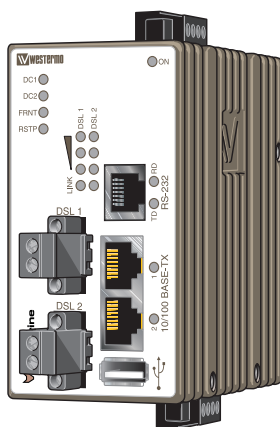




# DDW-142



*Industrial Ethernet Extender*

## License Information

This device contains public available software which is under the GPL license.

For more information see [legal.pdf](#) included with all firmware releases.

This product includes software developed by the OpenSSL Project for use in the **OpenSSL Toolkit**. <http://www.openssl.org>

## Legal information

The contents of this document are provided "as is". Except as required by applicable law, no warranties of any kind, either express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose, are made in relation to the accuracy and reliability or contents of this document. Westermo reserves the right to revise this document or withdraw it at any time without prior notice.

Under no circumstances shall Westermo be responsible for any loss of data or income or any special, incidental, and consequential or indirect damages howsoever caused.

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.

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 voltage by disconnecting the unit from power supply.

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

### **Care recommendations**

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

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

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

Do not drop, knock or shake the unit, rough handling above 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 part may be damaged.

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

A readily accessible disconnect device shall be incorporated external to the equipment.

This unit may have hot surfaces when used in high ambient temperature.

### **WARNING:**

When this unit is operated at an ambient temperature above +60°C, the External Surface of Equipment may exceed Touch Temperature Limit according to EN/IEC/UL 60950-1. To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord.

### **Maintenance**

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

## Agency approvals and standards compliance

| Type   | Approval / Compliance                                                                                                    |
|--------|--------------------------------------------------------------------------------------------------------------------------|
| EMC    | EN 55024 + A1 + A2, Electromagnetic compatibility - Immunity IT equipment                                                |
|        | EN 55022 + A1, Information technology equipment.<br>Radio disturbance characteristics. Limits and methods of measurement |
|        | EN 61000-6-1, Immunity residential environments                                                                          |
|        | EN 61000-6-2, Immunity industrial environments                                                                           |
|        | EN 61000-6-4, Emission industrial environments                                                                           |
|        | EN 61000-6-3, Emission residential, commercial and light-industrial environments                                         |
|        | FCC part 15 Class A and Class B                                                                                          |
|        | EN 50121-4, Railway signalling and telecommunications apparatus                                                          |
|        | IEC 62236-4, Railway signalling and telecommunications apparatus                                                         |
|        |                                                                                                                          |
| Safety | EN 60950-1                                                                                                               |

### FCC Part 15.105 Notice:

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.

# Declaration of Conformity



Westermo Teleindustri AB

## Declaration of conformity

The manufacturer      Westermo Teleindustri AB  
SE-640 40 Stora Sundby, Sweden

Herewith declares that the product(s)

| Type of product              | Model   | Art no    |  |
|------------------------------|---------|-----------|--|
| Industrial Ethernet Extender | DDW-142 | 3642-0300 |  |

is in conformity with the following EC directive(s).

| No          | Short name                          |
|-------------|-------------------------------------|
| 2004/108/EC | Electromagnetic Compatibility (EMC) |

References of standards applied for this EC declaration of conformity.

| No           | Title                                                                                                                            | Issue                        |
|--------------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| EN 61000-6-1 | Electromagnetic compatibility – Immunity for residential environments                                                            | 2007                         |
| EN 61000-6-2 | Electromagnetic compatibility – Immunity for industrial environments                                                             | 2005                         |
| EN 61000-6-3 | Electromagnetic compatibility – Emission for residential environments                                                            | 2007<br>+A1:2011             |
| EN 61000-6-4 | Electromagnetic compatibility – Emission for industrial environments                                                             | 2007<br>+A1:2011             |
| EN 50121-4   | Railway applications - Electromagnetic compatibility<br>Emission and immunity of the signalling and telecommunications apparatus | 2006                         |
| IEC 62236-4  | Railway applications - Electromagnetic compatibility<br>Emission and immunity of the signalling and telecommunications apparatus | 2008                         |
| EN 55024     | Information technology equipment - Immunity                                                                                      | 1998<br>+A1:2001<br>+A2:2003 |
| EN 55022     | Information technology equipment - Emission                                                                                      | 2006<br>+A1:2007             |

The last two digits of the year in which the CE marking was affixed:

