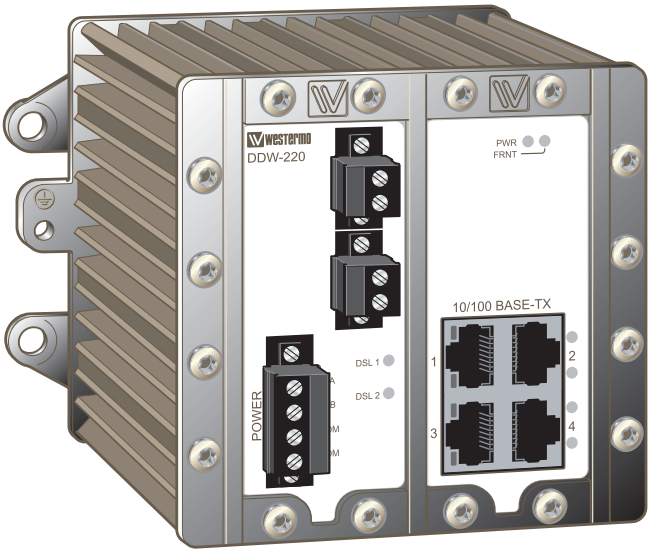
User Guide
6642-22002

DDW-220

WOLVERINE SERIES



Wolverine

Industrial Ethernet
SHDSL extender

gross automation

www.westermosales.com

Legal information

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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.

Maintenance

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

Agency approvals and standards compliance

Type	Approved Agency/ W-mo	Approval / Compliance
EMC	W-mo	EN 61000-6-2, Immunity industrial environments
	W-mo	EN 55024, Immunity IT equipment
	W-mo	EN 61000-6-4, Emission industrial environments
	W-mo	FCC part 15 Class A
	W-mo	EN 50121-4, Railway signalling and telecommunications apparatus
Safety	W-mo	EN 60950-1, IT equipment

FCC Part 15.105 Notice:

This equipment has been tested and found to comply with the limits for a Class 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.

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	Installation manual
DIN-rail	DDW-220	3642-0200	6642-22002

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

No	Short name
89/336/EEG	Electromagnetic Compatibility (EMC)
73/23/EEG	Low Voltage Directive - LVD

References of standards applied for this EC declaration of conformity.

No	Title	Issue
EN 61000-6-2	Immunity for industrial environments	2 (2001)
EN 61000-6-1	Immunity for residential, commercial and light-industrial environments	1 (2001)
EN 55024	Information technology equipment – Immunity	1 (1998)
EN 50121-4	Railway applications – Electromagnetic compatibility – Emission and Immunity of the signalling and telecommunications apparatus	
EN 61000-6-4	Emission standard for industrial environments	1 (2001)
EN 60950	Safety of information technology equipment	6 (2006)

The last two digits of the year in which the CE marking was affixed: 08

Herewith declares that product(s) listed above is in conformity with

No	Title	Issue
FCC part 15 Class A	Radio frequency devices	

Hans Levin
Technical Manager
30th January 2008

Postadress/Postal address	Tel.	Telefax	Postgiro	Bankgiro	Org.nr/ Corp. identity number	Registered office
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Sweden	Int+46 16428000	Int+46 16428001				

