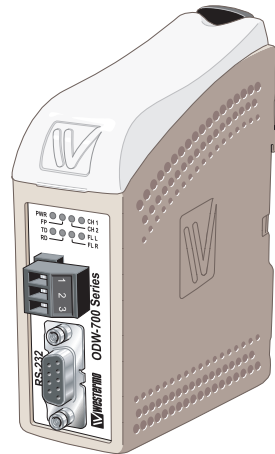


# USERGUIDE

## ODW-720-F1

Fibre Optic Modem

Industrial Converter  
RS-232 to Fibre Optic Link  
Point to Point applications



## **Legal information**

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More information about Westermo can be found at the following Internet address:  
**<http://www.westermo.com>**

## Safety



### **Before installation:**

Read this manual completely and gather all information on the unit. Make sure that you understand it fully. Check that your application does not exceed the safe operating specifications for this unit.

This unit should only be installed by qualified personnel.

This unit should be built-in to an apparatus cabinet, or similar, where access is restricted to service personnel only.

The power supply wiring must be sufficiently fused, and if necessary it must be possible to disconnect manually from the power supply. Ensure compliance to national installation regulations.

Branch circuit protection (fuse) is required for this unit with rating not exceeding 20 A.

Product should be connected to UL Listed power supplies rated 12 – 48VDC, min 500 mA or 24 VAC, min 500 mA or reliably grounded DC SELV source.

This unit uses convection cooling. To avoid obstructing the airflow around the unit, follow the spacing recommendations (see Cooling section).



### **Before mounting, using or removing this unit:**

Prevent access to hazardous voltages by disconnecting the unit from the power supply.



Warning! Do not open a connected unit. Hazardous voltages may occur within this unit when connected to a power supply.

### **Class 1 Laser Product**

This unit is designed to meet the Class 1 Laser regulations. However, the user is warned not to look directly into fibre optical fibre port or any connected fibre.

### **Care recommendations**

Follow the care recommendations below to maintain full operation of the unit and to fulfil the warranty obligations.

This unit must not be operated with covers or lids removed.

Do not attempt to disassemble the unit. There are no user serviceable parts inside.

Do not drop, knock or shake the unit. Rough handling beyond the specification may cause damage to internal circuit boards.

Do not use harsh chemicals, cleaning solvents or strong detergents to clean the unit.

Do not paint the unit. Paint can clog the unit and prevent proper operation.

Do not expose the unit to any kind of liquids (rain, beverages, etc).

The unit is not waterproof. Keep the unit within the specified humidity levels.

Do not use or store the unit in dusty, dirty areas. Connectors as well as other mechanical parts may be damaged.

If the unit is not working properly, contact the place of purchase, nearest Westermo distributor office, or Westermo Tech support.

Fibre connectors are supplied with plugs to avoid contamination inside the optical port.

The plug should be fitted when no optical fibre is inserted in the connector; e.g. during storage, service or transportation.

## Note. Fibre Optic Handling

Fibre optic equipment requires careful handling as the fibre components are very sensitive to dust and dirt. If the fibre is disconnected from the modem, the protective plug on the transmitter/receiver must be replaced. The protective plug must be kept on during transportation. The fibre optic cable must also be protected in the same way. If this recommendation is not followed, it can jeopardise the warranty.

## Cleaning of the optical connectors

In the event of contamination, the optical connectors should be cleaned by using forced nitrogen and some kind of cleaning stick.

Recommended cleaning fluids:

- Methyl-, ethyl-, isopropyl- or isobutyl-alcohol
- Hexane
- Naphtha

## Maintenance

No maintenance is required, as long as the unit is used as intended within the specified conditions.

## Product disposal



This symbol means that the product shall not be treated as unsorted municipal waste when disposing of it. It needs to be handed over to an applicable collection point for recycling electrical and electronic equipment.

By ensuring this product is disposed of correctly, you will help to reduce hazardous substances and prevent potential negative consequences to both environment and human health, which could be caused by inappropriate disposal.

## Simplified EU declaration of conformity

Hereby, Westermo declares that the equipment is in compliance with EU directives. The full EU declaration of conformity and other detailed information are available at the respective product page at [www.westermo.com](http://www.westermo.com).