12

  
Signature

Pierre Öberg  
Technical Manager  
27th April 2012

|                                 |                               |                               |            |           |                                  |                   |
|---------------------------------|-------------------------------|-------------------------------|------------|-----------|----------------------------------|-------------------|
| Postadress/Postal address       | Tel.                          | Telefax                       | Postgiro   | Bankgiro  | Org.nr/<br>Corp. identity number | Registered office |
| S-640 40 Stora Sundby<br>Sweden | 016-428000<br>Int+46 16428000 | 016-428001<br>Int+46 16428001 | 52 72 79-4 | 5671-5550 | 556361-2604                      | Eskestuna         |

## Type tests and environmental conditions

| Electromagnetic Compatibility |                |                                                          |                                                                                                                                                                                                              |
|-------------------------------|----------------|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environmental phenomena       | Basic standard | Description                                              | Test levels                                                                                                                                                                                                  |
| Electrostatic discharge       | EN 61000-4-2   | Enclosure                                                | Contact: $\pm 6$ kV<br>Air: $\pm 8$ kV                                                                                                                                                                       |
| Fast transients               | EN 61000-4-4   | Power port                                               | $\pm 2$ kV                                                                                                                                                                                                   |
|                               |                | Ethernet ports                                           | $\pm 2$ kV                                                                                                                                                                                                   |
|                               |                | SHDSL ports                                              | $\pm 2$ kV                                                                                                                                                                                                   |
|                               |                | RS-232 port                                              | $\pm 2$ kV                                                                                                                                                                                                   |
|                               |                | Status out / Digital in                                  | $\pm 2$ kV                                                                                                                                                                                                   |
|                               |                | Earth port                                               | $\pm 1$ kV                                                                                                                                                                                                   |
| Surge                         | EN 61000-4-5   | Power port                                               | L-L: $\pm 0.5$ kV, $2 \Omega$ , $18 \mu\text{F}$<br>L-E: $\pm 0.5$ kV, $12 \Omega$ , $9 \mu\text{F}$<br>L-E: $\pm 2$ kV, $42 \Omega$ , $0.5 \mu\text{F}$<br>L-L: $\pm 1$ kV, $42 \Omega$ , $0.5 \mu\text{F}$ |
|                               |                | Ethernet ports                                           | L-E: $\pm 2$ kV, $2 \Omega$                                                                                                                                                                                  |
|                               |                | SHDSL ports                                              | L-E: $\pm 2$ kV, $42 \Omega$ , $0.5 \mu\text{F}$                                                                                                                                                             |
|                               |                | RS-232 port                                              | L-E: $\pm 2$ kV, $2 \Omega$                                                                                                                                                                                  |
|                               |                | Status out / Digital in                                  | L-E: $\pm 2$ kV, $42 \Omega$ , $0.5 \mu\text{F}$                                                                                                                                                             |
|                               |                | Enclosure                                                | 300 A/m                                                                                                                                                                                                      |
| Radiated RF immunity          | EN 61000-4-3   | Enclosure                                                | 20 V/m 80% AM, 1 kHz sine, 80 – 1000 MHz<br>12 V/m 80% AM, 1 kHz sine, 1000 – 2700 MHz                                                                                                                       |
| Conducted RF immunity         | EN 61000-4-6   | Power port                                               | 10 V, 80% AM, 1 kHz sine; 0.15 – 80 MHz                                                                                                                                                                      |
|                               |                | Ethernet ports                                           | 10 V, 80% AM, 1 kHz sine; 0.15 – 80 MHz                                                                                                                                                                      |
|                               |                | SHDSL ports                                              | 10 V, 80% AM, 1 kHz sine; 0.15 – 80 MHz                                                                                                                                                                      |
|                               |                | RS-232 port                                              | 10 V, 80% AM, 1 kHz sine; 0.15 – 80 MHz                                                                                                                                                                      |
|                               |                | Status out / Digital in                                  | 10 V, 80% AM, 1 kHz sine; 0.15 – 80 MHz                                                                                                                                                                      |
|                               |                | Earth port                                               | 10 V, 80% AM, 1 kHz sine; 0.15 – 80 MHz                                                                                                                                                                      |
| Voltage dips and interruption | EN 61000-4-29  | DC Power port                                            | 10, 20 and 5000 ms, interruption<br>500 ms, 30% reduction<br>200 ms, 60% reduction<br>+20 above & -20% below rated voltage                                                                                   |
| Radiated RF emission          | EN 55022       | Enclosure                                                | Class B                                                                                                                                                                                                      |
|                               | FCC part 15    |                                                          | Class B                                                                                                                                                                                                      |
| Conducted RF emission         | EN 55022       | Power port                                               | Class B                                                                                                                                                                                                      |
|                               | FCC part 15    |                                                          | Class B                                                                                                                                                                                                      |
|                               | EN 55022       | Ethernet ports                                           | Class B                                                                                                                                                                                                      |
|                               | FCC part 15    |                                                          | Class B                                                                                                                                                                                                      |
| Dielectric strength           | EN 60950-1     | Power port to other isolated ports                       | 2000 Vrms 50 Hz 1 min                                                                                                                                                                                        |
|                               |                | Ethernet ports to all other isolated ports               | 1500 Vrms 50 Hz 1 min                                                                                                                                                                                        |
|                               |                | RS-232 port to all other isolated ports                  |                                                                                                                                                                                                              |
|                               |                | SHDSL ports to all other isolated ports                  |                                                                                                                                                                                                              |
|                               |                | Status out / Digital in port to all other isolated ports |                                                                                                                                                                                                              |
|                               |                |                                                          |                                                                                                                                                                                                              |

