backup time at half-load: Type:  Typical recharge time:	11.8 minutes Maintenance-Free sealed lead-acid Suspended electrolyte: Leakproof 16 hours **		
<u>Filtering</u>	Full time multi-pole noise filtering:	5% IEEE surge let-through. Response time meets UL 1449		

## Environmental

Operating Relative Humidity 0 - 95%

Operating Elevation 0-10000 feet (0-3000 m)

Storage Temperature -15 - 45 °C (5 - 113°F)

Storage Relative Humidity 0 - 95%

Storage Elevation 0-50000 feet (0-15000 m)

Audible noise at 1 meter from surface of unit 45 dBA

Online thermal dissipation 14 (100), 16 (102) & 47 (104) BTU/hr

\*\* The time to recharge to 90% of full battery capacity following a discharge to shutdown using a load rated for 1/2 the full load rating of the UPS.

## Conformance - APC Back UP Module

Approvals: cUL Listed  
FCC Part 15 Class B  
FCC part 68, NOM  
UL1778  
UL497A  
UL498

## Physical Dimensions PBU Series Back Up Systems

	PUB 100/600		PBU 102/602			PBU 104/505/506/604/606		
VAC	120	24	120	24	230	120	24	230
Max HT	15.25	15.25	17.50	17.50	17.50	17.50	17.50	17.50
Max WD	13.52	13.52	15.05	15.05	15.05	15.05	15.05	15.05
Net Depth	7.50	7.50	9.50	9.50	9.50	9.50	9.50	9.50
Net WT	35	45	45	58	50	54	72	58
Ship WT	45	55	58	71	63	67	85	71

\*NOTE: PBU Series ships in two separate cartons.

## **Commissioning**

After completing all mounting and wiring procedures, main power is available and battery has been connected per instructions found on page 2, it is now possible to commission the PBU.

1. Apply power to the unit, the green LINE IN indicator is illuminated.
2. Measure (for your unit) xxx vac on terminals H & N on the PBU panel face.
  - 2.01 PBU 120V & 24V units, measure 100-125vac on terminals H & N on the PBU panel face.
  - 2.02 PBU 230V units, measure 210-240vac on terminals H & N on the PBU panel face.
3. Press the START button on the battery unit (see item 10 page 2).
4. Wait for 30 seconds, then the LED on the battery unit itself will turn green and stay on solid.
5. Measure (for your unit) xxx vac on terminals A1 & B2 on the PBU panel face.
  - 5.01 PBU 120V units, measure 100-125vac on terminals A1 & B2 on the PBU panel face.
  - 5.02 PBU 24V units, measure 22.5-26.0vac on terminals A1 & B2 on the PBU panel face.
  - 5.03 PBU 230V units, measure 210-240vac on terminals A1 & B2 on the PBU panel face.
6. The blue CHARGE indicator is illuminated.
7. The yellow BAT POWER indicator is NOT illuminated.
8. Command the FIELD CONTROL DEVICE to generate a CLOSE signal (4mA or 2vdc). The actuator will drive CLOSED.
9. Measure 4mA (2vdc) between terminal S5 (-) and S6 (+) {actuator disconnected}.
10. Command the FIELD CONTROL DEVICE to generate an OPEN signal (20mA or 10vdc). The actuator will drive OPEN.
11. Measure 20mA (10vdc) between terminal S5 (-) and S6 (+) {actuator disconnected}.
12. Move the Fail Position Selector switch to the OPEN position, and the green FAIL OPEN indicator is illuminated. This will have no effect on the position of the ACTUATOR.
13. Move the Fail Position Selector switch to the CLOSE position, and the red FAIL CLOSED indicator is illuminated. This will have no effect on the position of the ACTUATOR.
14. Disconnect MAIN power from the PBU.
15. The ALARM will start beeping on the battery unit, once every 30 seconds until power is restored.
16. The green LINE IN indicator will turn off.
17. The blue BAT CHARGE indicator will turn off.
18. The yellow BAT POWER indicator will be illuminated.
19. The commands received from the FIELD CONTROL DEVICE will have no effect on the positioning of the actuator.
20. Measure 0 vac on terminals H & N (all models).
21. Measure (for your unit) xxx vac on terminals A1 & B2 on the PBU panel face.
  - 21.01 PBU 120V units, measure 100-125vac on terminals A1 & B2 on the PBU panel face.
  - 21.02 PBU 24V units, measure 22.5-26.0vac on terminals A1 & B2 on the PBU panel face.
  - 21.03 PBU 230V units, measure 210-240vac on terminals A1 & B2 on the PBU panel face.
22. Move the Fail Position Selector switch to the CLOSE position, the red FAIL CLOSE indicator is illuminated and the actuator will drive CLOSED. The FIELD CONTROL DEVICE will have no effect on the position of the actuator in this mode.
23. Measure 4mA (2vdc) between terminal S5 (-) and S6 (+) {actuator disconnected}.
24. Move the Fail Position Selector switch to the OPEN position, the green FAIL OPEN indicator is illuminated and the actuator will drive OPEN. The FIELD CONTROL DEVICE will have no effect on the position of the actuator in this mode.
25. Measure 20mA (10vdc) between terminal S5 (-) and S6 (+) {actuator disconnected}.
26. Reconnect actuator control wires.
27. Re-establish Main power, whereupon the unit will automatically return to normal operating mode.
28. Unit is now ready for automatic operation.

