



EXCLUSIVE



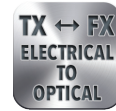
SUBSTATION



CLASS 1 DIV 2



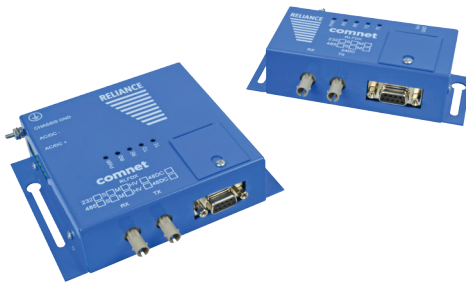
-40° to 85° C



CONVERTER



1



The ComNet RLFDX series of serial data link/repeaters are substation-rated and industrially hardened form, fit, function and completely backwards-compatible replacements for the popular Garrettcom/Dymec 5843, 5844, 5845, and 5846-series of serial data link/repeaters. They are designed for deployment in environments where high levels of electromagnetic noise and interference (EMI) and severe voltage transients and surges are routinely encountered, such as electrical utility substations and switchyards, heavy manufacturing facilities, trackside and roadside electronic equipment, and other difficult out-of-plant applications. Optical connectivity provides significantly extended transmission distances compared to copper media; high levels of electrical isolation; enhanced reliability and protection for peripheral IEDs, RTUs, and other equipment; and operational safety.

The RLFDX series of serial data link/repeaters are easily field-configurable for point-to-point, point-to-multipoint/master-slave, loop, or bus topologies. They may be also used for electrical data protocol conversion: an RLFDX232 RS-232 modem and IED/RTU can communicate directly with an RLFDX485 RS-422/RS-485 modem and IED/RTU.

The extremely versatile and simple-to-install RLFDX series is ideal for any mission-critical application where very high levels of reliability and network availability are of the utmost importance.

## FEATURES

- › Fully electrically, mechanically, and optically identical to and backward-compatible with the Garrettcom/Dymec 5843, 5844, 5845, and 5846 Series. A ComNet RLFDX may directly replace a Dymec unit anywhere within the network.
- › Full-duplex, half-duplex, or simplex transmission of RS-232, RS-422, RS-485 2/4-wire data, or TTL logic
- › Tested and certified to meet or exceed the requirements of IEEE 1613 Class 2 for electrical utility substations
- › RS-232 Version: DTE/DCE switching
- › Diagnostic test mode feature tests the copper and optical connections before the connected IED or RTU is active within the network.
- › Extended ambient operating temperature range of -40° to +85° C, with no fan/forced air cooling, for use in virtually any environment
- › Optical transmission distances of up to 5 km over multimode fiber; 30 km over single-mode fiber
- › +9 to 36 VDC, +/-36 to 59 VDC, or HV AC/DC (+/-88 to 300 VDC/85-264 VAC) operating power options. HV DC input permits operation directly from station battery bus power. 48 VDC and HV models' DC inputs are isolated from ground, allowing operation from positive or negative DC sources.
- › Internal/self-contained high-reliability power supply - a screw terminal block connects directly to the power source for permanent, reliable, and maintenance-free operation
- › LED status indicators confirm operating status
- › Rugged galvanized and powder-coated panel-mount enclosure

- › IP-30 rated for ingress protection (2.5 mm objects)
- › Conformal coating of the circuit boards is optionally available, for use in humidity with condensation conditions (extra charge, see ordering information).
- › Made in the USA
- › Lifetime Warranty

## APPLICATIONS

- › Electrical substation automation & SCADA networks, protective relaying systems
- › Power transmission & distribution systems, remote wind farm, hydroelectric, and solar/photovoltaic power generation facilities, and other electrical utility-specific applications
- › Controlled access to electrical substations and power generating facilities, and other high-value, mission-critical sites
- › Industrial/Factory Automation & Process Control SCADA Networks
- › Chemical and petrochemical refining and processing facilities, oil and gas pipelines/transmission systems, and mining installations
- › Food processing operations
- › Wastewater treatment plants
- › Railway/trackside control and monitoring systems
- › ITS/Transportation traffic signalization networks
- › Integrated data transmission networks

SPECIFICATIONS (RS232 Models)

Data

Data Rate	DC to 250 kbps
Data Transmission	Asynchronous, simplex OR Full Duplex
Bit Error Rate	10-E9 Max.
Point to Point Latency	4 μS
Repeat Latency	400 nsec Max.

