

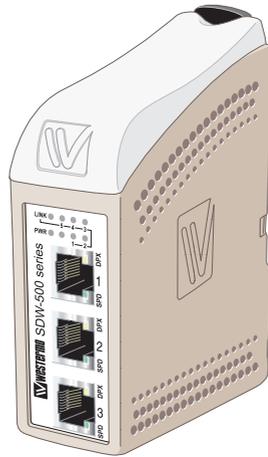
User Guide

6644-2214



# SDW-500

S E R I E S



## Industrial Ethernet 5-port Switch

[www.westermo.com](http://www.westermo.com)



## Software tools

Related software tools are available in the folder software tools under technical support on the Westermo website.

## 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.

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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.

This unit uses convection cooling. To avoid obstructing the air flow around the unit, follow the spacing recommendations (see Installation 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.



### **Class 1 Laser Product**

Do not look directly into fibre optical fibre port or any connected fibre although this unit is designed to meet the Class 1 Laser regulations.

### **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.

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

As long as no optical fibre is mounted on the connector, e.g. for storage, service or transportation, should the plug be applied.

### **Note. Fibre Optic Handling**

Fibre optic equipment needs special treatment. It is very sensitive to dust and dirt. If the fibre will be disconnected from the modem the protective hood on the transmitter/receiver must be connected. The protective hood must be kept on during transportation. The fibre optic cable must also be handle the same way.

If this recommendation not will be followed it can jeopardise the warranty.

### **Cleaning of the optical connectors**

In the event of contamination, the optical connectors should be cleaned by the use of 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.

## Article number, model and description

| Article   | Model                  | Description                                 |
|-----------|------------------------|---|
| 3644-0001 | SDW-550                | 10/100Base-T/TX: 5 ports                    |
| 3644-6001 | SDW-550 E-mark         | 10/100Base-T/TX: 5 ports                    |
| 3644-0015 | SDW-550B               | 10/100Base-T/TX: 5 ports                    |
| 3644-0019 | SDW-532-MM-SC2-SM-SC15 | 10/100Base-T/TX: 3 ports 100Base-FX: 2 port |
| 3644-0020 | SDW-541-MM-SC2         | 10/100Base-T/TX: 4 ports 100Base-FX: 1 port |
| 3644-0021 | SDW-541-MM-ST2         | 10/100Base-T/TX: 4 ports 100Base-FX: 1 port |
| 3644-0022 | SDW-541-SM-LC15        | 10/100Base-T/TX: 4 ports 100Base-FX: 1 port |
| 3644-0023 | SDW-541-MM-LC2         | 10/100Base-T/TX: 4 ports 100Base-FX: 1 port |
| 3644-0024 | SDW-541-SM-SC15        | 10/100Base-T/TX: 4 ports 100Base-FX: 1 port |
| 3644-0025 | SDW-541-SM-LC40        | 10/100Base-T/TX: 4 ports 100Base-FX: 1 port |
| 3644-0030 | SDW-532-MM-SC2         | 10/100Base-T/TX: 3 ports 100Base-FX: 2 port |
| 3644-0031 | SDW-532-MM-ST2         | 10/100Base-T/TX: 3 ports 100Base-FX: 2 port |
| 3644-0032 | SDW-532-SM-LC15        | 10/100Base-T/TX: 3 ports 100Base-FX: 2 port |
| 3644-0033 | SDW-532-MM-LC2         | 10/100Base-T/TX: 3 ports 100Base-FX: 2 port |
| 3644-0034 | SDW-532-SM-SC15        | 10/100Base-T/TX: 3 ports 100Base-FX: 2 port |
| 3644-0035 | SDW-532-SM-LC40        | 10/100Base-T/TX: 3 ports 100Base-FX: 2 port |

## Agency approvals and standards compliance

| Type   | Approval / Compliance  |
|--------|--|
| EMC    | EN 61000-6-2, Immunity industrial environments   |
|        | EN 61000-6-3 <sup>1</sup> , Emission residential environments  |
|        | EN 61000-6-4 <sup>2</sup> , Emission industrial environments   |
|        | E-Mark, Road Vehicles, 10R-04 7216 <sup>3</sup>  |
| Safety | EN/IEC 60950-1, IT Equipment   |
|        | UL 60950-1, IT Equipment 1st Edition <sup>4</sup>  |
| Marine | DNV GL rules for classification – Ships and offshore units <sup>5</sup>  |
| Note   | <p>1 _ Applicable only for 3644-x001</p> <p>2 _ Applicable only for 3644-0019, 3644-002x and 3644-003x</p> <p>3 _ Applicable only for 3644-6001</p> <p>4 _ Applicable only for 3644-0001</p> <p>5 – Applicable only for 3644-0001, 3644-0022 , 3644-0023, 3644-0025, 3644-0032, 3644-0033, 3644-0035</p> |

### Corrosive environment

#### Notice:

This product has been successfully tested in a corrosion test according to IEC 60068-2-60, method 3. This means that the product meets the requirements to be placed in an environment classified as ISA-S71.04 class G3.

