Media Converter – Value Line

IE-MC-VL Series

Hardware Installation Guide

Sixth Edition, April 2024
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Please note:
This document and any further product information - if available - can be downloaded at the internet link:

https://www.weidmueller.com

Weidmüller

Overview

Weidmüller´s Media Converter, which is specially designed for reliable and stable operation in harsh industrial environments, provides industrial grade media conversion between 10/100BaseT(X) and 100BaseFX. The IE-MC-VL Series reliable industrial design is excellent for keeping your industrial automation applications running continuously and comes with a relay output warning alarm to help prevent damages and losses.

This product is available in an operating temperature range from 0 to 60°C or -40 to 75°C, and is designed to withstand a high degree of vibration and shock. The rugged hardware design makes IE-MC-VL Series perfect for ensuring that your Ethernet equipment can withstand critical industrial applications, such as in hazardous locations (Class 1 Division 2/Zone 2), and complies with FCC, UL and CE Standards.

Package Checklist

Weidmüller Media Converter is shipped with the following items. If any of these items is missing or damaged, please contact your customer service representative for assistance.

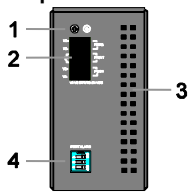
- Weidmüller Media Converter
- Hardware Installation Guide

Features

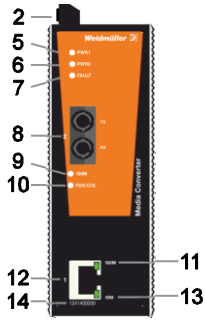
- Supports 10/100Base-TX auto-negotiation and auto-MDI/MDI-X
- Multi mode, single mode with SC or ST fiber connector available
- Supports Link Fault Pass-Through
- Relay Output alarm when a port breaks or the power fails
- Redundant 24 VDC (12 to 45 VDC) power inputs
- Operating temperature range from 0 to 60°C, or extended operating temperature from -40 to 75°C for (-T) models

Panel Layout of IE-MC-VL Series

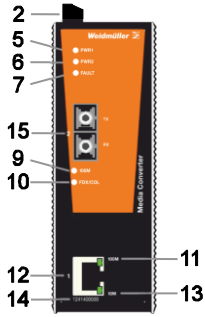
Top Panel View



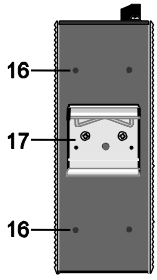
Front Panel View
IE-MC-VL-1TX-1ST



Front Panel View
IE-MC-VL-1TX-1SC/1SCS



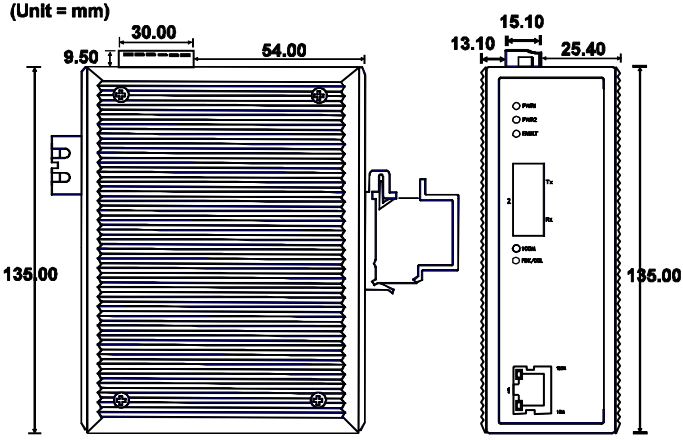
Rear Panel View



1. Grounding screw
2. Terminal block for power input PWR1/PWR2 and relay output
3. Heat dissipation orifices
4. Dip switch
5. Power input PWR1 LED
6. Power input PWR2 LED
7. Fault LED
8. 100BaseFX (ST connector) Port
9. FX port's 100 Mbps LED
10. FX port's Full Duplex/Collision LED
11. TP port's 100 Mbps LED
12. 10/100BaseT(X)
13. TP port's 10 Mbps LED
14. Article Number
15. 100BaseFX (SC connector) Port
16. Screw hole for wall mounting kit
17. DIN-Rail mounting kit

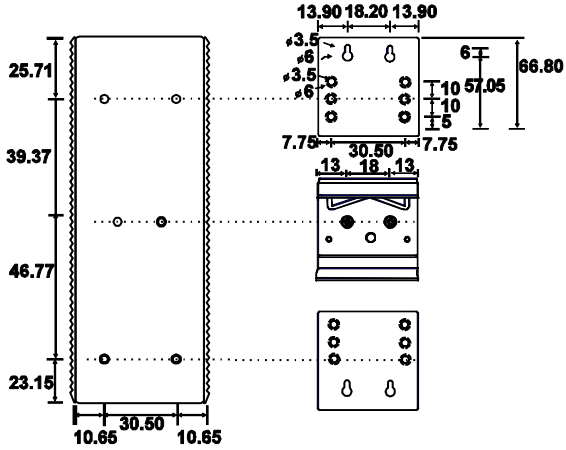
Mounting Dimensions

(Unit = mm)



