



RFL3200 UK-10, Ten Port Unmanaged Ethernet Switch User Guide

Table of Contents

1. Warranty Information.....	2
2. Overview – Key Features.....	3
3. Safety Instructions	4
4. Installing the 3200 UK-10.....	6
5. Power and Ethernet Connections.....	9
6. Operating the Unit.....	12
7. Standards, Specifications and Compliances.....	14
8. Ordering Information.....	15

Important: The RFL 3200 UK-10 Unmanaged Ethernet Switch contains no user serviceable parts. Attempted service by unauthorized personnel shall render all warranties null and void. If problems are experienced with this product please contact RFL using the contact information below for assistance.

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Trademark information:

“Ethernet” is a trademark of Xerox Corporation.

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1. Warranty Information

• **Warranty Statement**

The RFL3200 UK-10 Unmanaged Ethernet Switch comes with a three-year warranty from the date of shipment and is warranted against defects in material and workmanship for three years. During the warranty period RFL will repair or, at its option, replace components that prove to be defective at no cost to the customer, except the shipping cost of the failed assembly. All equipment returned to RFL Electronics Inc. must have an RMA (Return Material Authorization) number, obtained by calling the RFL Customer Service Department at 973.334.3100 or e-mail customerservice@rfect.com. A defective part should be returned to the factory, shipping charges prepaid, for repair or replacement FOB Boonton, N.J. RFL warrants product repair from three-years from the date of repair or the balance of the original factory warranty, whichever is longer.

This warranty does not apply if the equipment has been damaged by accident, neglect, misuse, or causes other than performed or authorized by RFL Electronics Inc.

This warranty specifically excludes damage incurred in shipment to or from RFL. In the event an item is received in damaged condition, the carrier should be notified immediately. All claims for such damage should be filed with the carrier.

NOTE

If you do not intend to use the product immediately, it is recommended that it be opened immediately after receiving and inspected for proper operation and signs of impact damage.

This warranty is in lieu of all other warranties, whether expressed, implied or statutory, including but not limited to implied warranties of merchantability and fitness for a particular purpose. In no event shall RFL be liable, whether in contract, in tort, or on any other basis, for any damages sustained by the customer or any other person arising from or related to loss of use, failure or interruption in the operation of any products, or delay in maintenance or for incidental, consequential, indirect or special damages or liabilities, or for loss of business or other financial loss arising out of or in connection with the sale, lease, maintenance, use, performance, failure or interruption of the products.

• **FCC Statement**

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

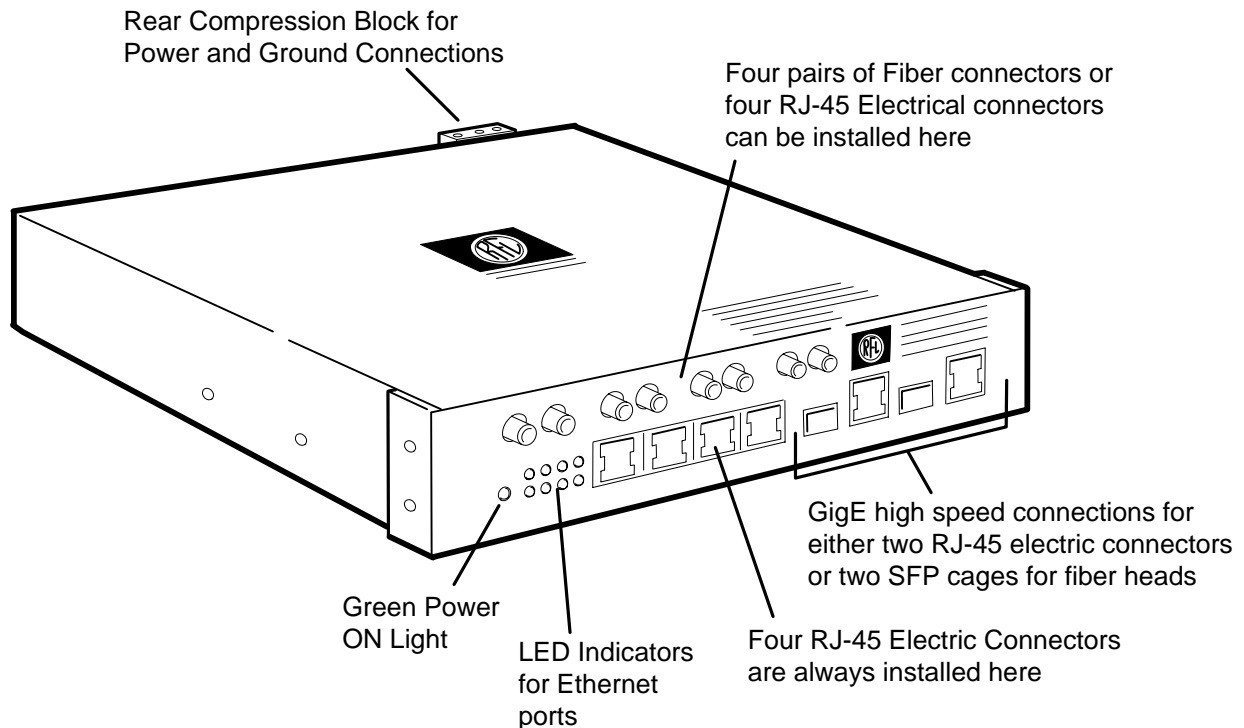
NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

