Installation Instructions

Stratix 2000 Ethernet Unmanaged Switches

Catalog Numbers 1783-US03T01F, 1783-US06T01F, 1783-US05T, 1783-US08T

Allen-Bradley • Rockwell Software Rockwell Automation

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at http://literature.rockwellautomation.com) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

WARNING 	Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
ATTENTION 	Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard and recognize the consequences.
SHOCK HAZARD 	Labels may be on or inside the equipment (for example, drive or motor) to alert people that dangerous voltage may be present.
BURN HAZARD 	Labels may be on or inside the equipment (for example, drive or motor) to alert people that surfaces may reach dangerous temperatures.

North American Hazardous Location Approval

The following information applies when operating this equipment in hazardous locations.	**Informations sur l'utilisation de cet équipement en environnements dangereux.**
Products marked "CL I, DIV 2, GP A, B, C, D" are suitable for use in Class I Division 2 Groups A, B, C, D, Hazardous Locations and nonhazardous locations only. Each product is supplied with markings on the rating nameplate indicating the hazardous location temperature code. When combining products within a system, the most adverse temperature code (lowest "T" number) may be used to help determine the overall temperature code of the system. Combinations of equipment in your system are subject to investigation by the local Authority Having Jurisdiction at the time of installation.	Les produits marqués "CL I, DIV 2, GP A, B, C, D" ne conviennent qu'à une utilisation en environnements de Classe I Division 2 Groupes A, B, C, D dangereux et non dangereux. Chaque produit est livré avec des marquages sur sa plaque d'identification qui indiquent le code de température pour les environnements dangereux. Lorsque plusieurs produits sont combinés dans un système, le code de température le plus défavorable (code de température le plus faible) peut être utilisé pour déterminer le code de température global du système. Les combinaisons d'équipements dans le système sont sujettes à inspection par les autorités locales qualifiées au moment de l'installation.

WARNING

EXPLOSION HAZARD -

- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.
- Do not disconnect connections to this equipment unless power has been removed or the area is known to be nonhazardous. Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Substitution of components may impair suitability for Class I, Division 2.
- If this product contains batteries, they must only be changed in an area known to be nonhazardous.

AVERTISSEMENT

RISQUE D'EXPLOSION –

- Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher l'équipement.
- Couper le courant ou s'assurer que l'environnement est classé non dangereux avant de débrancher les connecteurs. Fixer tous les connecteurs externes reliés à cet équipement à l'aide de vis, loquets coulissants, connecteurs filetés ou autres moyens fournis avec ce produit.
- La substitution de composants peut rendre cet équipement inadapté à une utilisation en environnement de Classe I, Division 2.
- S'assurer que l'environnement est classé non dangereux avant de changer les piles.

European Hazardous Location Approval

ATTENTION

This equipment is intended for use in potentially explosive atmospheres as defined by European Union Directive 94/9/EC.
IBExU certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of Category 3 equipment intended for use in potentially explosive atmospheres, given in Annex II to this Directive.
Compliance with the Essential Health and Safety Requirements has been assured by compliance with EN 60079-15.

WARNING

- This equipment is not resistant to sunlight or other sources of UV radiation.
- This equipment must be installed in an enclosure providing at least IP54 protection when applied in Class I, Zone 2 environments.
- This equipment shall be used within its specified ratings defined by Rockwell Automation.
- Provision shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 40% when applied in Class I, Zone 2 environments.
- Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.
- Do not disconnect equipment unless power has been removed or the area is known to be nonhazardous.

Environment and Enclosure

ATTENTION

This equipment is intended for use in a Pollution Degree 2 industrial environment, in overvoltage Category II applications (as defined in IEC publication 60664-1), at altitudes up to 2000 meters (6562 ft) without derating.

This equipment is considered Group 1, Class A industrial equipment according to IEC/CISPR Publication 11. Without appropriate precautions, there may be potential difficulties ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbance.

This equipment is supplied as open-type equipment. It must be mounted within an enclosure that is suitably designed for those specific environmental conditions that will be present and appropriately designed to prevent personal injury resulting from accessibility to live parts. The enclosure must have suitable flame-retardant properties to prevent or minimize the spread of flame, complying with a flame spread rating of 5VA, V2, V1, V0 (or equivalent) if non-metallic. The interior of the enclosure must be accessible only by the use of a tool. Subsequent sections of this publication may contain additional information regarding specific enclosure type ratings that are required to comply with certain product safety certifications.

