SERVICE BULLETIN

Original Issue Date: **7/95**
Model: **20-2000 kW**
Market: **Industrial**
Subject: **Microprocessor-Plus Controller Release**

The manufacturer of Spectrum has released the Microprocessor-Plus controller. All spec numbers and controller kit numbers remain the same. Serial number 363369 marks the change from the Microprocessor controller to the Microprocessor-Plus controller. Generator sets with serial number 363369 and above have the Microprocessor-Plus controller.

A seven-light controller replaces the six-light controller. Separate lights now indicate low water temperature and auxiliary.

The major change is the addition of the TB2 terminal strip, R41 potentiometer, and LED4. The Microprocessor-Plus controller has all the same functionality as the current Microprocessor along with the following features:

1. **Overvoltage Shutdown.** The Microprocessor-Plus controller incorporates the overvoltage function as a standard feature. The overvoltage function is set to 115% at the factory, but is adjustable. Potentiometer R41 and LED4 have been added to the new Microprocessor-Plus board. Compare Figures 1 and 2.
2. **Prime Power Mode.** A prime power mode has been added to the new controller. This mode is for applications where draw from the battery must be kept to a minimum. In prime power mode the controller draws 200 microamps of power when in the OFF/RESET position. Use terminal strip TB2 to enable this feature. Adding jumpers to the TB2 terminal strip puts the unit into the prime power mode. See Figure 2. The controller can be only manually started when in the prime power mode; there is no remote start capability in this mode.

   All controller functions are inoperative, including the LEDs and alarm horn, when the generator master switch is in the OFF/RESET position. Move the generator master switch to the AUTO position to manually start the generator set. LEDs and alarm horn features become operational and all controller functions return to normal when the generator master switch is moved to the AUTO position.
3. **Common Fault Output (32A).** A single terminal (32A) has been added to terminal strip TB1 to annunciate auxiliary fault, high engine temperature, low oil pressure, overspeed, and emergency stop conditions. These faults were typically annunciated together by the common fault relay kit. This terminal does not require a common fault relay kit; it does require a failure relay kit for a single fault. All outputs require relays for customer connection.
4. **Generator Set Running Output (70R).** Terminal (70R) has been added to terminal strip TB1 to annunciate generator set running. This output requires a relay kit for customer connection.
5. **Generator in Cooldown Mode (70C).** Terminal (70C) has been added to terminal strip TB1 to annunciate generator set in cooldown mode. This output requires a relay kit for customer connection.
6. **Remote Start and Crank Mode Terminals Moved (3,4,9).** The remote start and crank mode terminals are moved from TB1 to the TB2 terminal strip.

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7. **Kits.** The following kits changed.

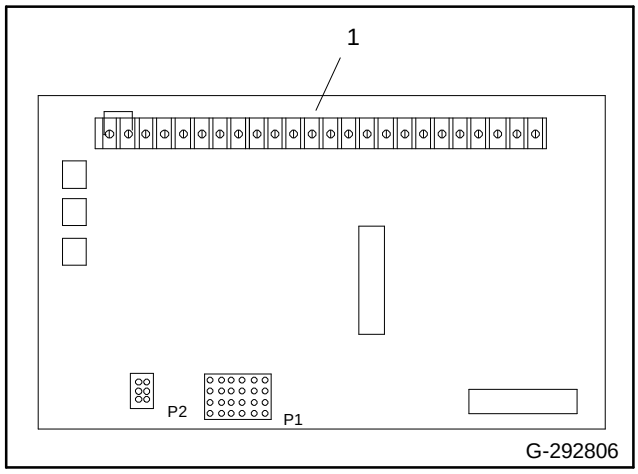
   a. **Overvoltage Kit.** This kit is now a standard feature.

   b. **Common Failure Relay Kit (PA-273914).** The common failure relay kit with a harness for five user-selected faults is now available only as a loose (PA-) kit. The new 32A terminal annunciates the typical faults of the original common failure relay kit. Order the failure relay kit 347274 described below to annunciate 32A common faults.

   c. **Controller Connection Kit (328911).** The new terminals added to the controller for the above mentioned conditions (items 2-6) have also been added to the controller connection kit. Kit 273915 has changed to 328911 and is offered as both loose (PA-) and installed.

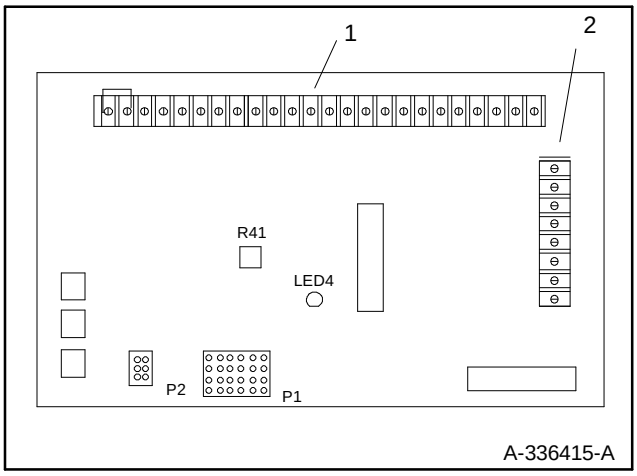
   d. **Failure Relay Kit With Harness for a Single User Fault (347274).** The failure relay kit contains a relay and wire harness to be connected to a single fault terminal. Order this kit for use with a customer-supplied device (light, horn, etc.) to annunciate a single controller fault. Order this kit loose (PA-) or installed. The kit connects to terminal 32A and annunciates emergency stop, auxiliary, overspeed, high engine temperature, and low oil pressure when ordered installed.