| Electromagnetic Compatibility |                         |                     |                                                                                               |
|-------------------------------|-------------------------|---------------------|-----------------------------------------------------------------------------------------------|
| Environmental phenomena       | Basic standard          | Description         | Test levels                                                                                   |
| <b>Environmental</b>          |                         |                     |                                                                                               |
| Temperature                   |                         | Operating           | −40 to +70°C (−40 to +158°F)                                                                  |
|                               |                         | Storage & Transport | −40 to +85°C (−40 to +185°F)                                                                  |
| Humidity                      |                         | Operating           | 5 to 95% relative humidity                                                                    |
|                               |                         | Storage & Transport | 5 to 95% relative humidity                                                                    |
| Altitude                      |                         | Operating           | 2 000 m / 70 kPa                                                                              |
| Service life                  |                         | Operating           | 10 years                                                                                      |
| Reliability prediction (MTBF) |                         | Operating           | 437,000 hours (MIL-HDBK- 217F2, GB, 25°C)                                                     |
| Vibration                     | IEC 60068-2-64 (random) | Operating           | 5 – 20 Hz: 2 m <sup>2</sup> /s <sup>3</sup><br>20 – 500 Hz: − 3 dB/oct<br>3 axis = 3 * 30 min |
| Shock                         | IEC 60068-2-27          | Operating           | 6 ms 1000 m/s <sup>2</sup><br>6 directions, 3 shocks/direction                                |
| Bump                          | IEC 60068-2-27          | Operating           | 11 ms 100 m/s <sup>2</sup><br>6 directions, 100 shocks/direction                              |
| <b>Packing</b>                |                         |                     |                                                                                               |
| Enclosure material            | EN 60950-1              |                     | Zinc (fire enclosure)                                                                         |
| Dimension W x H x D           |                         | Without connectors  | 52.5 x 100 x 92 mm                                                                            |
|                               |                         | With connectors     | 52.5 x 100 x 111 mm                                                                           |
| Weight                        |                         |                     | 0.8 kg                                                                                        |
| Degree of protection          | EN 60529                | Enclosure           | IP 40                                                                                         |
| Cooling                       |                         |                     | Convection                                                                                    |
| Mounting                      |                         | Enclosure           | Horizontal on 35 mm DIN-rail                                                                  |

# Description

## Functional description

The Wolverine DDW-142 allows effective Ethernet networks to be created over long distances up to 15 km (9.3 mi) at data rates up to 15.3 Mbit/s on a single twisted pair cable. By using two pairs “bonded” this rate can be doubled up to 30.4 Mbit/s. The integral switch allows 2 Ethernet devices to be attached and an RS-232 port allows for a legacy piece of equipment to be incorporated into the IP network.

The operating system in DDW-142 (WeOS) can deliver unique security functionality for this class of product as well as allowing the DDW-142 to form part of a resilient multi-media ring network using the Westermo FRNT protocol or industry standard STP/RSTP. WeOS has been developed to provide industrial networking solutions and contains amazing serial connectivity capability – from being able to simulate an old AT modem, convert Modbus RTU to TCP or encapsulate serial data into an IP packet.