**Note!** If the product is placed in a corrosive environment, it is important that all unused connector sockets are protected with a suitable plug in order to avoid corrosion attacks on the gold plated pins in connectors.

# 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 switch | SDW-500 series | 3644-0001, -0002, -0005, -0015, -0019, -0020, -0021, -0022, -0023, -0024, -0025, -0030, -0031, -0032, -0033, -0034, -0035 |
|                            | SDW-550 E-mark | 3644-6001   |

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

| No         | Short name   |
|------------|--|
| 2014/30/EU | Electromagnetic Compatibility (EMC)  |
| 2014/35/EU | Low Voltage Directive (LVD)  |
| 2011/65/EU | Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) |

References of standards applied for this EU declaration of conformity.

| No                        | Title  | Issue                                       |
|---------------------------|--|---|
| EN 61000-6-2              | Electromagnetic compatibility – Immunity for industrial environments   | 2005  |
| EN 61000-6-3 <sup>1</sup> | Electromagnetic compatibility – Emission for residential environments  | 2007  |
| EN 61000-6-4 <sup>2</sup> | Electromagnetic compatibility – Emission for industrial environments   | 2007  |
| EN 60950-1                | Information technology equipment -- Safety -- General requirements   | 2006<br>+A11:2009<br>+A1: 2010<br>+A12:2011 |
| EN 50581                  | Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances | 2012  |

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

16

Signature

Pierre Öberg  
Technical Manager  
21<sup>st</sup> March 2016

<sup>1</sup> Applicable for 3644-000x and 3644-6001

<sup>2</sup> Applicable for 3644-0019, 3644-002x and 3644-003x.

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Org.nr/  
Corp. identity number  
556361-2604

Registered office  
Eskilstuna

## Environmental conditions

| Isolation between interfaces     |  |
|----------------------------------|--|
| Power Interface to all other     | 2.8 kV DC 2.0 kV RMS @ 50 Hz and 60 s duration |
| TX signal Interface to all other | 2.1 kV DC 1.5 kV RMS @ 50 Hz and 60 s duration |
| TX shield Interface to all other | 1.5 kV DC 1.0 kV RMS @ 50 Hz and 60 s duration |

| Environmental                                 |   |
|---|---|
| Temperature, operating                        | -25 to +70°C (SDW-550),<br>-25 to +65°C (SDW-541)<br>-25 to +60°C (SDW-532) |
| Temperature, storage and transportation       | -25 to +70°C  |
| Relative humidity, operating                  | 5 to 95% (non-condensing)   |
| Relative humidity, storage and transportation | 5 to 95% (condensation allowed outside packaging)                           |
| Altitude, operating                           | 2000 m/70 kPa   |

| Mechanical            |                   |
|-----------------------|-------------------|
| Dimension (W x H x D) | 35 x 121 x 119 mm |
| Weight                | 0.2 kg            |
| Mounting              | DIN-rail          |
| Degree of protection  | IP21              |

| Configuration  |
|--|
| Auto configured (auto-negotiation) or manually setting of speed and duplex of individual TX port, by DIP-switches.   |
| Port mirror function is possible to set with DIP-switch. With the port mirror function active the switch will copy all outgoing traffic to port 1. This can be used to monitor all traffic going out from the switch. Packets may be discarded if the total throughput exceeds the port speed of port 1. |

