**User Guide** 6644-2214

# SDW-500 S E R I E S



Industrial Ethernet 5-port Switch



# 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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# **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 water-proof. 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.



# ATEX Information (Applicable for SDW-500 Ex series only)

#### General

This unit is intended for use in Zone 2 hazardous location only.

# **Marking**

€x II 3 G

Ex nA IIC 140°C (T3) Gc

SPECIAL CONDITION

WARNING - DO NOT SEPARATE WHEN ENERGIZED

⟨£x⟩	Indicate that this unit complies with relevant European standards that are harmonised with the 94/9/EC Directive (ATEX).
II	Equipment group II.  This unit can be installed in all places with an explosive gas atmosphere other than mines susceptible to firedamp.
3	Equipment category 3.  A category is the classification according to the required level of protection.  This unit ensures the requisite level of protection during normal operation and is intended for use in areas in which explosive atmosphere caused by gases, vapours, mists, or dust mixtures are unlikely to occure or, if they do occure, are likely to do so only infrequently and for a short periode only.
G	Indicates protection concerning explosive atmospheres caused by gases, vapours or mists (G).
Ex	Indicates that this unit is in conformity with relevant European Ex standard(s).
n <b>A</b>	The type of protection used.  This unit is a non-sparking device "nA" which is constructed to minimize the risk of occurence of arcs or sparks capable of creating an ignition hazard during conditions of normal operation.
IIC	Gas group, a typical gas i hydrogen.
140°C (T3)	Maximum surface temperature assigned = 140°C with the next highest temperature class T3 (T3 = 200°C).  This unit is classified in accordance with its maximum surface temperature (external and internal).
Gc  Equipment protection level Gc (EPL Gc) Equipment for explosive gas atmospheres, having a "enhanced" level of ption, which is not a source of ignition in normal operation and which msome additional protection to ensure that it remains inactive as an ignit source in the case of regular expected occurences. EPL Gc are analogough the ATEX Categories (Category 3 G = EPL Gc).	
SPECIAL CONDITION	This unit has a special condition for safe use.  The special condition for safe use contains safety related information that is necesarry for the correct installation and safe use.

# Ratings and safety control drawing

Ratings \ Model	SDW-550EX	SDW-541EX-MM-LC2 SDW-541EX-SM-SC15 SDW-541EX-SM-LC40	SDW-541EX-MM-SC2 SDW-541EX-MM-ST2 SDW-541EX-SM-LC15
Power	(12 – 48) VDC; 320 mA	(12 – 48) VDC; 350 mA	(12 – 48) VDC; 450 mA
Ambient temperature	$-25^{\circ}\text{C} \le \text{Ta} \le +70^{\circ}\text{C}$ $-25^{\circ}\text{C} \le \text{Ta} \le +65^{\circ}\text{C}$		
Maximum surface temperatur	140°C (temperatur class T3)		
Degree of protection	IP 21		
Installation spacing	Minimum 25 mm above / below and minimum 10 mm left / right		

Ratings \ Model	SDW-532EX-2SM-LC15 SDW-532EX-2MM-LC2 SDW-532EX-2SM-SC15 SDW-532EX-2SM-LC40	SDW-532EX-2MM-SC2 SDW-532EX-2MM-ST2
Power	(12 – 48) VDC; 450 mA	(12 – 48) VDC; 600 mA
Ambient temperature	-25°C ≤ Ta ≤ +60°C	
Maximum surface temperatur	140°C (temperatur class T3)	
Degree of protection	IP 21	
Installation spacing	Minimum 25 mm above / below and minimum 10 mm left / right	



Ethernet TX - RJ 45

Position descripton		Input / Output values
1	In / Out / TD+	
2	In / Out / TD-	
3	In / Out / RD+	Per port: U = ± 1 V (4μV/s)
4	Not connected	I = ± 20 mA
5	Not connected	Data rate:
6	In / Out / RD-	10/100 Mbit/s
7	Not connected	
8	Not connected	
Shield	HF-connected	
C - l : II	to the first of the	6 1 22 1 2 1 2 1

Galvanically isolated via signal transformers and capacitively isolated to signal ground through 3 kV 470 pF capacitor.

# Ethernet FX - SC, ST or LC

_	Position	Direction* / descripton	Input / Output values
	Rx	In / Receive port	Max optical power = 5 dBm
	Tx	Out / Transmit port	Tiax optical power = 3 dbill

#### **Power**

/	Position	Direction* / descripton	Input / Output values
	1	In / COM	U <sub>in</sub> = (9.6 – 57.6) VDC
	2	In / +VA	Max I <sub>in</sub> = 0.6 A @ 9.6 VDC
	3	In / +VB	Max P <sub>in</sub> = 6 W

The different models allows these ports to be configured as either copper RJ 45, optical SC, -ST or -LC connection.

