

EISC Series

CTRLink®

Ethernet Configurable Switching Hubs

INSTALLATION GUIDE

INTRODUCTION

The EISC Series of configurable switches in the CTRLink® family provides capabilities beyond those of standard Plug and Play (PnP) switches. Besides conventional features — auto-negotiation, 10/100 Mbps data rate, flow control, half- or full-duplex operation — the EISC has advanced features such as VLAN, trunking, Quality of Service (QoS) and a programmable fault relay that can be connected to a supervisory system. Individual port parameters can be configured via a console port attached to a Windows-based workstation. Port status can also be monitored through the console port using the Modbus protocol, making it easy to interface the EISC with supervisory control equipment. These features make the EISC one of the most versatile of Industrial Ethernet switches available.

The EISC Series has four models. The EISC16-100T offers 16 twisted-pair ports. The EISC12-100T/FT has ten twisted-pair and two multimode fiber optic ports with ST connectors. The EISC12-100T/FC also has two fiber ports, but uses SC connectors. And the EISC12-100T/FCS also employs SC connectors, but for single-mode fiber optic cable.

Configuration is accomplished via a console port connected to a Windows-based configuration program included with the product. Modbus protocol and register information is also provided so the switch can be configured or monitored by a Modbus master device. Each twisted-pair port parameter (data rate, duplex and flow control) can be pre-set via the console port or set automatically via auto-negotiation. A unique troubleshooting feature provides a dynamic signal strength bar graph for each twisted-pair port.

Each twisted-pair port automatically optimizes its data rate to 10 Mbps or 100 Mbps — but data rate and duplex settings can be specified, if desired. Fiber ports are *fixed* at 100 Mbps, full-duplex operation.

Each twisted-pair port negotiates flow control, but control can be disabled for individual ports. The PAUSE function is supported for full-duplex links. The backpressure scheme is used for half-duplex segments.

All units can be powered from wide-range, low-voltage AC or DC sources. All units have provisions for either DIN-rail or panel mounting.



CONTEMPORARY CONTROLS®

SPECIFICATIONS

Electrical

INPUT	DC	AC
Voltage:	10–36 V	8–24 V
Power (max):	12 W	12 VA
Frequency:	N/A	47-63 Hz
Relay Contacts:	24 V, 500 mA	

LED Indicators

Power:	Green
Link/Data:	Green/Yellow
Status:	Green/Yellow

Regulatory Compliance

- CE Mark
- CFR 47, Part 15 Class A
- UL 508 Listed (intended for use with Class 2 circuits)

Environmental

Operating temperature:	0°C to +60°C
Storage temperature:	-40°C to +85°C
Humidity, non-condensing:	10 % to 95 %

Functional

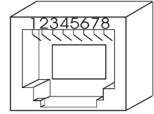
Aging (typical):	300 seconds
Compliance:	ANSI/IEEE 802.3

RJ-45 Connector Pin Assignments

PIN MDI-X Port 16X

1	TD+	RD+
2	TD-	RD-
3	RD+	TD+
6	RD-	TD-

(All other pins are unused.)



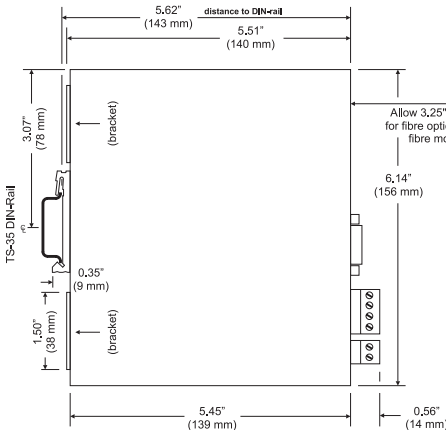
Warning: This is a Class A product. In a domestic environment the product may cause radio interference in which case the user may be required to take adequate measures.

TWISTED-PAIR

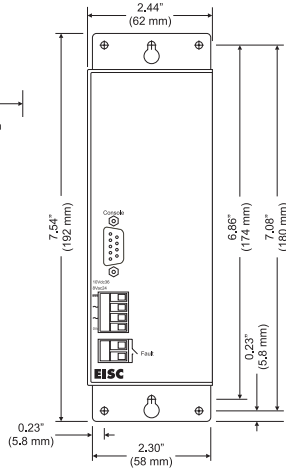
FIBER

Signaling:	10BASE-T/100BASE-TX	100BASE-FX, 1300 nm
Data Rates:	10/100 Mbps	100 Mbps
Port Count:	16 or 10	0 or 2
Connectors:	RJ-45, shielded	SC or ST
Segment length (max):	100 m	2 km, multimode 15 km, single-mode

Mechanical



Side View showing DIN-rail Clip
(Mounting Brackets Retracted)



Front View with
Mounting Brackets Extended

INSTALLATION

The EISC can be snap-mounted onto TS-35 DIN-rail. If the DIN-rail clip is removed, the EISC can be secured in an industrial enclosure or wiring closet using the provided brackets and #8 pan-head screws (not provided).

