

Table 2 - ControlLogix Digital I/O Modules

Cat. No.	Description	Page
1756-IA8D	79...132V AC 8-point diagnostic input module	96
1756-IA16, 1756-IA16K	74...132V AC 16-point input module	97
1756-IA16I, 1756-IA16IK	79...132V AC 16-point isolated input module	97
1756-IA32, 1756-IA32K	74...132V AC 32-point input module	98
1756-IB16, 1756-IB16K, 1756-IB16XT	10...31.2V DC 16-point input module	98
1756-IB16D, 1756-IB16DK	10...30V DC diagnostic input module	99
1756-IB16I, 1756-IB16IK	10...30V DC 16-point, isolated input module	100
1756-IB16IF, 1756-IB16IFK	10...30V DC, 16-point, isolated, fast peer control input module	101
1756-IB32, 1756-IB32K	10...31.2V DC 32-point input module	102
1756-IC16	30...60V DC 16-point input module	102
1756-IG16, 1756-IG16K	Transistor-transistor logic (TTL) input module	103
1756-IH16I, 1756-IH16IK	90...146V DC 16-point isolated input module	104
1756-IM16I, 1756-IM16IK	159...265V AC 16-point isolated input module	104
1756-IN16, 1756-IN16K	10...30V AC 16-point input module	105
1756-IV16, 1756-IV16K	10...30V DC 16-point sourcing current input module	105
1756-IV32, 1756-IV32K	10...30V DC 32-point sourcing current input module	106
1756-OA8	74...265V AC 8-point output module	106
1756-OA8D	74...132V AC 8-point diagnostic output module	107
1756-OA8E	74...132V AC 8-point electronically fused output module	107
1756-OA16, 1756-OA16K	74... 265V AC 16-point output module	108
1756-OA16I, 1756-OA16IK	74...265V AC 16-point isolated output module	109
1756-OB8, 1756-OB8K	10...30V DC 8-point output module	110
1756-OB8EI, 1756-OB8EIK	10...30V DC 8-point electronically fused, isolated output module	111
1756-OB16D, 1756-OB16DK	19.2...30V DC 16-point diagnostic output module	111
1756-OB16E, 1756-OB16EK	10...31.2V DC 16-point electronically fused output module	112
1756-OB16I	10...30V DC 16-point isolated output module	112
1756-OB16IEF, 1756-OB16IEFK	10...30V DC, 16-point, isolated, fast peer control output module	113
1756-OB16IEFS, 1756-OB16IEFSK	10...30V DC, 16-point, isolated, fast, scheduled per point output module	113
1756-OB16IS	10...30V DC scheduled, isolated output module	114
1756-OB32, 1756-OB32K, 1756-OB32XT	10...31.2V DC 32-point output module	114
1756-OC8, 1756-OC8K	30...60V DC 8-point output module	115
1756-OG16, 1756-OG16K	Transistor-transistor logic (TTL) output module	116
1756-OH8I	90...146V DC 8-point isolated output module	117
1756-ON8, 1756-ON8K	10...30V AC 8-point output module	117
1756-OV16E	10...30V DC 16-point electronically fused, sinking current output module	118
1756-OV32E, 1756-OV32EK	10...30V DC 32-point electronically fused, sinking current output module	118
1756-OW16I, 1756-OW16IK	10...265V, 5-150V DC 16-point isolated contact module	119
1756-OX8I, 1756-OX8IK	10...265V, 5-150V DC 8-point isolated contact module	119

IMPORTANT

ControlLogix Digital I/O Modules that have an **XT** at the end of the catalog number are shipped in packaging that provides a degree of protection from corrosive atmospheres.

Once the factory packaging seal is broken, the module and the corresponding ControlLogix-XT Removable Terminal Block (RTB) must remain installed at all times, and the RTB door must remain closed, for the product to maintain its corrosive atmosphere rating.

If maintenance is required, you can open the RTB door or remove the module or RTB. Close the RTB door or reinstall the module or RTB after temporary access is complete.