## Agency approvals and standards compliance

Type	Approval / Compliance
EMC	EN 61000-6-1, Immunity residential environments
	EN 61000-6-2, Immunity industrial environments
	EN 61000-6-3, Emission residential environments
	EN 61000-6-4, Emission industrial environments
	EN 50121-4, Railway signalling and telecommunications apparatus
	IEC 62236-4, Railway signalling and telecommunications apparatus
	DNV Standard for Certification no. 2.4
Safety	UL/CSA/IEC/EN 60950-1, IT equipment

### **FCC Part 15.105 Notice:**

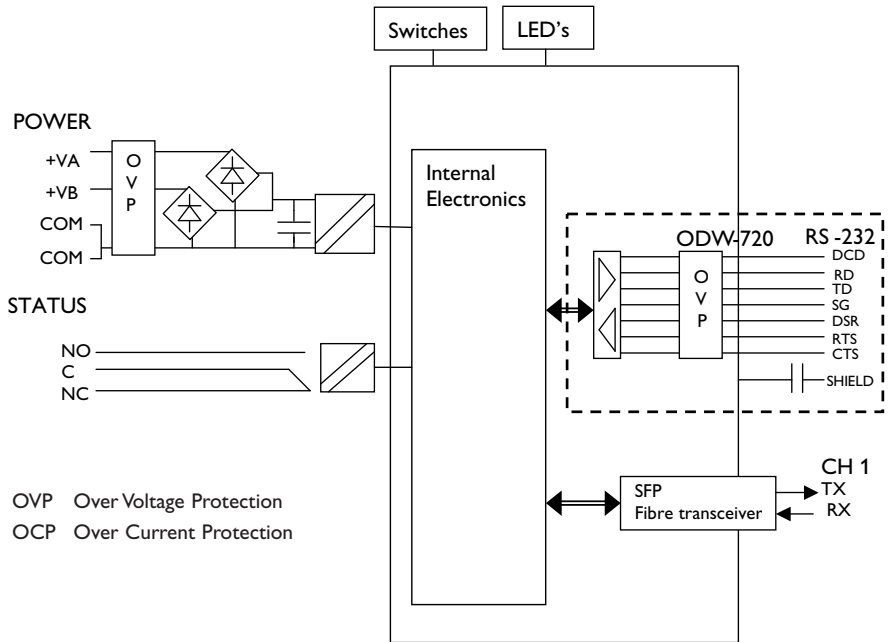
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

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.

## Type tests and environmental conditions

Electromagnetic Compatibility			
Phenomena	Test	Description	Level
ESD	EN 61000-4-2	Enclosure contact	± 6 kV
		Enclosure air	± 8 kV
RF field AM modulated	IEC 61000-4-3	Enclosure	10 V/m 80% AM (1 kHz), 80 – 800 MHz 20 V/m 80% AM (1 kHz), 800 – 1000 MHz 20 V/m 80% AM (1 kHz), 1400 – 2700 MHz
RF field 900 MHz	ENV 50204	Enclosure	20 V/m pulse modulated 200 Hz, 900 ± 5 MHz
Fast transient	EN 61000-4-4	Signal ports	± 2 kV
		Power ports	± 2 kV
Surge	EN 61000-4-5	Signal ports unbalanced	± 2 kV line to earth, ± 2 kV line to line
		Signal ports balanced	± 2 kV line to earth, ± 1 kV line to line
		Power ports	± 2 kV line to earth, ± 2 kV line to line
RF conducted	EN 61000-4-6	Signal ports	10 V 80% AM (1 kHz), 0.15 – 80 MHz
		Power ports	10 V 80% AM (1 kHz), 0.15 – 80 MHz
Pulse Magnetic field	EN 61000-4-9	Enclosure	300 A/m, 6.4 / 16 µs pulse
Voltage dips and interruption	EN 61000-4-11	AC power ports	10 & 5 000 ms, interruption 200 ms, 40% residual voltage 500 ms, 70% residual voltage
Mains freq. 50 Hz	EN 61000-4-16	Signal ports	100 V 50 Hz line to earth
Mains freq. 50 Hz	SS 436 15 03	Signal ports	250 V 50 Hz line to line
Radiated emission	CISPR 16-2-3	Enclosure	EN 61000-6-3
	ANSI C63.4		FCC part 15
Conducted emission	CISPR 16-2-1	AC power ports	EN 61000-6-3
	ANSI C63.4	AC power ports	FCC part 15
	CISPR 16-2-1	DC power ports	EN 61000-6-4
Dielectric strength	EN 60950	Signal port to all other isolated ports	2 kVrms 50 Hz 1min
		Power port to other isolated ports	3 kVrms 50 Hz 1min 2 kVrms 50 Hz 1min (@ rated power < 60V)
Environmental			
Temperature	EN 60068-2-1 EN 60068-2-2	Operating	–40 to +70°C
		Storage & Transport	–40 to +70°C
		Maximum surface temperature	135°C (temperature class T4)
Humidity	EN 60068-2-30	Operating	5 to 95% relative humidity
		Storage & Transport	5 to 95% relative humidity
Altitude		Operating	2 000 m / 70 kPa
Service life		Operating	10 year
Vibration	IEC 60068-2-6	Operating	7.5 mm, 5 – 8 Hz 2 g, 8 – 500 Hz
Shock	IEC 60068-2-27	Operating	15 g, 11 ms
Packaging			
Enclosure,	UL 94	PC / ABS	Flammability class V-1
Dimension W x H x D			35 x 121 x 119 mm
Weight			0.26 kg
Degree of protection			IP21
Cooling	IEC 529	Enclosure	Convection
Mounting			Horizontal on 35 mm DIN-rail