Type tests and environmental conditions

Phenomena	Test	Description	Test levels
ESD	EN 61000-4-2	Enclosure contact	± 6 kV
		Enclosure air	± 8 kV
RF field AM modulated	IEC 61000-4-3	Enclosure	20 V/m 80% AM (1 kHz), 80 – 1000 MHz 10 V/m 80% AM (1 kHz), 1400 – 2100 MHz 5 V/m 80% AM (1 kHz), 2100 – 2500 MHz 1 V/m 80% AM (1 kHz), 2500 – 2700 MHz
Fast transient	EN 61000-4-4	Signal ports	± 2 kV
		Power ports	± 2 kV
Surge	EN 61000-4-5	Signal ports balanced	± 2 kV line to earth, ± 1 kV line to line
		Power ports	± 2 kV line to earth, ± 2 kV line to line
RF conducted	EN 61000-4-6	Signal ports	10 V 80% AM (1 kHz), 0.15 – 80 MHz
		Power ports	10 V 80% AM (1 kHz), 0.15 – 80 MHz
Power frequency magnetic field	EN 61000-4-8	Enclosure	300 A/m
Pulse magnetic field	EN 61000-4-9	Enclosure	300 A/m
Mains freq. 50 Hz	EN 61000-4-16	Signal ports	100 V 50 Hz line to earth
Mains freq. 50 Hz	SS 436 15 03	Signal ports	250 V 50 Hz line to line
Voltage dips and interruption	EN 61000-4-29	DC power ports	10 & 100 ms, interruption 10 ms, 30% reduction 10 ms, 60% reduction +20% above & –20% below rated voltage
Radiated emission	EN 55022	Enclosure	Class A
	FCC part 15		Class A
Conducted emission	EN 55022	DC power ports	Class B
Dielectric strength	EN 60950	Signal port to other isolated ports	1500 Vrms 50 Hz 1 min
		Power port to other isolated ports	2000 Vrms 50 Hz 1 min
Temperature		Operating	-40 to +185°F
		Storage & Transport	-40 to +185°F
Humidity		Operating	5 to 95% relative humidity
		Storage & Transport	5 to 95% relative humidity
Altitude		Operating	6562 ft. / 70 kPa
Reliability prediction (MTBF)	MIL-HDBK- 217F	Operating	700 000 hours @ 77°F
Service life		Operating	10 year
Vibration	IEC 60068-2-6	Operating	.3 in, 5 – 8 Hz 2 g, 8 – 500 Hz
Shock	IEC 60068-2-27	Operating	15 g, 11 ms
Enclosure	UL 94	Aluminium/Zink	Flammability class V-0
Dimension W x H x D			5.3 x 4.1 x 4.8 in.
Weight			4.0 kg
Degree of protection	IEC 529	Enclosure	IP40
Cooling			Convection
Mounting			Horizontal on 1.4 in. DIN-rail

Description

The DDW-220 is an Industrial Ethernet SHDSL extender with a built-in Ethernet switch. It is designed as a transparent Ethernet Extender for 10/100BaseTX networks.

SHDSL represents the best of several symmetric DSL technologies. This unit provides the ability to reuse existing twisted copper pair with data rates from 192 kbit/s to 5.7 Mbit/s in both directions. The DDW-220 makes it possible to communicate over 6.2 miles (10 km) on twisted pair cable.

The DDW-220 is a bridge not router and so is simple to install. All configuration is done using a web interface.

The DIN rail mounted DDW-220 is designed for harsh environments and can be used in industrial and railway applications. It can be powered from two separate supplies and handle an operating voltage range of 16 – 60 VDC.

- 192 kbit/s to 5.7 Mbit/s
- Over 6.2 miles (10 km) on twisted pair
- Multidrop SHDSL applications
- Wide temperature range (–40 to +85°C) (–40 to 185°F)
- Total galvanic isolation & transient protection
- Industrial and Rail EMC approvals
- Redundant power and wide DC input range
- Configuration using web interface
- Integrated 4-port Ethernet switch with 10/100Base-T/TX
- Auto MDI/MDI-X
- Auto speed on SHDSL with reliable, normal or high-speed mode
- Comprehensive diagnostics
  - SHDSL
  - Ethernet port statistics
- SNMP support
- Extensive line protection with over-current / voltage suppression

Diagram showing speed versus distance

	DDW-220 @ 0.5 mm²	DDW-220 @ 0.4 mm²
Speed bit/s	**Distance meter / miles**	**Distance meter / miles**
192000	10000 / 6.21	6450 / 4.00
1024000	7650 / 4.75	4850 / 3.01
1280000	7050 / 4.38	4700 / 2.92
2304000	5950 / 3.69	4150 / 2.58
3328000	4900 / 3.04	3700 / 2.30
4544000	4250 / 2.64	3150 / 1.95
5696000	3650 / 2.26	2800 / 1.73

Distance is tested without noise.

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Interface specifications

Power

Rated voltage	20 to 48 VDC
Operating voltage	16 to 60 VDC
Rated current	300 mA @ 20 VDC 150 mA @ 48 VDC
Rated frequency	DC
Inrush current, I^2t	3.1 A^2s
Startup current*	400 mA
Polarity	Reverse polarity protected
Redundant power input	Yes
Isolation to	Ethernet, SHDSL
Connection	Detachable screw terminal
Connector size	AWG 24-12 (0.2 – 2.5 mm^2)
Shielded cable	Not required

* If external power supply is used it must meet specified inrush current.