Isolated and Nonisolated Varieties of Output Modules

As with input modules, ControlLogix output modules provide isolated or nonisolated wiring options. I/O modules provide point-to-point, group-to-group, or channel-to-channel wiring isolation. Your specific application determines what type of isolation is necessary and which output module to use.

IMPORTANT Although some ControlLogix I/O modules provide nonisolated, field-side wiring options, each I/O module maintains internal electrical isolation between the system side and field side.

Time-scheduled Output Control

Time-scheduled output control is available for these modules:

- 1756-OB16IS—Provides time-scheduled output control in CST time for outputs 0...7. Enables schedules with a minimum interval of 100 μ s.
- 1756-OB16IEFS—Provides time-scheduled output control in CIP Sync time for outputs 0...15. Enables schedules with a minimum interval of 5 μ s.

By using the time-scheduled output control feature, the module can turn the outputs On or Off at a scheduled time. You can set the time for the output to turn On or Off in program logic. The modules manage the time locally, so that the output is turned On or Off at the specified time.

MAOC Instructions with Time-scheduled Output Control

The Motion Axis Output Cam (MAOC) instruction provides position-based control of outputs by using position and velocity information of any motion axis. When the 1756-OB16IS or 1756-OB16IEFS module is specified as the output destination for the MAOC instruction, the MAOC instruction automatically handles time-based scheduling for outputs. The benefit of using output scheduling in this manner is that the resolution of the output control is improved from the motion coarse update rate (typically 1...32 ms) to 100 μ s for outputs 0...7 on the 1756-OB16IS module and 10 μ s for outputs 0...15 on the 1756-OB16IEFS module.

You can also use outputs 8...15 on the 1756-OB16IS module with the MAOC instruction. However, only outputs 0...7 have 100 μ s resolution. Outputs 8...15 are updated at the motion coarse update rate.

IMPORTANT The 1756-OB16IS Scheduled Output Module can be associated with one MAOC axis/execution target only.

For more information about using the MAOC instruction with scheduled output modules, refer to the Position-based Output Control with the MAOC Instruction Application Technique, publication [1756-AT017](#).

Module Major Revision Considerations with Timestamping

When using timestamping for inputs or diagnostic timestamping of I/O modules, these conditions can occur depending on the major revision of the module:

- If the module has a Major Revision = 1 (unless a 1756-IB16IF, 1756-IB16ISOE, or 1756-IH16ISOE module), it always returns a positive timestamping value.
- If the module has a Major Revision > 2 or is a 1756-IB16IF, 1756-IB16ISOE, or 1756-IH16ISOE module, it returns a negative timestamping value until the module is synchronized with the owner-controller and the first change of state condition occurs.

Use the Module Properties dialog box in Logix Designer application to determine if the module has been synchronized with the owner-controller and whether the controller is synchronized with the CST. For more information on synchronizing owner-controllers and modules with the CST, see the ControlLogix System User Manual, publication [1756-UM001](#).

Refer to this table to determine what fuse to use in your application. If your module does not support fusing, you can use a fused IFM to protect outputs. See publication [1492-TD008](#).