2. Overview – Key Features

Designed to operate in harsh substation environments, the RFL 3200 UK-10 Unmanaged Ethernet Switch provides eight 10/100 Base TX RJ-45 electrical ports and two 10/100/1000 Base TX RJ-45 electrical ports with parallel SFP cages. The SFP cages will allow LC fiber heads to be installed for 100 or 1000 Mb/s operation. Optionally four of the 10/100 RJ-45 ports can be provided with fiber heads. Each Ethernet port has LED indicators that show if the port is linked, whether there is activity and the data transfer speed. The RFL3200 carries a 3-year warranty.



The RFL3200 UK-10 Unmanaged Ethernet Switch features:

- Plug-and-play installation.
- Switching full and half-duplex support.
- Auto-negotiation and auto crossover on all ports.
- High performance non-blocking operation.
- Automatic learning and aging of up to 8192 MAC addresses.
- IEEE 802.3 compliant.

3. Safety Instructions



Keep Away from Live Circuits

Operating personnel should **never** remove covers. Component replacement and internal adjustments must be done by qualified RFL service personnel only.



Do not Operate in an Explosive Atmosphere or in Wet or Damp Areas

Do not operate the product in the presence of flammable gases or fumes, or in any area that is wet or damp. Operating any electrical equipment under these conditions can result in a definite safety hazard.



Do not Substitute Parts or Modify Equipment

There are no serviceable parts in the RFL3200 UK-10, do not install substitute parts or make unauthorized modifications to the equipment. The product may be returned to RFL for service and repair, to ensure that all safety features are maintained.



Read the User Guide

Operators should read this User Guide before attempting to use the equipment, to learn how to use the equipment properly and safely.

Throughout this User Guide, warnings appear before procedures that are potentially dangerous, and cautions appear before procedures that may result in equipment damage if not performed properly. The instructions contained in these warnings and cautions must be followed exactly.

Warning!

Follow all of your company's policies and procedures regarding the installation of AC powered or DC powered equipment. If there is a conflict between any procedure in this manual and your company's safety rules, then your company's safety rules must take priority.

Warning!

For DC operations and AC operations where neutral cannot be reliably identified, readily accessible double pole disconnects and overcurrent devices must be installed between the building wiring and the RFL3200 UK-10.

For AC operations where the neutral can be reliably identified, readily accessible single pole disconnects and overcurrent devices must be installed between the building wiring and the RFL3200 UK-10.



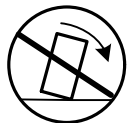
Warning!

The RFL 3200 UK-10 may use third party SFP Class 1 Laser Modules. These modules may be purchased through RFL or third parties. The class 1 certification originates with the SFP manufacturer, not RFL. Read the following safety information and any additional safety information included with the modules.

Class 1 Laser Products supplied by RFL are not considered dangerous and comply with the following standards:

US 21 CFR 1040.10 and 1040.11
IEC 60825-1: 2007

Laser light can potentially cause serious eye damage. The lasers used in the RFL 3200 UK-10 produce light that is invisible to the naked eye. It should be assumed that the laser is active at all times and it is imperative that the technician never look into the end of the fiber or the aperture with the naked eye or with optical instruments.



