Controller Diagnostics

The controller cannot be repaired in the field. If a unit fails, do not disassemble it. Return it to the factory for replacement.

Status LED

The red Status LED on the controller, Figures 5 & 6, blinks in various patterns to indicate the controller status.

Normal Operation
The Status LED blinks on and off rapidly.

Keypad Not Connected
If the controller is powered without a keypad connected, the LED blinking pattern will be "off" for one second, followed by four quick "on" blinks.

Internal Errors
If the LED blinking pattern is "on" for a second, followed by one or more quick blinks "off," the controller is experiencing internal errors. The specific error is indicated by the number of "off" blinks:

> **One "Off" Blink**—Corrupt RAM
>
> **Two "Off" Blinks**—Checksum error indicating EPROM corruption.
>
> **Three "Off" Blinks**—System error.
>
> **Four "Off" Blinks**—System error.

If any of the above four patterns occur, power cycle the control. If the pattern occurs again, remove the controller from service and return it to the factory.

> **Five "Off" Blinks**—Internal error; possibly noise problems.
>
> **Six "Off" Blinks**—Internal error; possibly noise problems.

If either of these two patterns occur, check for loose connections and fix any obvious noise problems. If the problem persists, remove the controller from service and return it to the factory.

Keypad Diagnostics

Keypad Fault LED

If the Fault LED on the keypad lights, turn the controller off and back on. If the keypad Fault LED does not go off, the keypad microprocessor has malfunctioned. Return the keypad to the factory.

Keypad Diagnostics

The 6400 Keypad includes a series of diagnostics that show the status of various keypad functions. To start the diagnostics, turn the controller off, then restart the controller while pressing any key on the keypad.
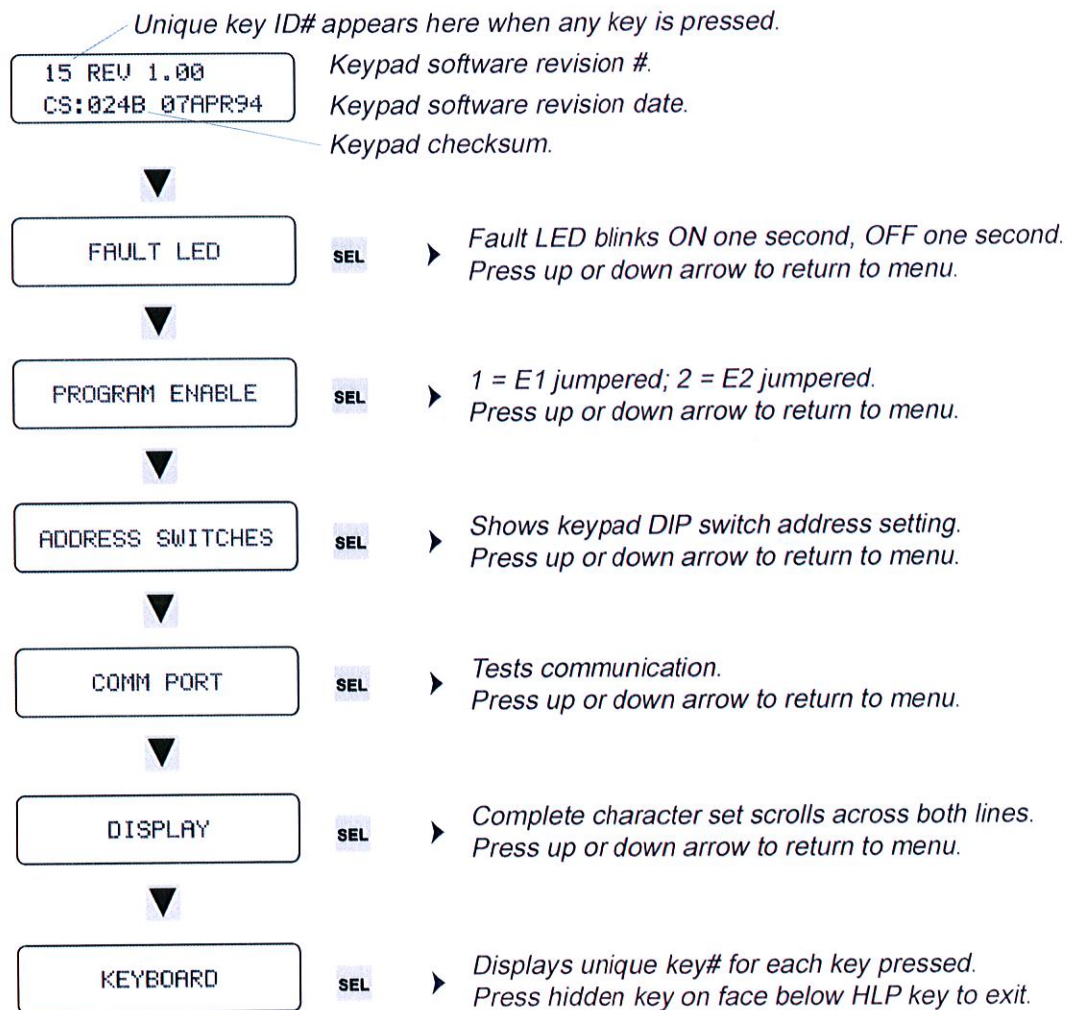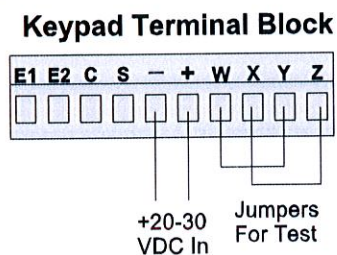
Unique key ID# appears here when any key is pressed.

```
15 REV 1.00
CS:024B 07APR94
```
Keypad software revision #.
Keypad software revision date.
Keypad checksum.