In addition to this publication, see the following publications:

- publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines, for additional installation requirements
- NEMA Standards publication 250, and IEC publication 60529, as applicable, for explanations of the degrees of protection provided by different types of enclosures.

Prevent Electrostatic Discharge

ATTENTION

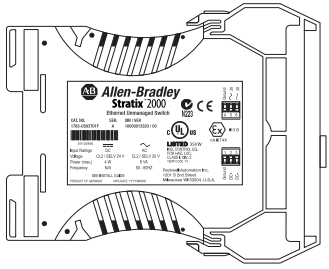
This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation. Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- Use a static-safe workstation, if available.
- Store the equipment in appropriate static-safe packaging when not in use.

About the Stratix 2000 Ethernet Unmanaged Switches

The Ethernet network unmanaged switches can be used to divide an Ethernet network into segments, and to direct network traffic more efficiently than using repeating hubs. This allows a larger network size, regardless of the amount of network traffic.

Connecting one of the switches' ports to a single device segments the network, letting you dedicate bandwidth to that device. Unmanaged switches also enable multiple simultaneous communication between devices on different ports.



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The switches are available in the following port configurations for attaching local devices:

Port Configuration	Catalog Number
3-port copper 1-port fiber	1783-US03T01F
5-port copper	1783-US05T
6-port copper 1-port fiber	1783-US06T01F
8-port copper	1783-US08T

The 3-port copper 1-port fiber switch (catalog number 1783-US03T01F) is shown in this publication.

The individual ports auto-negotiate link speeds (10 Mbps or 100 Mbps). To improve data throughput, traffic is restricted to ports in a data exchange, while other data is simultaneously exchanged on other ports.

IMPORTANT The device you connect to a switch should have its Ethernet port configured for auto-negotiate to avoid confusion between half- and full-duplex communication. You can also set the device's Ethernet port to half-duplex. Failure to do so may result in higher error rates.

In addition to a power status indicator, each port has these indicators:

- Each copper port has two link/status/activity indicators (only one of which is active at a time)
- The fiber optic port has one link/status/activity indicator

When This Indicator Is Lit	Link Speed Is
Amber (copper port only)	10 Mbps
Green	100 Mbps

The switches operate on low-voltage ac or dc power.

Features supported by the Ethernet unmanaged switches include the following.

- 10 Mbps/100 Mbps, full/half duplex communication, per-copper port autonegotiation
- automatic crossover detection (auto MDIX)
- LC-type fiber optic connector; multimode cable

Use Caution When Handling Switches With Fiber Optic Ports

Observe the following when using the unmanaged switches equipped with fiber optic ports (catalog numbers 1783-US03T01F and 1783-US06T01F).

ATTENTION

Under certain conditions, viewing the optical port may expose the eye to hazard. When viewed under some conditions, the optical port may expose the eye beyond the maximum permissible exposure recommendations.

Required Tools

You will need this tool to install the switch.

Item	Description
Screwdriver	flat-bladed, 0.375 mm (0.15 in.) width blade.

Required System Components

The switches require either of these types of power supplies:

- 24V dc rated voltage (10-35V dc; max. 4 W power consumption)
- 20V ac rated voltage (10-24V ac; max 6VA power consumption).

ATTENTION

To comply with the CE Low Voltage Directive (LVD), this equipment must be powered from a source compliant with the following:
Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).

To comply with UL restrictions, this equipment must be powered from a source compliant with the following:
Class 2 or Limited Voltage/Current.

See the procedure on page 13 to wire the switch.

Install the Switch

Follow these procedures to install the switch.

WARNING

If you connect or disconnect the communications cable with power applied to this module or any device on the network, an electrical arc can occur. This could cause an explosion in hazardous location installations.
Be sure that power is removed or the area is nonhazardous before proceeding.

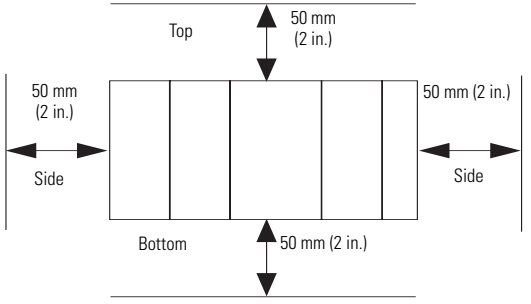
WARNING

If you connect or disconnect wiring while the field-side power is on, an electrical arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

Mount the Switch

Mount the switch vertically on a horizontal DIN rail, either free-standing, or at the rear of the control cabinet. Ensure that the switch is oriented so the ports face forward. The Power status indicator should be oriented to the right. See the illustrations on page 11.