CAUTION

Any installation using an enclosed cabinet with a swing-out rack must be securely fastened to the floor. This will prevent the cabinet from falling forward when the rack is moved outward.

CAUTION

If your RFL3200 UK-10 has Optical Fiber Heads always replace the protective covers when the unit is not in use.

NOTICE

RFL products are not designed for safety critical direct control of nuclear reactors and should not be used as such.

4. Installing the 3200 UK-10

The RFL 3200 UK-10 is primarily designed for installation in a 1U rack, however it can also function in an office or lab environment un-mounted. Mounting ears (brackets) are provided for installation in a standard 19 inch rack. Optionally, DIN rail and wall mounting can be accommodated. If the RFL3200 UK-10 is to be stored for an extended period before being installed, precautions to prevent corrosion must be taken. This is especially important in humid climates.

After unpacking and inspecting the equipment for any shipping damage it should be securely mounted in its operating location. The various mounting options are listed below. Note RFL does not supply mounting hardware apart from the items listed. Other mounting options may be available, contact RFL at sales@rfelect.com

Application	Description
Standard 19" Rack Mounting	Mounting Brackets (2) and 4 screws for mounting the brackets to the RFL3200 UK-10.
DIN Rail Mounting	Adapter Kit installed under the unit.
Wall Mounting	Mounting Brackets (2) and 4 screws for mounting the brackets to the RFL3200 UK-10.

Ordering information can be found on [page 15](#) with a complete list of RFL3200 UK-10 options and their corresponding Smart Numbers.

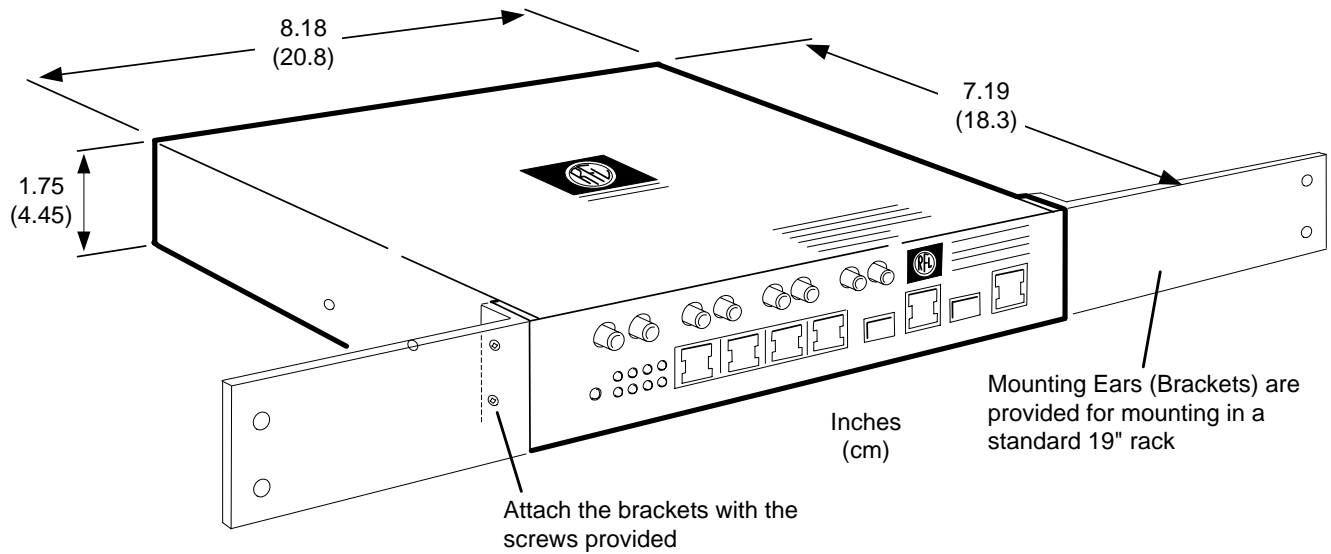
Standard Rack Mounted Applications

CAUTION

Any installation using an enclosed cabinet with a swing-out rack must be securely fastened to the floor. This will prevent the cabinet from falling forward when the rack is moved outward.