The DDW-142 is incredibly flexible and easy to use. A basic point to point or multidrop network can be created without the need for any kind of configuration. If however a more complex solution requires some kind of network configuration the Web based setup is simple to use. A CLI interface is also provided making the unit easy for networking professionals to quickly master. Once the system is configured an easy solution is also available for the maintenance engineer – USB backup and restore means that stored configurations can be automatically downloaded from a USB stick.

The DDW-142 is often used in applications on railways, roads or with utilities where failure could result in significant costs. All Westermo products are designed with high MTBF in mind to improve operational reliability and also give long service life. Even features like the SHDSL diagnostics and management allow indication of line degradation allowing planned maintenance. As the unit is designed for these applications Westermo also ensure that testing is carried out to ensure the unit can operate at extremes of temperature, EMC and vibration and still provide robust communications.

## Interface specifications

| Power                            |                                                                                                                  |
|----------------------------------|------------------------------------------------------------------------------------------------------------------|
| Rated voltage                    | 24 to 48 VDC                                                                                                     |
| Operating voltage                | 19 to 60 VDC                                                                                                     |
| Rated current                    | 245 mA (405 mA) @ 24 VDC (with 500 mA USB load)<br>124 mA (200 mA) @ 48 VDC (with 500 mA USB load)               |
| Rated frequency                  | DC                                                                                                               |
| Inrush current, I <sup>2</sup> t | 10.6 mA <sup>2</sup> s @ 24 VDC<br>24.7 mA <sup>2</sup> s @ 36 VDC<br>42.4 mA <sup>2</sup> s @ 48 VDC            |
| Startup current <sup>*)</sup>    | 2 x Rated current                                                                                                |
| Polarity                         | Reverse polarity protected                                                                                       |
| Redundant power input            | Yes                                                                                                              |
| Isolation to                     | All other                                                                                                        |
| Connection                       | Detachable screw terminal                                                                                        |
| Connector size                   | 0.2 – 2.5 mm <sup>2</sup> (AWG 24 – 13)<br>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 start-up.

| RS-232                   |                                                              |
|--------------------------|--------------------------------------------------------------|
| Electrical specification | EIA RS-232                                                   |
| Data rate                | 300 bit/s – 115.2 kbit/s                                     |
| Data format              | 7 or 8 data bits, Odd, even or none parity, 1 or 2 stop bits |
| Protocol                 | Transparent, optimised by packing algorithm                  |
| Circuit type             | SELV                                                         |
| Transmission range       | 15 m / 49 ft                                                 |
| Isolation to             | Power, SHDSL, Ethernet                                       |
| Galvanic connection to   | USB, Console                                                 |
| Connection               | RJ-45 according to EIA-561                                   |
| Shielded cable           | Recommended                                                  |
| Conductive housing       | Yes                                                          |
| Number of ports          | 1                                                            |

| <b>Ethernet TX</b>       |                                                                                                                                         |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Electrical specification | IEEE std 802.3. 2005 Edition                                                                                                            |
| Data rate                | 10 Mbit/s, 100 Mbit/s, manual or auto                                                                                                   |
| Duplex                   | Full or half, manual or auto                                                                                                            |
| Circuit type             | TNV-1                                                                                                                                   |
| Transmission range       | Up to 150 m, with CAT5e cable or better                                                                                                 |
| Isolation to             | All other                                                                                                                               |
| Connection               | RJ-45, auto MDI/MDIX                                                                                                                    |
| Shielded cable           | Not required, except when installed in Railway applications as signalling and telecommunications apparatus and located close to rails.* |
| Conductive housing       | Yes                                                                                                                                     |
| Number of ports          | 2                                                                                                                                       |

\* 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.

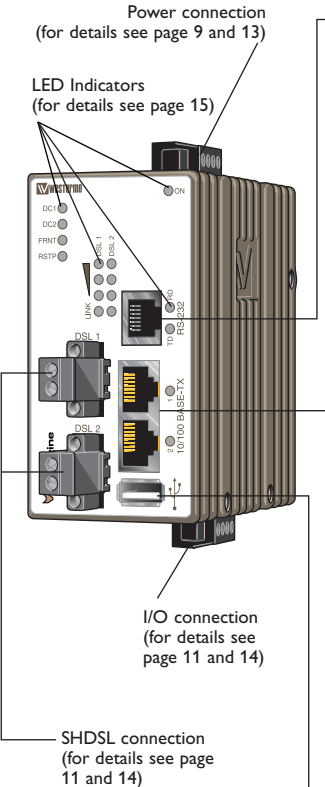
This earthing point should have a low impedance connection to the conductive enclosure of the apparatus cabinet, or similar, where the unit is built-in. This conductive enclosure should be connected to the earthing system of an installation and may be directly connected to the protective earth.

