IC693PWR331 High Capacity Power Supply, 24 VDC Input

The Series 90-30 DC input High Capacity power supply (IC693PWR331) is a 30 watt wide range supply designed for 24 VDC nominal inputs. *For applications requiring greater +5V current capacity than is available with the standard supply, this supply allows all 30 watts to be consumed from the +5 V output.* It will accept an input voltage range from 12 VDC to 30 VDC. Although it is capable of maintaining all outputs within specifications with input voltages as low as 12 VDC, it will not start with initial input voltages of less than 18 VDC. This power supply provides the following outputs:

- +5 VDC output.
- +24 VDC Relay power output which provides power to circuits on Series 90-30 Output Relay modules.
- Isolated +24 VDC, which is used internally by some modules, can also be used to provide external power for 24 VDC Input modules.

The load capacity for each output of this power supply is shown in the following table.

Table 4-10. IC693PWR331 Power Supply Capacities

Catalog Number	Load Capacity	Input	Output Capacities (Voltage/Power *)		
IC693PWR331	30 Watts	12 to 30 VDC	+5 VDC 30 watts	+24 VDC Isolated 20 watts	+24 VDC Relay 15 watts

* Total of all outputs combined cannot exceed 30 watts.

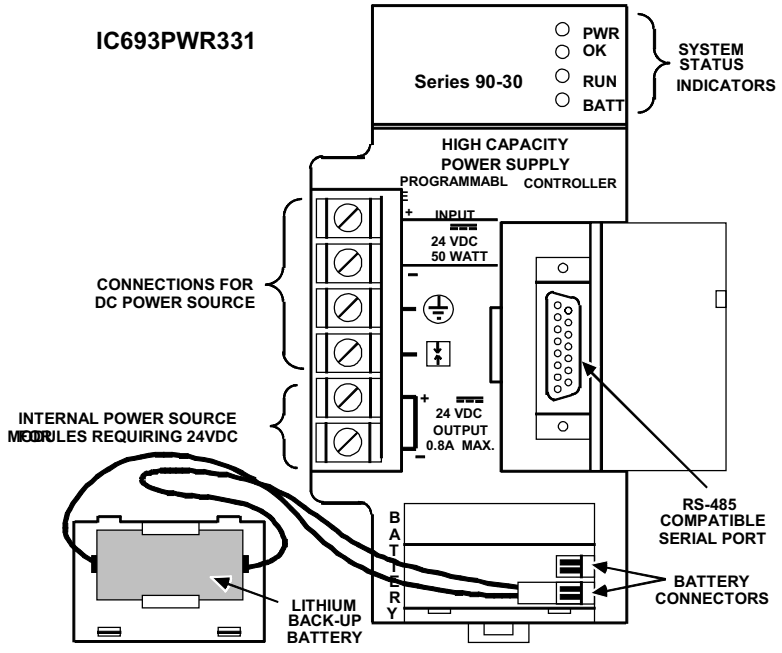


Figure 4-8. Series 90-30 24 VDC Input High Capacity Power Supply - IC693PWR331

Table 4-11. Specifications for IC693PWR331 Power Supply

Nominal Rated Voltage **Input Voltage Range** **Start** **Run**	24 VDC 18 to 30 VDC 12 to 30 VDC
Input Power **Inrush Current**	50 watts maximum at full load *
Output Power	5 VDC: 30 watts maximum ** 24 VDC Relay: 15 watts maximum 24 VDC Isolated: 20 watts maximum *NOTE: 30 watts maximum total (all three outputs)*
Output Voltage	5 VDC: 5.0 VDC to 5.2 VDC (5.1 VDC nominal) 24 VDC Relay: 19.2 to 28.8 VDC 24 VDC Isolated: 19.2 VDC to 28.8 VDC
Protective Limits **Overvoltage:** **Overcurrent;**	 5 VDC output: 6.4 to 7 V 5 VDC output: 7 A maximum
Holdup Time:	10 ms minimum
Standards	Refer to data sheet, GFK-0867B, or later version for product standards, and general specifications.