Space requirements are shown in the following illustration which depicts a typical 19" rack installation.

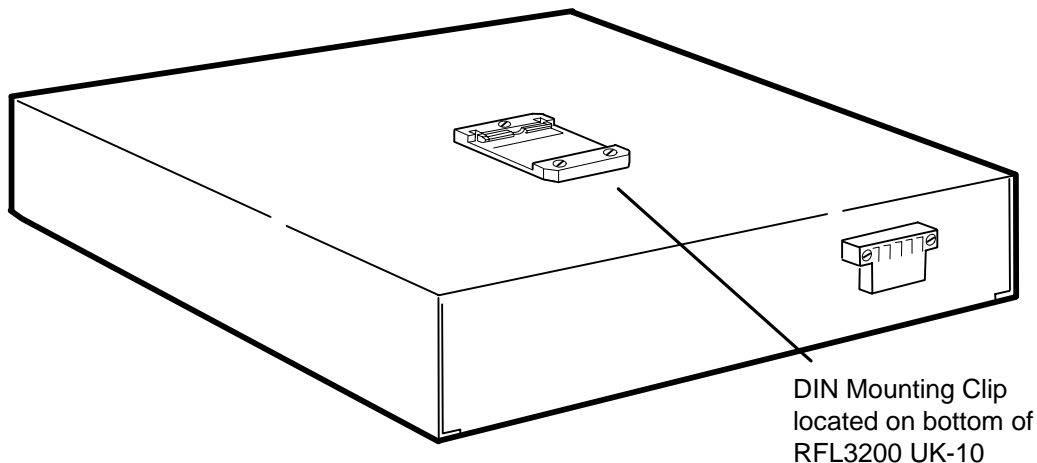
Mount the brackets to the RFL3200 UK-10 with the screws provided as shown below.



The specified operating temperature of the RFL3200 UK-10 is -30°C to $+75^{\circ}\text{C}$ (-22°F to $+167^{\circ}\text{F}$). Operation at higher temperatures may affect reliability and performance. Units installed in enclosed cabinets should be well ventilated. When operating at temperatures above 55°C (131°F) a full 1U of chassis space must be left open above the installed RFL3200 UK-10.

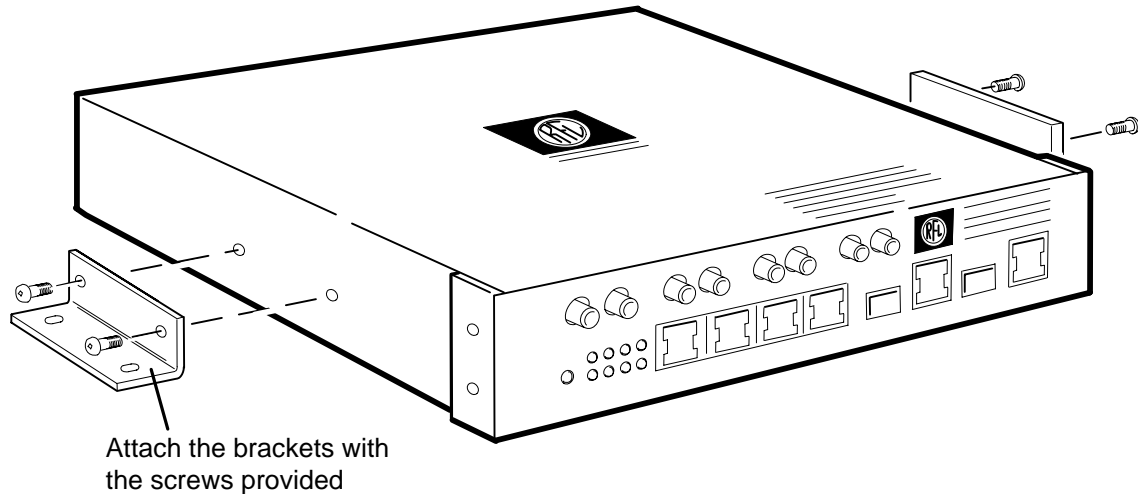
DIN Rail Installation

When installation in a metric DIN type rack or cabinet is required, RFL provides an adapter that is conveniently mounted under the unit as shown below. Carefully install onto the DIN rail and snap into place.