▼

| FAULT LED | **SEL** | ▸ | *Fault LED blinks ON one second, OFF one second.* *Press up or down arrow to return to menu.* |

▼

| PROGRAM ENABLE | **SEL** | ▸ | *1 = E1 jumpered; 2 = E2 jumpered.* *Press up or down arrow to return to menu.* |

▼

| ADDRESS SWITCHES | **SEL** | ▸ | *Shows keypad DIP switch address setting.* *Press up or down arrow to return to menu.* |

▼

| COMM PORT | **SEL** | ▸ | *Tests communication.* *Press up or down arrow to return to menu.* |

▼

| DISPLAY | **SEL** | ▸ | *Complete character set scrolls across both lines.* *Press up or down arrow to return to menu.* |

▼

| KEYBOARD | **SEL** | ▸ | *Displays unique key# for each key pressed.* *Press hidden key on face below HLP key to exit.* |

Figure 22—Keypad Communications Port Test Setup

Keypad Terminal Block

```
E1 E2 C  S  −  +  W  X  Y  Z
[ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]
```

+20-30 VDC In   Jumpers For Test

When the COMM PORT diagnostic is run with keypad terminals W, X, Y, and Z jumpered as shown, a string of "plus" signs will scroll across the display. When either jumper is removed, the scrolling will stop.

Encoder Troubleshooting

Encoder Type

The encoder used with the PS-6244 controller is an incremental quadrature encoder. The encoder sends three signals to the controller: A, B, and Z, as shown below in Figure 23.

Failure Symptoms

Most encoder failures or wiring problems will affect the POS (position) display. Some of the possible symptoms are listed below:

Pins 1, 2, 3, 5, 9:

Failure Before Startup
Position display remains at zero.

Failure During Operation
The display will freeze on the position at the time of circuit break. If the circuit is re-connected before power is turned off, the display will resume incrementing until the zero pulse (Signal "Z") is received, at which time the display will return to its programmed offset value.

Pin 7:

Failure Before Startup
Position display remains at zero.

Failure During Operation
Operation will appear to be unaffected. However, errors in count values may accumulate, and on subsequent startup, the display will remain at zero.

> ⚠ **IMPORTANT** Depending on the type and timing of encoder failure, the machine may continue operating normally until it is turned off. On subsequent startup, the POS (position) display may be "frozen" at zero.

Figure 23—Quadrature Encoder Signals & Controller Pin Connections

10-Pin Weidmiller TB4

Pin	Connection
1	+ENC
2	VREF
3	A
4	–A
5	B
6	–B
7	Z
8	–Z
9	COM
10	Shield

Signal	Pulses	Function
A	⎍⎍⎍	Increments position; relationship with "B" indicates direction.
B	⎍⎍⎍	Increments position; relationship with "A" indicates direction.
Z	⎍	Resets position to "0" once per revolution.

> ⚠️ **IMPORTANT** ➤ The controller and keypad cannot be repaired in the field. If a unit fails, do not disassemble it. Return it to the factory for replacement.

