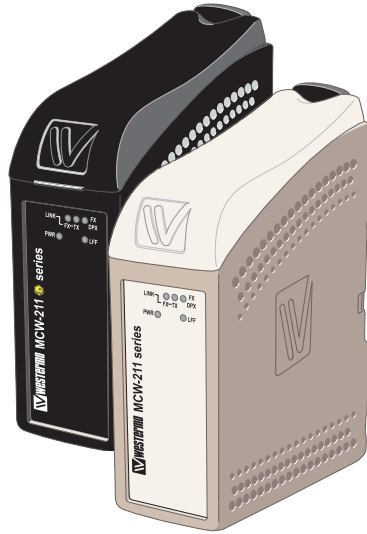


User Guide  
6645-2204



# MCW-211

S E R I E S



*Industrial Ethernet  
Media Converter*

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

## **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.



## ATEX Information (Applicable for MCW-211 Ex only)

### General

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

### Marking

II 3 G

Ex nA IIC T4 Gc

SPECIAL CONDITION

WARNING – DO NOT SEPARATE WHEN ENERGIZED

	Indicate that this unit complies with relevant European standards that are harmonised with the 94/9/EC Directive (ATEX).
<b>II</b>	Equipment group II. This unit can be installed in all places with an explosive gas atmosphere other than mines susceptible to firedamp
<b>3</b>	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 occur or, if they do occur, are likely to do so only infrequently and for a short period only.
<b>G</b>	Indicates protection concerning explosive atmospheres caused by gases, vapours or mists (G).
<b>Ex</b>	Indicates that this unit is in conformity with relevant European Ex standard(s).
<b>nA</b>	Type of protection used. This unit is a non-sparking device "nA" which is constructed to minimize the risk of occurrence of arcs or sparks capable of creating an ignition hazard during conditions of normal operation.
<b>IIC</b>	Gas group, a typical gas i hydrogen.
<b>T4</b>	Temperature class T4 (T4 = 135°C). This unit is classified in accordance with its maximum surface temperature (external and internal).
<b>Gc</b>	Equipment protection level Gc (EPL Gc). Equipment for explosive gas atmospheres, having a "enhanced" level of protection, which is not a source of ignition in normal operation and which may have some additional protection to ensure that it remains inactive as an ignition source in the case of regular expected occurrences. EPL Gc are analogous to the ATEX Categories (Category 3 G = EPL Gc).
<b>SPECIAL CONDITION</b>	This unit has a special condition of use. The special condition for safe use contains safety related information that is necessary for the correct installation and safe use.

## Ratings and safety control drawing

<b>Power</b>	(12 – 48) VDC; 200 mA
<b>Ambient temperature</b>	-25°C ≤ Ta ≤ +70°C
<b>Maximum surface temperature</b>	Temperatur class T4 (max 135 °C )
<b>Degree of protection</b>	IP21
<b>Installation spacing</b>	Minimum 25 mm above / below and minimum 10 mm left / right



### Ethernet TX – RJ-45

Position	Direction*/description	Input/Output values
1	In/Out / TD+	U = ±1V (4 μV/s) I = ±20 mA Data rate: 10/100 Mbit/s
2	In/Out / TD-	
3	In/Out / RD+	
4	Not connected	
5	Not connected	
6	In/Out / RD-	
7	Not connected	
8	Not connected	

\* 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/description	Input/Output values
Rx	In / Receive port	Max optical power = dBm
Tx	Out / Transmit port	Data rate: 100 Mbit/s

### Power

Position	Direction/description	Input/Output values
1	In / COM	U <sub>in</sub> = (10 – 60) VDC Max I <sub>in</sub> = 0.29 A @ 10 VDC MaxP <sub>In</sub> = 3.6 W
2	In / +VA	
3	In / +VB	

The FX port is selectable between SC, -ST or -LC connection depending on variant of the model.