# Functional description



## Converter serial interface – optical fibre

ODW-720-F1 is a fibre optic modem that converts between electrical RS-232 and a fibre optic link.

ODW-720-F1 can also be used to convert from RS-232 to RS-485 by using one ODW-720-F1 and one ODW-730-F1.

## Data rate up to 250 kbit/s

ODW-720-F1 converts data using rates from 300 bit/s up to 250 kbit/s.

## Interface specifications

<b>Power</b>	
Rated voltage	12 to 48 VDC and 24 VAC
Operating voltage	10 to 60 VDC and 20 to 30 VAC
Rated current	300 mA @ 12 V 150 mA @ 24 V 75 mA @ 48 V
Rated frequency	DC and 48 to 62 Hz
Inrush current I <sup>2</sup> t	0.2 A <sup>2</sup> s
Startup current*	1.0 Apeak
Polarity	Reverse polarity protected
Redundant power input	Yes
Isolation to	RS-232 and Status port
Connection	Detachable screw terminal
Connector size	0.75 – 2.5 mm <sup>2</sup> (AWG 18 – 13) Connect the unit using at least 18 AWG (0.75 mm <sup>2</sup> ) wiring
Shielded cable	Not required

\* External supply current capability for proper startup

<b>Status</b>	
Port type	Signal relay, changeover contacts
Rated voltage	Up to 48 VDC
Operating voltage	Up to 60 VDC
Contact rating	500 mA @ 48 VDC
Contact resistance	< 50 mΩ
Isolation to	RS-232 and Power port
Connection	Detachable screw terminal
Connector size	0.2 – 2.5 mm <sup>2</sup> (AWG 24 – 13)
Shielded cable	Not required



<b>RS-232</b>	
Electrical specification	EIA RS-232
Data rate	300 bit/s – 250 kbit/s
Protocol	Asynchronous or synchronous
Data format	9 – 12 bits in asynchronous mode Any type in synchronous mode
Data retiming	Asynchronous mode only
Transmission range	15 m
Isolation to	Status and Power port
Connection	9-pin D-sub female (DCE)
Shielded cable	Not required, except when installed in railway applications as signalling and telecommunications apparatus and located close to rails*
Conductive housing	Isolated to all other circuits and housings