Fiber Optical Parameters

(At Maximum Operating Temperature)

Optical Budget Typical	Multimode: 19.5dB Single Mode: 19dB
Output Power Typical	Multimode: -10.5 dBm peak Singlemode: -14.5 dBm peak
Receiver Sensitivity Typical	Multimode: -30 dBm peak (62.5 μ/125) Single Mode: -33.5 dBm peak (9 μ/125)
Wavelength	Multimode: 850 nm Single Mode: 1310 nm
Transmission Distance	Multimode: Up to 5 km (62.5 μ/125 Cable @ 3 dB/km) Single Mode: Up to 30 km (9 μ/125 Cable @ 0.5 dB/km)
Compatible Fiber Type	Multimode: 50-200 μm Single Mode: 9 to 13 μm

Configuration Switches

- DTE/DCE
- AC/DC Coupled
- Link/Repeat
- Pin 8 Drive Current
- Pin 6 +5 VDC (DSR or CTS pull up)
- Diagnostic Mode

Connectors

Optical	ST
Data	DB-9 (9 Pin D-Type Female)
Power	Removable, 3-pin Screw Terminal Block

Electrical Parameters

Inputs	
I/O Data Format	EIA RS232; CCITT v.24
Input Impedance	>3000 Ω
Input Voltage	+/-30 Volts Max.
Outputs	
Output Impedance	>300 Ω
Driver Output	+/- Volts into 3000 Ω
Pin 8 Output	0 to 5 V 67 or 207 Ω Source Impedance

Power Required

24 VDC	Multimode: +9 to 36 VDC @ 250 mA (3W) Single Mode: +9 to 36 VDC @ 340 mA (4.1 W)
48 VDC	Multimode: +/-36 to 59 VDC @ 250 mA (4W) Single Mode: +/-36 to 59 VDC @ 340 mA (5.5 W)
HV	Multimode: +/-88 to 300 VDC @ 35 mA (4 W) or 85 to 264 VAC @ 35 mA (4 W) Single Mode: +/-88 to 300 VDC @ 50 mA (5.5 W) or 85 to 264 VAC @ 50mA (5.5 W)

Power Dissipation BTU/H

24 VDC	Multimode: 8.2 BTU/hr Single Mode: 10.2 BTU/hr
HV & 48 VDC	Multimode: 10.9 BTU/hr Single Mode: 12.3 BTU/hr

Mechanical

Indicating LEDs	Power Transmit Fiber Transmit Electrical Receive Fiber Receive Electrical
Circuit Board	Meets IPC Standard
Actual Weight	HV & 48 VDC: 1.06 lb / 0.48 kg 24 VDC: 0.56 lb / 0.26 kg
Dimensions (W × L × H)	
HV & 48 VDC:	4.1 × 5.1 × 1.3 in (10.41 × 12.95 × 3.3 cm)
24 VDC:	2.0 × 5.1 × 1.3 in (5.08 × 12.95 × 3.3 cm)

Environmental

MTBF	>250,000 hours
Operating Temperature	Multimode: -40°C to +85°C Single Mode: -40°C to +70°C
Storage Temperature	-40°C to 85°C
Relative Humidity	0% to 95% (non-condensing) <sup>1</sup>

ORDERING INFORMATION (RS-232/TTL Models)

Model	Data Format	Fiber Type	Input Power	Equivalent Dymec Model
RLFDX232M2/24DC	RS-232/TTL	Multimode	9 to 36 VDC	5843HRT
RLFDX232M2/HV	RS-232/TTL	Multimode	88 to 300 VDC / 85 to 264 VAC	5844HRT-H
RLFDX232M2/48DC	RS-232/TTL	Multimode	36 to 59 VDC	5844HRT-L
RLFDX232S2/24DC	RS-232/TTL	Single Mode	9 to 36 VDC	5843SHRT
RLFDX232S2/HV	RS-232/TTL	Single Mode	88 to 300 VDC / 85 to 264 VAC	5844SHRT-H
RLFDX232S2/48DC	RS-232/TTL	Single Mode	36 to 59 VDC	5844SHRT-L
Options	[1] Add suffix 'C' for Conformally Coated Circuit Boards to extend to condensation conditions (Extra charge, consult factory)			

NOTE: This product requires a fiber installation with a minimum 30 dB connector return loss. The use of Super Polish Connectors is recommended. Complies with FDA Performance Standard for Laser Products, Title 21, Code of Federal Regulations, Subchapter J  
In a continuing effort to improve and advance technology, product specifications are subject to change without notice.

## SPECIFICATIONS (RS422/485 Models)

### Data

Data Rate	DC to 2 Mbps
Data Transmission	Asynchronous, simplex OR Full Duplex
Bit Error Rate	10-E9 Max.
Point to Point Latency	500 nsec Max.
Repeat Latency	400 nsec Max.