Side View

Front View



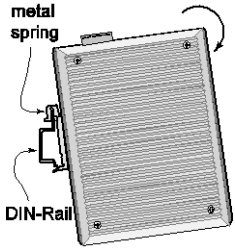
Back View

Panel Mount Kit

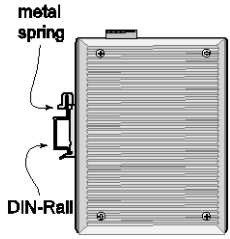
DIN-Rail Mounting

The aluminum DIN-Rail attachment plate should be fixed to the back panel of Weidmüller Media Converter when you take it out of the box. If you need to reattach the DIN-Rail attachment plate to the device, make sure the stiff metal spring is situated towards the top, as shown in the figures below.

STEP 1:
Insert the top of the DIN-Rail into the slot just below the stiff metal spring.



STEP 2:
The DIN-Rail attachment unit will snap into place as shown below.



To remove the Media Converter from the DIN-Rail, simply reverse Steps 1 and 2 above.

ATEX Information

1. Certification number: DEMKO 11 ATEX1106692X
2. Ambient range (-40°C ≤ Tamb ≤ 75°C)
3. Certification string : Ex nA nC IIC T4 Gc
4. Standards covered:
   EN 60079-0:2012+A11:2013
   EN 60079-15:2010
5. The conditions of safe usage:
   - The equipment should be installed in an enclosure that provides a minimum ingress protection of IP 54 in accordance with IEC/EN 60079-0.
   - The equipment should only be used in an area of at least pollution degree 2, as defined by IEC/EN 60664-1. disturbances of more than 40%.
6. Rated Cable Temp ≧ 87.3°C

Wiring Requirements

WARNING

WARNING

Substitution of components may impair suitability for Class I, Division 2 and Zone 2.

These devices must be supplied by a SELV source as defined in the Low Voltage Directive 2014/35/EU.

WARNING

Do not disconnect modules or wires unless the power has been switched off or the area is known to be non-hazardous. The devices may only be connected to the supply voltage shown on the type plate.

The devices are designed for operation with a safety extra-low voltage. Thus, they may only be connected to the supply voltage connections and to the signal contact with the safety extra-low voltages (SELV) in compliance with IEC 60950-1/VDE0805.

ATTENTION

This unit is a built-in type. During installation into certain end equipment, it must comply with fire enclosure stipulations of IEC 60950-1, or similar statements.

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your Weidmüller Media Converter.

Safety First!

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.

If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

You should also pay attention to the following points:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.

  NOTE: Do not run signal or communications wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.
- You can use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separated.
- It is strongly advised that you label wiring to all devices in the system when necessary.

Grounding the Media Converter

Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screw to the grounding surface prior to connecting devices.

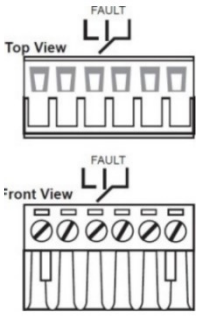
ATTENTION

This product is intended to be mounted to a well-grounded mounting surface. such as a metal panel. A 4 mm² conductor must be used when a connection to the external grounding screw is used.

Wiring the Alarm Contact

The Alarm contact is made up of the two middle contacts of the terminal block on the Media Converter's top panel. Refer to the next section for detailed instructions on how to connect the wires to the terminal block connector, and how to attach the terminal block connector to the terminal block receptor.

In this section, we explain the meaning of the two contacts used to connect the Alarm Contact.



FAULT: The two middle contacts of the 6-contact terminal block connector are used to detect both power faults and port faults. The two wires attached to the Fault contacts form an open circuit when:

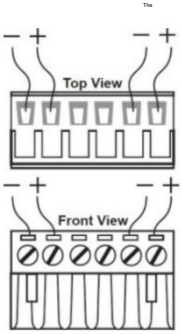
1. The Media Converter has lost power from one of the DC power inputs.

   OR

2. One of the ports for which the corresponding PORT ALARM Dip Switch is set to ON is not properly connected.

If neither of these two conditions occurs, the Fault circuit will be closed.

Wiring the Redundant Power Inputs



STEP 1: Insert the negative/positive DC wires into the V-/V+ terminals.

STEP 2: To keep the DC wires from pulling loose, use a small flat-blade screwdriver to tighten the wire-clamp screws on the front of the terminal block connector.

STEP 3: Insert the plastic terminal block connector prongs into the terminal block receptor, which is located on the Media Converter's top panel.

NOTE Terminal block with 28 to 12 AWG (torque value 4.5 lb-in) should be used with the devices.