* Dependent on installation and power supply impedance characteristics.

** Derate per Figure 2-22 at ambient temperatures above 50°C (122°F).

Current Derating for Higher Temperatures

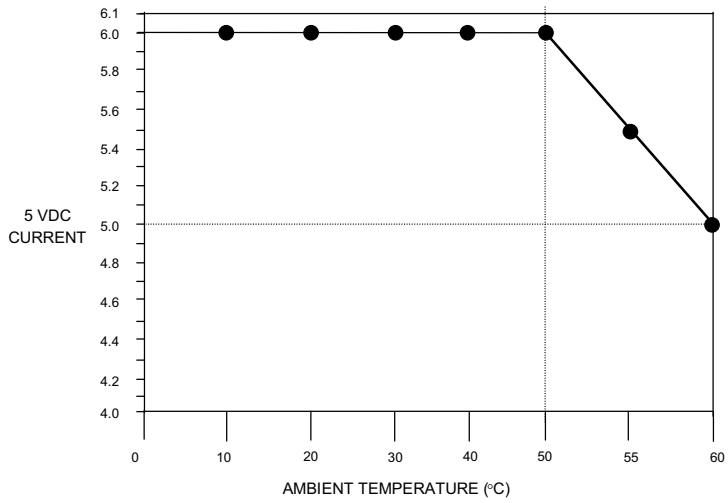


Figure 4-9. 5 VDC Current Output Derating for Temperatures above 50°C (122°F)

Calculating Input Power Requirements for IC693PWR331

Use the following procedure to determine input power requirements for the 24 VDC High Capacity Power Supply:

- Determine total output power load from typical specifications listed for individual modules at the end of this chapter.
- Multiply the output power by 1.5 to determine the input power value.
- Divide the input power value by the operating source voltage to determine the input current requirements
- Use the lowest input voltage to determine the maximum input current
- Allow for start-up surge current requirements
- Allow margins (10% to 20%) for variations

Field Wiring Connections to the DC Input-Only Power Supplies

DC Power Source Connections

The + and - wires from the DC power source connect to the top two terminals on the terminal strip. The + wire should be connected to the top terminal screw, and the - wire to the second screw (counting from the top down). The ground connection connects to the third screw. This connection scheme is clearly marked on the front of these power supplies.

Isolated 24 VDC Supply Output Connections

The bottom two terminals of the power supply terminal strip provide connections to the Isolated +24 volt DC output which can be used to provide power for external circuits (within power limitations of the supply).

Caution

If the Isolated 24 VDC supply is overloaded or shorted, the Programmable Logic Controller will stop operation.

Common Series 90-30 Power Supply Features

Status Indicator Lights on all Power Supplies

Four LEDs are located on the upper right front of the power supply faceplate. The purpose of these LEDs is as follows:

PWR

The top green LED, labeled **PWR**, provides an indication of the operating state of the power supply. The LED is *ON* when the power supply has a correct source of power and is operating properly, and *OFF* when a power supply fault occurs or power is not applied.

OK

The second green LED, labeled **OK**, is steady *ON* if the PLC is operating properly, and *OFF* if a problem is detected by the PLC.

RUN

The third green LED, labeled **RUN**, is steady *ON* when the PLC is in the RUN mode.

BATT

The bottom red LED, labeled **BATT**, will be *ON* if the memory backup battery voltage is too low to maintain the memory under a loss of power condition; otherwise it remains *OFF*. If this LED is ON, the Lithium battery must be replaced before removing power from the rack, or PLC memory may be lost.

Input Overvoltage Protection Devices

This information applies to all Series 90-30 power supplies except IC693PWR322 and IC693PWR328. The overvoltage protection devices for this power supply are connected internally to pin 4 on the user terminal strip. This pin is normally connected to frame ground (pin 3) with the supplied jumper strap which is installed at the factory. If overvoltage protection is not required *or* is supplied upstream, this feature can be disabled by removing the jumper strap from pins 3 and 4.

