



ODW-720-F1

Fibre Optic Modem

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

General information

Legal information

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Safety and Regulations

Warning signs are provided to prevent personal injury and/or damages to the product.

The following levels are used:

| Level of warning | Description | Consequence personal injury | Consequence material damage |
|--|---|--------------------------------|--------------------------------|
|  WARNING | Indicates a potentially hazardous situation | Possible death or major injury | Major damage to the product |
|  CAUTION | Indicates a potentially hazardous situation | Minor or moderate injury | Moderate damage to the product |
|  NOTICE | Provides information in order to avoid misuse of the product, confusion or misunderstanding | No personal injury | Minor damage to the product |
|  NOTE | Used for highlighting general, but important information | No personal injury | Minor damage to the product |

Before installation:

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



WARNING - SAFETY DURING INSTALLATION

The product must be installed by qualified service personnel and built in to an apparatus cabinet or similar, where access is restricted to service personnel only.



WARNING - HAZARDOUS VOLTAGE

Do not open an energized product. Hazardous voltage may occur when connected to a power supply.



WARNING - PROTECTIVE FUSE

It must be possible to disconnect manually from the power supply. Ensure compliance to national installation regulations. Replacing the internal fuse must only be performed by Westermo qualified personell.



CAUTION - CLASS 1 LASER PRODUCT

Do not look directly into a fibre optical port or any connected fibre, although the product is designed to meet the Class 1 Laser regulations and complies with 21 CFR 1040.10 and 1040.11.



CAUTION - ELECTROSTATIC DISCHARGE (ESD)

Prevent electrostatic discharge damages to internal electronic parts by discharging your body to a grounding point (e.g. use a wrist strap).



CAUTION - HANDLING OF SFP TRANSCEIVERS

SFP transceivers are supplied with plugs to avoid contamination inside the optical port. They are very sensitive to dust and dirt. If the fibre is disconnected from the product, the protective plugs on the transmitter/receiver must be connected. The protective plugs must be kept on during transportation. The fibre optics cables must be handled the same way.

Care recommendations

Follow the care recommendations below to maintain full operation of product and to fulfill the warranty obligations:

- Do not drop, knock or shake the product. Rough handling above the specification may cause damage to internal circuit boards.
- Use a dry or slightly water-damp cloth to clean the product. Do not use harsh chemicals, cleaning solvents or strong detergents.
- Do not paint the product. Paint can clog the product and prevent proper operation.

If the product is used in a manner not according to specification, the protection provided by the equipment may be impaired.

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

Cleaning of the optical connectors

In the event of contamination, the optical connectors should only be cleaned by the use of recommended cleaning fluids and correct cleaning equipment.

Recommended cleaning fluids:

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

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.

Declaration of Conformity

Hereby, Westermo declares that this product is in compliance with applicable EU directives and UK legislations. The full declaration of conformity and other detailed information is available at www.westermo.com/support/product-support.



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 60950-1, IT equipment |

FCC Part 15.105 Notice:

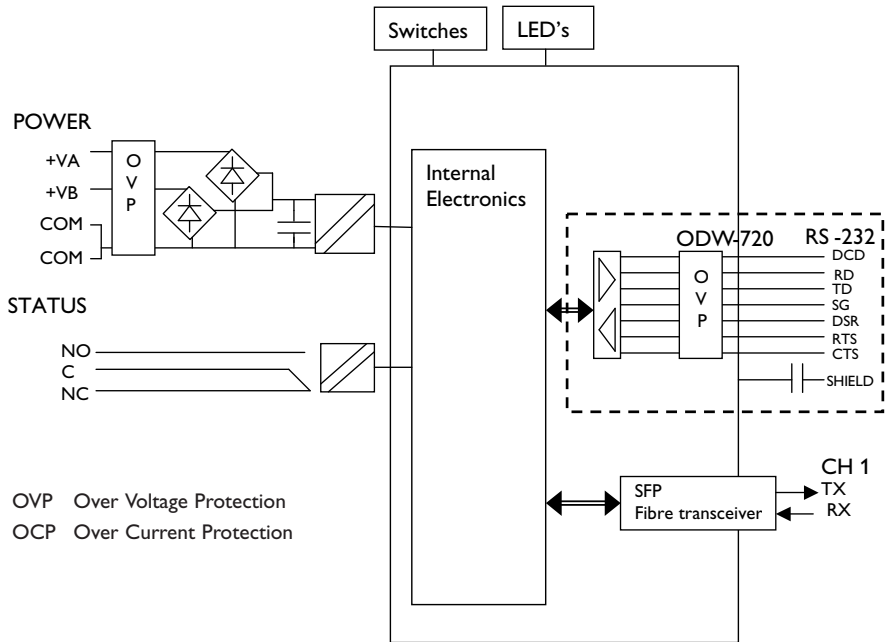
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

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 |
| 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 | UL 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

| Power | |
|---------------------------------|---|
| 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 ² t | 0.2 A ² 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 ² (AWG 18 – 13) Connect the unit using at least 18 AWG (0.75 mm ²) wiring |
| Shielded cable | Not required |

* External supply current capability for proper startup

| Status | |
|--------------------|---|
| 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 ² (AWG 24 – 13) |
| Shielded cable | Not required |

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 – 48 VDC, min 500 mA or 24 VAC, min 500 mA or reliably grounded DC SELV source.

| RS-232 | |
|--------------------------|--|
| 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 |