SHDSL

Electrical specification	ITU-T G.991.2 Annex B
Data rate	192 kbit/s to 5696 kbit/s
Protocol	ITU-T G.991.2, Annex E Clear Channel Data Supports both G.SHDSL and G.SHDSL.BIS
Transmission range	According to ITU-T G.991.2 depending on the line quality
Protection	Overcurrent / overvoltage protection circuit and varistor
Isolation to	Power, Ethernet
Connection	Detachable screw terminal
Connector size	AWG 24-12 (0.2 – 2.5 mm^2)
Shielded cable	Not required
Number of ports	2

Ethernet TX

Electrical specification	IEEE std 802.3 2000 Edition
Data rate	10 Mbit/s, 100 Mbit/s, manual or auto
Duplex	Full or half
Transmission range	328 ft / 100 m
Isolation to	Power, SHDSL
Connection	RJ-45
Shielded cable	Not required, except when installed in Railway applications as signalling and telecommunications apparatus and located close to rails**
Number of ports	4 ports marked as 1, 2, 3, 4

** 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.

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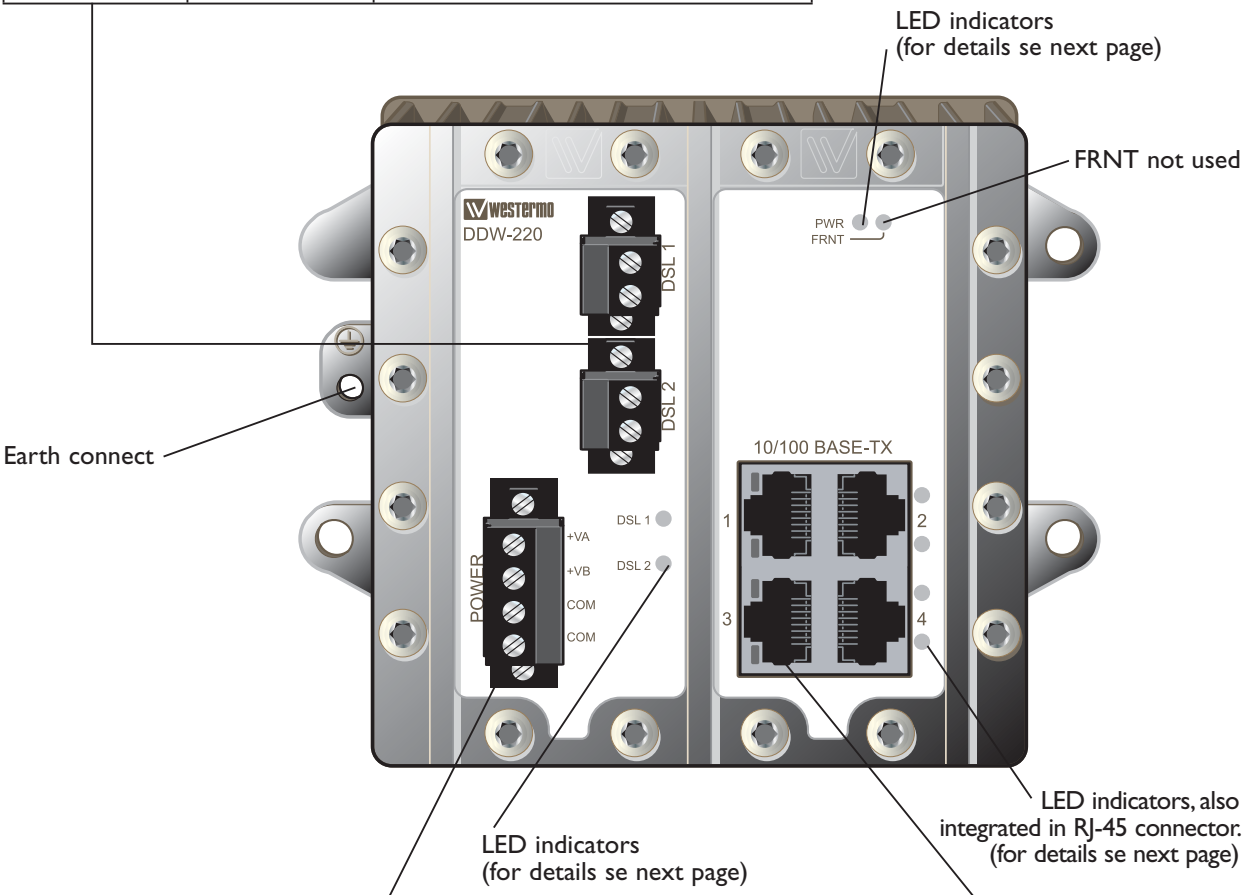
Connections