   e. **40-Foot Cable for Remote Mounting Controller (PAA-347239).** New leads are added to the 40-foot cable kit for remote mounting the controller. The kit part number changed from PAB-258849 to PAA-347239.



1. TB1 Terminal Strip

Figure 1. TB1 Terminal Strip on Microprocessor Controller Circuit Board



1. TB1 Terminal Strip
2. TB2 Terminal Strip

Figure 2. TB1 and TB2 Terminal Strips on Microprocessor-Plus Controller Circuit Board

Comparison of Microprocessor and Microprocessor-Plus

TB1 Terminal Strip

Terminal No.	Description	Microprocessor (See Figure 1)	Microprocessor-Plus (See Figure 2)
1	Ground– emergency stop relay (K4)– Connect emergency stop across terminals TB1-1 and 1A†	X	X
1A	Emergency Stop Relay (K4) coil; negative side– Connect emergency stop across terminals TB1-1 and 1A†	X	X
2	Ground terminal	X	X
3	Remote start ground– Connect transfer switch or remote start switch to TB1-3 and TB1-4	X	-
4	Remote start– Connect transfer switch or remote start switch to TB1-3 and TB1-4	X	-
9	Crank mode selection (open– cyclic crank; ground– continuous crank). Connect TB1-2 to TB1-9 for continuous cranking; leave TB1-9 open cyclic cranking– see Starting	X	-
12	Overcrank (OC) signal*	X	X
26	Auxiliary (AUX) signal*	X	X
32	Common Fault/Prealarm Line 1– A/V alarm or common fault relay activated by OC, 12; AUX, 26; LWT, 35; HET, 36; LOP, 38; OS, 39; AHET, 40; ALOP, 41; and LF, 63 faults	X	X
32A	Common Fault/Prealarm Line 2– A/V alarm or common fault relay activated by AUX, 26; HET, 36; LOP, 38; OS, 39; and ES, 48 faults	-	X
35	Low water temperature (LWT) signal	X	X
36	High engine temperature (HET) signal*	X	X
38	Low oil pressure (LOP) signal*	X	X
39	Overspeed (OS) signal*	X	X
40	Anticipatory high engine temperature (AHET) signal*	X	X
41	Anticipatory low oil pressure (ALOP) signal*	X	X
42A	Battery voltage (fuse #1 protected)– Accessory power supply;	X	X
	Customer may also provide separate accessory power source	X	X
48	Emergency stop (ES) signal*	X	X
56	Air damper (AD) signal (if equipped). Standard on all 200-2000 kW Detroit Diesel powered models	X	X
60	System ready signal*	X	X
61	Battery charger fault– Connect battery charger alarm contact to TB1-61 to activate fault lamp (active low) (if used)	X	X
62	Low battery volts– Connect battery charger alarm contact to TB1-62 to activate fault lamp (active low) (if used)	X	X
63	Low fuel (LF) fault– Connect fuel level sensor to TB1-63 to activate fault lamp (active low) (if used)	X	X
70C	Generator in cool down mode signal	-	X
70R	Generator in running mode signal	-	X
80	Not in auto signal*	X	X

NOTE: Not all terminals are used for all generator sets (see appropriate wiring diagrams for specific generator set model)
† Connect jumper across terminals 1 and 1A if emergency stop switch is not used.
* Use a remote annunciator and/or A/V alarm kit as an indicator with a dry contact kit connected to controller terminal strip TB1.

TB2 Terminal Strip

Terminal No.	Description		
1P	Prime power operation	-	X
2P	Prime power operation	-	X
3	Remote start ground– Connect transfer switch or remote start switch to TB2-3 and TB2-4	-	X
3P	Prime power operation	-	X
4	Remote start– Connect transfer switch or remote start switch to TB2-3 and TB2-4	-	X
4P	Prime power operation	-	X
9	Crank mode selection (open– cyclic crank; ground– continuous crank). Connect TB2-9 to TB2-9A for continuous cranking; leave TB2-9 open cyclic cranking– see Starting	-	X
9A	Crank mode ground		X

NOTE: To use prime power mode– place jumpers across TB2-1P to TB2-2P, TB2-3P to TB2-4P, and TB2-3 to TB2-4.
To deactivate prime power mode– remove jumpers across TB2-1P to TB2-2P, TB2-3P to TB2-4P, and TB2-3 to TB2-4.