If you want to Hi-pot test this supply, overvoltage protection *must be disabled* during the test by removing the terminal strip jumper strap. Re-enable overvoltage protection after testing by reinstalling the strap.

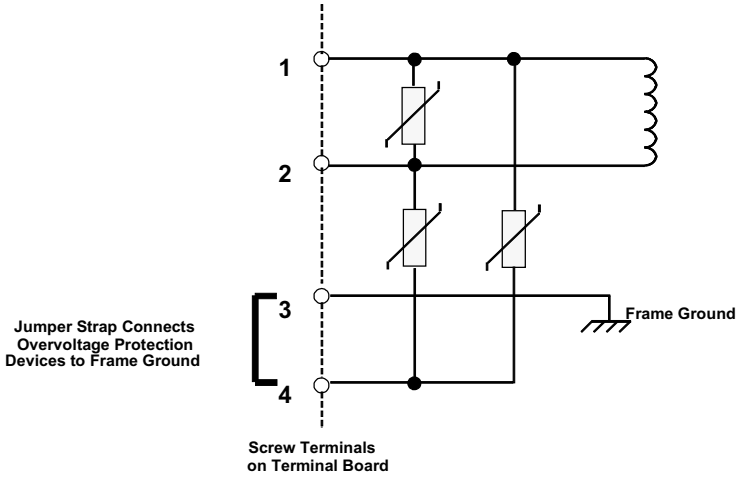


Figure 4-10. Overvoltage Protection Devices and Jumper Strap

Output Voltage Connections to Backplane (All Supplies)

The following figure illustrates how these three output voltages are connected internally to the backplane on the baseplate. The voltage and power required by modules installed on the baseplate is supplied through the baseplate connectors.

