PACSystems* RX3i and Series 90-30
## IC694MDL931 / IC693MDL931

Output Module, Isolated Relay, NC and Form C, 8 Amp, 8 Point

The MDL931 Series 90*-30 and PACSystems[*] **8 Amp Isolated Relay Output** modules provide four normally-closed and four Form C relay circuits for controlling output loads provided by the user. The output switching capacity of each circuit is 8 Amps. Each output relay is isolated from the other relays, and each relay has a separate common power output terminal. The relay outputs can control a wide range of load devices, such as: motor starters, solenoids, and indicators.

Individual numbered LEDs show the ON/OFF status of each output point. There are no fuses on this module. The red bands on the label indicate that MDL931 is a high-voltage module.

This module can be installed in any I/O slot in an RX3i or Series 90-30 system.

The user must supply the AC or DC power to operate the field devices.
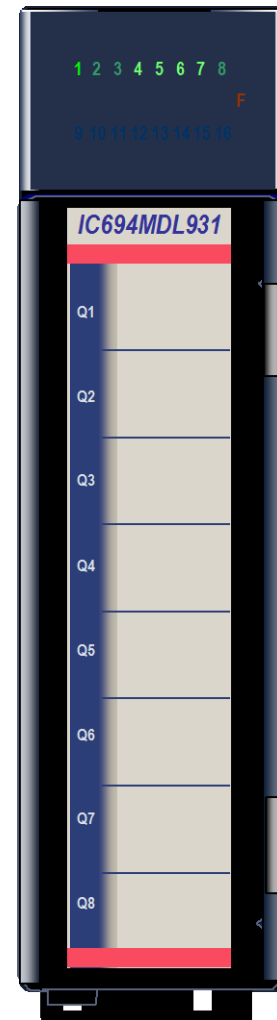
⚠ Caution

This module is not compatible with hot swap operations in any backplane. Hot removing or inserting this module into a backplane can cause damage to the module or other system components.

Related Documents

For product standards, general operating specifications and installation requirements refer to:

RX3i:	*PACSystems RX3i System Manual (GFK-2314)*
Series 90-30:	*Series 90-30 PLC Installation and Hardware Manual (GFK-0356)*
	Installation Requirements for Conformance to Standards (GFK-1179)

Specifications

Rated Voltage	24 volts DC, 120/240 VAC, 50/60 Hz (nominal - see the following table for exceptions)
Output Voltage Range	5 to 30 volts DC
	5 to 250 VAC, 50/60 Hz
Outputs per Module	Eight isolated outputs
Isolation:	
Field to Backplane and to Frame Ground	250 VAC continuous; 1500 VAC for 1 minute
Point to Point	250 VAC continuous; 1500 VAC for 1 minute
Maximum Load	8 Amps resistive maximum per output
	20 Amps maximum per module for UL installations Maximum load depends on ambient temperature as shown.
Minimum Load	10mA
Inrush Current	8 Amps maximum for one cycle
On Response Time	15ms maximum[1]
Off Response Time	15ms maximum[1]
Output Leakage Current	1mA maximum at 250 VAC, (25°C (77°F))
Power Consumption	6mA (all outputs on) from 5 volt bus on backplane 110mA (all outputs on) from relay 24V bus on backplane

[1] When this module is used with DC power supply IC695PSD040 or PSD140, special precautions should be taken because dropouts in the source voltage will be seen by this module and may cause relay dropouts.

Load Current vs. Temperature
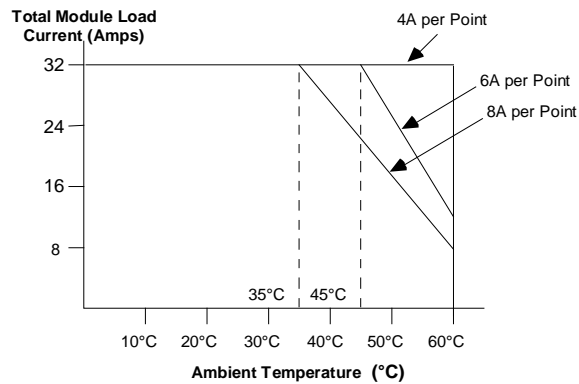
Load Current Limitations

