## **CONTROLLERS** PICO-GUARD™ Fiber Optic

- Four optical channels protect personnel from hazardous equipment and to protect critical tooling or processes.
- Controller signals the machine control circuit to stop when the system detects a loss in light signal or receives a safety stop request from its Universal Safety Stop Interface (USSI) input.
- Each channel can control several optical elements in the same fiber loop.
- Each channel can monitor a separate part of a machine, such as doors, points of entry and E-stops.
- USSI connects multiple PICO-GUARD™ Controllers and other safety devices in a single safety circuit, when required.
- · Controllers are available with optical channel auxiliary outputs and muting.
- · Controllers interface with PICO-GUARD Grids, Points, Interlock Switches and Optical E-Stop Buttons to solve numerous applications.
- · Diverse-redundant and self-checking design exceeds OSHA/ANSI Control Reliability requirements and meets Category 4 per ISO 13849-1(EN 954-1) and IEC 61496-1 Type 4 requirements.













## PICO-GUARD™ Controller Models, 24V dc

Inputs	Safety Outputs	Output Rating	Aux. Outputs	Muting	Output Response Time	Models
4 Optical Channels		0.5 amps	3 PNP (Aux., Fault, Weak)	-	13 ms (optical channels) 7 ms (USSIs)	SFCDT-4A1
& 2 NC USSI (dual) 2 PNP OSSD	2 PNP OSSD		7 PNP (Aux., Fault, Weak & Ch 1-4)	-		SFCDT-4A1C
4 Optical Channels, Mute Inputs, Mute Enable			7 PNP (Aux./Mute lamp, Fault, Weak & Ch 1-4)	Yes	13 ms (optical channels)	SFCDT-4A1CM1

NOTE: A complete system requires a controller and optical elements, such as Interlocking Switches (see page 515), Grids and Points (see page 511), or E-Stop buttons (see page 518).



System Power Requirements	24V dc ±15%, 10% max. ripple; 250 mA max., exclusive of output loads. External supply must be in accordance with IEC 61558				
Short Circuit Protection	All inputs and outputs are protected from short circuits to +24V dc or dc common.				
Response Time	Optical Channel: 13 milliseconds max. (Time between the opening of an optical switch and the OSSD safety outputs turning off.)				
	USSI Inputs: 7 milliseconds max. (Time between actuation of the safety stop input device and the OSSD safety outputs turning off.)				
External Device Monitoring (EDM) Input	Two inputs for external device monitoring (EDM). Each input monitors the status of a normally closed, forced-guided monitor contact of an external safety device or MPCE. The EDM inputs must be high (10 to 30V dc) when the external device or MPCE is OFF, and must be low (less than 3V dc) when the external device or MPCE is ON. External devices or MPCEs must meet certain timing requirements, depending on the configuration setting.				
System Reset Input	The Reset input must be high (10 to 30V dc) for 0.25 to 2 seconds and then low (less than 3V dc) to reset the system from a manual power-up, optical channel latch or system lockout condition.				
USSI 1 Reset Input (Not available on SFCDT-4A1CM)	The Reset input must be high (10 to 30V dc) for 0.25 to 2 seconds and then low (less than 3V dc) to reset the system from a USSI 1 latch condition.				
USSI 1 Input (Not available on SFCDT-4A1CM1)	Dual-channel, redundant inputs for monitoring output contacts or "handshake" compatible safety solid-state outputs of other safety stop devices. OFF (stop) signals cause the PICO-GUARD OSSDs to latch OFF (Latch condition).				
USSI 2 Input (Not available on SFCDT-4A1CM1)	Dual-channel, redundant inputs for monitoring output contacts or "handshake" compatible safety solid-state outputs of other safety stop devices. OFF (stop) signals cause the PICO-GUARD OSSDs to turn OFF (Trip condition).				
Muting Device Inputs (SFCDT-4A1CM1)	The muting devices work in pairs (MS1 and MS2, MS3 and MS4) and required to be "closed" within 3 seconds of each other (simultaneity requirement) to intiate a mute (assuming all other conditions are meet). Muting device outputs must be hard contacts (electrical), capable of switching 15 to 30V dc at 10 to 50 mA.				
Mute Enable Input (SFCDT-4A1CM1)	When Mute Enable is selected (functional), this input must have +24V dc applied in order to start a mute; opening this input after mute has begun has no effect.				
Safety Outputs	Two redundant solid-state 24V dc, 0.5A max. sourcing OSSD (Output Signal Switching Device) safety outputs. (Use optional interface modules for ac or larger dc loads.)  Capable of the Banner "Safety Handshake".  ON-state voltage: ≥ Vin-1.5V dc OFF-state voltage: 1.2V dc max.  Max. load resistance: 1,000 Ω  Max. load capacitance: 0.1 μF				
Non-Safety Outputs	Solid state 24V dc (≥ Vin – 1.5V dc), 0.25A max. sourcing (PNP) non-safety outputs  Non-muting: Aux., weak, fault, Ch 1-4  Muting: Aux./Mute temp, fault, Ch 1-4 (-4A1CM1 models only)				
Remote Status Interface	Isolated RS-232 non-safety output (4800 Baud rate) for setup or monitoring the system status. Connections provided for a Remote Display unit. See Interfacing Products on page 501.				
Controls and Adjustments	Redundant switches for Auto/Manual power-up, Trip/Latch output operation and 1- or 2-channel EDM operation. Redundant switches for ON/OFF of each optical channel.  (NOTE: At least one optical channel must be ON.)				
Ambient Light Immunity	> 10,000 lux at 5° angle of incidence				
Strobe Light Immunity	Totally immune to one Federal Signal Corp. "Fireball" model FB2PST strobe				
Emitter Element	Visible red LED, 660 nm at peak emission				
Status Indicators	All models:  System Status (bi-color Red/Green): overall status of the PICO-GUARD system  System Reset (bi-color Yellow/Red): status of the input; indicates system reset needed  Channel (4 bi-color Red/Green): each shows the status of one optical channel  EDM (bi-color Red/Green): status of the EDM input channels  OSSD (bi-color Red/Green): status of the OSSD outputs  Config (bi-color Red/Green): status of the system configuration  Non-Muting models:  USSI (2 bi-color Red/Green): status of the USSI input channels (a-b and c-d)  USSI 1 Reset (bi-color Yellow/Red): status of USSI 1 reset input; indicates USSI 1 reset needed  EDM (bi-color Red/Green): status of the EDM input channels  OSSD (bi-color Red/Green): status of the OSSD outputs  Config (bi-color Red/Green): status of the system configuration  Muting Models:  Muting (4 bi-color Red/Green): status of the muting input				