## Fibre optic power budget

| Model  | Multimode MM-xx2   | Singlemode SM-SC15 | Singlemode SM-LC15 | Singlemode SM-LC40 |
|--|--------------------|--------------------|--------------------|--------------------|
| Transmitted wavelength                               | 1310 nm            | 1310 nm            | 1310 nm            | 1310 nm            |
| Min. output power, transmitter                       | -19 dBm            | -15 dBm            | -15 dBm            | -5 dBm             |
| Max. output power, transmitter                       | -12 dBm            | -8 dBm             | -8 dBm             | 0 dBm              |
| Input sensitivity, receiver                          | -31 dBm            | -34 dBm            | -31 dBm            | -34 dBm            |
| Min. power budget                                    | 12 dBm             | 19 dBm             | 16 dBm             | 29 dBm             |
| Max. power budget                                    | 19 dBm             | 26 dBm             | 23 dBm             | 34 dBm             |
| Recommended fibre cable and core / cladding diameter | 50/125<br>62.5/125 | 9/125<br>10/125    | 9/125<br>10/125    | 9/125<br>10/125    |

## Attenuation in connectors / splices

| Type              | Normal attenuation |
|-------------------|--------------------|
| Connector         | 0.2 - 0.4 dBm      |
| Fusion splice     | 0.1 dBm            |
| Mechanical splice | 0.2 dBm            |

## Description

The SDW-550 is an Industrial Ethernet 5-port switch.

All ports support auto-negotiation, but DIP-switches also allow speed and duplex configuration of any individual TX port. It is also possible to set up one port to monitor traffic to/from the switch.

The SDW-550 has been designed to meet high industrial specifications, providing very high dependability in harsh environmental conditions.

### Features:

- ⌘ TX shields individually isolated
- ⌘ Wide DC power range 12 – 48 VDC
- ⌘ Wide temperature range
- ⌘ Automatic MDI/MDI-X crossover
- ⌘ LED indicators for Power, Speed, Duplex, Link and Traffic
- ⌘ Port monitoring
- ⌘ 35 mm DIN rail mounting
- ⌘ Enable or disable of flow control

### Example of applications are:

- ⌘ 5-port switch
- ⌘ Ethernet isolator, for STP networks

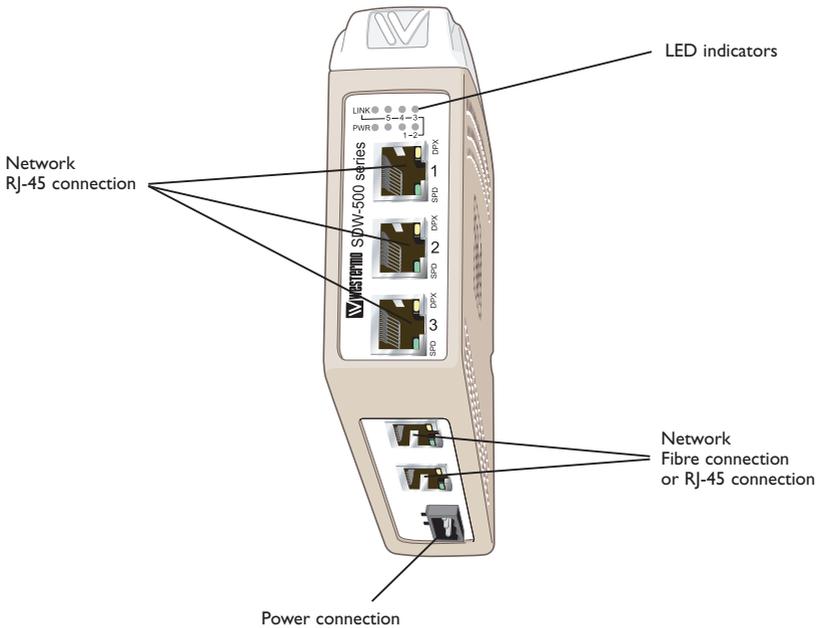
## Interface specifications

| <b>Power SDW-500 series</b> |                                       |        |
|-----------------------------|---------------------------------------|--------|
| Rated voltage               | 12 – 48 VDC, polarity protected       |        |
| Operating voltage           | 9.6 – 57.6 VDC                        |        |
| Rated current               | @12 VDC power input                   |        |
|                             | SDW-550                               | 320 mA |
|                             | SDW-541-MM-SC2                        | 450 mA |
|                             | SDW-541-MM-ST2                        | 450 mA |
|                             | SDW-541-SM-LC15                       | 450 mA |
|                             | SDW-541-SM-SC15                       | 350 mA |
|                             | SDW-541-SM-LC40                       | 350 mA |
|                             | SDW-541-MM-LC2                        | 350 mA |
|                             | SDW-532-MM-SC2                        | 600 mA |
|                             | SDW-532-MM-ST2                        | 600 mA |
|                             | SDW-532-SM-LC15                       | 450 mA |
|                             | SDW-532-SM-SC15                       | 450 mA |
|                             | SDW-532-SM-LC40                       | 450 mA |
|                             | SDW-532-MM-LC2                        | 450 mA |
| SDW-532-MM-SC2-SM-SC15      | 450 mA                                |        |
| Rated frequency             | DC                                    |        |
| Connection                  | Detachable screw terminal             |        |
| Connector size              | 0.2 – 2.5 mm <sup>2</sup> (AWG 24-12) |        |