### Fiber Optical Parameters

(At Maximum Operating Temperature)

Optical Budget Typical	Multimode: 19.5 dB Single Mode: 19 dB
Output Power Typical	Multimode: -10.5 dBm peak Single Mode: -14.5 dBm peak
Receiver Sensitivity Typical	Multimode: -30 dBm peak (62.5 μ/125) Single Mode: -33.5 dBm peak (9 μ/125)
Wavelength	Multimode: 850 nm Single Mode: 1310 nm
Compatible Fiber Type	Multimode: 50-200 μm Single Mode: 9-13 μm
Transmission Distance	Multimode: Up to 5 km (62.5 μ/125 Cable @ 3 dB/km) Single Mode: Up to 30 km (9 μ/125 Cable @ 0.5 dB/km)
Configuration Switches	Half/Full Duplex AC/DC Link/Repeat Biasing Resistors In/Out Data Inversion Mode Enable Holdover (4 settings) Diagnostic Mode

### Connectors

Optical	ST
Data	DB-9 (9 Pin D-Type Female)
Power	Removable, 3-pin Screw Terminal Block

### Electrical Parameters

Inputs	
I/O Data Format	EIA 422/485
Input Impedance	750 Ω
Input Voltage	+12 to -7 Volts Max referenced to signal common +/-6 Volts differential Max
Outputs	
Output Impedance	>250 Ω
Driver Output	50 mA

### Power Required

24 VDC	Multimode: +9 to 36 VDC @ 250 mA (3 W) Single Mode: +9 to 36 VDC @ 340 mA (4.1 W)
48 VDC	Multimode: +/-36 to 59 VDC @ 250 mA (4 W) Single Mode: +/-36 to 59 VDC @ 340 mA (5.5 W)
HV	Multimode: +/-88 to 300 VDC @ 35 mA (4 W) or 85 to 264 VAC @ 35 mA (4 W) Single Mode: +/-88 to 300 VDC @ 35 mA (5.5 W) or 85 to 264 VAC @ 50mA (5.5 W)

### Power Dissipation BTU/H

24 VDC	Multimode: 10 BTU/hr Single Mode: 14 BTU/hr
HV & 48 VDC	Multimode: 20 BTU/hr Single Mode: 27 BTU/hr

### Mechanical

Indicating LEDs	Power Transmit Fiber Transmit Electrical Receive Fiber Receive Electrical
Circuit Board	Meets IPC Standard
Actual Weight	HV & 48 VDC: 1.06 lb / 0.48 kg 24 VDC: 0.56 lb / 0.26 kg
Dimensions (W × L × H)	
HV & 48 VDC:	4.1 × 5.1 × 1.3 in (10.41 × 12.95 × 3.3 cm)
24 VDC:	2.0 × 5.1 × 1.3 in (5.08 × 12.95 × 3.3 cm)

### Environmental

MTBF	>250,000 hours
Operating Temperature	Multimode: -40°C to +85°C Single Mode: -40°C to +70°C
Storage Temperature	-40°C to 85°C
Relative Humidity	0% to 95% (non-condensing) <sup>1</sup>

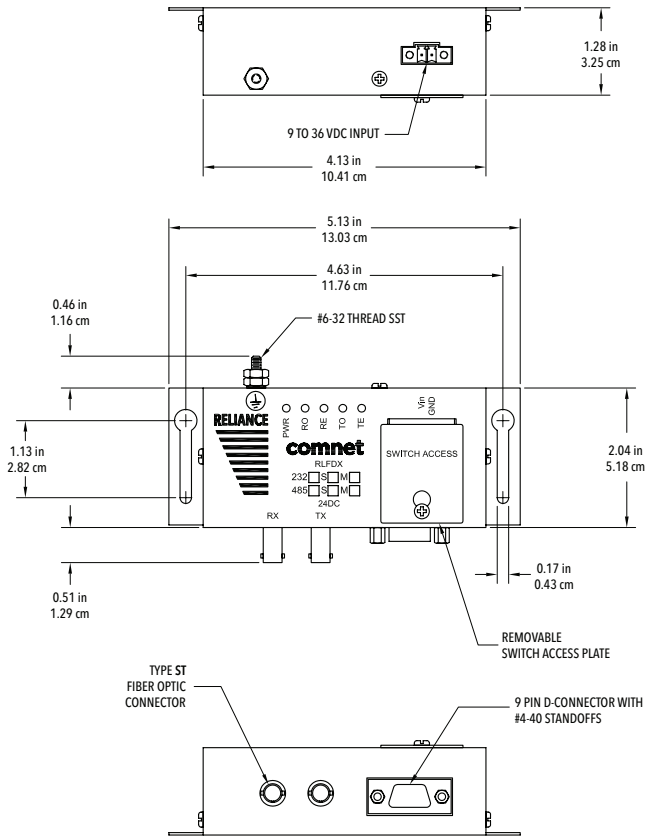
## ORDERING INFORMATION (RS-422/RS-485 Models)