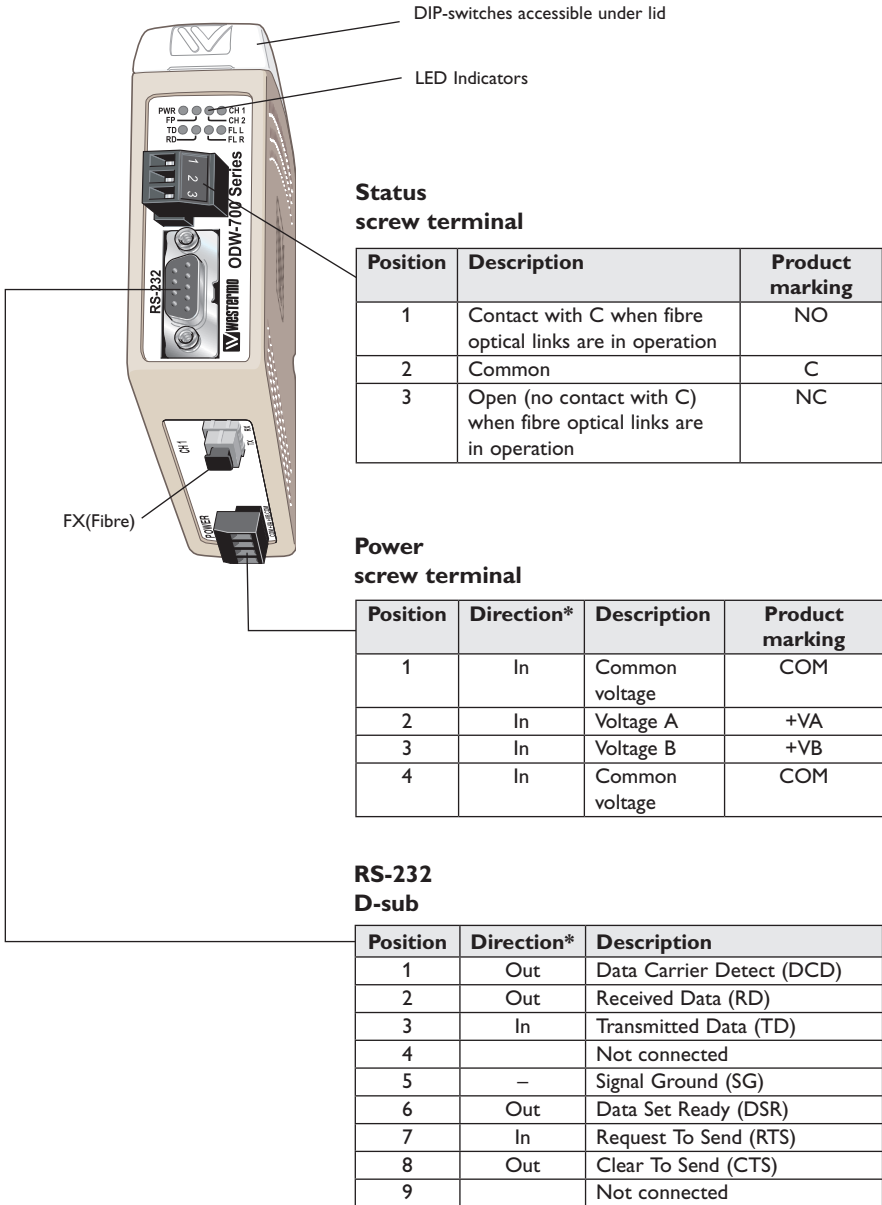
* To minimise the risk of interference, a shielded cable is recommended when the cable is located inside 3 m boundary to the rails and connected to this port.

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

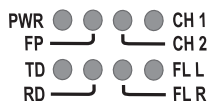
ODW-720-F1



* 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.

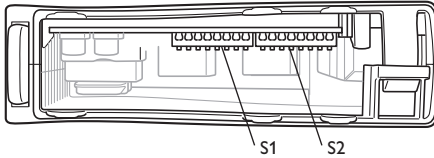
Note: During power up, all LED's will turn on for about 1 second.

DIP-switch settings



CAUTION - ELECTROSTATIC DISCHARGE (ESD)

Prevent electrostatic discharge damages to internal electronic parts by discharging your body to a grounding point (e.g. use a wrist strap).



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.

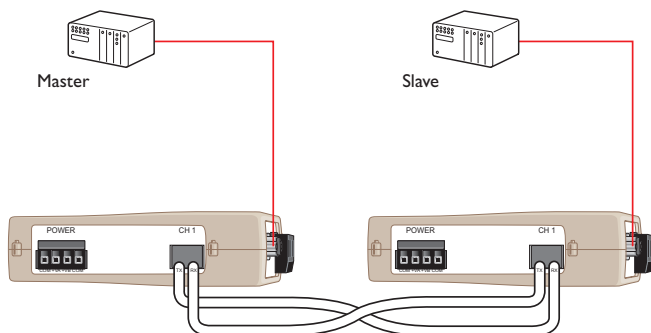
| S1 DIP-switch | |
|---------------|---|
| | S1:1 – S1:8 always OFF for point-to-point applications. |

| 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

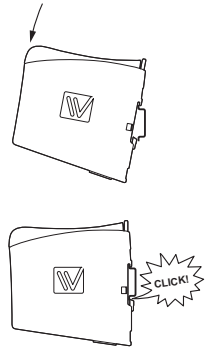
The RS-232 interface is a female 9-position D-sub. Pin assignments are compliance with the EIA RS-232 standard.

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.

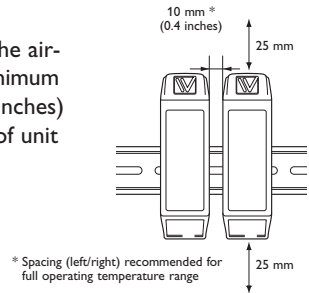
Mounting

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.



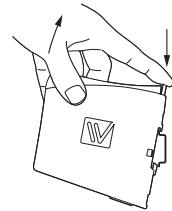
Cooling

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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