Maintain spacing from enclosure walls, wireways, and adjacent equipment. Allow 50 mm (2 in.) of space on all sides, as shown. This provides ventilation and electrical isolation.

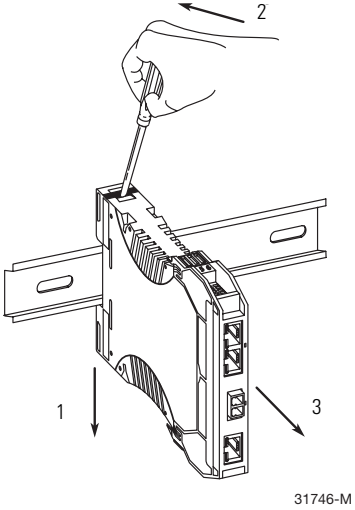


WARNING

Secure any external connections that mate to this equipment by using screws, sliding latches, threaded connectors, or other means provided with this product.

Follow these steps to mount the switch on a DIN rail.

1. Using a flat-bladed screwdriver, open the latch at either the top or bottom of the switch.

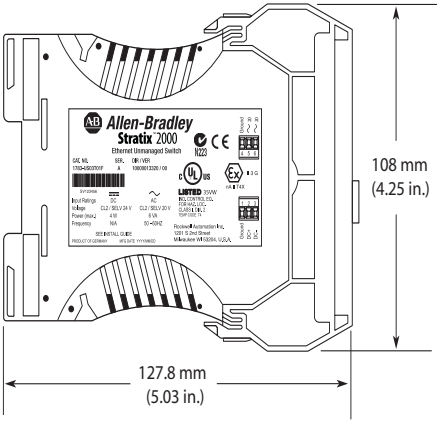


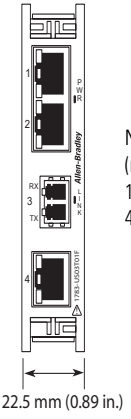
2. Holding the latch open, hook the latch over the DIN rail.

3. Remove the screwdriver and allow the latch to close.

Product Dimensions

The following illustrations show the switch dimensions.





Note that other versions of the switch (not shown here, catalog numbers 1783-US06T01F and 1783-US08T) are 45 mm (1.77 in.) wide.

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Wire the Switch

ATTENTION

To comply with the CE Low Voltage Directive (LVD), this equipment must be powered from a source compliant with the following:
Safety Extra Low Voltage (SELV) or Protected Extra Low Voltage (PELV).

To comply with UL restrictions, this equipment must be powered from a source compliant with the following:
Class 2 or Limited Voltage/Current.

Provide low voltage ac or dc power to the switch by using the screw terminals at the top and bottom of the switch. The ac connector is at the top of the switch.The dc connector is at the bottom of the switch.

Follow these steps to wire the switch.

Wire the Switch for ac Operation

The following table shows pinouts for the low voltage ac power supply cable.

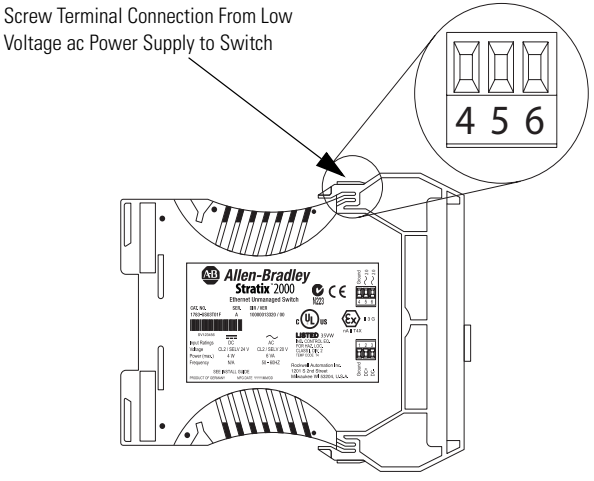
Terminal	Designation
4	(Ground) functional earth ground Terminal 1 of the dc connector may be used in place of terminal 4 of the ac connector.
5	~ 20 (20V ac nominal)
6	~ 20 (20V ac nominal)

1. Ensure that power to the power supply is turned off.
2. Ensure you have the proper gauge of wire for your power supply.

