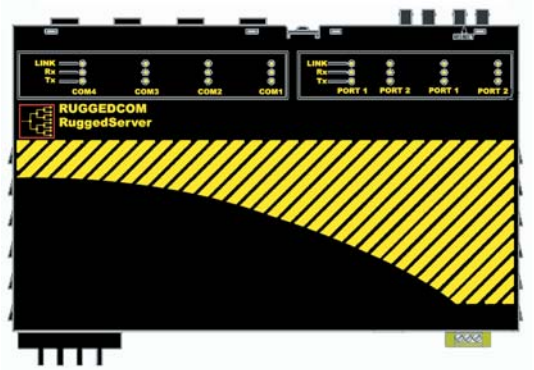
RuggedServer™ - RS400

The **RuggedServer™ RS400** is an industrially hardened multi-port Serial - to - Ethernet server specifically designed to operate in harsh environments such as those found in electric utility substations and factory floors. The RS400 provides industrial strength Ethernet networking capability allowing legacy serial devices to connect to the high speed Ethernet networks at 10Mbps or 100Mbps via copper or fiber. The RuggedServer™ provides four isolated (2kV) serial ports of RS232 or RS485 plus an integrated 4 port Ethernet switch and an optional V.90 Modem for remote connectivity.

The RS400 is specifically designed to meet the same EMI immunity and environmental requirements as mission critical protective realying 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 as well as **NEMA TS 2 (1998)** EMI and environmental requirments for traffic control equipment. 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.



"INDUSTRIALLY HARDENED"

DESIGNED FOR HARSH ENVIRONMENTS

ADDRESSES SUBSTATION EMI AND ENVIRONMENTAL REQUIREMENTS:

- Exceeds the new IEC 61850 - 3 (2002) standard for networks in substations.
- Meets the new IEEE 1613 (2003) standard.
- Meets NEMA TS 2 (1998) Environmental Requirements for traffic control equipment.

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 - 300Vdc / 85Vac - 264Vac).

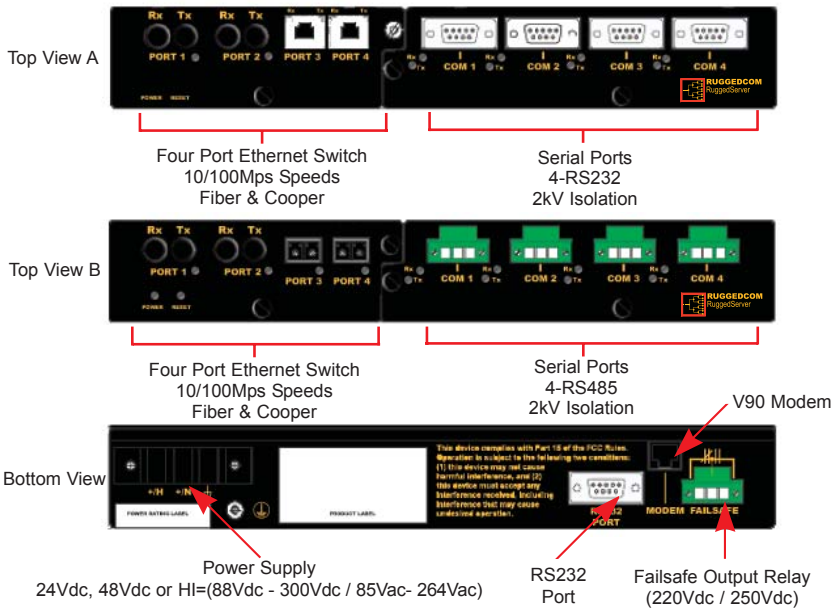
FAILSAFE OUTPUT RELAY:

- For critical failure or error alarming.

SOLID METAL ENCLOSURE:

- 18 Gauge Galvanized Steel.

RS400



ADVANCED NETWORKING FEATURES

STANDARD:

- MultiProtocol Support: i.e. Modbus TCP, TCP/IP, UDP, Telnet & RTelnet
- Multi-master' capability - RS400 co-ordinates shared access.
- Each serial port configurable as master or slave.
- Connection to COM-port based applications via port 'redirector' PC software.
- Flexible configuration via RS232, Telnet.
- Built-in statistics, packet capture, and Modbus 'ping' equivalent to aid trouble-shooting.
- 'Smart' Modbus end-of-packet detection for devices that violate 3.5 character timeout.
- Field upgradeable firmware for future enhancements.

SERIAL PORTS:

- 4 - Ports of RS232 via DB9 Connector.
- 4 - Ports of RS485 via 3 POS. screw terminals.
- EMI and Transient Immunity as per IEC 61850 - 3 and IEEE C37.90.x standard.
- 2kV of Galvanic Isolation per port.
- (300bps - 230Kbps) baud rates.