Table 11 – Recommended Fuses

Circuit Type	Cat. No.	Fusing on the module	Recommended Fuse	Fuse Supplier
AC	1756-0A8 ⁽¹⁾	None—Fused IFM can be used to protect outputs	5x20mm 6.3 A Medium lag	SAN-O Industry Corp. (SOC) PN MT 4-6.3A
	1756-0A8D ^{(2) (3)}	Yes—Fused on a per point basis	Electronically fused	
	1756-0A8E ^{(2) (3)}			
	1756-0A16 ^{(1) (4) (5)}	Yes—Fused on a per group basis	5x20mm 3.15 A Slo-Blow 1500 A Interruption current	Littelfuse p/n H2153.15
	1756-0A16I ⁽¹⁾	None—Fused IFM can be used to protect outputs	5x20mm 6.3 A Medium lag	SOC p/n MT 4-6.3A
	1756-0N8			
DC	1756-0B8 ⁽⁶⁾	None—Fused IFM can be used to protect outputs	5x20mm 4 A Quick acting	SOC p/n MQ2-4A
	1756-0B8I ⁽⁶⁾			
	1756-0B8E ^{(2) (3) (6)}	Yes—Fused on a per point basis	Electronically fused	
	1756-0B16D ^{(2) (3) (7)}			
	1756-0B16E ^{(2) (5) (6)}	Yes—Fused on a per group basis		
	1756-0B16I ^{(6) (8)}	None—Fused IFM can be used to protect outputs	5x20mm 4 A Quick acting	SOC p/n MQ2-4A
	1756-0B16IE ^{(2) (3) (6)}	Yes—Fused on a per point basis	Electronically fused	
	1756-0B16IEFS ^{(2) (3) (6)}			
	1756-0B16IS ^{(6) (8)}	None—Fused IFM can be used to protect outputs	5x20mm 4 A Quick acting	SOC p/n MQ2-4A
	1756-0B32 ^{(6) (8)}		5x20mm 800 mA	Littelfuse p/n SP001.1003 or Schurter p/n 216.800
	1756-0C8 ⁽⁶⁾		5x20mm 4 A Quick acting	SOC p/n MQ2-4A
	1756-0G16 ⁽⁶⁾			
	1756-0H8I ^{(6) (8)}			
	1756-0V16E ^{(2) (5) (6)}	Yes—Fused on a per group basis	Electronically fused	
	1756-0V32E ^{(2) (5) (6)}			
Relay	1756-0W16I ⁽⁸⁾	None—Fused IFM can be used to protect outputs	5x20mm 6.3 A Medium lag	SOC p/n MT 4-6.3A
	1756-0X8I ⁽⁸⁾			

- (1) For voltages above 132V AC, the Interface Modules (IFM) are not an acceptable means to provide external fusing. A rated terminal block for the intended application must be used.
- (2) Electronic protection is not intended to replace fuses, circuit breakers, or other code-required wiring protection devices.
- (3) The electronic protection of this module has been designed to provide protection for the module from short-circuit conditions. The protection is based on a thermal cut-out principle. In the event of a short-circuit condition on an output channel, that channel limits the current within milliseconds after its thermal cut-out temperature has been reached. All other channels with a NUT of that group continue to operate as directed by the module master (CPU, bridge, and so forth).
- (4) A fuse is provided on each common of this module for a total of two fuses. The fuses are designed to protect the module from short circuit conditions. The fuse does not provide overload protection. In the event of an overload on an output channel, it is likely that the fuse does not blow and the output device associated with that channel is damaged. To provide overload protection for your application, install user-supplied fuses externally.
- (5) If a short circuit condition occurs on any channel within this module group, the entire group is turned Off.
- (6) The module does not provide protection against reverse polarity wiring or wiring to AC power sources.
- (7) The electronic protection of this module has been designed to provide protection for the module from short-circuit conditions. The protection is based on a thermal cut-out principle. In the event of a short-circuit condition on an output channel, that channel limits the current within milliseconds after its thermal cut-out temperature has been reached. Other channels could produce a false error on the output verify fault signal due to the supply dropping below the minimum detect level of 19.2V DC. The output channels that are affected by this phenomenon continues to operate as directed by the module master (CPU, bridge, and so forth). What this means is that the output verify fault signals of the other channels must be checked and reset if a short-circuit on one channel occurs.
- (8) The recommended fuse for this module has been sized to provide short circuit protection for wiring only to external loads. In the event of a short circuit on an output channel, it is likely that the transistor or relay associated with that channel is damaged and the module can be replaced or a spare output channel used for the load. The fuse does not provide overload protection. In the event of an overload on an output channel, it is likely that the fuse does not blow and the transistor or relay associated with that channel is damaged. To provide overload protection for your application, user supplied fuse can be installed externally and properly sized to match the individual load characteristics.

You can reset an electronic fuse through the Logix Designer application during online monitoring or through program logic running on a controller. If your module uses point-level fusing, you can reset a fuse with a CIP Generic message instruction, as described on [Reset a Fuse, Perform Pulse Test, and Reset Latched Diagnostics on page 154](#).

