

## 2591-EF 3 Amp Application

Two outputs on the 2591-EF can be used in parallel to drive loads up to 3 Amps. Figure 9 shows the electrical hook up driving loads from 1.5 to 3 Amps.

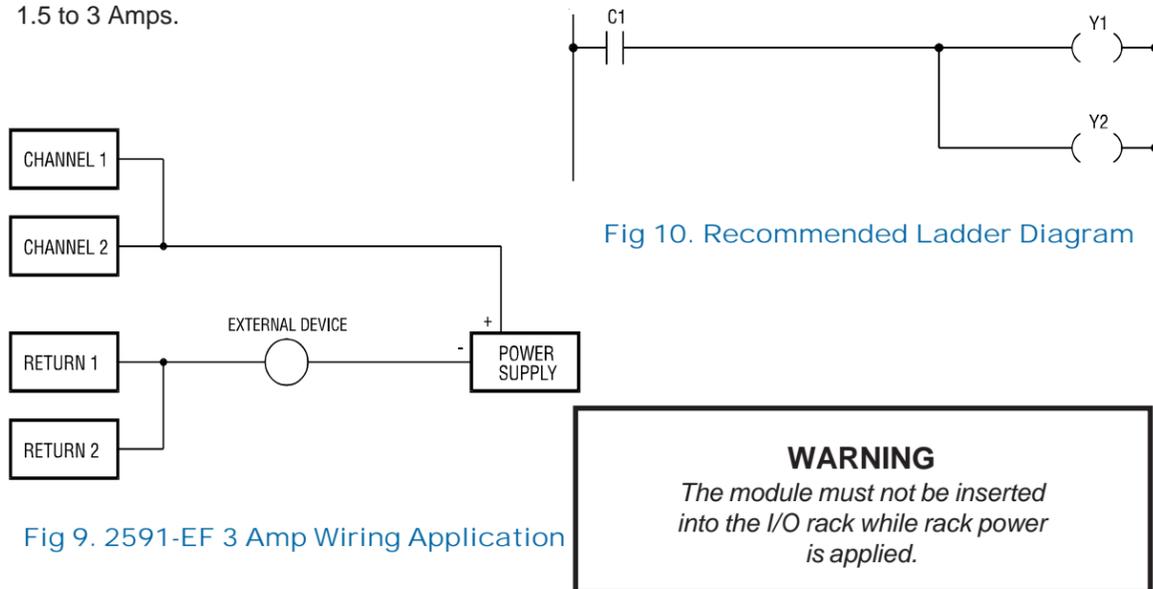


Fig 9. 2591-EF 3 Amp Wiring Application

Care must be taken to ensure that neither output is turned on by itself. Damage to the output transistor will occur. Figure 10 shows a ladder logic rung that turns on Y1 and Y2 by using C1.

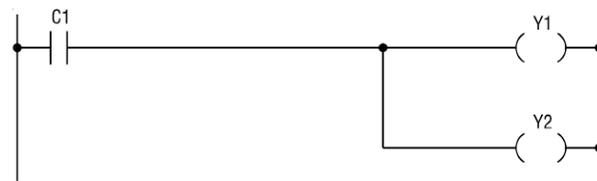


Fig 10. Recommended Ladder Diagram

**WARNING**  
The module must not be inserted into the I/O rack while rack power is applied.

**NOTE:**  
Only one starting address is needed to log in the module. The PLC will automatically assign the first 16 locations as inputs (X) and the next 16 locations as outputs (Y).

**NOTE:**  
If the line is blank or erroneous, re-check the module to ensure that it is firmly seated in the slots. Generate the PLC I/O configuration chart again. If the line is still incorrect, contact your local distributor or CTI for assistance.

For CTI product warranty and repair policy call 865-584-0440 or visit CTI's website at: [www.controltechnology.com](http://www.controltechnology.com)

## 2590-EF / 2591-EF 16-Point Isolated Discrete Output Modules with External Front Panel Accessed Fuses



### 2590-EF Specifications

Outputs: 16  
Output voltage: 20 to 132 VAC  
Output source current per circuit: 2.0A max  
Minimum current: 40 mA per circuit  
Non-repetitive surge current: 80 Amps (1 cycle)  
"OFF" state leakage: 1 mA maximum @ 25°C  
Turn ON or OFF time: 1 AC cycle  
Total module output current: 32 Amps max  
Fuses: 16, 3 Amp, 250 V, Type Littlefuse #2173.15, Bussman GMA# GMA-3A, CTI Part #80-65 (field replaceable)

### Specifications 2591-EF

Outputs: 16  
Output voltage: 11 to 146 VDC  
Output source current per circuit: 1.5A max  
Maximum surge current: 3 Amps for 15 seconds  
"ON" state voltage drop: 0.3 V @ 1.5 Amps  
"OFF" state leakage current: 125 µA @ 146 VDC  
Turn ON time: 0.5 mSec (nominal)  
Turn OFF time: 1.5 mSec (nominal)  
Total module output current: 24 Amps max  
Fuses: 16, 1.6 Amp, 250 V, Schurter #034.2518 CTI Part #80-79 (field replaceable)