ETHERNET PORTS:

- Built - in - 4 - Port Ethernet switching hub.
- IEEE 802.3 (Ethernet) and IEEE 802.3u (Fast Ethernet).
- Support for copper and fiber optical media.
- Full - Duplex (IEEE 802.3x) operation on all ports (no collisions!).
- EMI and Transient Immunity as per IEC 61850-3 and IEEE C37.90.x standard.
- Support for up to 4096 MAC Addresses.
- Automatic Address Learning & Aging.

MODEM PORT(S):

- Optional V.90 (56Kbps) Modem.
- EMI and Transient Immunity as per IEC 61850 - 3 and IEEE C37.90.x standard.

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Technical Specifications

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[3]	+/- 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, +/- 1kV 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[3]	10V	3
IEC 61000-4-8	Magnetic Field	Enclosure ports	40 A/m continuous, 1000 A/m for 1 s	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 50 periods, 100% for 50 periods [2]	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	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 P1613 (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 ports3	+/- 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	N/A
IEC 60068-2-2	Dry Heat	Test Bd	+85˚C	N/A
IEC 60068-2-30	Humidity (Damp Heat, Cyclic)	Test Db	95% (non-condensing), 55˚C,6cycles	N/A
IEC 60255-22-1	Vibration	Tests Fc	2g @ (10-150)Hz	Class 2
IEC 60255-22-2	Shock	Tests Ea	30g @ 11ms	Class 2
IEC 60255-22-2	Bump	Tests Eb	20g @ 16ms	Class 2

NETWORKING SPECIFICATIONS			
Parameter	**10Mbps Ports**	**100Mbps Ports**	**Notes**
Latency	16us + frame time	5us + frame time	
Filtering Rate	14 880	148 800	Frames/sec
MAC Address Table	1000		

NETWORKING SPECIFICATIONS					
Parameter	**10Mbps Ports**		**100Mbps Ports**		
Speed Standard	10BaseFL	10BaseT	100BaseFX		100BaseTX
			MM	SM	
Connector Type	ST	RJ45	MTRJ	LC	RJ45
Segment Length	2km	100m	2km +	15km +	100m
Optical Wavelength	820nm		1300nm	1310nm	
Cable Size/Core Cladding	62.5/125µm		62.5/125µm	9/125µm	

NOTE: Longer segment length dependent on fiber specifications. Consult factory for further details.

POWER SUPPLY OPTIONS

(24) 24Vdc:
Input Range: 18Vdc to 36Vdc (max)

(48) 48Vdc:
Input Range: 36Vdc to 75Vdc (max)

(HI) 125/250Vdc or 110/230Vac:
Input Range: HI = (88Vdc - 300Vdc / 85Vac - 264Vac) (max)

PHYSICAL DIMENSIONS

DIMENSIONS (L X W X H)
11.47 x 7.96 x 1.74 inches
(291.34 x 202.18 x 44.20 mm)

WEIGHT
6lbs (2.7 Kg)

ENCLOSURE
18 Gauge Galvanized Steel

WARRANTY

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

For details visit www.ruggedcom.com - see "Rugged-Warranty"

APPROVALS

ISO: Manufactured in an ISO9001 facility
Safety: CSA C22.2 No. 60950, UL 60950, EN 60950, IEC 6950.
Emissions: FCC Part 15, Class A, EN 55022 (CISPR22 Class A)
CE Marking

ORDER CODESRS

RS400 - __ - __ - __ - __
PS - EP - SP - MP

PS (Power Supply Rating)
24 = 24Vdc
48 = 48Vdc
HI = (88Vdc - 300Vdc / 85Vac - 264Vac)

EP (Ethernet Port Options)
TX= 4 - 10/100BaseTX

FLM = 2 - 10/100BaseTX, 2 - 10BaseFL, 820nm, MM Fibre, 2km via ST connector

C2C2 = 2-10/100BaseTX , 2-100FX 1300nm, SM Fiber, 20km via SC connector

FXM = 2 - 10/100BaseTX, 2 -100BaseFX 1300nm, MM Fiber, 2km via MTRJ connector

FXS = 2 - 10/100BaseTX, 2 -100BaseFX 1310nm, SM Fiber, 15km via LC connector

SP (Serial Port Options)
2= 4-RS232 via DB9
4= 4-RS485 via 3 POS screw terminals.

MP (Modem Port Options)
Blank = No Modem
M = v90 (56Kbps) Modem

*MM= MultiMode *SM= SingleMode