DSL screw connector 1 & 2

Position	Direction	Description
1	In/Out	2-wire Receive/ Transmit SHDSL
2	In/Out	2-wire Receive/ Transmit SHDSL



Power connection

Position	Direction*	Description
1	In	+ Voltage A
2	In	+ Voltage B
3	In	Common
4	In	Common

* Direction relative this unit

Ethernet TX connection (RJ-45 connector) 1 – 4**

Position	Direction*	Description
1	In/Out	TD+
2	In/Out	TD–
3	In/Out	RD+
4	–	Not Connected
5	–	Not Connected
6	In/Out	RD–
7	–	Not Connected
8	–	Not Connected

CAT 5 cable is recommended.
Unshielded (UTP) or shielded (STP) connectors can be used.

* Direction relative this unit

** 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.

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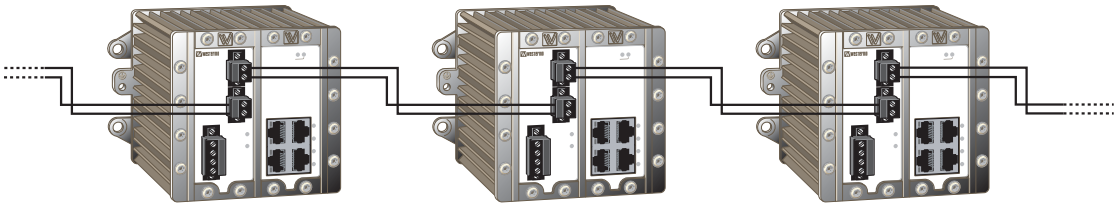
LED indicators

LED	Status	Description
PWR	OFF	No power
	ON (green)	Booting ready, unit ready
	ON (red)	Unit is booting
10/100BASE-TX Port 1 – 4 Green led	OFF	No link
	ON	Link active
	Flashing	Traffic on link
10/100BASE-TX Port 1 – 4 Yellow led	OFF	No port alarm
	ON	Port alarm
DSL Port 1 – 2	OFF	No link
	ON (green)	Link established
	ON (red)	Unit is booting
	Flashing (green)	Link negotiation
	Flashing (red))	Downloading firmware to DSL chip

DSL connection



The default configuration of the units allow for an Ethernet extension to be made. Connect DSL 1 to DSL 2 on the following units to obtain a chain of linked units.

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Configuration

The unit can easily be configured via the onboard Web based configuration tool. Local IP addresses can also be configured by using the Westermo IP Config tool, from the IP Config tool it is then possible to browse into the unit for further configuration.

IP Address

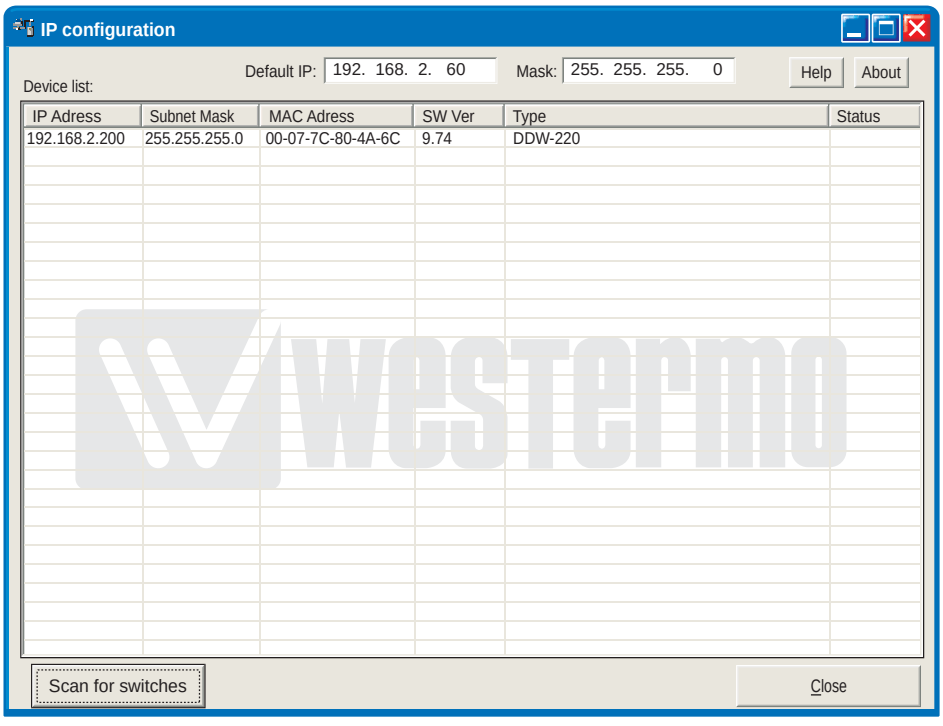
When delivered, the default IP address of the DDW-200 is 192.168.2.200.
Default gateway 192.168.2.200
If the default address of the unit is valid in the connected network it is possible to access the unit directly from a web browser.