| <b>Console</b>           |                                                       |
|--------------------------|-------------------------------------------------------|
| Electrical specification | LVTTL/LVCMOS-level                                    |
| Data rate                | 115.2 kbit/s                                          |
| Data format              | 8 data bits, none parity, 1 stop bit, no flow control |
| Circuit type             | SELV                                                  |
| Connection               | 2.5 mm jack, use Westermo cable 1211-2027             |

| <b>USB</b>               |                                   |
|--------------------------|-----------------------------------|
| Electrical specification | USB 2.0 host interface            |
| Data rate                | Up to 12 Mbit/s (full-speed mode) |
| Circuit type             | SELV                              |
| Maximum supply current   | 500 mA                            |
| Connection               | USB receptacle connector type A   |

| <b>I/O / Relay output</b>      |                                                      |
|--------------------------------|------------------------------------------------------|
| Maximum voltage/current        | 60 VDC / 80 mA                                       |
| Connect resistance             | Max 30 $\Omega$                                      |
| Isolation to                   | All other                                            |
| Connection                     | Detachable screw terminal                            |
| Connector size                 | 0.2 – 2.5 mm <sup>2</sup> (AWG 24 – 13)              |
| <b>I/O / Digital in</b>        |                                                      |
| Maximum voltage / load current | 60 VDC / 2 mA                                        |
| Voltage levels                 | Logic one >12 V, Logic zero <1V                      |
| Isolation to                   | All other                                            |
| Connection                     | Detachable screw terminal                            |
| Connector size                 | 0.2 – 2.5 mm <sup>2</sup> (AWG 24 – 13)              |
| <b>SHDSL</b>                   |                                                      |
| Electrical specification       | ITU-T G.991.2 Annex B                                |
| Data rate                      | 192 kbit/s to 30.6 Mbit/s with bonding               |
| Protocol                       | EFM according to IEEE 802.3-2005                     |
| Transmission range             | According to ITU-T G.991.2 depending on line quality |
| Isolation to                   | All other                                            |
| Connection                     | Detachable screw terminal                            |
| Connector size                 | 0.2 – 2.5 mm <sup>2</sup> (AWG 24 – 13)              |
| Shielded cable                 | Not required                                         |
| Number of ports                | 2                                                    |

# Location of interface ports and LED's

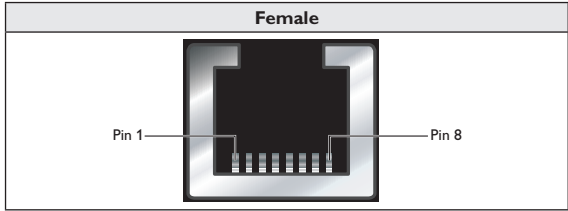


## RS-232 Connection

| Position | Signal | Direction* | Description                       |
|----------|--------|------------|-----------------------------------|
| No. 1    | DSR    | Out        | Data Set Ready                    |
| No. 2    | DCD    | Out        | Data Carrier Detect               |
| No. 3    | DTR    | In         | Data Terminal Ready               |
| No. 4    | SG     | —          | Signal Ground, not chassis ground |
| No. 5    | RD     | Out        | Receive Data                      |
| No. 6    | TD     | In         | Transmit Data                     |
| No. 7    | CTS    | Out        | Clear To Send                     |
| No. 8    | RTS    | In         | Request To Send                   |

\* Direction relative this unit.

## RS-232 Connection



## Ethernet connection TX (2 ports)

| Position | Direction* | Description               |
|----------|------------|---------------------------|
| No.1     | In/Out     | Transmitted/Received data |
| No. 2    | In/Out     | Transmitted/Received data |
| No. 3    | In/Out     | Transmitted/Received data |
| No. 4    |            | Not Connected             |
| No. 5    |            | Not Connected             |
| No. 6    | In/Out     | Transmitted/Received data |
| No. 7    |            | Not Connected             |
| No. 8    |            | Not Connected             |

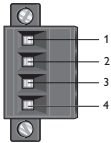
\* Direction relative this unit.