   Minimum wire gauge is 1.5 mm^2 (16 AWG).
3. Strip approximately 0.9 mm (0.35 in.) from each end of the wire.

4. If the connector is already installed in the switch, use a flat-bladed screwdriver to gently pry the connector from the switch.

5. If the connector is not already installed in the switch, wire the connector before replacing it in the switch.



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6. Using a flat-bladed screwdriver, loosen the screw terminals on the connector at the top of the switch.

7. Connect one ac output (20V ac nominal) from the low voltage ac power supply to terminal 5 (~20) and tighten the screw.

8. Connect the other ac output (20V ac nominal) from the low voltage ac power supply to terminal 6 (~20) and tighten the screw.

9. Connect functional earth ground to terminal 4 and tighten the screw.

IMPORTANT Maximum recommended torque for all screw connections is 0.4...0.5 Nm (3.5...4.4 pound-inches).

Refer to the grounding considerations on page 19.

10. Plug the connector back into the switch.

11. Tug gently on the wires to ensure the connections are secure.

Wire the Switch for dc Operation

The following table shows pinouts for the dc power supply cable.

Terminal	Designation
1	Ground (functional earth ground) Terminal 4 of the ac connector may be used in place of terminal 1 of the dc connector.
2	dc+ (24V dc nominal)
3	dc- (0V dc)

1. Ensure that power to the power supply is turned off.

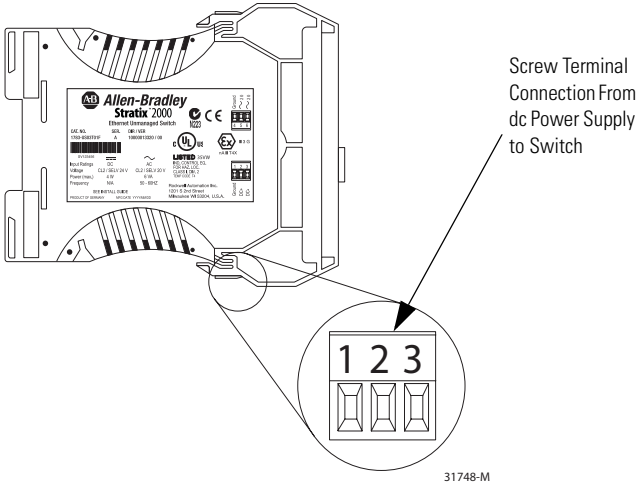
2. Ensure you have the proper gauge of wire for your power supply.

Minimum wire gauge is 1.5 mm^2 (16 AWG).

3. Strip approximately 0.9 mm (0.35 in.) from each end of the wire.

4. If the connector is already installed in the switch, use a flat-bladed screwdriver to gently pry the connector from the switch.

If the connector is not already installed in the switch, wire the connector before replacing it in the switch.



5. Using a flat-bladed screwdriver, loosen the screw terminals on the connector at the bottom of the switch.

6. Connect dc+ (24V dc nominal) from the power supply to terminal 2 and tighten the screw.

7. Connect dc- (0V dc) from the power supply to terminal 3 and tighten the screw.

8. Connect functional earth ground to terminal 1 and tighten the screw.

   Refer to the grounding considerations on page 19.

IMPORTANT Maximum recommended torque for all screw connections is 0.4...0.5 Nm (3.5...4.4 pound-inches).

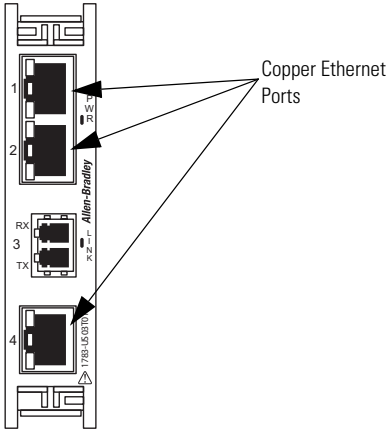
9. Plug the connector back into the switch.

10. Tug gently on the wires to ensure the connections are secure.

Connect the Copper Ethernet Ports

Follow these steps to connect the copper Ethernet port(s) on the switch.