Cabling Considerations

When attaching cables to the EISC, Table 1 should be considered.

Medium	Signaling and Data Rate	Required Cable	Maximum Segment Distance
Copper	10BASE-T 10 Mbps	Category 3 UTP	100 m (328 ft)
Copper	100BASE-TX 100 Mbps	Category 5 UTP	100 m (328 ft)
Fiber	100BASE-FX 100 Mbps	1300 nm, multimode 50/125 or 62.5/125 μm	2 km (6562 ft) (Full-Duplex Only)
Fiber	100BASE-FX 100 Mbps	1300 nm, single-mode	15 km (49213 ft) (Full-Duplex Only)

Table 1 — Cabling Considerations

Observe in Table 1 that segment distance is very limited when using copper media — regardless of the data rate. Although 10BASE-T segments can successfully use Category 3, 4 or 5 cable, 100BASE-TX segments must use Category 5 cable.

A popular choice for improved distance is multimode fiber — which also gives good electromagnetic noise immunity and optimum protection from lightning strikes. Considerable distance can be achieved with multimode fiber — and the greatest distance can be realized with single-mode fiber.

EIS switches offer three types of field connectors. Copper ports accept RJ-45 modular plugs. Two choices of fiber connectors are available: ST and SC.

Powering

The EISC requires low-voltage power — AC or DC — via a removable keyed four-pin connector which accepts 16-18 AWG conductors. Consult the specifications for power requirements. Power options are explained below.

NOTE: This device is intended for use with Class 2 circuits.

DC Powered

The EISC accepts a voltage range of 10-36 VDC and draws a maximum current value commensurate with 12-watt power consumption. Power conductors should be sized accordingly. Ground is directly connected to zero volts and the equipment chassis is isolated from zero volts. The DC voltage input connections are reverse-polarity protected.

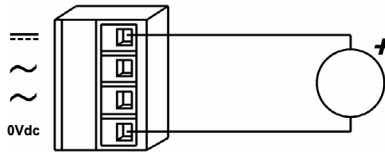


Figure 1 — DC Powered

Redundant DC Powered

Redundant diode-isolated DC power inputs are provided so the EISC can operate despite the loss of primary power. Both sources must provide 12 watts of power.

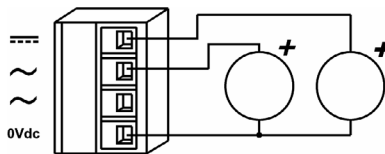


Figure 2 — Redundant DC Powered

AC Powered

The EISC can be powered by an AC voltage in the range of 8-24 V capable of delivering 12 VA of apparent power. Two auxiliary power supplies are available: The AI-XFMR is for use with 120 VAC. The AI-XFMR-E is for use with 230 VAC.

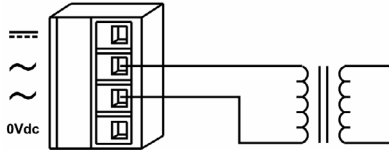


Figure 3 — AC Powered

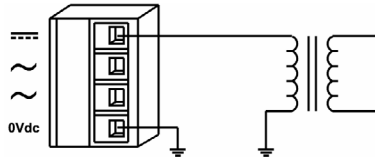


Figure 4 — AC Powered with Grounded Secondary

AC Powered with Battery Backup

The EISC can also operate in the AC mode with a backup battery supplying power, if the AC source fails. The EISC does NOT charge the battery, so separate provisions are required for charging.

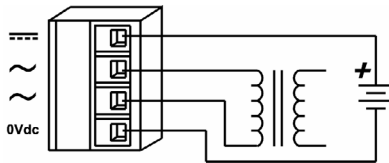


Figure 5 — AC Powered with Battery Backup

OPERATION

Switching

The EISC uses an 8K-address look-up table augmented with 128 entries of Content Addressable Memory. A hashing algorithm is used to update the table. Addresses are aged in about 300 seconds. Runt packets (less than 64 bytes) and oversize packets (greater than 1536 bytes) are discarded.

Data Storage

Data storage buffer for Ethernet packets consists of 512 k bytes.

Data Forwarding

An entire Ethernet packet must be received before forwarding occurs.