### Specifications Common to Both

Isolation: 1500 VDC channel-to-channel  
1500 VDC channel-to-backplane

Connector: Removable  
Wire gauge: 14-22 AWG  
Backplane power: 2.5 watts max  
Module size: Double wide  
Blown fuse indication: Front panel LED (per channel)

Blown fuse reporting: Reported to PLC as X input per channel (jumper selectable)

Operating temperature: 0° to 60°C (32° to 140°F)

Storage temperature: -40° to 85°C (-40° to 185°F)

Humidity, relative: 5% to 95% (non-condensing)  
Agency approvals: UL, UL Canada, FM (Class, Div 2)

### Description

The 2590-EF and 2591-EF 16-Point Discrete Output Modules provide sixteen isolated outputs from the CTI 2500 Series™ or Simatic® 505 I/O base with front panel accessible fuses. The modules use solid-state output circuits to switch on or off external devices such as pilot lamps, motor starters, or solenoids. The 2590-EF is designed to switch externally supplied 20 to 132 VAC and the 2591-EF is designed to switch externally supplied 11 to 146 VDC. For both modules, the internal logic signals are isolated from the external outputs to 1500 VDC.

### Features

- Supports sourcing and sinking applications
- Front panel accessible fuses for easier maintenance
- 2A per output 2590-EF (no derating)  
1.5 A per output 2591-EF (no derating)
- Blown fuse reporting directly to PLC for each channel
- Logs in as 16Y or 16X/16Y (jumper selectable)
- Isolated 1500 VDC channel-to-channel



**Control Technology Inc.**

5734 Middlebrook Pike, Knoxville, TN 37921-5962  
Phone: 865/584-0440 Fax: 865/584-5720 [www.controltechnology.com](http://www.controltechnology.com)