Wall Mounting

Brackets are provided for mounting the RFL3200 UK-10 to a wall as shown below.



Because of the many different wall materials available, RFL does not provide wall mounting hardware. It is the customer's responsibility to securely mount the RFL3200 UK-10 to the wall.

Mount the unit in the required location allowing enough space for convection cooling.

Un-mounted Unit

When installed in a lab or workplace setting ensure that there is an unobstructed view of the front of the unit for observation of the LED indicators. Keep an open area around the unit so that cooling by convection can occur while the RFL3200 UK-10 is in operation.

5. Power and Ethernet Connections

The following section describes how to connect power to the RFL3200 UK-10.

Before beginning the installation note the following:

- Before proceeding with the connection of power to the RFL3200 UK-10 ensure that the power wires to be installed are disconnected at their source.
- **Ensure that the power supply installed in your RFL3200 UK-10 will operate at the available input power.**
- Follow all of your company's policies and procedures regarding the installation of AC powered or DC powered equipment. If there is a conflict between any procedure in this Users Guide and your company's safety rules, then your company's safety rules must take priority.

Connecting Power

The RFL3200 UK-10 has a label located on the rear of the unit above the compression block that indicates which power supply was installed in the unit before leaving the factory.

Before proceeding with the power and ground wire installation check the power supply label to ensure that the unit will operate at the input voltage available.

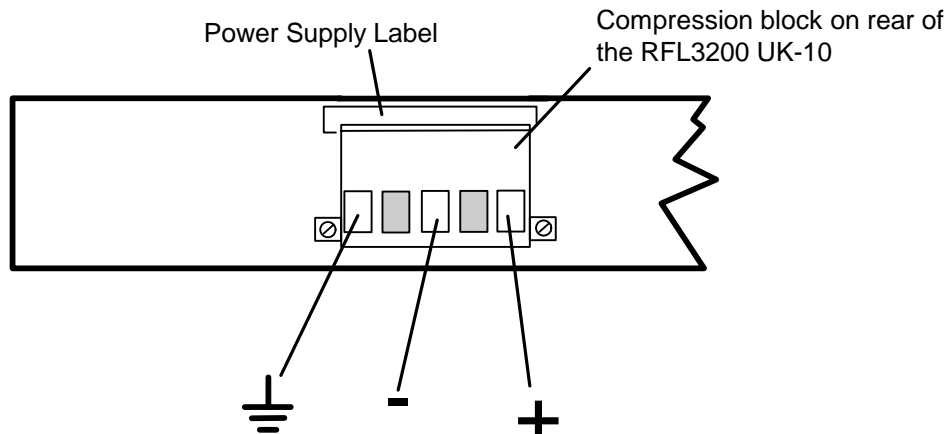
WARNING!

The RFL3200 UK-10 must be properly grounded as described on the following page before attempting to connect input power. Improper ground connections may result in system malfunctions, equipment damage, or electrical shock.

For DC operations and AC operations where neutral cannot be reliably identified, readily accessible double pole disconnects and overcurrent devices must be installed between the building wiring and the RFL3200 UK-10.

For AC operations where the neutral can be reliably identified, readily accessible single pole disconnects and overcurrent devices must be installed between the building wiring and the RFL3200 UK-10.

Power and ground connections are made to the compression block on the rear of the RFL3200 UK-10 as shown below.



1. Before proceeding with the connection of power to the RFL3200 UK-10 ensure that the power wires to be installed are disconnected at their source.
2. If the unit is installed in a traditional cabinet type location with a station battery supply, connect a ground wire to the rack ground; connection type and location will vary by installation. The grounding wire should be kept as short and straight as possible, to keep its resistance and inductance to a minimum.
3. Carefully remove the 3-pin compression block plug from its socket, being careful not to damage the pins.
4. The RFL3200 UK-10 is designed for permanently wired installation in restricted access locations only.