Photoelectrics Sensors Fiber Optic Sensors Special Purpose Sensors

Measurement & Inspection Sensors

Vision

Wireless Lighting & Indicators

Safety Light Screens

Safety Laser Scanners

## Fiber Optic Safety Systems

Safety Controllers & Modules

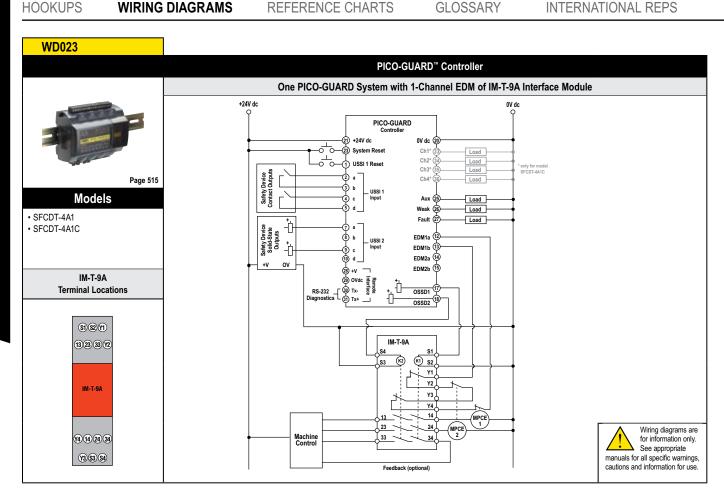
Safety Two-Hand Control Modules

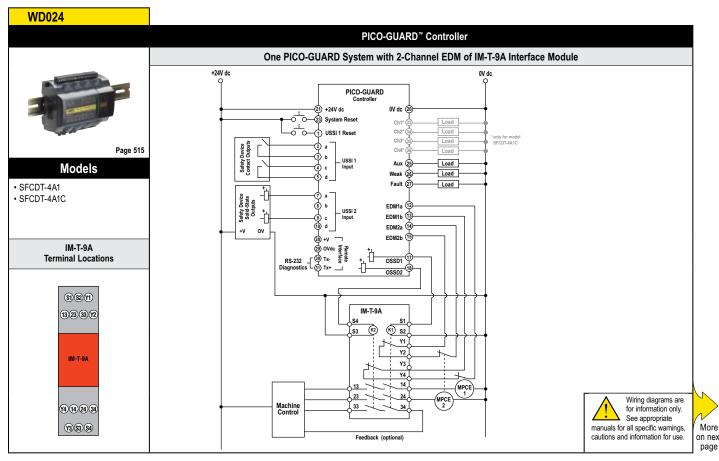
Safety Interlock Switches

Emergency Stop & Stop Control

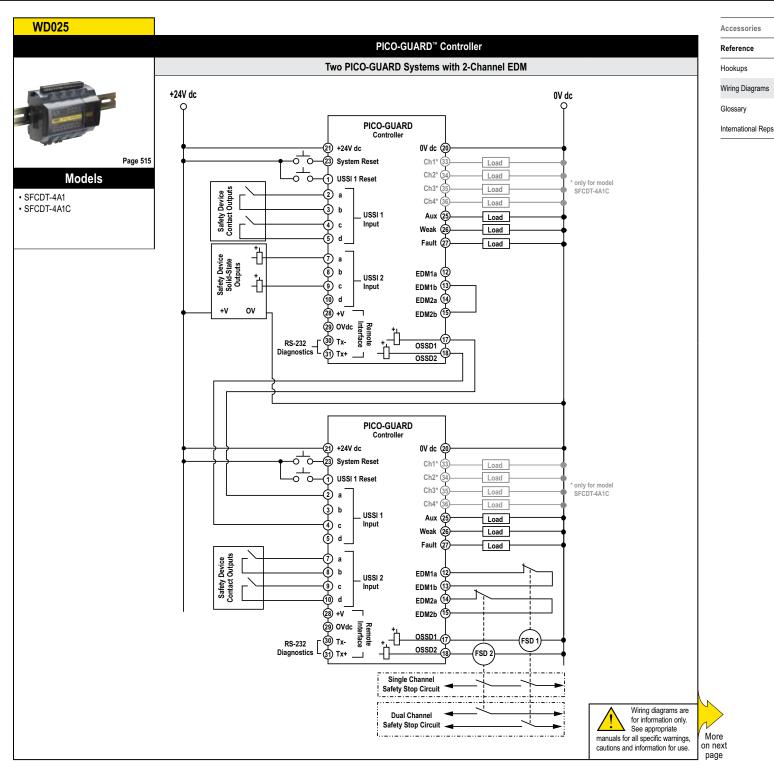
FIBER OPTIC CONTROLLERS **GRID & POINTS** INTERLOCKS E-STOP BUTTONS

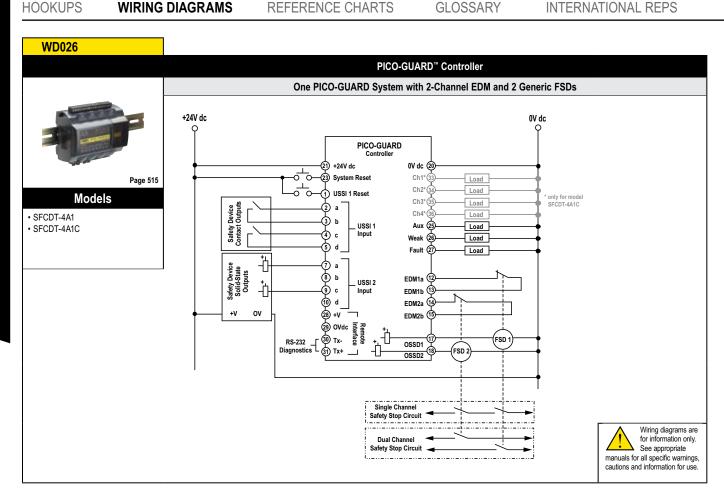
PICO-GUARD™ Controller Specifications (cont'd)				
Enclosure Rating	IEC IP20			
Operating Conditions	Temperature: 0° to +50° C Relative humidity: 95% maximum (non-condensing)			
