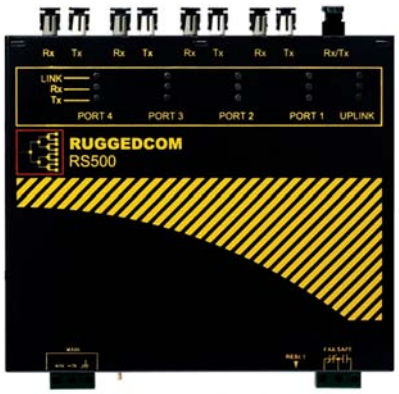
The **RuggedSwitch™ RS500** is an industrially hardened fiber optical Ethernet switch specifically designed to operate in harsh environments such as those found in electric utility substations and factory floors. The RS500 combines advanced Ethernet networking features with the immunity, reliability and security characteristics of fiber optical communications in a cost effective package.

The RS500 is specifically designed to meet the same EMI immunity and environmental requirements as mission critical protective relaying devices in accordance with the newly issued **IEC 61850-3 (2002)** and **IEEE 1613 (2003)** standards for communications and networking equipment in electric power utility substations. The reliability of the RuggedCom product families exceeds those of commercial devices by having no rotating mechanical parts (i.e. no cooling fans), utilizing high-temperature solid state components and incorporating the necessary transient and surge suppression circuitry required for substation and electrically harsh environments.



"SUBSTATION HARDENED"
with
Zero-Packet-Loss™
TECHNOLOGY

DESIGNED FOR HARSH ENVIRONMENTS

ADDRESSES SUBSTATION EMI AND ENVIRONMENTAL REQUIREMENTS VIA "*ZERO - PACKET - LOSS™*" TECHNOLOGY!

- Exceeds the new IEC 61850 - 3 (2002) standard for networks in substations.
- Meets the new IEEE 1613 (2003) standard - qualifies as a class 2 "Error Free" Networking Device.

EXTENDED OPERATING TEMPERATURE RANGE: -40 TO 85°C!

- No rotating mechanical parts (i.e No Fans!) ensuring the highest reliability.

WIDE POWER SUPPLY OPTIONS:

- 24Vdc, 48Vdc, HI=(88Vdc - 150Vdc).

FAILSAFE OUTPUT RELAY:

- For critical failure or error alarming.

SOLID METAL ENCLOSURE:

- 18 Gauge Galvanized Steel.

ADVANCED NETWORKING FEATURES

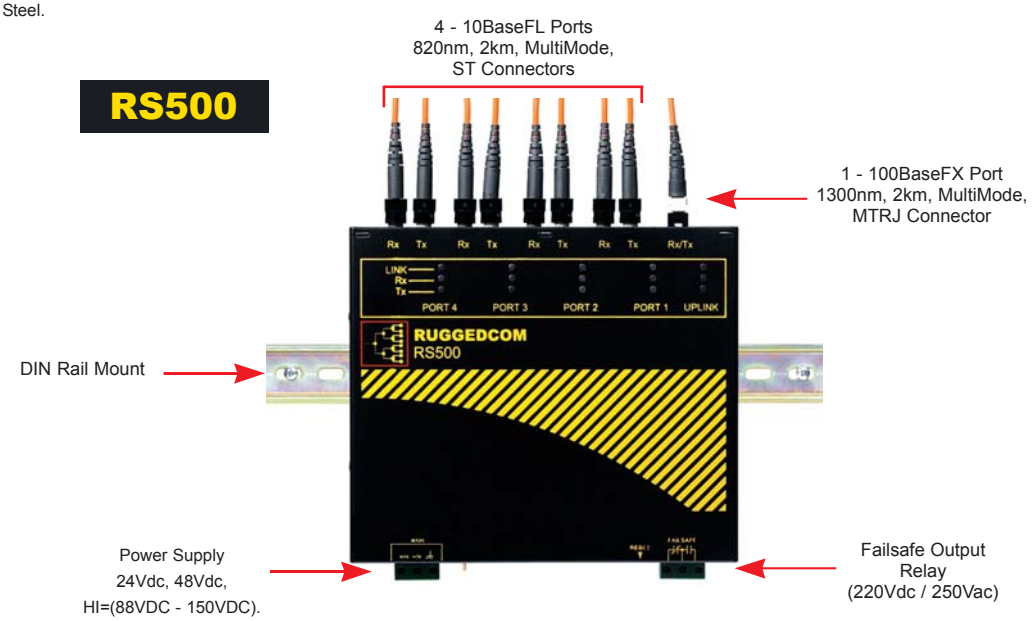
STANDARD:

- 4 -10BaseFL,1 - 100BaseFX.
- Optional SingleMode fiber optical Uplink port for distances of up to 15km.
- Pass thru mode allows 802.1Q VLAN and 802.1p Priority tagged messages.
- Store-and-forward switching mode.
- IEEE 802.3, IEEE 802.3u.
- Support for up to 4096 MAC addresses.
- Automatic address learning and aging.
- Full - Duplex operation.

COMPLIANCE:

- IEEE 802.3 (10Mbps Ethernet)
- IEEE 802.3u (Fast Ethernet 100Mbps)

RS500



Tel: (905) 856-5288 **Fax:** (905) 856-1995 **Toll:** 888-264-0006 **Email:** sales@ruggedcom.com **www.ruggedcom.com**

EMI AND ENVIRONMENTAL TYPE TESTS

IEC 61850-3 EMI TYPE TESTS				
TEST	***Description***		***Test Levels***	***Severity Levels***
IEC 61000-4-2	ESD	Enclosure Contact	+/- 8kV	4
		Enclosure Air	+/- 15kV	4
IEC 61000-4-3	Radiated RFI	Enclosure ports	20 V/m	x
IEC 61000-4-4	Burst (Fast Transient)	Signal ports	+/- 4kV @ 2.5kHz	x
		D.C. Power ports	+/- 4kV	4
		A.C. Power ports	+/- 4kV	4
		Earth ground ports [1]	+/- 4kV	4
IEC 61000-4-5	Surge	Signal ports	+/- 4kV line-to-earth, +/- 2kV line-to-line	4
		D.C. Power ports	+/- 2kV line-to-earth, +/- 2kV line-to-line	3
		A.C. Power ports	+/- 4kV line-to-earth, +/- 2kV line-to-line	4
IEC 61000-4-6	Induced (Conducted) RFI	Signal ports	10V	3
		D.C Power ports	10V	3
		A.C. Power ports	10V	3
		Earth ground ports [1]	10V	3
IEC 61000-4-8	Magnetic Field	Enclosure ports	40 A/m continuous, 1000 A/m for 1s	N/A
IEC 61000-4-29	Voltage Dips & Interrupts	D.C. Power ports	30% for 0.1s, 60% for 0.1s, 100% for 0.05s	N/A
		A.C. Power ports	30% for 1 period, 60% for 50 periods	N/A
IEC 61000-4-11			100% for 5 periods, 100% for 50 periods	N/A
IEC 61000-4-12	Damped Oscillatory	Signal ports	2.5kV common, 1kV diff. mode@1MHz	3
		D.C. Power ports	2.5kV common, 1kV diff. mode@1MHz	3
		A.C. Power ports	2.5kV common, 1kV diff. mode@1MHz	3
IEC 61000-4-16	Mains Frequency Voltage	Signal ports	30V Continous, 300V for 1s	4
		D.C. Power ports	30V Continous, 300V for 1s	4
IEC 61000-4-17	Ripple on D.C. Power Supply	D.C. Power ports	10%	3
IEC 60255-5	Dielectric Strength	Signal ports	2kVAC (Fail-Safe Relay output)	N/A
		D.C. Power ports	2kVAC	N/A
		A.C. Power ports	2kVAC	N/A
IEC 60255-5	H.V. Impulse	Signal ports	5kV (Fail-Safe Relay output)	N/A
		D.C. Power ports	5kV	N/A
		A.C. Power ports	5kV	N/A