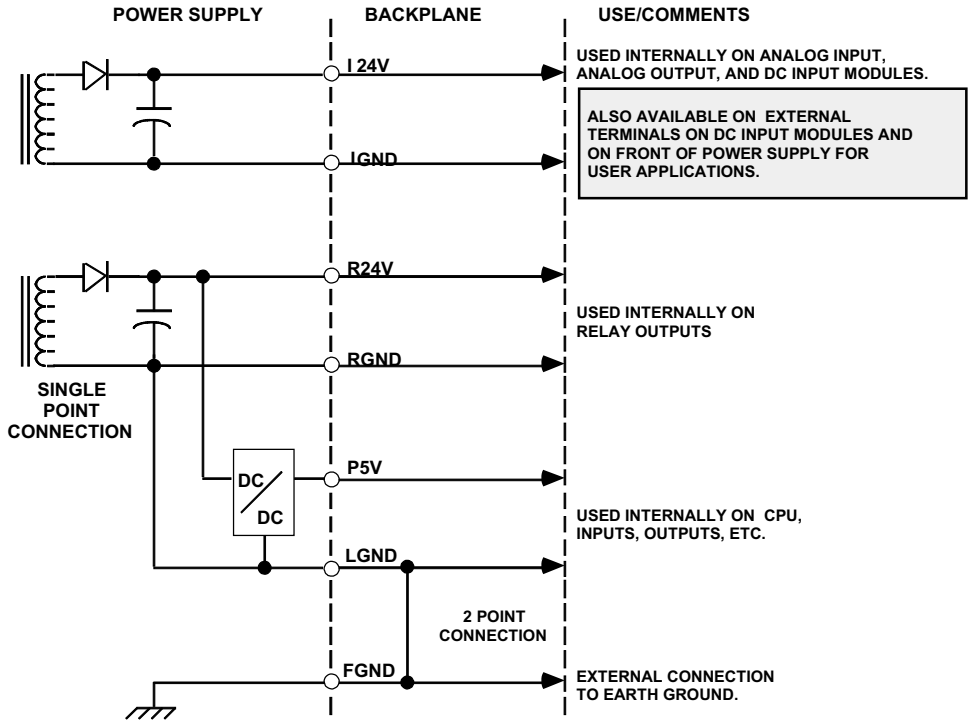


Figure 4-11. Interconnection of Power Supplies

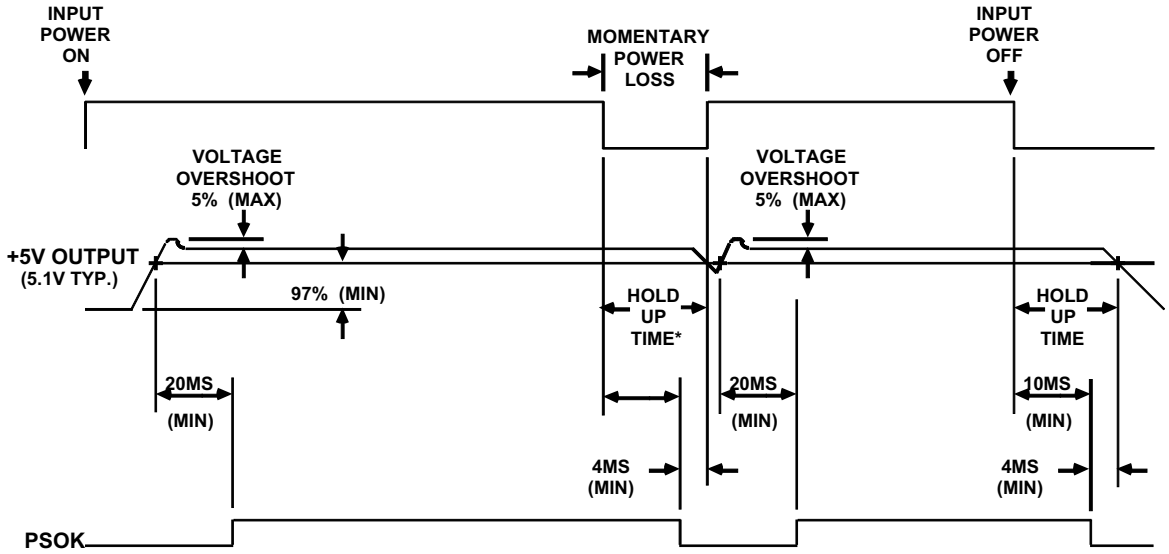
Overcurrent Protection (all Supplies)

The 5V logic output is electronically limited to 3.5 amps (7 amps for high capacity supplies). An overload (including short circuits) is sensed internally and causes the supply to shut down. The supply will continually try to restart until the overload is removed. An internal fuse in the input line is provided as a backup. The supply will usually shut down before the fuse blows. The fuse also protects against internal supply faults.

Timing Diagram

The timing diagram below shows the relationship of the DC input to the DC outputs and to the Power Supply OK signal (PSOK) generated by the power supply. When power is first applied, the PSOK signal goes false. This line remains false for a minimum of 20 msec after the +5V bus is within specifications, then it becomes true.

If input power is interrupted, the +5V bus will remain within specifications and PSOK will remain true a minimum of 10 milliseconds. PSOK then goes false. The +5V bus will remain within specifications for an additional 4 milliseconds minimum to allow an orderly shutdown of the system.



*HOLD-UP TIME: 20 ms, minimum for IC693PWR321/330
14 ms, minimum for IC693PWR322
10 ms, minimum for IC693PWR331/332

Figure 4-12. Timing Diagram for all Series 90-30 Power Supplies

CPU Serial Port Connector on Power Supply (All Supplies)

A 15-pin D-type female connector, accessed by opening the hinged door on the right front of the power supply, provides the connection to a CPU serial port which is used to connect to:

- A programmer (usually a personal computer) running GE PLC programming software.
- The GE Hand-Held Programmer.
- Other serial devices.