#### SPECIAL CONDITION FOR SAFE USE

#### Ambient temperature:

This unit is designed for use in extreme ambient temperature conditions according to the following:

SDW-550:  $-25^{\circ}$ C  $\leq$  Ta  $\leq$  +70 $^{\circ}$ C SDW-541:  $-25^{\circ}$ C  $\leq$  Ta  $\leq$  +65 $^{\circ}$ C SDW-532:  $-25^{\circ}$ C  $\leq$  Ta  $\leq$  +60 $^{\circ}$ C

#### Installation in an apparatus cabinet:

This unit requires installation in an Ex certified apparatus cabinet suitable for the area of use and providing a degree of protection of at least IP54.

#### Resistance to impact:

This unit requires installation in an apparatus cabinet where adequate resistance to impact is provided by the apparatus cabinet. See "Installation in an apparatus cabinet" above for requirements on the external apparatus cabinet.

#### Resistance to light:

This unit requires installation in an apparatus cabinet where it is protected from light (for example daylight or light from luminaires).

See "Installation in an apparatus cabinet" above for requirements on the external apparatus cabinet.

#### Secureness of plugs:

When this unit is installed in an explosive atmospheres, all connectors must be mechanically secured to prevent loosening.

#### **Conductor temperature:**

When this unit is installed in locations with high ambient temperature, special precautions shall be taken upon the choice of external conductors and the temperature rating of the conductor(s).

#### Directive 94/9/EC alongside with other directives:

Directive 2004/108/EC (EMC) applies and to assure a safe performance of this unit under the scope of Directive 94/9/EC, refer to the electromagnetic immunity level specified under "Type tests and environmental conditions" in this manual.

#### Standards and date of compliance

EN 60079-0 and EN 60079-15 2011-04-15

# 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.

# Agency approvals and standards compliance

Туре	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>6</sup>
Safety	UL 60950-1, 1st Edition <sup>3</sup>
Marine	DNV Standard for Certification no. 2.4 <sup>4</sup>
Ex	EN 60079-0 and EN 60079-15 <sup>5</sup>
Note	<sup>1</sup> – Applicable only for 3644-000x and 3644-0015
	<sup>2</sup> – Applicable only for 3644-0019, 3644-002x and 3644-003x
	<sup>3</sup> – Applicable only for 3644-000x (SDW-550 och SDW-550 EC)
	<sup>4</sup> – Applicable only for 3644-0001, 3644-0022 , 3644-0023, 3644-0025, 3644-0032, 3644-0033, 3644-0035
	(SDW-550, SDW-532-MM-LC15, SDW-532-MM-LC2, SDW-532-SM-LC40, SDW-532-2SM-LC15, SDW-532-2SM-LC40)
	<sup>5</sup> – Applicable only for SDW-5xx Ex series
	6 _ Applicable only for 3644-6001 (SDW-550 E-mark)

# **Declaration of Conformity**



# **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, -0005, -0015, -0019, -0020,-0021, -
		0022, -0023, -0024, -0025, -0030,-0031, -0032, -
		0033, -0034, -0035
	SDW-500 EX series	3644-5001 ,-5020, -5021, -5022, -5023,-5024, -
		5025, -5030, -5031, -5032, -5033, -5034, -5035
	SDW-550 E-mark	3644-6001

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

No	Short name	
2004/108/EC	Electromagnetic Compatibility (EMC)	
94/9/EC 1	Equipment Explosive Atmospheres (ATEX)	
2011/65/EU	Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)	

References of standards applied for this EC declaration of conformity.

No	Title	Issue
EN 61000-6-2	Electromagnetic compatibility – Immunity for industrial environments	2005
EN 61000-6-3 <sup>2</sup>	Electromagnetic compatibility – Emission for residential environments	2007
EN 61000-6-4 <sup>3</sup>	Electromagnetic compatibility – Emission for industrial environments	2007
EN 60079-0 <sup>1</sup>	Explosive atmospheres Equipment – General requirements	2009
EN 60079-15 <sup>1</sup>	Electrical apparatus for explosive gas atmospheres – Construction, test and marking of type of protection "n" electrical apparatus	2005

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

Cianatura

Pierre Öberg Technical Manager 12<sup>th</sup> Mars 2014

<sup>&</sup>lt;sup>1</sup> Applicable for SDW-500 EX series.

<sup>&</sup>lt;sup>2</sup> Applicable for 3644-000x, 3644-0015 and 3644-6001

<sup>&</sup>lt;sup>3</sup> Applicable for 3644-0019, 3644-002x and 3644-003x.