Design Standards	Designed to comply with Type 4 per IEC 61496-1; Type 4 per UL 61496-1; Category 4 per EN 954-1			
Certifications	Important Notice: European Community Machinery Directive 2006/42/EC The PICO-GUARD Controllers comply with Machine Directive 98/37/EC and are certified to EN954-1(1996). After December 31, 2011, these safety devices can only be installed as a replacement component within the European Union (EU). For more information, please see www.bannerengineering.com/144763 or call 1-888-373-6767.			
Wiring Diagrams	WD023, WD024, WD025, WD026, WD027, WD028 (pp. 788-791)			

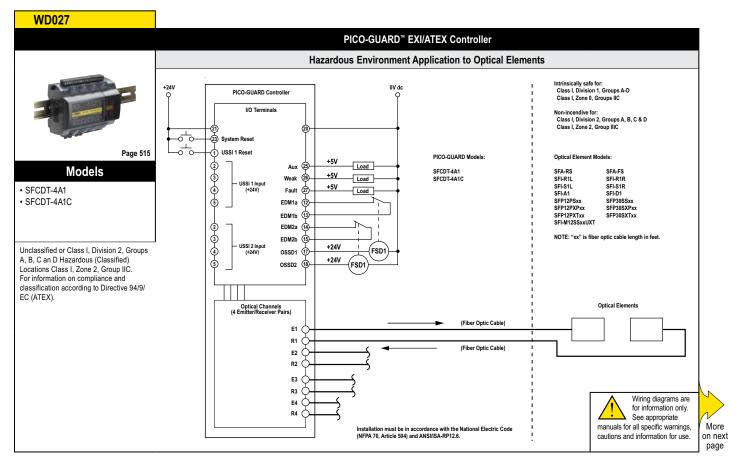














Accessories

Reference

Hookups
Wiring Diagrams

Glossary

International Reps