## USB

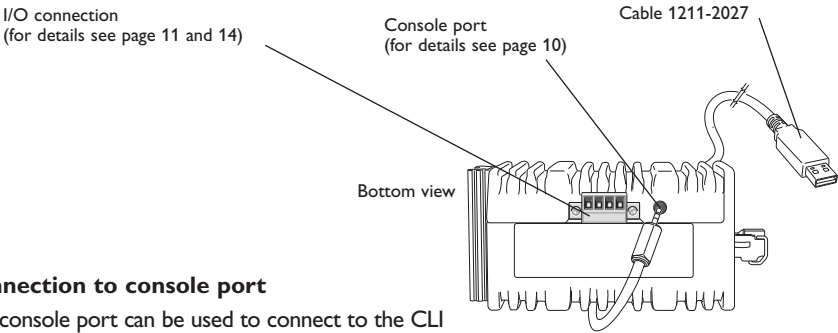
| Position | Direction* | Description                   |
|----------|------------|-------------------------------|
| No.1     | Out        | VBUS                          |
| No. 2    | In/Out     | D-                            |
| No. 3    | In/Out     | D+                            |
| No. 4    | Out        | GND                           |
| Shield   | In/Out     | Connected to protective earth |

\* Direction relative this unit.

Power connection

|  | 4-position | Product marking | Direction | Description              |
|-----------------------------------------------------------------------------------|------------|-----------------|-----------|--------------------------|
|                                                                                   | No. 1      | +DC1            | Input     | Supply voltage input DC1 |
|                                                                                   | No. 2      | +DC2            | Input     | Supply voltage input DC2 |
|                                                                                   | No. 3      | -COM            | Input     | Common                   |
|                                                                                   | No. 4      | -COM            | Input     | Common                   |

This unit supports redundant power connection. The positive inputs are +DC1 and +DC2, the negative input for both supplies are -COM. Connect the primary voltage (e.g. +24VDC) to the +DC1 pin and return to one of the -COM pins on the power input.



Connection to console port

The console port can be used to connect to the CLI (Command Line Interface).

The following steps needs to be taken

- 1. Connect the serial diagnostic cable to the console port (use only Westermo cable 1211-2027).
- 2. Connect cable to your computer (USB port, if drivers are needed they can be downloaded from our Web page).
- 3. Use a terminal emulator and connect with correct speed and format (115200, 8N1) to the assigned port.

For more information about the CLI, see the WeOS management guide.

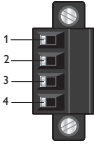
| Accessories            |           |
|------------------------|-----------|
| Description            | Art no    |
| Westermo console cable | 1211-2027 |
| RJ45 to DB9 cable      | 1211-2210 |

SHDSL

|  | Position | Direction* | Description                   |
|-----------------------------------------------------------------------------------|----------|------------|-------------------------------|
|                                                                                   | No.1     | In/Out     | 2-wire Receive/Transmit SHDSL |
|                                                                                   | No. 2    | In/Out     | 2-wire Receive/Transmit SHDSL |

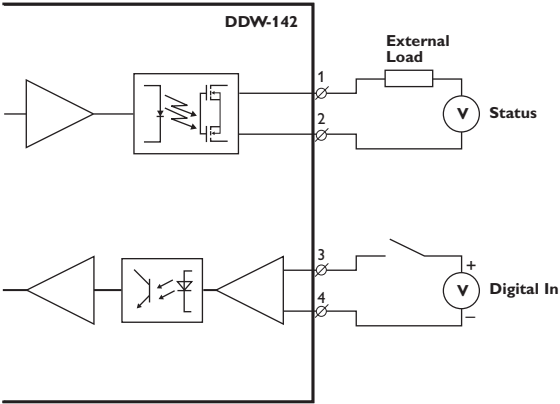
\* Direction relative this unit.

I/O connection

|  | 4-position | Product marking | Direction | Description                  |
|-----------------------------------------------------------------------------------|------------|-----------------|-----------|------------------------------|
|                                                                                   | No. 1      | Status +        | Output    | Alarm relay (status) contact |
|                                                                                   | No. 2      | Status -        | Output    | Alarm relay (status) contact |
|                                                                                   | No. 3      | Digital in +    | Input     | Digital in +                 |
|                                                                                   | No. 4      | Digital in -    | Input     | Digital in -                 |

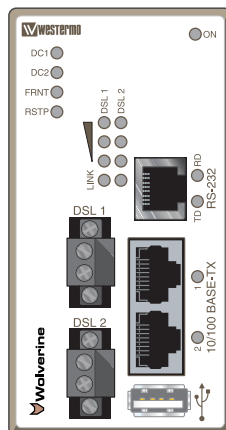
The Status output is a potential free, opto-isolated normally closed solid-state relay. This can be configured to monitor various alarm events within the unit, see WeOS Management Guide. An external load in series with an external voltage source is required for proper functionality. For voltage/current ratings, see Interface Specification section.