1. Locate the copper Ethernet RJ-45 ports on the front of the switch.



2. Connect one end of an Ethernet cable to one of the copper ports on the front panel of the switch.

3. Connect the other end of the Ethernet cable to a device in your Ethernet network.

Connect the Fiber Optic Ethernet Port

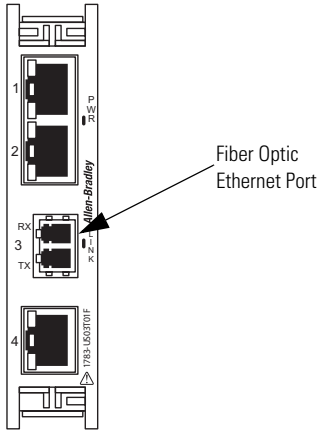
Follow these steps to connect the fiber optic Ethernet port on the switch.

ATTENTION

Under certain conditions, viewing the optical port may expose the eye to hazard. When viewed under some conditions, the optical port may expose the eye beyond the maximum permissible exposure recommendations.

TIP For fiber optic specifications, see page 24.

1. Locate the fiber optic Ethernet port on the front of the switch.



2. Connect the duplex LC connector end of the fiber optic cable to the fiber optic Ethernet port.

3. Connect the other end of the cable to a device in your network, or to another switch if connecting switches together.

Grounding Considerations

ATTENTION

For proper grounding, you must always connect the power supply functional ground screw when connecting the power supply. You must provide an acceptable grounding path for each device in your application. For more information on proper grounding guidelines, refer to publication1770-4.1, Industrial Automation Wiring and Grounding Guidelines.

This product is intended to be mounted to a well-grounded mounting surface such as a metal panel. The functional earth ground connection to the product is through the specified pin on the ac and dc connection terminals.

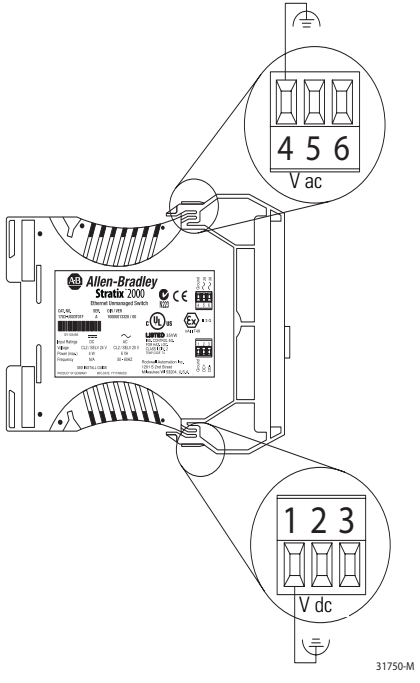
IMPORTANT

Only one of these ground connections is required:

- pin 1 on the dc connection terminals
- pin 4 on the ac connection terminals

Connect the functional earth (FE) ground to the ground pin of either the dc (pin 1) or ac (pin 4) power connector on one of the connectors at the top and bottom of the switch.

Connect the functional earth (FE) ground to the ground pin of either the dc (pin 1) or ac (pin 4) connector.



Refer to publication 1770-4.1, Industrial Automation Wiring and Grounding Guidelines, for additional information.

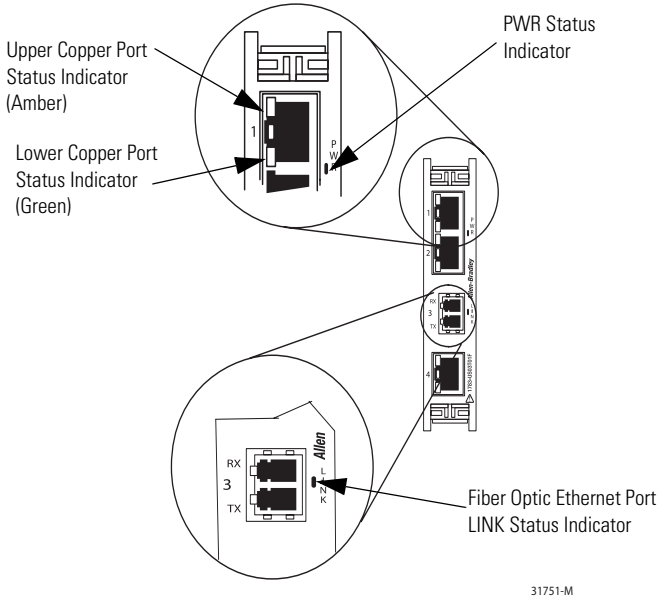
Status Indicators

To aid in troubleshooting, the switch contains these indicators:

- A power indicator labeled PWR
- Two link status indicators on each copper Ethernet port (located on the RJ45 connector)

  These indicators are not labeled on the switch faceplate.

Switches with a fiber optic Ethernet port have an additional Ethernet link status indicator labeled LINK.