The RFL3200UK-10 contains fuses on both supply poles that are intended for replacement by qualified personnel only. The following fuses are recommended

19-32V	115V, 5x20 mm, 2 amp
38-150V	250V, 5x20 mm, 1 amp
200-300V	250V, 5x20 mm, 0.25 amp

5. Strip back and connect the positive and negative leads from the station battery to the positive and negative connections on the compression block. If an AC supply is used the negative and positive markings can be ignored. When installing power and protective earth connections, expose no more than 0.2” (5mm) of bare wire. Twist the wires to prevent strands from escaping and use care when inserting the wires into the connector. Inspect the wires prior to energizing to ensure no strands have escaped.
6. Reinstall the compression block into its socket.

Before connecting the power at its source, check the following:

1. Is the unit grounded correctly?
2. Is the polarity of the input power correct?
3. Have the power wires been inspected as described in step 5.
4. Is the unit ventilated correctly?

The RFL3200 UK-10 may now have power applied.

Ethernet Connections

Make the necessary LAN and WAN Ethernet connections as required. When installing fiber optic ST connectors, make sure the connectors are properly aligned before twisting to lock in place.

For Ethernet LED indicators see the next section.

Optical Connectors – Distance Options

LAN Ports 5 to 8 Fiber Heads if installed	RFL Smart Number Option and RFL Part Numbers	Wavelength/ Mode	Connector Type	RX Sensitivity	TX Power	System Gain	Typical Distance (3dB margin)
100 Base-FX	2	1310 nm Multimode	ST	-33.9 to -31dBm	-22.5 to -14dBm Average into 50µm fiber -19 to -14dBm Average into 62.5µm fiber	14dB ¹	2 km (1.2 mi)
WAN Ports 9 & 10 SFP Base Units, if installed, available options							
SFP-100 Base-FX	B (104358-1)	1310 nm Multimode	LC	-30dBm (max)	-15.7dBm (typical)	14dB	2 km (1.2 mi)
SFP-100 Base-LX	C (104358-2)	1310 nm Singlemode	LC	-31dBm (max)	-15 to -8dBm	20dB	10 km (6.2 mi)
SFP-100 Base-FX	D (104358-3)	1310 nm Singlemode	LC	-34 to -10dBm	-5 to 0dBm	19dB	40 km (24.8 mi)
SFP-100 Base-ZX	E (104358-4)	1550 nm Singlemode	LC	-34 to -10dBm	-5 to 0dBm	19dB	80 km (49.7)
SFP-1000 Base-SX	F (104359-1)	850 nm Multimode	LC	-19dBm (max)	-9.5 to -3dBm	13dB	550 m (1800 ft)
SFP-1000 Base-LX	G (104359-2)	1310 nm Singlemode	LC	-19dBm (max)	-9.5 to -3dBm	13dB	10 km (6.2 mi)
SFP-1000 Base-FX	H (104359-3)	1310 nm Singlemode	LC	-9 to -27dBm	-2 to 3dBm	17dB	40 km (24.8 mi)
SFP-1000 Base-ZX	I (104359-4)	1550 nm Singlemode	LC	-24dBm (max)	0 to 5dBm	21dB	80 km (49.7)

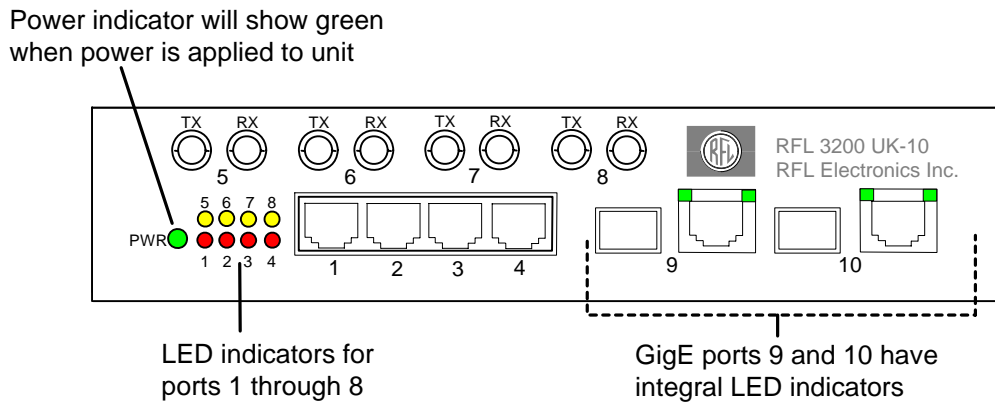
Notes: 1. For 50µm fiber.