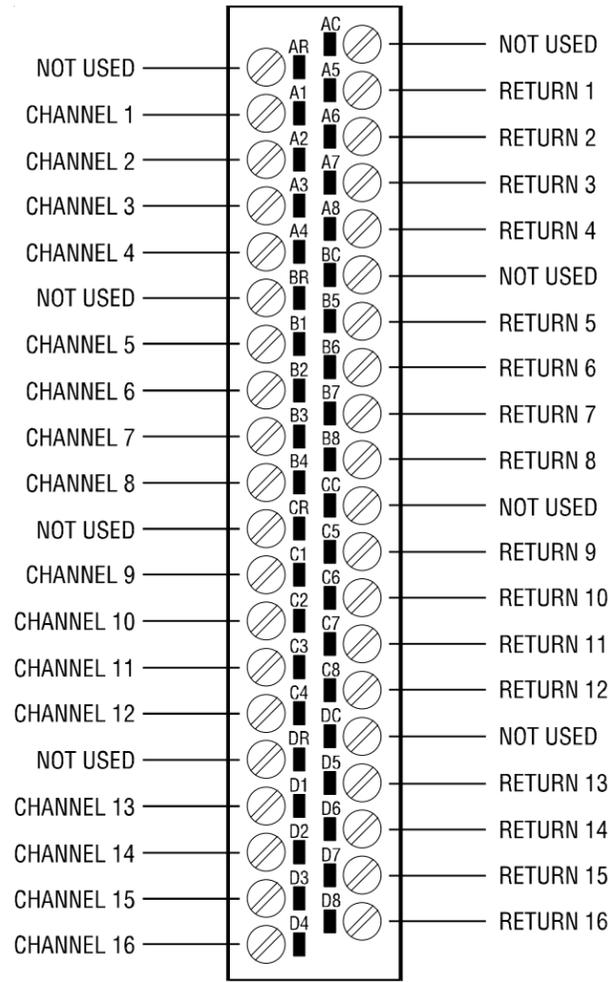


Fig 1. 2590-EF/2591-EF Connector Pin Out

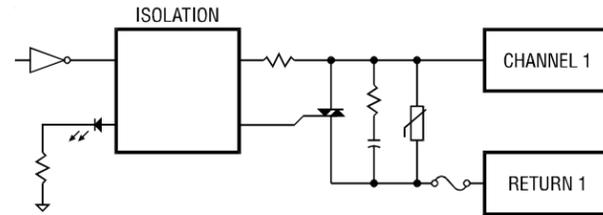


Fig 3. Typical Internal Circuit - 2590-EF

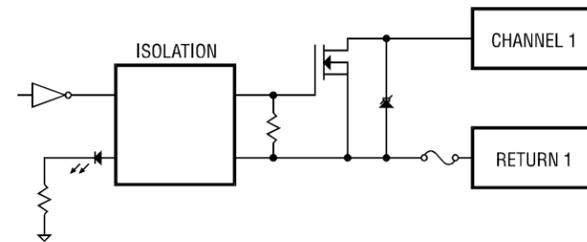


Fig 4. Typical Internal Circuit - 2591-EF

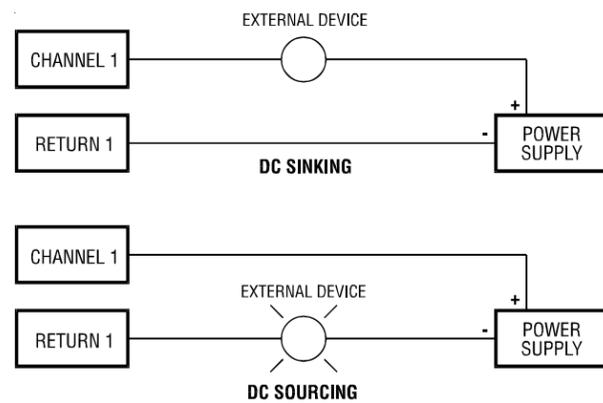


Fig 5. Typical External Wiring Application 2591-EF

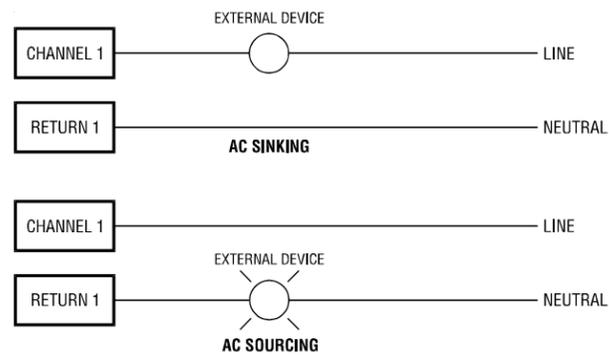


Fig 2. Typical External Wiring Application 2590-EF

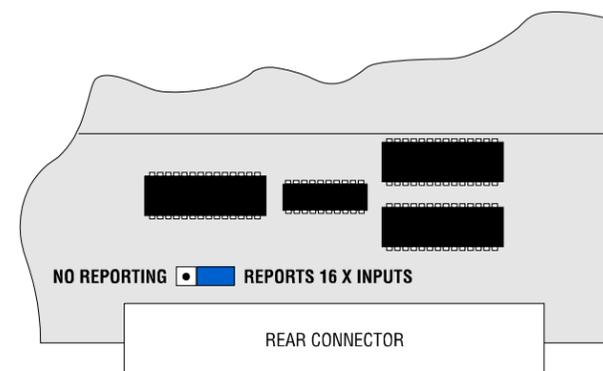


Fig 6. Blown Fuse Reporting Selection

## Checking Module Operation

You must check to see that the module is configured in the memory of the PLC. This is important because the module will appear to be functioning regardless of whether it is communicating with the PLC. To view the PLC I/O configuration chart listing all slots on the base and the inputs or outputs associated with each slot, refer to your Programming Manual. An example chart is shown in Figure 7.

### 2590/91-EF Operation Without Blown Fuse Reporting

The 2590/91-EF standard shipping configuration logs in as 16Y locations to the PLC.

I/O MODULE DEFINITION FOR CHANNEL ... 1 BASE ... 00

SLOT	ADDRESS	X	Y	WX	WY	SPECIAL FUNCTION
01	.....0001	..... 16	..... 00	..... 00	..... 00	..... NO
02	.....0000	..... 00	..... 00	..... 00	..... 00	..... NO
15	.....0000	..... 00	..... 00	..... 00	..... 00	..... NO
16	.....0000	..... 00	..... 00	..... 00	..... 00	..... NO

Fig 7. I/O Configuration Chart

In Figure 7 above, the 2590/91-EF module is inserted in slot 1 in the I/O base 0. Data appears as 16 "Y" locations starting at "Y1". For your particular module, look in the chart for the number corresponding to the slot occupied by the module. If bit locations appear on this line, then the module is registered in the PLC memory and the module is ready for operation.

### 2590/91-EF Operation With Blown Fuse Reporting

The 2590/91-EF will alert the PLC CPU when an output channel has a blown fuse. The feature is enabled by moving jumper JP9, as shown in Figure 6, to the "Reports 16X Inputs". When JP9 is in this position the module will log on to the base as a 16X and 16Y module. The 16X inputs are used for Blown Fuse Reporting and the 16Y outputs are used just as any other discrete output would be used.

In the example in Figure 8 is an I/O Configuration Chart showing a 2590/91-EF plugged in the first slot with Blown Fuse Reporting Enabled. X1-X16 are the Blown Fuse Reporting inputs and Y17-Y32 are the outputs under PLC ladder logic control.

I/O MODULE DEFINITION FOR CHANNEL ... 1 BASE ... 00

SLOT	ADDRESS	X	Y	WX	WY	SPECIAL FUNCTION
01	.....0001	..... 16	..... 16	..... 00	..... 00	..... NO
02	.....0000	..... 00	..... 00	..... 00	..... 00	..... NO
15	.....0000	..... 00	..... 00	..... 00	..... 00	..... NO
16	.....0000	..... 00	..... 00	..... 00	..... 00	..... NO

Fig 8. I/O Configuration Chart with Blown Fuse Reporting