## **SPECIAL CONDITION FOR SAFE USE**

### **Ambient temperature:**

This unit is designed for use in extreme ambient temperature conditions according to the following:  
 $-25^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$

### **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  
2011-04-27

## 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

Type	Approval / Compliance
EMC	EN 61000-6-2, Immunity industrial environments
	EN 61000-6-4, Emission industrial environments
Marine	DNV Standard for Certification no. 2.4 <sup>1</sup>
Ex	EN 60079-0 and EN 60079-15 <sup>2</sup>
Note	<sup>1</sup> Applicable only for 3645-0030, 3645-0040 , 3645-0050 (MCW-211-SM-LC15, MCW-211-SM-LC40, MCW-211-MM-LC2) <sup>2</sup> Applicable only for MCW-211Ex series

# 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 Media Converter	MCW-211 series	3645-0001, -0010, -0020, -0030, -0040, -0050
	MCW-211 EX series	3645-5001, -5010, -5020, -5030, -5040, -5050


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

No	Short name
2004/108/EC	Electromagnetic Compatibility (EMC)
94/9/EC <sup>1</sup>	Equipment Explosive Atmospheres (ATEX)

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 61000-6-4	Electromagnetic compatibility – Emission for industrial environments	2007
EN 60079-0	Explosive atmospheres Equipment – General requirements	2009
EN 60079-15	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: 11

  
Signature

Pierre Öberg  
Technical Manager  
27 April 2011

<sup>1</sup> Applicable for MCW-211 EX series only.

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## Type tests and environmental conditions

<b>Electromagnetic Compatibility</b>			
<b>Phenomena</b>	<b>Test</b>	<b>Description</b>	<b>Level</b>
ESD	EN 61000-4-2	Enclosure contact	± 4 kV
		Enclosure air	± 8 kV
RF field AM modulated	IEC 61000-4-3	Enclosure	10V/m 80% AM (1 kHz), 80 – 2700 MHz
Fast transient	EN 61000-4-4	Signal ports	± 1 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	10V 80% AM (1 kHz), 0.15 – 80 MHz
		Power ports	10V 80% AM (1 kHz), 0.15 – 80 MHz
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
Conducted emission	EN 55022	DC power ports	Class A
Dielectric strength	EN 60950	Signal port to other isolated ports	1.5 kVrms 50 Hz 1 min
		Power port to other isolated ports	2 kVrms 50 Hz 1 min
<b>Environmental</b>			
Temperature		Operating	-25 to +70°C
		Maximum surface temperature	135°C (temperature class T4)
		Storage & Transport	-40 to +70°C
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 year
Vibration	IEC 60068-2-6	Operating	7.5 mm, 5 – 8 Hz
			2 g, 8 – 500 Hz
Shock	IEC 60068-2-27	Operating	15 g, 11 ms
<b>Packaging</b>			
Enclosure, MCW-211	UL 94	PC / ABS	Flammability class V-1
Enclosure, MCW-211 Ex		Cabelec 6141	
Dimension W x H x D			35 x 121 x 119 mm
Weight			0.25 kg
Degree of protection	IEC 529	Enclosure	IP 21
Cooling			Convection
Mounting			Horizontal on 35 mm DIN-rail

## Interface specifications

<b>Power</b>	
Rated voltage	12 to 48 VDC
Operating voltage	10 to 60 VDC
Rated current	200 mA @ 12 VDC 100 mA @ 24 VDC 50 mA @ 48 VDC
Rated frequency	DC
Inrush current I <sub>2t</sub>	0.03 A <sup>2</sup> s @ 12 VDC
Startup current*	0.75 A peak
Polarity	Reverse polarity protected
Redundant power input	Yes
Isolation to	Ethernet TX
	Ethernet FX
Connection	Detachable screw terminal
Connector size	0.2 – 2.5 mm <sup>2</sup> (AWG 24 – 12)
Shielded cable	Not required

\* Direction relative this unit

<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
Transmission range	100 m
Isolation to	Power
Connection	RJ-45

<b>Ethernet FX</b>	
Optical specification	IEEE std 802.3. 2000 Edition
Data rate	100 Mbit/s
Duplex	Full or half
Connection	SC, ST or LC

## Location of interface ports and LED's

LED Indicators (for details see page 13)

DIP switches are accessible under the lid



### Ethernet TX – RJ-45

Position	Direction*	Description
1	In/Out	TD+
2	In/Out	TD-
3	In/Out	RD
4	-	-
5	-	-
6	In/Out	RD-
7	-	-
8	-	-

\* Direction relative this unit

### Ethernet FX – SC, ST or LC

Position	Direction*	Description	Product marking
Rx	In	Receive port	Rx
Tx	Out	Transmit port	Tx

\* Direction relative this unit

### Power

Position	Direction*	Description	Product marking
1	-	Common	COM
2	In	+ Voltage A	+VA
3	In	+ Voltage B	+VB