Operating Voltage	Maximum Current for Load Type		Typical Contact Life (Number of operations)
	Resistive	*Lamp or Solenoid* [2]	
5 to 120 VAC	8 Amps	3 Amps	200,000
	6 Amps	2.5 Amps	300,000
	4 Amps	1.5 Amps	400,000
	1 Amp	0.5 Amp	1,100,000
240 VAC	8 Amps	3 Amps	100,000
	6 Amps	2.5 Amps	150,000
	4 Amps	1.5 Amps	200,000
	1 Amp	0.5 Amp	800,000
24 VDC	8 Amps	3 Amps	100,000
	6 Amps	2.5 Amps	150,000
	4 Amps	1.5 Amps	200,000
	1 Amp	0.5 Amp	800,000
48 VDC	1.5 Amps	–	100,000
100 VDC	0.5 Amp	–	100,000
125 VDC	0.38 Amp	0.12 Amp	100,000
150 VDC	0.30 Amp	0.10 Amp	100,000
[2] For inductive loads			

Relay contact life, when switching inductive loads, will approach resistive load contact life if suppression circuits are used. The examples below show typical suppression circuits for AC and DC loads. The 1A, 200V diode shown in the DC load typical suppression circuit is an industry standard 1N4935. The resistor and capacitor shown for AC load suppression are standard components.

## Load Suppression Examples for Output Module MDL931
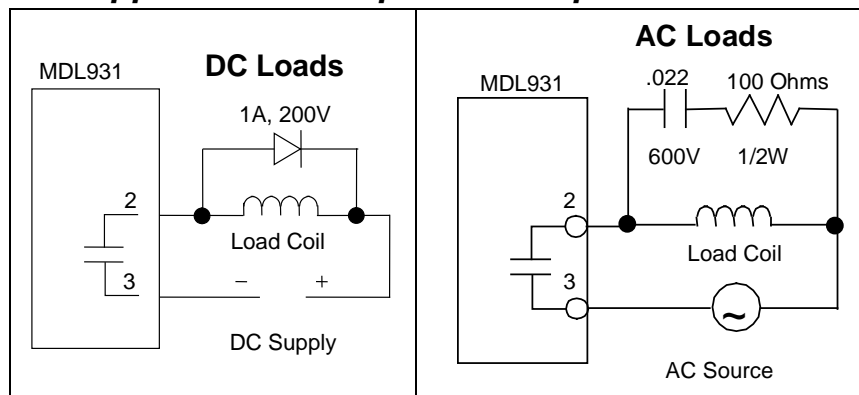
General Installation Requirements