Change local IP address

The local address of DDW-220 can be configured using the IP Configuration tool, then it is possible to browse into the unit for further configuration. The IP Configuration program is available on the CD or for download from the WESTERMO web page: http://www.westermo.com, (choose Downloads/Software/Ethernet/DDW-220

Name: setup.exe

Install the software and start the application from a PC on the network connected to where the DDW-220 is installed. Make sure that the Default IP of the configuration software (see figure below) is in the same subnet as your PC.
Note! If you are not sure about the subnet – consult your network administrator.
Note! IP Config version must be 9.8.5 or higher.



Note! If you are not sure about the settings - consult your network administrator.

Figure 1

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By clicking the Scan for switches button the IP Configuration Software will detect the Westermo switches on the network. The software will list all Westermo managed switches or routers connected to the network. Information as in figure 1 will appear for each detected unit connected to the same network as your PC.
If you only want to change the IP address and the subnet mask, this can be done within the IP config tool.

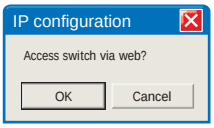

Figure 2

By clicking the listed DDW-220 that you wish to re-configure, you will be asked if you would like to access it via, web figure 2. Click the abort button, enter the preferred IP address, Subnet mask and IP gateway address and click the Set button to confirm the settings in the unit, figure 3.

Click the Scan for switches button again and the settings you configured will appear in the list. Now you can access the DDW-220 via the browser for further configuration by clicking the unit with an IP address that fits your subnet. Figure 2 will appear and now you click the OK button and a web browser will be opened and redirected to the DDW-220 unit login page, figure 5.

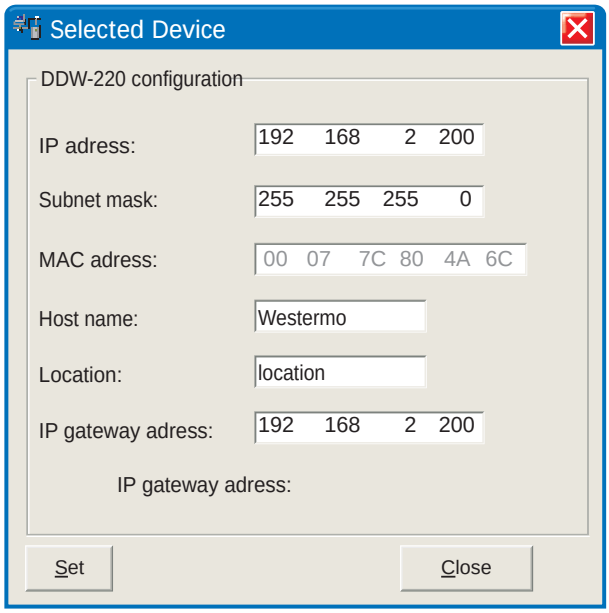

Figure 3

Click the Close button to get back to main view. You will then be asked if you would like to quit. Click the OK button, figure 4, and you will be back to the main view of the IP Configuration program (see figure 1).