The Digital in is an opto-isolated digital input which can be used to monitor external events. For voltage/current ratings, see Interface Specification section:



## LED indicators

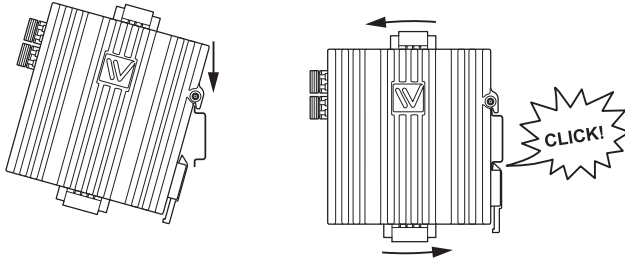
| LED                                                                                                                            | Status      | Description                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------|
| ON                                                                                                                             | OFF         | Unit has no power.                                                                                               |
|                                                                                                                                | GREEN       | All OK, no alarm condition.                                                                                      |
|                                                                                                                                | RED         | Alarm condition, or until unit has started up. (Alarm conditions are configurable, see "WeOS Management Guide"). |
|                                                                                                                                | FLASH       | Location indicator ("Here I am!"). Activated when connected to IPConfig Tool, or upon request from Web or CLI.   |
| DC1                                                                                                                            | OFF         | Unit has no power.                                                                                               |
|                                                                                                                                | GREEN       | Power OK on DC1.                                                                                                 |
|                                                                                                                                | RED         | Power failure on DC1.                                                                                            |
| DC2                                                                                                                            | OFF         | Unit has no power.                                                                                               |
|                                                                                                                                | GREEN       | Power OK on DC2.                                                                                                 |
|                                                                                                                                | RED         | Power failure on DC2.                                                                                            |
| RSTP                                                                                                                           | OFF         | RSTP disabled.                                                                                                   |
|                                                                                                                                | GREEN       | RSTP enabled.                                                                                                    |
|                                                                                                                                | BLINK       | Unit elected as RSTP/STP root switch.                                                                            |
| FRNT                                                                                                                           | OFF         | FRNT disabled.                                                                                                   |
|                                                                                                                                | GREEN       | FRNT OK.                                                                                                         |
|                                                                                                                                | RED         | FRNT Error.                                                                                                      |
|                                                                                                                                | BLINK       | Unit configured as FRNT focal point.                                                                             |
| LNK<br>SHDSL ports<br>Link indicator<br>Port 1–2                                                                               | OFF         | No DSL link.                                                                                                     |
|                                                                                                                                | GREEN       | DSL link established.                                                                                            |
|                                                                                                                                | GREEN FLASH | DSL link negotiation.                                                                                            |
|                                                                                                                                | YELLOW      | Port alarm and no link.<br>Or if FRNT or RSTP mode, port is blocked.                                             |
|  SHDSL ports<br>Quality indicator<br>Port 1–2 | All OFF     | No DSL link.                                                                                                     |
|                                                                                                                                | 3 RED       | Signal to noise value below 3 dB.<br><b>Unstable DSL link.</b>                                                   |
|                                                                                                                                | 1 GREEN     | Signal to noise value 3–5 dB.<br><b>Marginal DSL link.</b>                                                       |
|                                                                                                                                | 2 GREEN     | Signal to noise value 6–9 dB.<br><b>Normal DSL link.</b>                                                         |
|                                                                                                                                | 3 GREEN     | Signal to noise value above 9 dB.<br><b>Strong DSL link.</b>                                                     |
| RD                                                                                                                             | OFF         | No serial data transmitted.                                                                                      |
|                                                                                                                                | GREEN FLASH | Serial data transmitted.                                                                                         |
| TD                                                                                                                             | OFF         | No serial data received.                                                                                         |
|                                                                                                                                | GREEN FLASH | Serial data received.                                                                                            |
| Copper ports<br>Port 1–2                                                                                                       | OFF         | No link.                                                                                                         |
|                                                                                                                                | GREEN       | Link established.                                                                                                |
|                                                                                                                                | GREEN FLASH | Data traffic indication.                                                                                         |
|                                                                                                                                | YELLOW      | Port alarm and no link. Or if FRNT, RSTP or Link Aggregation mode, port is blocked.                              |