Model	Data Format	Fiber Type	Input Power	Equivalent Dymec Model
RLFDX485M2/24DC	RS-422/485	Multimode	9 to 36 VDC	5845HRT
RLFDX485M2/HV	RS-422/485	Multimode	88 to 300 VDC / 85 to 264 VAC	5846HRT-H
RLFDX485M2/48DC	RS-422/485	Multimode	36 to 59 VDC	5846HRT-L
RLFDX485S2/24DC	RS-422/485	Single Mode	9 to 36 VDC	5845SHRT
RLFDX485S2/HV	RS-422/485	Single Mode	88 to 300 VDC / 85 to 264 VAC	5846SHRT-H
RLFDX485S2/48DC	RS-422/485	Single Mode	36 to 59 VDC	5846SHRT-L
Options	[1] Add suffix 'C' for Conformally Coated Circuit Boards to extend to condensation conditions (Extra charge, consult factory)			

NOTE: This product requires a fiber installation with a minimum 30 dB connector return loss. The use of Super Polish Connectors is recommended. Complies with FDA Performance Standard for Laser Products, Title 21, Code of Federal Regulations, Subchapter J  
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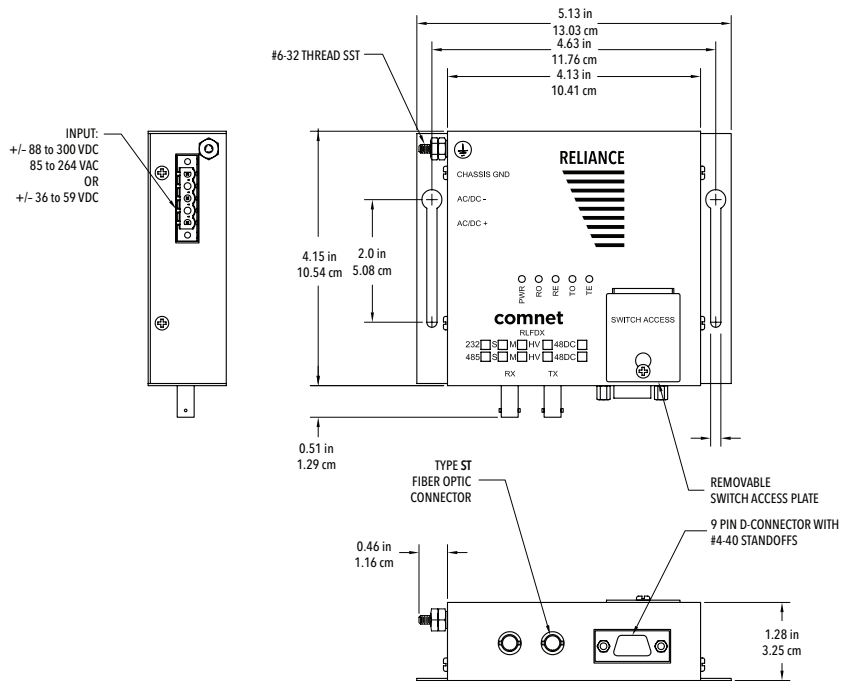
**OUTLINE & INSTALLATION DWG. A**

For Models:  
 RLFDX232M2/24DC  
 RLFDX232S2/24DC  
 RLFDX485M2/24DC  
 RLFDX485S2/24DC



**OUTLINE & INSTALLATION DWG. B**

For Models:  
 RLFDX232M2/HV  
 RLFDX232M2/48DC  
 RLFDX232S2/HV  
 RLFDX232S2/48DC  
 RLFDX485M2/HV  
 RLFDX485M2/48DC  
 RLFDX485S2/HV  
 RLFDX485S2/48DC



3 CORPORATE DRIVE | DANBURY, CONNECTICUT 06810 | USA | T: 203.796.5300 | F: 203.796.5303 | TECH SUPPORT: 1.888.678.9427 | INFO@COMNET.NET  
 8 TURNBERRY PARK ROAD | GILDERSOME | MORLEY | LEEDS, UK LS27 7LE | T: +44 (0)113 307 6400 | F: +44 (0)113 253 7462 | INFO-EUROPE@COMNET.NET