Communication Formats, Connection Formats, and Module Definitions

These are the communication formats and module definitions for Input and Output modules.

Table 30 - Communication Formats – Input Module

Communication Format	Data Return	Module
Input Data	Module returns only general fault and input data.	
CST Timestamped Input Data	Module returns input data with the value of the system clock from its local chassis when the input data changes.	1756-IA16, 1756-IA16K, 1756-IA16I, 1756-IA16IK, 1756-IA32, 1756-IA32K, 1756-IB16I, 1756-IB16IK, 1756-IB16, 1756-IB16K, 1756-IB16XT, 1756-IB32, 1756-IB32K, 1756-IC16, 1756-IG16, 1756-IG16K, 1756-IH16I, 1756-IH16IK, 1756-IM16I, 1756-IM16IK, 1756-IN16, 1756-IN16K, 1756-IV16, 1756-IV16K, 1756-IV32, 1756-IV32K
Rack Optimization	The Ethernet bridge module collects all digital input words in the remote chassis and sends them to the controller as a single rack image. This connection type limits the status and diagnostic information available.	
Listen Only—Input Data	These formats have the same definition as the similarly named options above except that they are Listen-only connections.	
Listen Only—CST Timestamped Input Data		
Listen Only—Rack Optimization		
Full Diagnostic Input Data	Module returns input data, the value of the system clock from its local chassis when the input data changes, and diagnostic data.	1756-IA8D, 1756-IB16D
Listen Only—Full Diagnostic Input Data	This format has the same definition as Full diagnostic input data except that it is a Listen-only connection.	1756-IA8D, 1756-IB16D

Table 31 - Module Definitions – Input Module

Connection	Input Data	Data Return	Module
Data	Timestamp Data	Module returns input data with COS timestamps in CIP Sync® system time. To configure per point timestamping, see page 80 .	1756-IB16IF
	Data	Module returns input data without COS timestamps, useful when the highest possible throughput is required.	
Data with Event	Timestamp Data	Results in two input connections: Connection to return input data with COS timestamps in CIP Sync system time. Connection to initiate event tasks. See Dedicated Connection for Event Tasks on page 48 .	
Listen Only	Timestamp Data	These formats have the same definition as those above except that they are Listen-only connections.	
	Data		
Listen Only with Event	Timestamp Data		

Table 32 - Communication Formats – Output Module

Communication Format	Data Return	Module	Communication Format
Output Data	The owner-controller sends the module only output data.	1756-OA8, 1756-OA16I, 1756-OB8, 1756-OB16I, 1756-OB16IS ⁽¹⁾ , 1756-OB32, 1756-OC8, 1756-OG16, 1756-OH8I, 1756-ON8, 1756-OW16I, 1756-OX8I	Output Data
Scheduled Output Data	The owner-controller sends the module output data and a CST timestamp value		Scheduled Output Data
Rack Optimization	The owner-controller sends all digital output words to the remote chassis as a single rack image.		Rack Optimization
Listen Only—Output Data	These formats have the same definition as those above except that they are Listen-only connections.	1756-OA16, 1756-OA8E, 1756-OB16E, 1756-OB8EI, 1756-OV16E, 1756-OV32E	Listen Only—Output Data
Listen Only—Rack Optimization			Listen Only—Rack Optimization
CST Timestamped Fuse Data—Output Data	The owner-controller sends the module only output data. The module returns Fuse Blown status with the value of the system clock (from its local chassis) when the fuse is either blown or reset.		CST Timestamped Fuse Data—Output Data
CST Timestamped Fuse Data—Scheduled Output Data	The owner-controller sends the module output data and a CST timestamp value. The module returns Fuse Blown status with the value of the system clock (from its local chassis) when the fuse is either blown or reset.	1756-OA8D, 1756-OB16D	CST Timestamped Fuse Data—Scheduled Output Data
Listen Only - CST Timestamped Fuse Data—Output Data	This choice has the same definition as CST timestamped fuse data - output data except that it is a Listen-only connection.		Listen Only - CST Timestamped Fuse Data—Output Data
Full Diagnostics—Output Data	The owner-controller sends the module only output data. The module returns diagnostic data and a timestamp of diagnostics.		Full Diagnostics—Output Data
Full Diagnostics—Scheduled Output Data	The owner-controller sends the module output data and a CST timestamp value. The module returns diagnostic data and a timestamp of diagnostics.	1756-OA8D, 1756-OB16D	Full Diagnostics—Scheduled Output Data
Listen Only—Full Diagnostics—Output Data	This format has the same definition as Full diagnostics - output data except that it is a Listen-only connection.		Listen Only—Full Diagnostics—Output Data