| <b>Ethernet TX</b>       |   |
|--------------------------|---|
| Electrical specification | IEEE std 802.3. 2000 edition            |
| Data rate                | 10 Mbit/s or 100 Mbit/s, manual or auto |
| Duplex                   | Full or half, manual or auto            |
| Connection               | SC, ST or LC                            |
| Circuit type             | Optical                                 |
| Transmission range       | 100 m                                   |

| <b>Ethernet FX</b>       |   |
|--------------------------|---|
| Electrical specification | IEEE std 802.3. 2000 edition            |
| Data rate                | 10 Mbit/s or 100 Mbit/s, manual or auto |
| Duplex                   | Full or half, manual or auto            |
| Connection               | SC, ST or LC                            |
| Circuit type             | Optical                                 |
| Transmission range       | 100 m                                   |

## Connections



### Available models:

- ⌘ SDW-550 10/100Base-T/TX: 5 ports
- ⌘ SDW-541 10/100Base-T/TX: 4 ports 100Base-FX: 1 port
- ⌘ SDW-532 10/100Base-T/TX: 3 ports 100Base-FX: 2 ports

### NOTE! SDW-532-MM-SC2-SM-SC15

**Port 4:** SC Single mode 15 km connector

**Port 5:** SC Multi mode 2 km connector

## Power

The SDW-500 series supports redundant power connection.

The positive input are +VA and +VB, the negative input for both supplies are COM.

The power is drawn from the input with the highest voltage.



| 3-pos screw terminal | Description | Power             |
|----------------------|-------------|-------------------|
| 1                    | COM         | 0 V               |
| 2                    | +VA         | A: 9.6 – 57.6 VDC |
| 3                    | +VB         | B: 9.6 – 57.6 VDC |

## TX

Ethernet TX connection (RJ-45 connector), automatic MDI/MDI-X crossover.

| Contact | Signal Name | Direction | Description/Remark        |
|---------|-------------|-----------|---------------------------|
| 1       | TD+         | In/Out    | Transmitted/Received data |
| 2       | TD-         | In/Out    | Transmitted/Received data |
| 3       | RD+         | In/Out    | Transmitted/Received data |
| 4       | –           | –         | –                         |
| 5       | –           | –         | –                         |
| 6       | RD-         | In/Out    | Transmitted/Received data |
| 7       | –           | –         | –                         |
| 8       | –           | –         | –                         |
| Shield  | –           | –         | HF-connected              |



CAT 5 cable is recommended.

Unshielded (UTP) or shielded (STP) connector might be used.

## FX SC Multi- or single mode (optional)

Ethernet FX connection.

1300 nm multi- or singlemode fibre transceiver with SC-connector.

The dust protection plug shall be mounted when no fibre is connected.



## FX ST Multi mode (optional)

Ethernet FX connection.

1300 nm multi mode fibre transceiver with ST-connector.

The dust protection plugs shall be mounted when no fibre is connected.



## FX LC Multi- or single mode (optional)

Ethernet FX connection.

1300 nm singlemode fibre transceiver with LC-connector.

The dust protection plug shall be mounted when no fibre is connected.



## LED indicators

At power on the PWR flashes during initialising.

**Indicators (LED)**      Power (PWR)  
                                  Link (LINK) of every port  
                                  Speed (SPD) and duplex (DPX) of TX ports

| LED       | Status     | Indication of  |
|-----------|------------|--|
| PWR       | ON         | Internal power, initialising OK                              |
|           | Slow flash | Initialisation progressing                                   |
|           | Fast flash | Initialisation error   |
| LINK      | OFF        | No Ethernet link   |
|           | ON         | Good Ethernet link   |
|           | Flash      | Ethernet data is transmitted or received, traffic indication |
| SPD       | OFF        | 10 Mbit/s  |
| (TX only) | ON         | 100 Mbit/s   |
| DPX       | OFF        | Half duplex  |
| (TX only) | ON         | Full duplex  |

## DIP switch settings SDW-550

DIP-switches are accessible under the lid on top of the unit. DIP-switches are used to configure the unit.