Problem	Possible Solution
Controller & keypad dead.	1. Check main fuse shown in Figs. 5 & 6. 2. Check power supply to controller.
Keypad dead, but controller LED's are on.	1. Check wiring between keypad and controller, Figure 12.
Keypad **Fault LED** "On"	1. Keypad microprocessor has malfunctioned. Turn the controller off and back on. If the keypad Fault LED does not go off, return the keypad to the factory.
Menu operation **Slow** on keypad display	1. Check KEYBOARD QTY programming. If it is set for two keypads, but only one is connected, menu operation will be very slow.
COMM FAILURE—HOST TO KEYBOARD message	1. This message may flash briefly on power-up under normal conditions. 2. If the message persists, check keypad wiring connections at keypad and controller, Figure 12. 3. Check DIP switch settings, Figures 13 & 14. 4. Be sure Input Terminal #15, Figure 7, is not energized.
Programming functions not accessible.	1. Programming not enabled. See Figure 12, and also ENABLE CODES for details.
POS (position) **frozen at "0"**	1. Encoder or encoder wiring may have failed. Unplug cable at encoder and plug a spare encoder into the cable. If this solves the problem replace the encoder on the machine. If not, prepare a short encoder cable (Fig. 16), unplug the cable at the controller, and plug the short cable with spare encoder into the controller. If this solves the problem, replace the cable on the machine. See page 4-3 for more.
POS (position) moves opposite to machine direction.	1. Check INCREASING DIR for the correct direction of rotation. 2. Check encoder wiring, Figure 16.
POS (position) does not match machine position.	1. Verify that OFFSET is correct. Once set, the offset value should not change. If it does, check the encoder coupling to be sure it is not loose. Also see "Encoder Troubleshooting," page 4-3. An intermittent encoder connection on controller pins 1, 2, 3, 5, or 9 might cause POS to lag the actual encoder position until the next "zero" pulse ("Z" signal) is received from the encoder.
Serial communications not working	1. Check COMMUNICATIONS programming to be sure type, baud rate, and address are correctly set. 2. Be sure the DIP switches for the PLuS-to-host communications are set correctly as shown in Figure 13. 3. Check communication cable wiring, Figure 2-15.
Outputs cycling regularly at incorrect machine positions	1. Check that the correct program number is active. 2. Check the setpoints of the output(s) in question. Also check SPEED COMP settings. 3. Verify that OFFSET is correct.
Erratic Operation	1. Run the Watchdog Timer test described under MEMORY TESTS in the programming section of this manual. 2. See "Encoder Troubleshooting," page 4-3.

Analog output not working.

1. Check that ANALOG QTY and ANALOG OUTPUT are programmed correctly.
2. Check that analog output module is located in the correct module position. See Figure 5 or 6.
3. Check correct wiring of analog output.
4. Verify that analog load device is within specifications for the analog module.
5. Try a different analog output module.

Some **transistor outputs** are not working.

1. Check that the correct program number is active.
2. Use OUTPUT STATUS to see if the controller is activating the output(s) at the correct position in the encoder revolution. If not, verify that the SETPOINTS are correctly programmed. Other programming that may prevent an output from energizing includes MOTION ANDING, INPUT ANDING, and SHFT REG ANDING.
3. If OUTPUT STATUS shows the output is on, use a meter to see if the output terminal is energized. If so, check the load device and its wiring. If not, go to Step 4.
4. Check the transistor array chips, Figure 17.

All **transistor outputs** are not working.

1. Check that the correct program number is active.
2. Use OUTPUT STATUS to see if the controller is activating the output(s) at the correct position in the encoder revolution. If not, verify that the SETPOINTS are correctly programmed. Other programming that may prevent an output from energizing includes MOTION ANDING, INPUT ANDING, and SHFT REG ANDING.
3. If OUTPUT STATUS shows the output is on, use a meter to see if the output terminal is energized. If so, check the load device and its wiring. If not, check the transistor output fuse, Figure 18. Use the fuse tester built into the controller, Figure 17.
4. Check that 10-30 VDC power is connected to TB 11, Figure 10 & 11.

AC/DC module output not working.

1. Check that correct program number is active.
2. Use OUTPUT STATUS to see if the controller is activating the output(s) at the correct position in the encoder revolution. If not, verify that the SETPOINTS are correctly programmed. Remember that AC/DC output modules are controlled by Channels 17 through 24. Other programming that may prevent an output from energizing includes MOTION ANDING, INPUT ANDING, and SHFT REG ANDING.
3. If OUTPUT STATUS shows the output is on, but the LED on top of the module does not light, try replacing the module.
4. If the LED on the module lights but the output terminal does not energize, check the fuse built into the top of the module. Use the fuse tester built into the controller, Figure 17.
5. Check that load power is present in the circuit and correctly wired. Remember that modules do not supply power to loads; they simply switch the load circuit on and off.