# Troubleshooting - Proportional Control Units

Common questions when using ProMation Engineering PBU systems:

**Issue:**

**Check:**

<p>The green LINE IN indicator does not illuminate.</p>	<p>Measure for proper line voltage on terminals H &amp; N on the panel face. Check the indicator bulb.</p>
<p>The green start indicator on the internal battery system does not turn on when the start button is pressed.</p>	<p>Measure for proper line voltage on terminals H &amp; N on the panel face. Is the battery connected as instructed on page 2? Has the panel breaker tripped? Check the indicator bulb on the panel face. Check the status indicator adjacent to the START button. Other than solid green color indicates a system problem. Has the START button been pressed?</p>
<p>The blue charge indicator does not illuminate.</p>	<p>Has the battery been connected as instructed on page 2? Check the indicator bulb.</p>
<p>The yellow BATTERY B/U indicator does not illuminate.</p>	<p>Has the START button been pressed? Has the battery been connected as instructed on page 2? Has line voltage been removed from terminals H &amp; N? Has the panel breaker tripped? Check the indicator bulb.</p>
<p>The breaker keeps tripping.</p>	<p>Check for proper actuator and PBU supply wiring and correct input voltage. Check thermal temperature of panel face. Has the START button been pressed?</p>
<p>The connected actuator does not respond properly to FIELD CONTROL Signals under MAIN POWER.</p>	<p>Has the battery been connected as instructed on page 2? Has the panel breaker tripped? Check FIELD CONTROL DEVICE (FCD) wiring to PBU terminals S1 &amp; S2 compared to wiring diagrams in this manual. Disconnect actuator control wiring from S5 &amp; S6 and measure mA or vdc at those terminals. The measurement must match that generated by the FCD. Polarity MUST be correct at S1 &amp; S2, and at S5 &amp; S6. Reconnect actuator control wiring and measure correct control signal and polarity AT THE ACTUATOR. Check actuator response settings.</p>

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## **Troubleshooting - Proportional Control Units**

(continued):

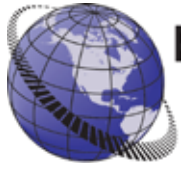
<p><b>The connected actuator does not respond properly in battery backup mode.</b></p>	<p>Has the START button been pressed? Has the battery been connected as instructed on page 2? Has line voltage been removed from terminals H &amp; N? Has the panel breaker tripped? Does the actuator respond correctly in POWER mode? Has the FAIL Position switch been set properly? Disconnect actuator control wiring from S5 &amp; S6 and measure mA or vdc at those terminals. When the FAIL position is selected for OPEN, S5 to S6 must read 19.9mA (9.95vdc) or greater. When the FAIL position is selected for CLOSED, S5 to S6 must read 3.9mA (1.95vdc) or less. Polarity MUST be correct at S5 &amp; S6. Reconnect actuator control wiring and measure correct control signal and polarity AT THE ACTUATOR. Check actuator response settings.</p>
<p><b>The connected actuator does not drive completely to the selected fail position before stopping.</b></p>	<p>Check the status indicator adjacent to the START button. Other than solid green color indicates a system problem. The battery may need replacing. Check product selection tables for proper actuator / PBU sizing. Measure the running current between PBU terminal A1 and actuator terminal 1 while running to check for abnormally high current readings. Seating torques may have increased over time to exceed the capability of the actuator and/or PBU system.</p>
<p><b>Multiple actuators connected to the same unit do not drive to the intended fail position.</b></p>	<p>Do the total starting amps of all the actuators together exceed the rating of the PBU? Has the wiring diagram on page 12 been followed?</p>
<p><b>There is no change in the status contacts when the PBU changes operating modes from POWER to BATTERY.</b></p>	<p>Unless ordered WITH the STATUS option, those PBU terminals are not activated on standard PBU models.</p>

For further assistance, please contact:

ProMation Engineering, Inc.  
352-544-8436 Technical Support  
www.promationei.com