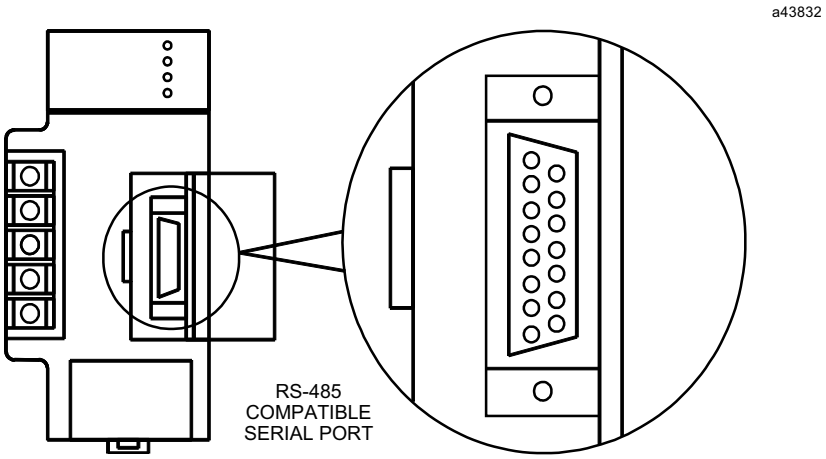


Figure 4-13. Serial Port Connector

- The serial port connector is only functional in a power supply that is installed in a baseplate that also contains the CPU. The serial port is not functional on a power supply that is installed in an expansion or remote baseplate.
- Any device connected to the serial port that uses +5 VDC power from the Series 90-30 power supply must be included in the calculation for maximum power consumption (see "Power Supply Loading Calculations" in Chapter 12).

CPU Serial Port Information

The serial port connector on the power supply accesses the CPU serial port, which is a feature of all Series 90-30 CPUs. See Chapter 5, "CPUs" for information on this serial port.

Backup Battery for RAM Memory (All Supplies)

The long-life Lithium battery (IC693ACC301) used to maintain the contents of the CMOS RAM memory in the CPU is accessed by removing the cover plate located at the bottom of the power supply faceplate. This battery is mounted on a plastic clip attached to the inside of this cover.

The battery is wired to a small Berg female connector that connects to either of the two Berg male connectors mounted on the Power Supply printed circuit board. This battery can be replaced with power applied to the PLC.

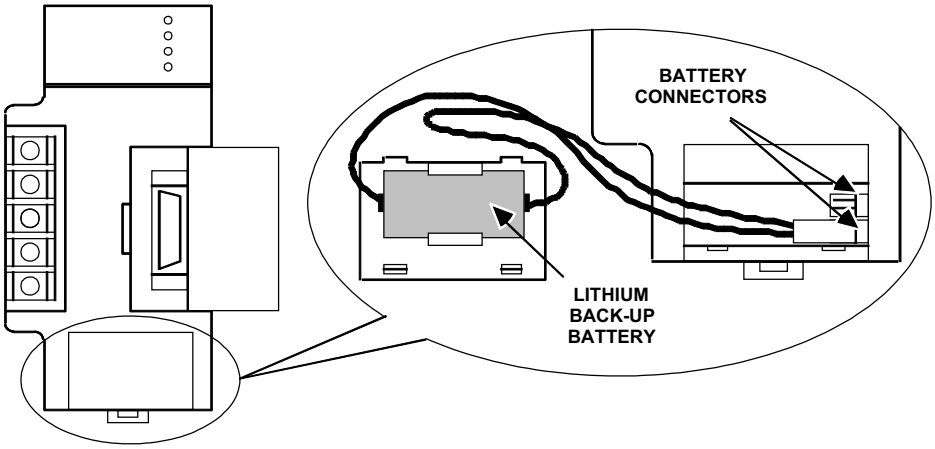


Figure 4-14. Backup Battery for RAM Memory

Caution

If a Low Battery Warning (BATT LED turns ON) occurs, replace the battery located in the power supply before removing power from the rack. Otherwise, there is a possibility that data will be corrupted or the application program will be cleared from memory.

Additional Battery Information

For additional information on the memory backup battery, see the chapter, "Memory Backup and Backup Battery."