Flow Control

Each twisted-pair port automatically negotiates flow control for either half- or full-duplex operation, if auto-negotiation is enabled. In full-duplex mode, the PAUSE function is supported. In half-duplex mode, the backpressure method is used. When flow control is disabled, the destination port of an incoming packet is checked and, if found to be congested, the packet is discarded to avoid blocking the packet stream.

Broadcast Storm Control

Using a storm-control counter, each port will pass 64 continuous broadcast packets before dropping extra ones. The counter will reset every 800 ms or after receiving a packet whose Device ID is other than ff ff ff ff ff.

LED Indicators (All LEDs are tested each time the EISC is powered up.)

P (green) *Power.* Glows when power is supplied to the EISC.

(Numbered LEDs) *Link/Activity.* Each port has an LED that glows if a link exists: **green** for 100 Mbps operation or **yellow** for 10 Mbps operation. It flashes as data transfer occurs.

S (green/yellow) *Fault Relay Status.* This LED functions in accordance with its configuration setting. See the User Manual for details.

Copper Ports

All RJ-45 ports are wired MDI-X — allowing DTE equipment to connect via straight-through cables — except that Port 16X on the EISC16-100T is wired MDI to permit the cascading of switches without the need of a crossover cable. Port 16 and Port 16X *cannot be used simultaneously.*

Advanced Operation

Advanced operation (requiring a null-modem cable) is explained in the User Manual located on the provided CD-ROM.

NEED MORE HELP INSTALLING THIS PRODUCT?

More comprehensive information can be found on our web site at www.ccontrols.com. This includes our on-line technical manuals, downloadable software drivers and utility programs that can test the product. When contacting one of our offices, just ask for Technical Support.

Warranty

Contemporary Controls (CC) warrants this product to the original purchaser for two years from the product shipping date. Product returned to CC for repair is warranted for one year from the date that the repaired product is shipped back to the purchaser or for the remainder of the original warranty period, whichever is longer.

If the product fails to operate in compliance with its specification during the warranty period, CC will, at its option, repair or replace the product at no charge. The customer is, however, responsible for shipping the product; CC assumes no responsibility for the product until it is received.

CC's limited warranty covers products only as delivered and does not cover repair of products that have been damaged by abuse, accident, disaster, misuse, or incorrect installation. User modification may void the warranty if the product is damaged by the modification, in which case this warranty does not cover repair or replacement.

This warranty in no way warrants suitability of the product for any specific application. IN NO EVENT WILL CC BE LIABLE FOR ANY DAMAGES INCLUDING LOST PROFITS, LOST SAVINGS, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PRODUCT EVEN IF CC HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR FOR ANY CLAIM BY ANY PARTY OTHER THAN THE PURCHASER.

THE ABOVE WARRANTY IS IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED OR STATUTORY, INCLUDING THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE OR USE, TITLE AND NONINFRINGEMENT.

Returning Products for Repair

Before returning a product for repair, contact Customer Service. A representative will instruct you on our return procedure.

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DECLARATION OF CONFORMITY

Applied Council Directives:

Electromagnetic Compatibility Directive, 2004/108/EEC Council Directive

General Product Safety Directive 92/59/EEC

Standards to which Conformity is Declared

EN 55022:1998/A2:2003 CISPR 22:1997/A2:2002, Class A, Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment

EN 55024:1998/A2:2003 CISPR 24:1997/A2:2002, Information Technology Equipment — Immunity Characteristics — Limits and Methods of Measurement

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Type of Equipment: Industrial Ethernet switching hub

Models			
EISC16-100T	EISC12-100T/FC	EISC12-100T/FCS	EISC12-100T/FT

Regulatory Compliance Standards			
Standard	Test Method	Description	Test Levels
EN 55024	EN 61000-4-2	Electrostatic Discharge	6 kV Contact
EN 55024	EN 61000-4-3	Radiated Immunity	10 V/m 80 MHz to 1 Ghz
EN 55024	EN 61000-4-4	Fast Transient Burst	1 kV Clamp & 2 kV Direct
EN 55024	EN 61000-4-5	Voltage Surge	1 kV L to L & 2 kV L to Earth
EN 55024	EN 61000-4-6	Conducted Immunity	10 Volts (rms)
EN 55024	EN 61000-4-11	Voltage Dips & Interruptions	1 to 5 Seconds @ 100% Dip 1 Line Cycle @ 100% Dip
EN 55022	CISPR 22	Radiated Emissions	Class A
EN 55022	CISPR 22	Conducted Emissions	Class B

Manufacturer's Declaration: I, the undersigned, hereby declare that the products specified above conform to the listed directives and standards.

George M. Thomas, President

November 1, 2006