IEEE 1613 (C37.90.x) EMI IMMUNITY TYPE TESTS				
Test	***Description***		***Test Levels***	***Severity Levels***
IEEE C37.90.3	ESD	Enclosure Contact	+/- 8kV	N/A
		Enclosure Air	+/- 15kV	N/A
IEEE C37.90.2	Radiated RFI	Enclosure ports	35 V/m	N/A
IEEE C37.90.1	Fast Transient	Signal ports	+/- 4kV @ 2.5kHz	N/A
		D.C. Power ports	+/- 4kV	N/A
		A.C. Power ports	+/- 4kV	N/A
		Earth ground ports [1]	+/- 4kV	N/A
IEEE C37.90.1	Oscillatory	Signal ports	2.5kV common mode @1MHz	N/A
		D.C. Power ports	2.5kV common, 1kV diff. mode@1MHz	N/A
		A.C. Power ports	2.5kV common, 1kV diff. mode@1MHz	N/A
IEEE C37.90	Dielectric Strength	Signal ports	2kVAC	N/A
		D.C. Power ports	2kVAC	N/A
		A.C. Power ports	2kVAC	N/A

Environmental Type Tests				
Test	**Description**		**Test Levels**	**Severity Levels**
IEC 60068-2-1	Cold Temperature	Test Ad	-40°C, 16 Hours	N/A
IEC 60068-2-2	Dry Heat	Test Bd	+85°C, 16 Hours	N/A
IEC 60068-2-30	Humidity (Damp Heat, Cyclic)	Test Db	95% (non-condensing), 55°C , 6 cycles	N/A
IEC 60255-21-1	Vibration	Tests Fc	2g @ (10 - 150) Hz	Class 2 [1]
IEC 60255-21-2	Shock	Tests Ea	30g @ 11mS	Class 2 [1]

Notes:
1. Only applicable to functional earth connections separated from the safety earth connection.
2. Class 2 refers to "Measuring relays and protection equipment for which a very high security margin is required or where the vibration levels are very high,
5. (e.g. shipboard application and for severe transportation conditions")

POWER SUPPLY

- Power Consumption: 5W (max)
- 24VDC: 10-36VDC (max)
- 48VDC: 36-59VDC (max)
- HI=(88-150Vdc)

PHYSICAL

- Height: 3.86"
- Width: 2.07"
- Depth: 3.55"
- Weight: 1.5lbs (0.68kg)
- Ingress Protection: IP40 (1mm objects)
- Enclosure: 18 AWG galvanized steel enclosure
- Mounting: DIN rail

EMI IMMUNITY AND ENVIRONMENTAL COMPLIANCE

- IEC 61000-6-2 Industrial (Generic)
- IEC 61800-3 Industrial (Variable Speed Drive Systems)
- IEC 61850-3 Electric Utility Substations
- IEEE 1613 Electric Utility Substations
- NEMA TS 2 Traffic Control Equipment

IEEE COMPLIANCE

- 802.3-10BaseT
- 802.3u-100BaseTX, 100BaseFX
- 803.x-Flow Control

APPROVALS

- ISO: Designed and manufactured using a ISO9001: 2000 certified quality program
- CE Marking
- Emissions: FCC Part 15 (Class A), EN55022 (CISPR22 Class A)
- Safety: cCSAus (Compliant with CSA C22.2 No. 60950, UL 60950, EN60950)
- Laser Eye Safety (FDA/CDRH): Complies with 21 CFR Chapter1, Subchapter J.

WARRANTY

- 5 Years-Applicable to design or manufacturing related product defects.

