

## HOW TO CHECK VOLTAGES ON A GE FANUC SERIES ONE BACKPLANE

The Series One PLC's uses power supplies integrated into 5 to 10 slot chassis. It is not possible to replace the power supply or the rack as separate units. If the PLC does not run or has been damaged, the backplane voltages can be measured to determine if the supply is operational. Since failed CPU or I/O modules could be loading down the supply, you may want to slide all modules forward an inch out of their backplane connectors.

All backplane slots use 28 contact double sided edge connectors. All modules have card edge contacts with the card top side mating to the right side of the connector (toward the power supply end). These signals are numbered from 1 at the top of 14 at the bottom contact. The CPU or I/O link modules installed in slot 1 next to the power supply have an additional 14 contacts on the bottom side of the card mating to the left side of the backplane connector which are numbered from 15 at the top to 28 at the bottom. The following voltages can be measured, with the Right side of the backplane being toward the power supply (also see diagram attached):

<u>Backplane pin</u>	<u>Signal/voltage level</u>
1-Right/15-Left	Circuit ground of 0 volts at the Top edge connector end
2-Right/16-Left	9 volts +/-1 volts for range of 8 to 12 volts
17-Left/18-Left	5 volt +/-0.25 volts for range of 4.75 to 5.25 volts (Other signals for addresses and data)
13-Right/27-Left	24 volt +/-4 volts for range of 20 to 28 volts
14-Right/28-Left	Input common, 0 volts at the Bottom edge connector end

Measuring voltage at the 2<sup>nd</sup> from the top connector (either Left or Right) relative to the top connector should be around 9 (8-12) volts, while voltage at the 2<sup>nd</sup> from the bottom connector (Left or Right) should be 24 (20-28) volts relative to the bottom connector. The 5 volt signal is only present at the CPU slot 1, 3<sup>rd</sup> and 4<sup>th</sup> down from the top on the Left side toward the power supply. Measure relative to the top connector. The Right side of the 3<sup>rd</sup> and 4<sup>th</sup> connectors are I/O reset and data lines.

If voltage levels are outside specifications, then check power supply fuses and inspect the backplane and power supply for discoloration or indication of a short circuit. If blown fuses fail again after they are replaced, there are shorts in the backplane traces. If fuses do not fail until modules are reinstalled, there are shorts in the last module installed.

If a failed backplane chassis has to be replaced, it is often a good idea to replace the CPU at the same time. Occasionally a CPU failure will cause a chassis to fail too. If you have to get a critical process running quickly, replace both the CPU and backplane chassis at

the same time, then check out the original CPU in a spare backplane. This avoids the possibility of having the original CPU short out and damage the replacement chassis.

**To replace or repair any Series One component or to get further support, contact Qualitrol International at 1-800-784-9385, or at support@qualitrol.com.**

**To measure Voltages on the Module or CPU Card Slot Connectors:**  
DO NOT CONNECT TO THE "B" SIDE OF THE CONNECTOR.

Set meter to read 0 to 15 VDC.

Carefully, position probe so that the negative probe is on A1

Carefully, position probe so that the positive probe is on A2

The meter should read 9VDC\_ (8.8 to 10.1)

Carefully, position probe so that the positive probe is on A3

The meter should read 5VDC\_ (4.8 to 5.3)

Set meter to read 0 to 40 VDC.

Carefully, position probe so that the negative probe is on A14

Carefully, position probe so that the positive probe is on A13

The meter should read 24VDC\_ (23.75 to 26.00)

To test Voltages on other CPU connections, see chart below.

**To measure the Battery on the CPU card:**

First make sure you have a good back up of your program.

Power off the PLC. Remove the CPU module.

Set meter to read 0 to 5 VDC.

Carefully, position probe so that the negative probe contacts the black wire on the battery.

Carefully, position probe so that the Positive probe contacts the Red wire on the battery.

The meter should read 3.0VDC\_ (3.4 new, 2.7 replace)

Batteries are only used when the AC power to the Rack fails.

I have come across some that were 15 years old and still read good.

Return the CPU back to the Rack and power up PLC.

## Series One Backplane Voltages

CPU Connector Pin Numbers	
15	1
16	2
17	3
18	4
19	5
20	6
21	7
22	8
23	9
24	10
25	11
26	12
27	13
28	14

Module Connector Pin Numbers	
	1
	2
	3
	4
	5
	6
	7
	8
	9
	10
	11
	12
	13
	14

Measure across Pins		Voltage (VDC)	Tolerance (VDC)
(+)	(-)		
2	1	9	+3 / -1
13	14	24	±4
16	15	9	+3 / -1
17	15	5	±0.25
18	15	5	±0.25
27	28	24	±4