(1) The 1756-OB16IS module does not support the Rack optimization, Listen only—rack optimization and Scheduled output data communication formats.

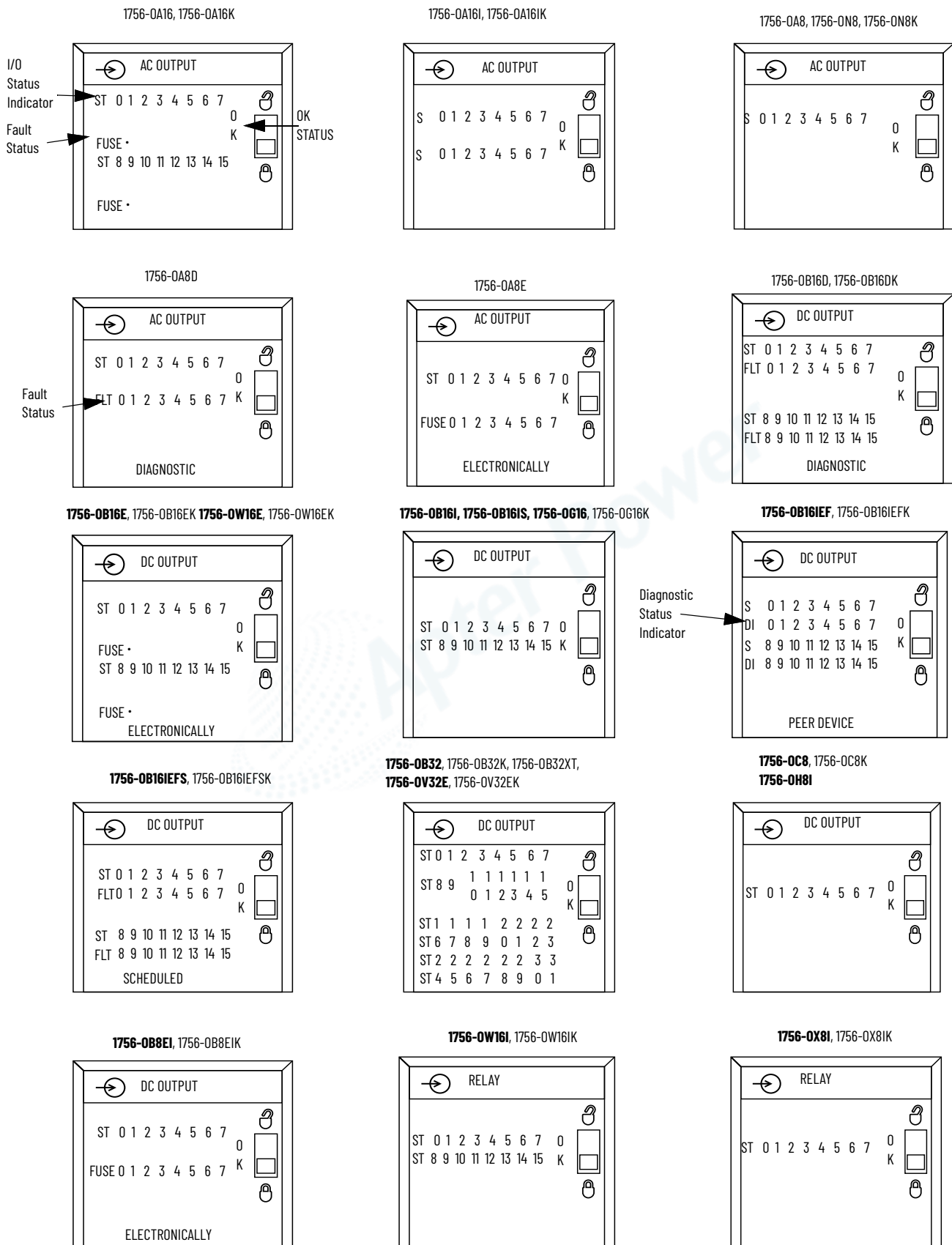
Status Indicators for Output Modules

ControlLogix output modules support the status indicators that are described in this table. The available status indicators vary by module catalog number, as shown in [Figure 21 on page 91](#).

Table 40 - Status Indicators for Output Modules

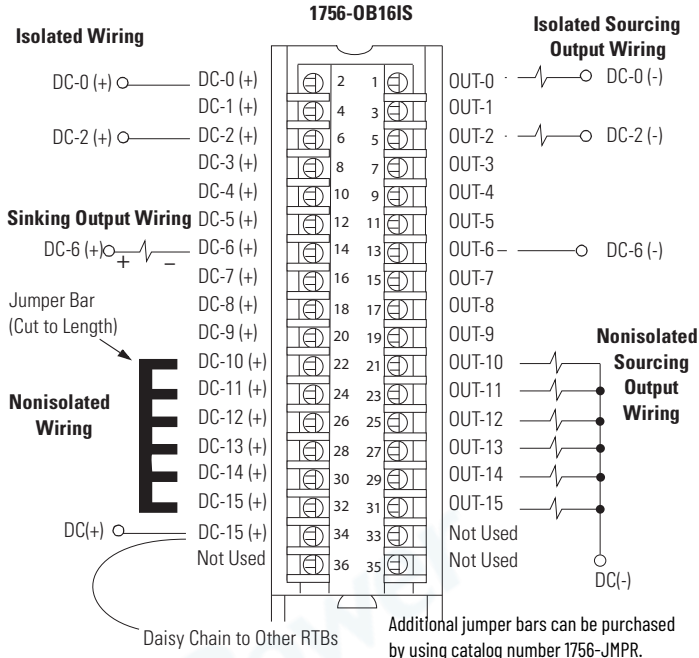
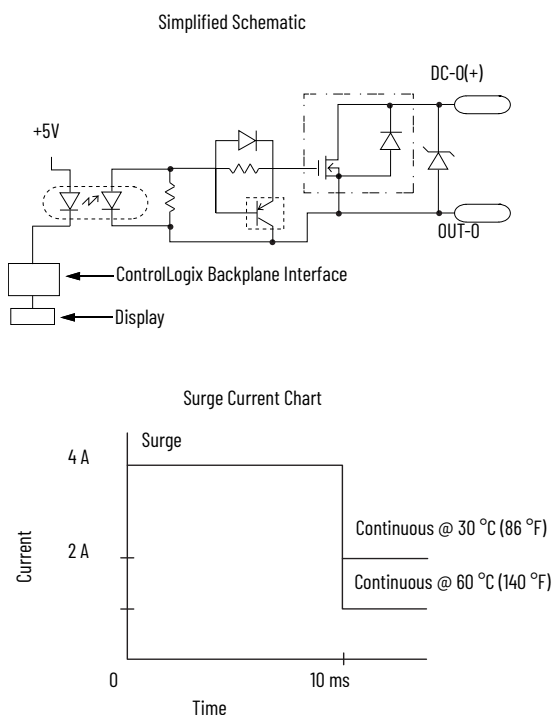
Indicator	Status	Description
OK Status	Steady green	The outputs are actively being controlled by a system processor.
	Flashing green	The module has passed internal diagnostics but is not actively controlled or it is inhibited or controller is in Program mode. Uninhibit connection, establish connection or transition controller to Run mode to enable communication to module.
	Steady red	The module must be replaced.
	Flashing red	Previously established communication has timed out. Check the controller and chassis communication.
I/O Status	Yellow	The output is On.
Fuse Status	Red	A short overload fault has occurred for a point in this group. Check the wiring for a short-overload. Also check the Module Properties dialog box in the Logix Designer application and reset the fuse.
Fault Status	Red	The output has encountered a fault. Check the output point at the controller.
Diagnostic Status	Steady red	The output has encountered a fault. Check the output point at the controller.
	Flashing red	The output is listening for peer inputs and using the inputs to determine the state of the output point.