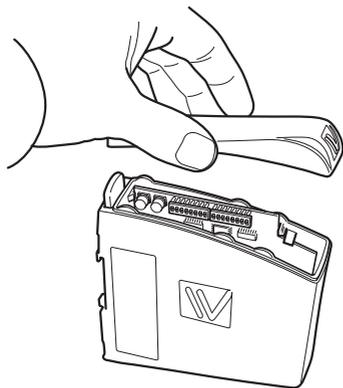
### Warning!

Prevent damage to internal electronics from electrostatic discharges (ESD) by discharging your body to a grounding point (e.g. use of wrist strap), before the lid on top/front of the unit is removed.



### Warning! Do not open connected equipment.

Prevent access to hazardous voltages by disconnecting the unit from AC/DC mains supply and all other electrical connections.

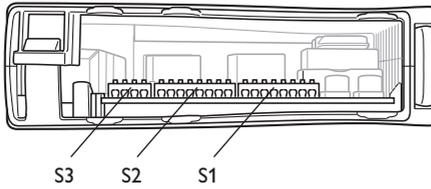


## NOTE

When configuration via DIP-switches, the settings of DIP-switches configure the unit only after a reboot (power off/on).

### To be observe when the DIP-switches will be configured

- ⚡ Speed and duplex setting only valid when auto-negotiation is disabled.
- ⚡ When monitoring selected all outgoing packets from the switch is also copied to the port 1.
- ⚡ Speed and duplex switch settings are ignored for FX ports.
- ⚡ If auto-negotiation and auto MDI/MDI-X disabled all TX ports support MDI-X configuration.



### Port 1 settings

S1  ON Auto-negotiation and auto MDI/MDI-X disabled  
1 2 3 4 5 6 7 8

S1  ON Auto-negotiation and auto MDI/MDI-X enabled  
1 2 3 4 5 6 7 8

S1  ON 10 Mbit/s speed selected  
1 2 3 4 5 6 7 8

S1  ON 100 Mbit/s speed selected  
1 2 3 4 5 6 7 8

S1  ON Half duplex selected  
1 2 3 4 5 6 7 8

S1  ON Full duplex selected  
1 2 3 4 5 6 7 8

### Port 3 settings

S1  ON Auto-negotiation and auto MDI/MDI-X disabled  
1 2 3 4 5 6 7 8

S1  ON Auto-negotiation and auto MDI/MDI-X enabled  
1 2 3 4 5 6 7 8

S1  ON 10 Mbit/s speed selected  
1 2 3 4 5 6 7 8

S1  ON 100 Mbit/s speed selected  
1 2 3 4 5 6 7 8

S1  ON Half duplex selected  
1 2 3 4 5 6 7 8

S2  ON Full duplex selected  
1 2 3 4 5 6 7 8

S2  ON Full duplex selected  
1 2 3 4 5 6 7 8

### Port 2 settings

S1  ON Auto-negotiation and auto MDI/MDI-X disabled  
1 2 3 4 5 6 7 8

S1  ON Auto-negotiation and auto MDI/MDI-X enabled  
1 2 3 4 5 6 7 8

S1  ON 10 Mbit/s speed selected  
1 2 3 4 5 6 7 8

S1  ON 100 Mbit/s speed selected  
1 2 3 4 5 6 7 8

S1  ON Half duplex selected  
1 2 3 4 5 6 7 8

S1  ON Full duplex selected  
1 2 3 4 5 6 7 8

### Port 4 settings

S2  ON Auto-negotiation and auto MDI/MDI-X disabled  
1 2 3 4 5 6 7 8

S2  ON Auto-negotiation and auto MDI/MDI-X enabled  
1 2 3 4 5 6 7 8

S2  ON 10 Mbit/s speed selected  
1 2 3 4 5 6 7 8

S2  ON 100 Mbit/s speed selected  
1 2 3 4 5 6 7 8

S2  ON Half duplex selected  
1 2 3 4 5 6 7 8

S2  ON Full duplex selected  
1 2 3 4 5 6 7 8

### Port 5 settings

S2  Auto-negotiation and auto MDI/MDI-X disabled

S2  Auto-negotiation and auto MDI/MDI-X enabled

S2  10 Mbit/s speed selected

S2  100 Mbit/s speed selected

S2  Half duplex selected

S2  Full duplex selected

### Port mirroring settings

S2  No monitoring selected

S2  Monitoring selected

### Flow control selected

S3  Flow control selected

S3  No flow control selected

### Factory settings

S1 

S2 

S3 

## DIP switch settings SDW-541 and SDW-532

DIP-switches are accessible under the lid on top of the unit. DIP-switches are used to configure the unit.