CAUTION

If your RFL3200 UK-10 has Optical Fiber Heads installed, always reinstall the protective covers when the unit is not in use.

6. Operating the Unit

It is important to note the numbering convention of the Ethernet ports as shown below.



In the example shown, ports 5 through 8 have fiber heads installed. These ports can be ordered from the factory as RJ-45 Electrical Connectors.

LAN Ports 1 – 8 LED Indicators

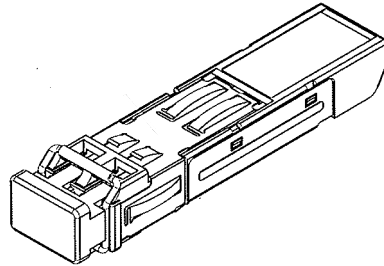
LED indicators **1 through 8** have two functions and will show the following:

- a. The state of the Ethernet connection and;
- b. The connection speed.

	LED Condition	Status
a.	LED ON	Port is linked and functioning
	LED Blinking	There is activity on the port
	LED OFF	There is NO connection on the port
b.	Color	Status
	Yellow	100 Mbps
	Red	10 Mbps

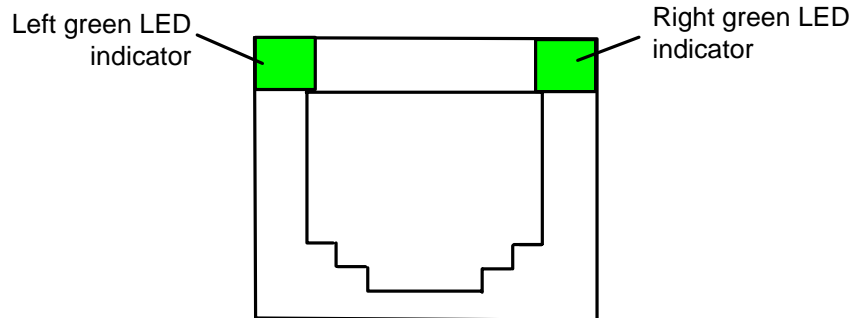
WAN GigE Ports 9 and 10 LED Indicators

When SFP Base Units are installed in the SFP cages at ports 9 and 10 the RJ-45 connectors are disabled.



SFP -100/1000 Base Unit (typical)

The integral LED indicators will continue to show status for the fiber heads however. The LED indicators are shown below.



LED indicators **9 and 10** have two functions and will show the following:

Left LED	Right LED	Status
Off	Off	There is no link on the port
Green	Off	1000 Mb/s link
Blinking green	Off	1000 Mb/s data transfer
Off	Green	100 Mb/s link
Off	Blinking green	100 Mb/s data transfer
Green	Green	10 Mb/s link
Blinking green	Blinking green	10 Mb/s data transfer

7. Standards, Specifications and Compliances

RFL 3200 UK-10 Environmental Compliances

IEC 61850-3
IEEE 1613

RFL 3200 UK-10 Agency Approvals

ISO 9001:	2000 certified.
CE Marking:	EMC, LVD.
Emissions:	FCC Part 15 (Part A). EN55022 (CISPR22 Class A).
Safety:	EN 60950-1.
Laser Eye Safety:	CDRH, Complies with 21 CFR Chapter 1, Subchapter J. IEC 60825-1 : 2007

Ethernet Port Specifications

802.3i	10 Base-T.
802.3u	100 Base-TX, 100 Base-FX.
802.3x	Duplex and Flow Control
802.3AB	1000 Base-T