## 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.

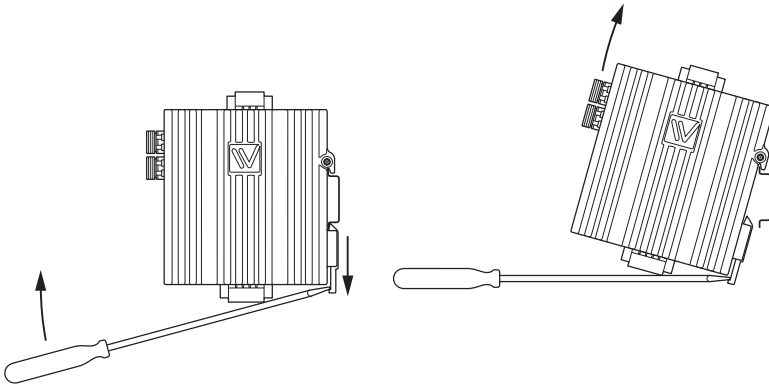
Mounting DDW-142 with integrated DIN-clip:



## Removal

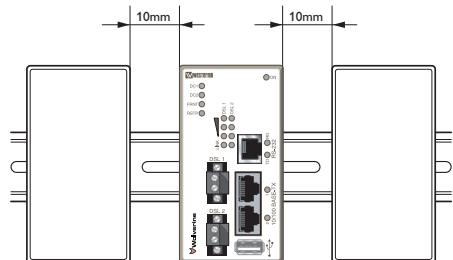
Removing DDW-142 with integrated DIN-clip:

Press down the support at the back of the unit using a screwdriver. See figure.



## Cooling

This unit uses convection cooling. To avoid obstructing the airflow 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.



## Getting Started

This product runs Westermo Operating System (WeOS) which provides several management tools that can be used for configuration of the unit.

- **IPConfig tool**

This is a custom Westermo tool used for discovery of attached Westermo units.

- **Web**

Configuration of the unit using the web browser.

- **CLI**

Configuration of the unit via the Command Line Interface.

If the computer is located in the same subnet as the switch you can easily use a web browser to configure the unit. Within the web you can configure most of the available functions.

For advanced network settings and more diagnostic information, please use the CLI. Detailed documentation is available in the chapter "The Command Line Management Tool" in the WeOS management guide.

|                 |             |               |
|-----------------|-------------|---------------|
| Factory default | IP address: | 192.168.2.200 |
|                 | Netmask:    | 255.255.255.0 |
|                 | Gateway:    | Disabled      |

**Note!** If you are not sure about the subnet – consult your network administrator.

## Configuration

### Configure the unit via Webbrowser

The unit can easily be configured via a Web browser.

Open the link <http://192.168.2.200> in your web browser, and you will be prompted with a Login screen, where the default settings for Username and Password are:

*Username:* admin

*Password:* westermo

Once you have logged in, you can use the extensive integrated help function describing all configuration options. Two common task when configuring a new switch is to assign appropriate IP settings, and to change the password of the admin account.

The password can be up to 64 characters long, and should consist of printable ASCII characters (ASCII 33-126); 'Space' is not a valid password character.

## Referring documents

| Type             | Description                  | Document number |
|------------------|------------------------------|-----------------|
| Management Guide | Westermo OS management guide | 6101-3201       |

## Factory default on DDW-142

It is possible to set the unit to factory default settings by using a standard Ethernet RJ-45 cable.

1. Power off the unit and disconnect all cables.
2. Connect an Ethernet cable between Ethernet ports 1 and 2.  
The unit needs to be connected directly by an Ethernet cable i.e., not via a hub or switch.  
Use a straight cable – not a cross-over cable, when connecting the ports.
3. Power on the unit.
4. Wait for the unit to start-up. Control that the ON LED is flashing red.  
The ON LED flashing indicates that the unit is now ready to be reset to factory default. You now have the choice to go ahead with the factory reset, or to skip factory reset and boot as normal.
  - Go ahead with factory reset:  
Acknowledge that you wish to conduct the factory reset by unplugging the Ethernet cable. The ON LED will stop flashing.  
This initiates the factory reset process\*, and the unit will restart with factory default settings. When the switch has booted up, the ON LED will show a green light, and is now ready to use.
  - Skip the factory reset:  
To skip the factory reset process, just wait for approximately 30 seconds (after the ON LED starts flashing RED) without unplugging the Ethernet cable.  
The switch will conduct a normal boot with the existing settings.

\* **Note** Do not power off the unit while the factory reset process is in progress.





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