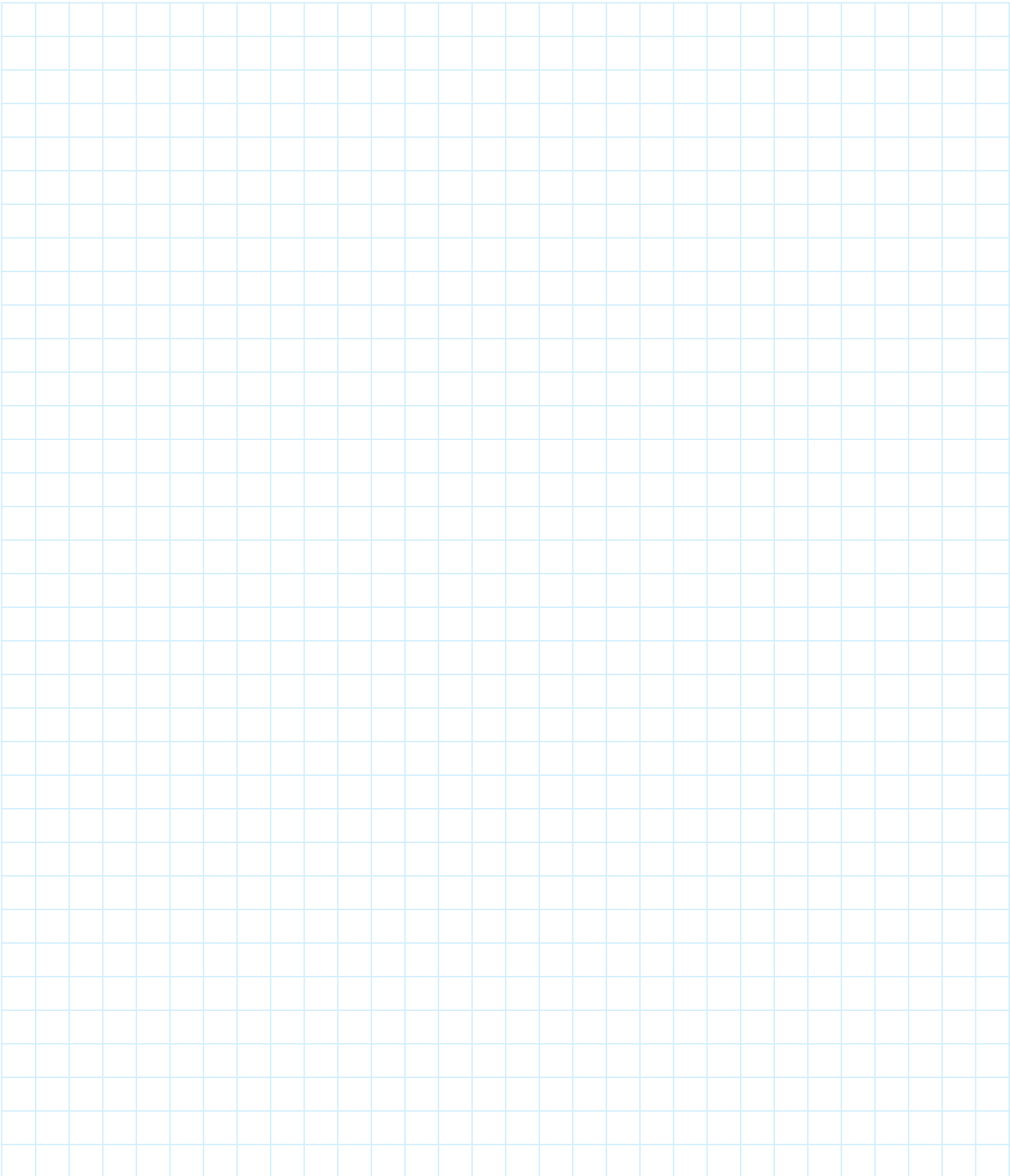
**Before contacting technical assistance, please have available your model number, serial number, and SO number, all found on the product label inside the PBU unit, as well as an as-built wiring diagram of your installation.**

ProMation Engineering follows a policy of continual product updates and enhancements. Please use the scan code on the back of this document to easily go online to our website to obtain the latest product documentation.



# PROMATION ENGINEERING

*Precision Actuation for Industry*



# Industrial Applications

ProMation Engineering actuators have been installed to operate process controls such as butterfly valves, ball valves, high performance valves, plug valves, gate valves and dampers, in a broad range of demanding industrial applications.

**Power  
Generation**



**Water  
Processes**



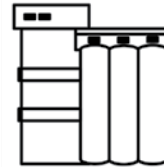
**Mining**



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## Complete Support

ProMation Engineering is committed to providing superior customer support compared to our larger competitors. Contact us today.

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We offer complete wiring diagrams, field installation manuals and set up documentation for all our products, both in printed and digital form. We regularly host customized educational webinars for our customers.

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