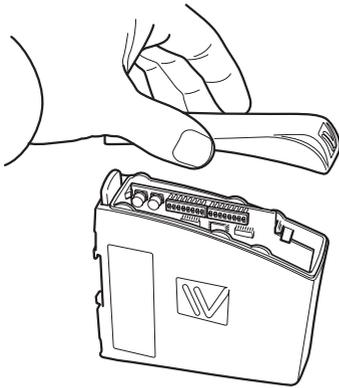
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### Warning! Do not open connected equipment.

Prevent access to hazardous voltages by disconnecting the unit from AC/DC mains supply and all other electrical connections.



## NOTE

When configuration via DIP-switches, the settings of DIP-switches configure the unit only after a reboot (power off/on).

### To be observe when the DIP-switches will be configured

- ⌘ Speed and duplex setting only valid when auto-negotiation is disabled.
- ⌘ When monitoring selected all outgoing packets from the switch is also copied to the port 1.
- ⌘ Speed and duplex switch settings are ignored for FX ports.
- ⌘ If auto-negotiation and auto MDI/MDI-X disabled all TX ports support MDI-X configuration.

### Port 1 settings

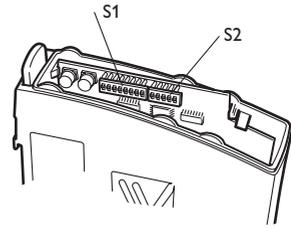
- S1  Auto-negotiation and auto MDI/MDI-X disabled
- S1  Auto-negotiation and auto MDI/MDI-X enabled
- S1  10 Mbit/s speed selected
- S1  100 Mbit/s speed selected
- S1  Half duplex selected
- S1  Full duplex selected

### Port 2 settings

- S1  Auto-negotiation and auto MDI/MDI-X disabled
- S1  Auto-negotiation and auto MDI/MDI-X enabled
- S1  10 Mbit/s speed selected
- S1  100 Mbit/s speed selected
- S1  Half duplex selected
- S1  Full duplex selected

### Port 3 settings

- S1  Auto-negotiation and auto MDI/MDI-X disabled
- S1  Auto-negotiation and auto MDI/MDI-X enabled
- S1  10 Mbit/s speed selected
- S1  100 Mbit/s speed selected
- S2  Half duplex selected
- S2  Full duplex selected



### Port 4 settings\*

- S2  Auto-negotiation and auto MDI/MDI-X disabled
- S2  Auto-negotiation and auto MDI/MDI-X enabled
- S2  10 Mbit/s speed selected
- S2  100 Mbit/s speed selected
- S2  Half duplex selected
- S2  Full duplex selected

\* Setting of port 4 is only possible when using SDW-541. These settings are ignored when using SDW-532

### Port mirroring settings

- S2  No monitoring selected
- S2  Monitoring selected

### Factory settings

- S1  S2 



## Installation

### Mounting / Removal

#### Before mounting or removing the unit:

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

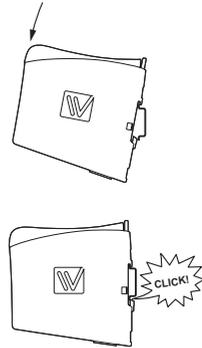
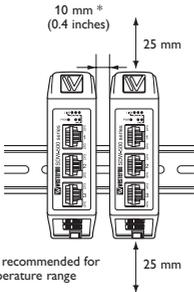
Prevent access to hazardous voltages by disconnecting the unit from AC/DC mains supply and all other electrical connections.

#### Mounting

This unit should be mounted on 35 mm DIN-rail which is horizontally mounted on a wall or cabinet backplate.

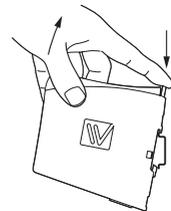
This unit uses convection cooling. To avoid obstructing the airflow around the unit, use the following spacing rules. Recommended spacing 25 mm (1.0 inch) above/below and 10 mm (0.4 inches) left/right the unit.

Snap on mounting, see figure



#### Removal

Press down the black support at the back of the unit, see figure.







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## Sales Units

### Westermo Data Communications

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#### China

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