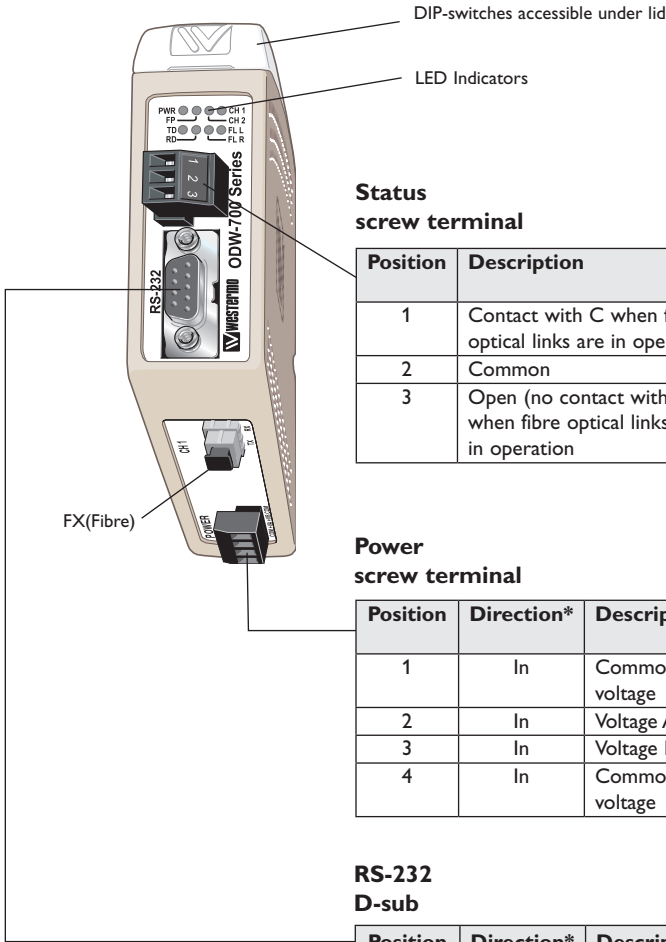
\* To minimise the risk of interference, a shielded cable is recommended when the cable is located inside 3 m boundary to the rails and connected to this port.

The cable shield should be properly connected (360°) to an earthing point within 1 m from this port.

This earthing point should have a low impedance connection to the conductive enclosure of the apparatus cabinet, or similar, where the unit is built-in. This conductive enclosure should be connected to the earthing system of an installation and may be directly connected to the protective earth.

# Location of Interface ports, LED's and DIP-switches

## ODW-720-F1



### Status screw terminal

Position	Description	Product marking
1	Contact with C when fibre optical links are in operation	NO
2	Common	C
3	Open (no contact with C) when fibre optical links are in operation	NC

### Power screw terminal

Position	Direction*	Description	Product marking
1	In	Common voltage	COM
2	In	Voltage A	+VA
3	In	Voltage B	+VB
4	In	Common voltage	COM

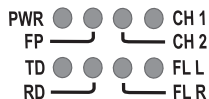
### RS-232 D-sub

Position	Direction*	Description
1	Out	Data Carrier Detect (DCD)
2	Out	Received Data (RD)
3	In	Transmitted Data (TD)
4		Not connected
5	-	Signal Ground (SG)
6	Out	Data Set Ready (DSR)
7	In	Request To Send (RTS)
8	Out	Clear To Send (CTS)
9		Not connected

\* Direction relative this unit

## LED indicators

LED	Status	Description
PWR Power	ON	Power is on.
	OFF	Power is off.
FP		Not used
CH 2		Not used
CH 1 Channel 1 link status	ON	Fiber link to other unit has been established at CH 1.
	Flashing	Optical power detected but link to other unit has not been established at CH 1.
	OFF	No optical power detected and no link to other unit has been established at CH 1.
TD	Flash	Data received on the electrical interface and transmitted out on the optical interface.
	OFF	No data received on the electrical interface.
RD	Flash	Data received on the optical interface and transmitted out on the electrical interface.
	OFF	No data received on the optical interface.
FL R Failure link remote	ON	Remote fibre link failure. A fibre link is out of operation at any other unit than this one*.
	Flashing	Hardware error or invalid configuration.
FL L Failure link local	ON	Local fibre link failure. A fibre link is out of operation at this unit.
	Flashing	Hardware error or invalid configuration.



\* Only valid if used together with ODW-720-F1 units in a multidrop network.

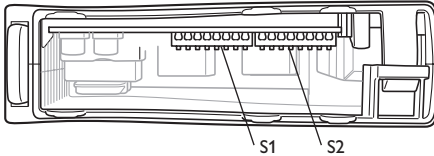
**Note:** During power up, all LED's will turn on for about 1 second.

## DIP-switch settings

### Before DIP-switch settings:

Prevent damage to internal electronics from electrostatic discharges (ESD) by discharging your body to a grounding point (e.g. use of wrist strap)

**Note:** Disconnect power before DIP-switch settings.



The ODW-720-F1 DIP-switches are pre-set from the factory, so that the unit can be used for point-to-point applications, together with an additional ODW-720-F1, straight out of the box, without the need for any type of user configuration.