This product is intended for use with the Series 90-30 or RX3i system. Its components are considered open equipment [having live electrical parts that may be accessible to users] and must be installed in an ultimate enclosure that is manufactured to provide safety. As a minimum, the enclosure shall provide a degree of protection against solid objects up to 12mm (e.g. fingers). This equates to a NEMA/UL Type 1 enclosure or an IP20 rating (IEC60529) providing at least a pollution degree 2 environment.
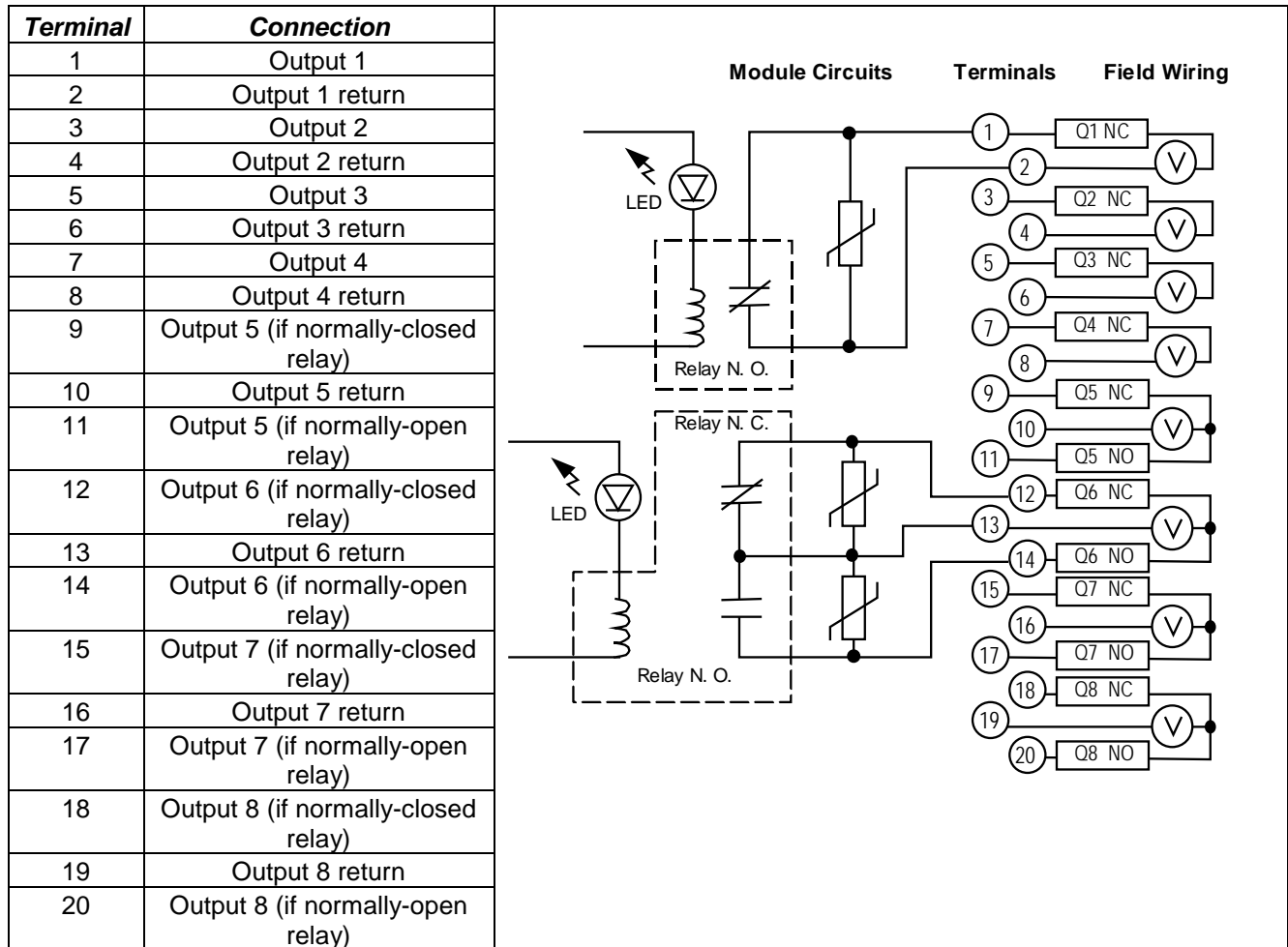
LEDs

Individual numbered LEDs display the ON/OFF status of each output point.
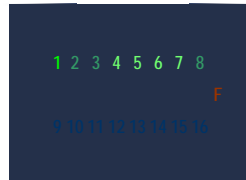
Module Data

The module receives 8 bits of output data from the host controller CPU. The starting location of this data is selected using the Proficy* Machine Edition configuration tool.

Field Wiring

Terminal	Connection
1	Output 1
2	Output 1 return
3	Output 2
4	Output 2 return
5	Output 3
6	Output 3 return
7	Output 4
8	Output 4 return
9	Output 5 (if normally-closed relay)
10	Output 5 return
11	Output 5 (if normally-open relay)
12	Output 6 (if normally-closed relay)
13	Output 6 return
14	Output 6 (if normally-open relay)
15	Output 7 (if normally-closed relay)
16	Output 7 return
17	Output 7 (if normally-open relay)
18	Output 8 (if normally-closed relay)
19	Output 8 return
20	Output 8 (if normally-open relay)

Screw terminals accept two copper wires in the range AWG #22 (0.36 mm^2) to AWG #16 (1.3 mm^2), or one AWG #14 (2.1 mm^2) copper 90°C (194°F) wire. Each terminal can accept solid or stranded wires, but the wires into any given terminal must be the same type (both solid or both stranded) and the same size. Screw torque is from 9.6 in-lbs to 11.5 in-lbs (1.1 to1.3 Newton-meters).

Release History

Version	Date	Description
IC693MDL931E	May 2015	Change in fab color from Green to Blue. No change in form-fit-functionality.
IC694 MDL931B	Jan 2015	Updated modules are RoHS converted product with applicable exemptions.
IC693/IC694 MDL931A	Aug. 2008	Initial release.