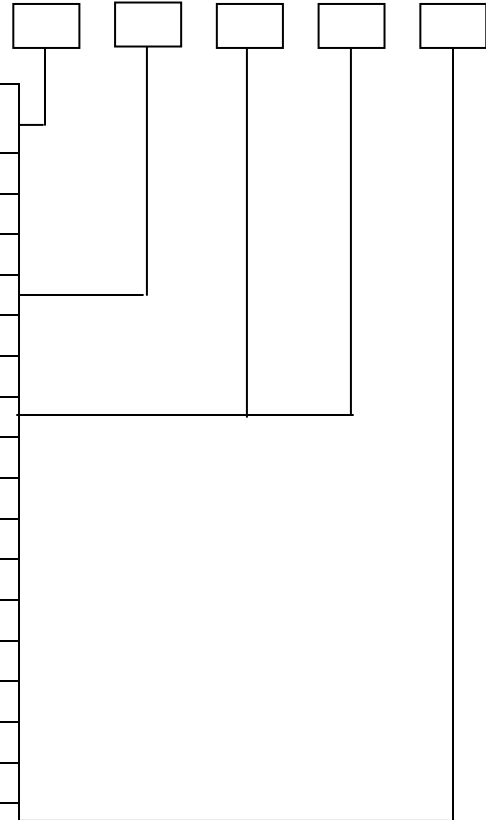
Power Supply Specifications

Supply Voltage:	19 – 32 Vdc. 38 – 150 Vdc / 96-132 Vac (50 or 60 Hz). 200 – 300 Vdc / 200 – 275 Vac (50 or 60 Hz).
Maximum Input Power:	15 W Continuous.
Operating Temperature:	-30° C (-22° F) to 75° C (167° F). Convection cooling only.
Operating Humidity:	90% RH Non Condensing @ 40° C (104° F).

8. Ordering Information

RFL 3200 Smart Number Description:

UK 10



Chassis with Main Board and Main Power Supply	Smart Number
24 Vdc w/Compression Block	1
38 – 150 Vdc /110 Vac w/Compression Block	2
200 - 300 Vdc/220 Vac w/Compression Block	3
10/100 Ethernet Switch LAN Ports (1 – 8)	
8 – RJ-45 10/100 Base TX	1
4 – Optical 100 Base FX MM ST, 4 – RJ-45 10/100 Base –TX	2
Ethernet Switch WAN Port 9 and 10 Option	
Electrical RJ-45 10/100/1000 Base TX	A
1 – SFP – 100 Base – FX, 1310nm, 2km/1.2mi MM LC Conn.	B
1 – SFP – 100 Base – LX, 1310nm, 10km/6.2mi SM LC Conn.	C
1 – SFP – 100 Base – FX, 1310nm, 40km/24.9mi SM LC Conn.	D
1 – SFP – 100 Base – ZX, 1550nm, 80km/49.7mi SM LC Conn.	E
1 – SFP – 1000 Base – SX, 850nm, 550m/1800ft MM LC Conn.	F
1 – SFP – 1000 Base – LX, 1310nm, 10km/6.2mi SM LC Conn.	G
1 – SFP – 1000 Base – FX, 1310nm, 40km/29.4mi SM LC Conn.	H
1 – SFP – 1000 Base – ZX, 1550nm, 80km/49.7mi SM LC Conn.	I
Mounting	
Wall Mount	1
19 Inch Rack	2
DIN Rail Mount	3

Customer Resource Center

The RFL Electronics Inc. "On-line Customer Resource Center" has been created to provide customers with "real-time" information necessary to keep RFL equipment operating optimally. The Resource Center contains Application Notes, Service Notices, Product Bulletins, Software Downloads, Software Upgrades, Technical Product Manuals and Sales Brochures, in a convenient and easy-to-use location on our web site. The Resource Center will be updated regularly, so the latest information is always at your fingertips. Registration is free, easy, and ensures your access to the Resource Center at any time. To register please use the link provided on this page.

Once registered at the "Customer Resource Center", RFL will automatically notify you via e-mail when new products are released, or when downloadable documents are available for the categories you have selected. RFL will alert you with important Service Notices that could improve the performance of your product or make you aware of special considerations when applying RFL products in certain applications.

[RFL Members Area](#)

Disposal

When disposing of the equipment, it should be done in strict accordance with all local and national regulations for the disposal of electrical and electronic equipment. The printed circuit boards should be separated for recycling.

Rev.	Description	Date	Approval
Beta	New Document Release (No ECO release)	6-16-09	TG
Beta	Second revision (No ECO release)	9-18-09	TG
11-17-09	Changes to Safety Instructions and Power connections. Marketing review. Add Smart Numbers. Initial ECO Release.	11-17-09	TG

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