The only choice required, is if to enable the RTS to CTS signalling function or not. See the DIP-switch S2:1 description below.

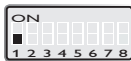
If the ODW-720-F1 is to be used in a multidrop network together with ODW-720-F2 units, please refer to the ODW-720-F2 user guide for details on how to configure the units.

### S1 DIP-switch



S1:1 – S1:8 always OFF for point-to-point applications.

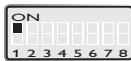
### S2 DIP-switch



CTS always active.



S2:2 and S2:4 – S2:7 always OFF.  
S2:3 and S2:8 always ON for point-to-point applications.



Transport RTS to CTS.

### Factory default



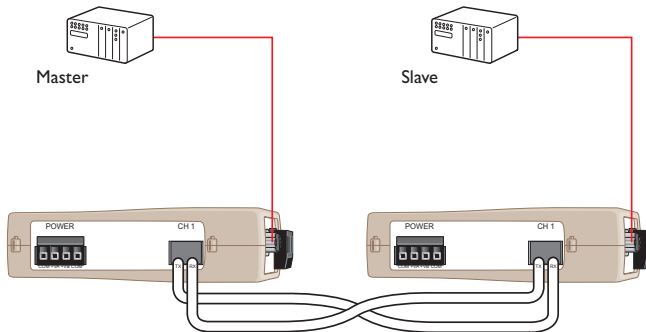
S1



S2

## Start up guide, point-to-point application

Follow the steps below to get the unit up and running in a simple application.



- ⌘ Using the factory DIP-switch settings:
- ⌘ Set DIP-switch S2:1 as desired.
- ⌘ Connect The fibre link between the ODW-720-F1.
- ⌘ Connect the power supply to both ODW-720-F1.
- ⌘ After a few seconds the fibre link should be in operation, indicated by an active CH1 LED.
- ⌘ Connect the serial cables from PLC master and slave to respective ODW-720-F1.
- ⌘ Frames from PLC master that are correctly received the ODW-720-F1 should be indicated by flashing TD LED.
- ⌘ Frames that are received via the fibre link will be transmitted to the PLC slave and indicated by flashing RD LED.
- ⌘ Replies from slave to master will be transferred and indicated in the opposite way.
- ⌘ The point-to-point application is up and running.

## About the interfaces

### Power

The power terminal has two independent inputs, +VA and +VB, allowing redundant power input.

The ODW-720-F1 power supply is galvanically isolated from all other interfaces.

### Optical fibre interfaces

ODW-720-F1 uses Small Form Factor Pluggable (SFP) transceivers. This means that a wide range of different fibre transceivers and connectors can be used.

### RS-232 interface

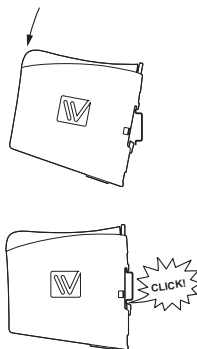
The RS-232 interface is a female 9-position D-sub. Pin assignments are compliance with the EIA RS-232 standard.

### Status port

The status port connects to an internal relay which may be used to trigger an external alarm if a fault condition occurs. During normal operation pins 1 and 2 are in contact with each other, and pins 2 and 3 are isolated. During an optical link failure, or power failure, pins 1 and 2 are isolated, and pins 2 and 3 are in contact with each other.

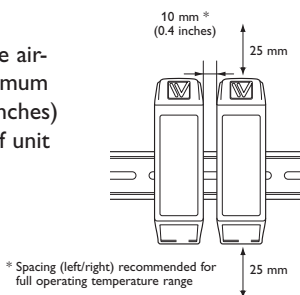
## Mounting

This unit should be mounted on 35 mm DIN-rail, which is horizontally mounted inside an apparatus cabinet, or similar. Snap on mounting, see figure.



## Cooling

This unit uses convection cooling. To avoid obstructing the air-flow around the unit, use the following spacing rules. Minimum spacing 25 mm (1.0 inch) above /below and 10 mm (0.4 inches) left /right the unit. Spacing is recommended for the use of unit in full operating temperature range and service life.



## Removal

Press down the black support at the top of the unit. See figure.





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