\* Direction relative this unit

## Fibre optic power budget

Model	MCW-211-MM xx2	MCW-211-SM SC15	MCW-211-SM LC15	MCW-211-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	Multimode 50/125, 62.5/125	Singlemode 9/125, 10/125	Singlemode 9/125, 10/125	Singlemode 9/125, 10/125

Fibre type	Normal attenuation @ 1310 nm multimode	Normal attenuation @ 1310 nm singlemode
50/125	3.0 dBm/km	–
62,5/125	3.5 dBm/km	–
9/125	–	0.5 dBm/km
10/125	–	0.5 dBm/km

## Attenuation in connectors / splices

Type	Normal attenuation
Connector	0.2 – 0.4 dBm
Fusion splice	0.1 dBm
Mechanical splice	0.2 dBm

## LED indicators

LED indicators are available on the front panel and on the RJ-45 TX connector.

LED	Status	Description
PWR	ON	Internal power, initialising OK
	Slow flash	Initialisation progressing
	Fast flash	Initialisation error
LINK TX	OFF	No Ethernet link TX
	ON	Good Ethernet link TX
	Flash	Ethernet data is transmitted or received on TX interface
LINK FX	OFF	No Ethernet link FX
	ON	Good Ethernet link FX
	Flash	Ethernet data is transmitted or received on FX interface
FX DPX	OFF	Half duplex FX interface
	ON	Full duplex FX interface
LFF	OFF	Link fault forward is not active
	ON	Link fault forward is active and has shutdown an interface

LED	Status	Description
SPD	OFF	10 Mbit/s TX interface
	ON	100 Mbit/s TX interface
DPX	OFF	Half duplex TX interface
	ON	Full duplex TX interface



## 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.

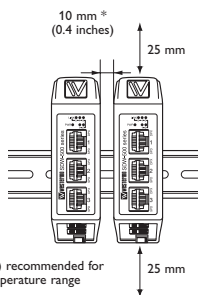
#### Mounting

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

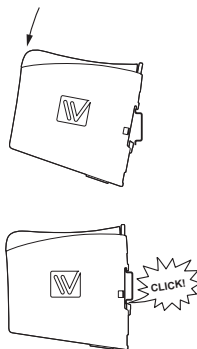
This unit uses convection cooling. To avoid obstructing the airflow around the unit, use the following spacing rules.

Recommended spacing 25 mm (1.0 inch) above/below and 10 mm (0.4 inches) left/right the unit.

Snap on mounting, see figure



\* Spacing (left/right) recommended for full operating temperature range



#### Removal

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



## Configuration

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



### DIP-switch settings

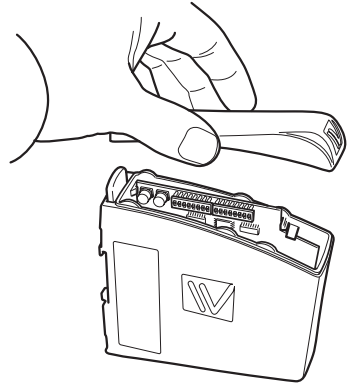
#### Before DIP-switch settings:

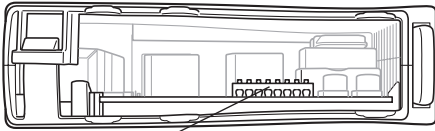
Prevent damage to internal electronics from electrostatic discharges (ESD) by discharging your body to a grounding point (e.g. use of wrist strap).

**NOTE** DIP-switch alterations are only effective after a power on.

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

- ⌘ Speed and duplex setting only valid when auto-negotiation is disabled.
- ⌘ If auto-negotiation and auto MDI/MDI-X disabled the TX ports supports MDI-X configuration.





S1

### TX Port settings

S1  Auto-negotiation and auto MDI / MDI-X disabled TX port

S1  Auto-negotiation and auto MDI / MDI-X enabled TX port

S1  10 Mbit/s speed selected TX port

S1  100 Mbit/s speed selected TX port

S1  Half duplex selected TX port

S1  Full duplex selected TX port

### Flow control setting

S1  Flow control disabled

S1  Flow control enabled

### Link fault forward settings

S1  TX → FX Link fault forward disabled

S1  TX → FX Link fault forward enabled

S1  FX → TX Link fault forward disabled

S1  FX → TX Link fault forward enabled

### FX Port settings

S1  Half duplex selected FX port

S1  Full duplex selected FX port

### Factory settings

S1 











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