Fiber Optical Specifications				
Parameter	**Fiber Port Type**			
Speed	10BaseFL	100BaseFX		
Mode	Multimode	Singlemode		
Connectors	MTRJ	LC		
Typical Dist. (km)	2	20	50	90
Optical Wavelength (nm)	1310	1310		
Cable Size Core/Cladding (um)	50 or 62.5/125	8 or 9/125		
Tx Power (dBm)	-15.7	-15.5	-2.5	2.5
Rx Sensitivity (dBm)	-33.5	-32	-37	-39
Typical Budget	17	16.5	34.5	41.5
Longer segment lengths dependent on fiber specifications. Consult factory for further detials.				

ORDER CODES

RS500 - __ - __
PS - FO

PS: (POWER SUPPLY)

- (24) Input Range: 10VDC-36VDC (max)
- (48) Input Range: 36VDC-59VDC (max)
- HI=(88-150Vdc)

FO: (FIBER OPTIONS FOR UPLINK PORT)

- MM = 1300nm, MM, 2km via SFF MTRJ connectors
- SM = 1310nm, SM, 15km via SFF LC connectors

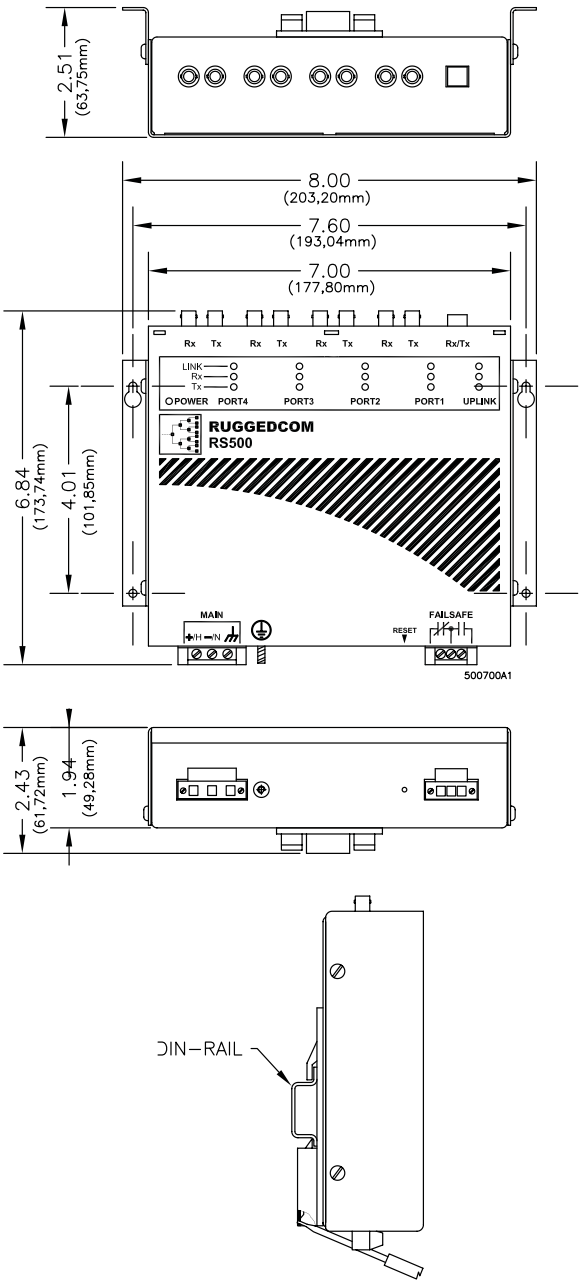
VALID ORDER CODE EXAMPLES

- RS500-24-MM
- RS500-48-MM
- RS500-HI-SM

*MM= MultiMode
*SM= SingleMode

MOUNTING OPTIONS:

Standard Unit for DIN rail mounting use
For Panel mounting, order P/N 14-50-0005



For additional information on our products and services, please visit our website at: www.ruggedcom.com

RuggedCom Inc.
30 Whitmore Road
Woodbridge, Ontario, Canada L4L 7Z4
Tel: (905) 856-5288 **Fax:** (905) 856-1995
Toll Free: (888) 264-0006
Technical Support Center: (866) 922-7975 or (954) 922-7975

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