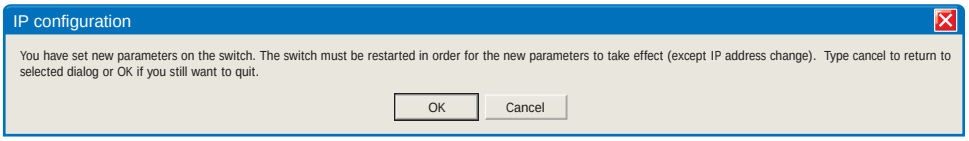

Figure 4

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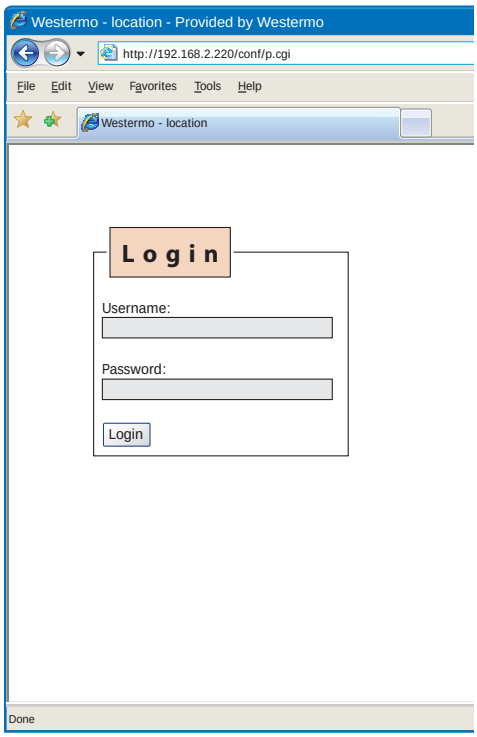


Log in via Web

You will be prompted with a Login screen where the default settings for Username and Password are:
Username: admin
Password: westermo

Figure 5

The unit can be easily configured via the on-board Web based configuration tool. The network interface and switch properties can be configured and stored. The Web tool also has an extended integrated help function describing all configuration options.

Note! Max 10 characters can be used in the login.

Note! For login the following characters are not valid.

ASCII 34 = "
ASCII 35 = #
ASCII 39 = ”
ASCII 40 = (
ASCII 92 = \

Simple Network Management Protocol (SNMP)

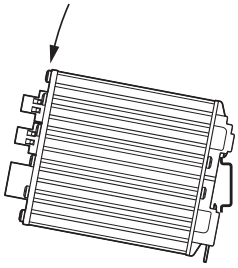
The DDW-220 supports Simple Network Management Protocol version 1 and 2c (SNMPv1 and SNMPv2c). SNMP is an Internet standard protocol (IP) developed to manage IP nodes (servers, workstations, routers, switches and hubs etc.) on an Ethernet network.

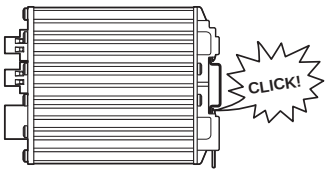
SNMP enables network administrators and control engineers to manage network performance, find and solve network problems, and plan for network growth.

The DDW-220 MIB’s are divided into groups allowing the SNMP manager to poll the SNMP agents for information.

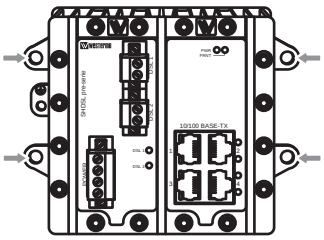
Mounting

This unit should be mounted on 1.4 in. DIN-rail, which is horizontally mounted inside an apparatus cabinet or similar. Snap on mounting, see figure.
1.4 in. DIN-rail shall be mounted with a maximum distance of 2.8 in. between the mounting points.



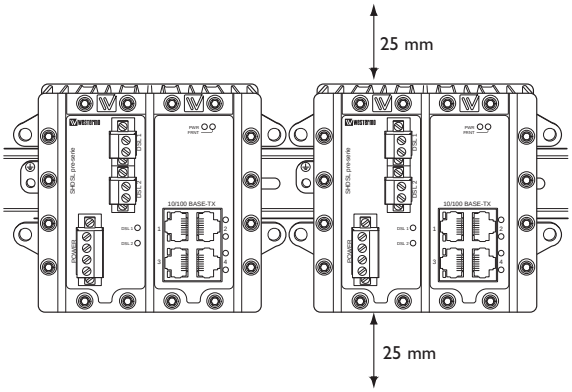


This unit can also be wall-mounted, see figure.



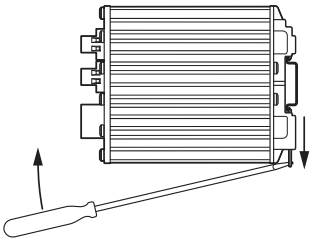
Cooling

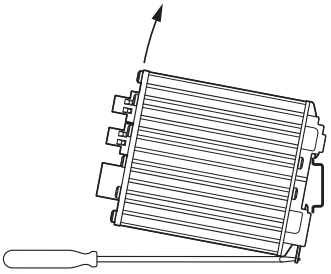
This unit uses convection cooling. To avoid obstructing the airflow around the unit, use the following spacing rules. Minimum spacing 1 inch (25 mm) above /below the unit. Spacing is recommended for the use of unit in full operating temperature range and service life.



Removal

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





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