Figure 21 - Output Module Status Indicators by Catalog Number



1756-OB16IS

ControlLogix DC (10...30V) scheduled, isolated output module



1756-OB32, 1756-OB32K, 1756-OB32XT

ControlLogix DC (10...31.2V) output module

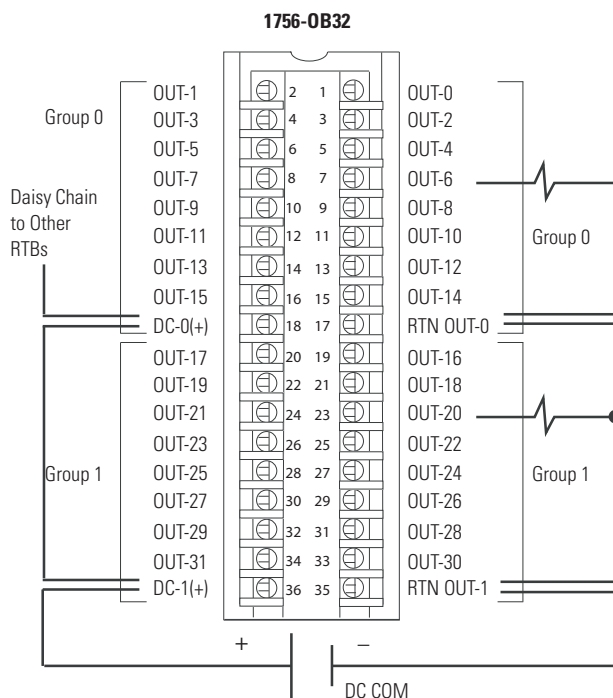
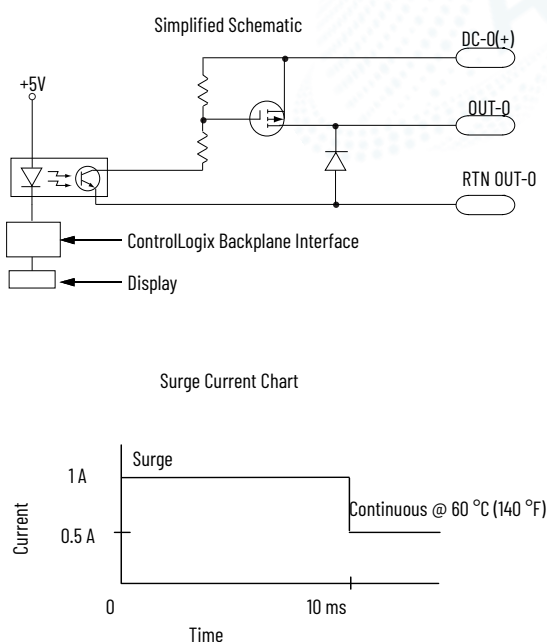


Table 75 - IFMs and Prewired Cables (Continued)