### **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),
	-25 to +65°C (SDW-541)
	-25 to +60°C (SDW-532)
Temperature, storage and transportation	−25 to +70°C
Relative humidity, operating	5 to 95% (non-condensing)
Relative humidity,	5 to 95% (condensation allowed outside packaging)
storage and transportation	
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	50/125	9/125	9/125	9/125
core / cladding diameter	62.5/125	10/125	10/125	10/125

# Attenuation in connectors / splices

Туре	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:

- **III** TX shields individually isolated
- ₩ Wide DC power range 12 48 VDC
- ₩ Wide temperature range
- **III** LED indicators for Power, Speed, Duplex, Link and Traffic
- Port monitoring
- **Ⅲ** 35 mm DIN rail mounting

# Example of applications are:

- **Ⅲ** 5-port switch
- **III** Ethernet isolator, for STP networks

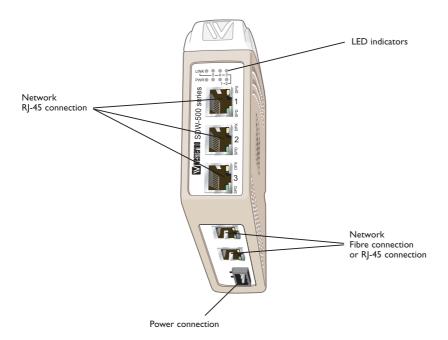
# Interface specifications

Power SDW-500 series				
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-532-2-MM-SC2	600 mA		
	SDW-532-2-MM-ST2	600 mA		
	SDW-532-2-SM-LC15	450 mA		
	SDW-532-2-SM-SC15	450 mA		
	SDW-532-2-SM-LC40	450 mA		
	SDW-532-2-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 mm² (AWG 24-12)			

Ethernet TX	
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

Ethernet FX	
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:

**Ⅲ** SDW-550 10/100Base-T/TX: 5 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 tranceiver 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 tranceiver 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.

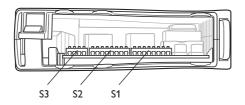


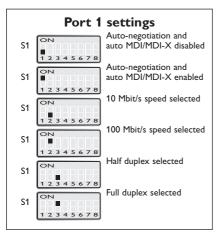
#### NOTE

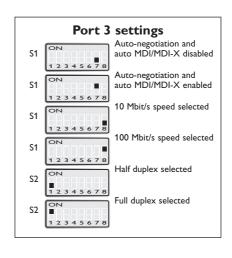
When configuration via DIP-switches, the settings of DIP-switches configure the unit only after a reboot (power off/on).

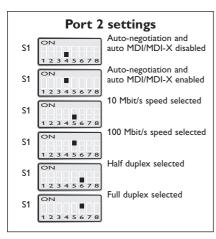
# To be observe when the DIP-switches will be configured

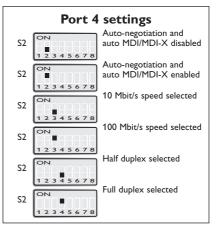
- Speed and duplex setting only valid when auto-negotiation is disabled.
- When monitoring selected all outgoing packets from the switch is also copied to the port 1.
- **Speed** and duplex switch settings are ignored for FX ports.
- If auto-negotiation and auto MDI/MDI-X disabled all TX ports support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

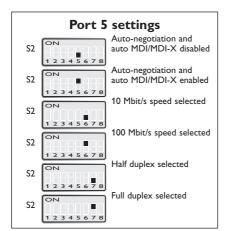


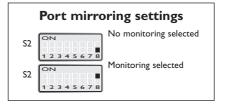


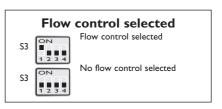


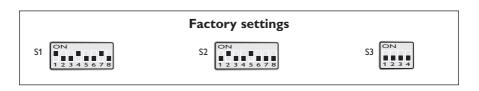












# DIP switch settings SDW-541 and SDW-532

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



### 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.

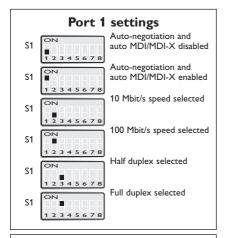


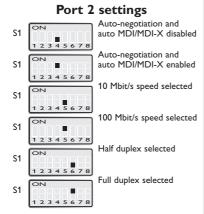
#### NOTE

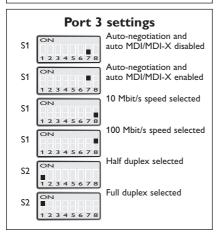
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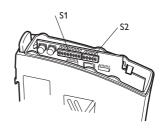
# To be observe when the DIP-switches will be configured

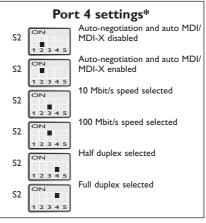
- **Speed** and duplex setting only valid when auto-negotiation is disabled.
- When monitoring selected all outgoing packets from the switch is also copied to the port 1.
- Speed and duplex switch settings are ignored for FX ports.
- If auto-negotiation and auto MDI/MDI-X disabled all TX ports support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





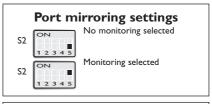






\* Setting of port 4 is only possible when using SDW-541.

These settings are ignored when using SDW-532







# 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.

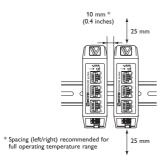
# Mounting

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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#### **France**

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# Germany

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#### **North America**

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#### Singapore

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#### Sweden

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#### **United Kingdom**

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#### Other Offices



For complete contact information, please visit our website at www.westermo.com/contact or scan the QR code