Indicator	State	Description
PWR	Solid green	The switch is powered
Upper copper port status indicator only	Solid amber	10 Mbps Ethernet link
	Flashing amber	There is activity on the 10 Mbps Ethernet link connected to this copper port

Indicator	State	Description
Lower copper port status indicator only	Solid green	100 Mbps Ethernet link
	Flashing green	There is activity on the 100 Mbps Ethernet link connected to this copper port
LINK	Solid green	An Ethernet link exists on the fiber optic port
	Flashing green	There is activity on the Ethernet link on the fiber optic port

Specifications

Stratix 2000 Ethernet Unmanaged Switches
Catalog Numbers 1783-US03T01F, 1783-US06T01F, 1783-US05T, 1783-US08T

Attribute	Value
Enclosure type rating	Meets IP20
Inrush current, max.	2.2 A
ac power supply voltage rating	20V ac (0...24V ac)
dc power supply voltage rating	24V dc (10...35V dc)
Isolation voltage	30V (continuous), Basic Insulation Type Type tested at 500V dc for 60 s, between communications ports and power ports. No isolation between individual Communications ports
Power consumption, max.	4 W (6VA) Maximum current 400 mA at 10V dc
Wire Size	Communications connectors: RJ45 connector according to IEC 60603-7, 2 or 4 pair Category 5e minimum cable according to TIA 568-B.1 or Category 5 cable according to ISO/IEC 24702. Power connectors: 1.5... 2.5 mm^2 (16...14 AWG) solid or stranded copper wire rated at 75 °C (167 °F) or greater 1.2 mm (3/64 in.) insulation max.
Torque	0.4...0.5 Nm (3.5...4.4 pound-inches) on power connectors
Fiber optic Ethernet data rate	100 Mbps
Fiber optic connecting mode	Full duplex
Fiber optic wavelength	1310 nm
Fiber optic link budget	Graded index multimode fiber; 2000 m

Stratix 2000 Ethernet Unmanaged Switches
Catalog Numbers 1783-US03T01F, 1783-US06T01F, 1783-US05T, 1783-US08T

Attribute	Value
Fiber optic cable maximum length	8 db with 62,5 / 125 µm multimode cable 4 db with 50 / 125 µm multimode cable
Fiber optic connector type	LC
Wiring Category[1]	2 - on power ports 2 - on communications ports
North American Temp Code	T4
IEC Temp Code	T4

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Environmental Specifications

Attribute	Value
Temperature, operating	IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock): 0…60 °C (32…140 °F)
Temperature, nonoperating	IEC 60068-2-1 (Test Ab, Unpackaged Non-operating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Non-operating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Non-operating Thermal Shock): -40…85 °C (-40…185 °F)
Relative humidity	IEC 60068-2-30 (Test Db, Unpackaged Damp Heat): 5…95% non-condensing
Vibration	IEC 60068-2-6 (Test Fc, Operating): 2 g @ 10…500 Hz
Operating shock	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 15 g
Nonoperating shock	IEC 60068-2-27 (Test Ea, Unpackaged Shock): 30 g

Environmental Specifications

Attribute	Value
Emissions	CISPR 11: Group 1, Class A
ESD immunity	IEC 61000-4-2: 6 kV contact discharges 8 kV air discharges
Radiated RF immunity	IEC 61000-4-3: 10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 1V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity	IEC 61000-4-4: ±2 kV at 5 kHz on power ports ±2 kV at 5 kHz on signal ports
Surge transient immunity	IEC 61000-4-5: ±1 kV line-line(DM) and ±2 kV line-earth(CM) on power ports ±2 kV line-earth(CM) on communications ports
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz

Certifications

Certifications (when product is marked)[1]	Value
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2004/108/EC EMC Directive, compliant with: EN 61326; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
C-Tick	AS/NZS CISPR 11; Industrial Emissions
Ex	EN 60079-15; Potentially Explosive Atmospheres, Protection "n" (Zone 2)

(1) See the Product Certification link at www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Additional Resources

These documents contain additional information concerning related Rockwell Automation products.

Resource	Description
EtherNet/IP Industrial Protocol White Paper, publication ENET-WP001A-EN-P	Describes how to implement services and data objects on a TCP/UDP/IP based Ethernet network.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://ab.com	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at http://literature.rockwellautomation.com. To order paper copies of technical documentation, contact your local Rockwell Automation distributor or sales representative.

www.rockwellautomation.com

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