I/O Cat. No.	IFM Cat. No.	IFM Type	IFM Description	Prewired Cable
1756-OB8EI, 1756-OB8EIK	1492-IFM40F	Feed-through	Standard	1492-CABLExY (x=cable length)
	1492-IFM40DS24-4	Status-indicating	Isolated with 24/48V AC/DC status indicators and four terminals per output	
	1492-IFM40F-FS-2	Fusible	Isolated with extra terminals for 120V AC/DC outputs	
	1492-IFM40F-FS24-2		Isolated with extra terminals and 24V AC/DC blown fuse indicators for outputs	
	1492-IFM40F-FS24-4		Isolated with 24V AC/DC blown fuse indicators and four terminals per output	
1756-OB16D, 1756-OB16DK	1492-IFM40F-FS-4		Isolated 240V AC/DC with four terminals per output	
	1492-IFM40F	Feed-through	Standard	1492-CABLExY (x=cable length)
	1492-IFM40F-2		Extra terminals	
	1492-IFM40DS24-4	Status-indicating	Isolated with 24/48V AC/DC status indicators and four terminals per output ⁽⁵⁾	
	1492-IFM40F-F24D-2	Fusible	Fused with 24V DC blown fuse low leakage status indicator circuit with four isolated groups and four terminals per output	
	1492-IFM40F-FS-2		Isolated with extra terminals for 120V AC/DC outputs	
	1492-IFM40F-FS24-2		Isolated with extra terminals and 24V AC/DC blown fuse indicators for outputs ⁽⁶⁾	
1756-OB16E, 1756-OB16EK	1492-IFM40F-FS24-4		Isolated with extra terminals and 24V AC/DC blown fuse indicators and four terminals per output ⁽⁶⁾	1492-CABLExX (x=cable length)
	1492-IFM40F-FS-4		Isolated 240V AC/DC with four terminals per output	
	1492-IFM20F	Feed-through	Standard	
	1492-IFM20FN		Narrow standard	
	1492-IFM20F-2		Extra terminals	
	1492-IFM20D24	Status-indicating	Standard with 24V AC/DC status indicators	
	1492-IFM20D24N		Narrow standard with 24V AC/DC status indicators	
	1492-IFM20D24-2		24V AC/DC status indicators and extra terminals for outputs	
	1492-IFM20F-F2	Fusible	120V AC/DC with extra terminals for outputs	
	1492-IFM20F-F24-2		Extra terminals with 24V AC/DC blown fuse indicators	
	1492-XIM2024-8R	Relay Master	20-pin master with eight, 24V DC relays ⁽⁷⁾	
	1492-XIM2024-16R		20-pin master with 16, 24V DC relays	
	1492-XIM2024-16RF		20-pin master with 16, 24V DC relays with fusing	
	1492-XIM24-8R	Relay Expander	Expander with eight, 24V DC relays ⁽⁴⁾	
1756-OB16I, 1756-OB16IK, 1756-OB16IEF, 1756-OB16IEFK, 1756-OB16IEFS, 1756-OB16IEFSK	1492-XIMF-2	Feed-through Expander	Expander with eight feed-through channels ⁽⁴⁾	
	1492-IFM40F	Feed-through	Standard	1492-CABLExY (x=cable length)
	1492-IFM40DS24-4	Status-indicating	Isolated with 24/48V AC/DC status indicators and four terminals per output	
	1492-IFM40F-FS-2	Fusible	Isolated with extra terminals for 120V AC/DC outputs ⁽⁸⁾	
	1492-IFM40F-FS24-2		Isolated with extra terminals and 24V AC/DC blown fuse indicators for outputs ⁽⁸⁾	
	1492-IMF40F-FS24-4		Isolated with 24V AC/DC blown fuse indicators and four terminals per output ⁽⁸⁾	
	1492-IFM40F-FS-4		Isolated with 240V AC/DC and four terminals per output ⁽⁸⁾	
1756-OB16IS	1492-IFM40F	Feed-through	Standard	1492-CABLExY (x=cable length)
	1492-IFM40DS24-4	Status-indicating	Isolated with 24/48V AC/DC status indicators and four terminals per output	
	1492-IFM40F-FS-2	Fusible	Isolated with extra terminals for 120V AC/DC outputs ⁽⁸⁾	
	1492-IFM40F-FS24-2		Isolated with extra terminals and 24V AC/DC blown fuse indicators for outputs ⁽⁸⁾	
	1492-IMF40F-FS24-4		Isolated with 24V AC/DC blown fuse indicators and four terminals per output ⁽⁸⁾	
	1492-IFM40F-FS-4		Isolated with 240V AC/DC and four terminals per output ⁽⁸⁾	