ATTENTION

Before connecting the device to the DC power inputs, make sure the DC power source voltage is stable.

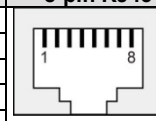
Communication Connections

IE-MC-VL models have one 10/100BaseT(X) Ethernet port, and one 100BaseFX (SC or ST type connector) fiber port.

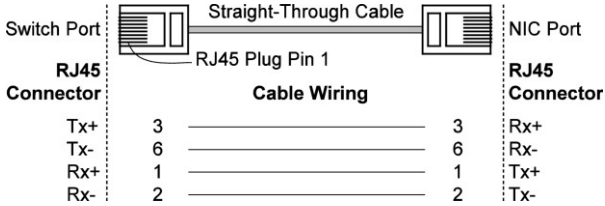
10/100BaseT(X) Ethernet Port Connection

The 10/100BaseT(X) ports located on the Media Converter's front panel are used to connect to Ethernet-enabled devices.

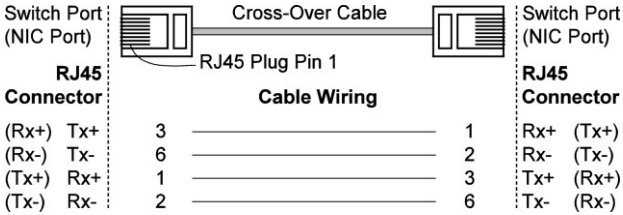
Below we show pinouts for both MDI (NIC-type) ports and MDI-X (HUB/Switch-type) ports and show cable wiring diagrams for straight-through and cross-over Ethernet cables.

MDI Port Pinouts		MDI-X Port Pinouts		8-pin RJ45
Pin	**Signal**	**Pin**	**Signal**	
1	Tx+	1	Rx+	
2	Tx-	2	Rx-	
3	Rx+	3	Tx+	
6	Rx-	6	Tx-	

RJ45 (8-pin) to RJ45 (8-pin) Straight-Through Cable Wiring



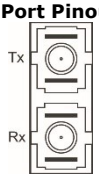
RJ45 (8-pin) to RJ45 (8-pin) Cross-Over Cable Wiring



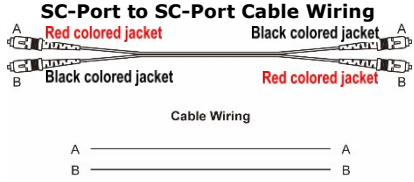
100BaseFX Ethernet Port Connection (Fiber)

Remember to connect the Tx (transmit) port of device 1 to the Rx (receive) port of device 2, and the Rx (receive) port of device 1 to the Tx (transmit) port of device 2. Fiber optic connections generally are using the full-duplex transmission mode.

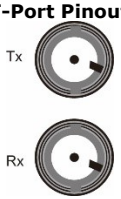
SC-Port Pinouts



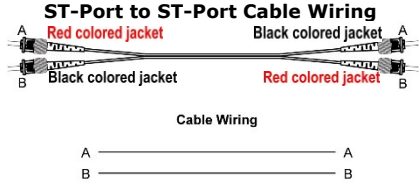
SC-Port to SC-Port Cable Wiring



ST-Port Pinouts



ST-Port to ST-Port Cable Wiring



ATTENTION

This is a Class 1 Laser/LED product. To avoid causing serious damage to your eyes, do not stare directly into the Laser Beam.

Redundant Power Inputs

Both power inputs can be connected simultaneously to live DC power sources. If one power source fails, the other live source acts as a backup, and automatically supplies all of the Media Converter's power needs.

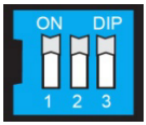
Alarm Contact

Weidmüller Media Converter has one Alarm Contact located on the top panel. For detailed instructions on how to connect the Alarm Contact power wires to the two middle contacts of the 6-contact terminal block connector, see the "Wiring the Alarm Contact" section above. A typical scenario would be to connect the Fault circuit to a warning light located in the control room. The light can be set up to switch on when a fault is detected.

The Alarm Contact has two terminals that form a Fault circuit for connecting to an alarm system. The two wires attached to the Fault contacts form an open circuit when (1) the Media Converter has lost power from one of the DC power inputs, or (2) one of the ports for which the corresponding PORT ALARM Dip Switch is set to ON is not properly connected.

If neither of these two conditions occurs, the Fault circuit will be closed.

Dip Switch Setting



Dip Switch 1 (Default: Off)

ON: Enables the PORT Alarm. If the port's link fails, the relay will form an open circuit and the fault LED will light up.

Off: Disables the corresponding PORT Alarm. The relay will form a closed circuit and the Fault LED will never light up.

Dip Switch 2 (Default: ON)

ON: Enables full duplex for 100BaseFX

Off: Disables full duplex for 100BaseFX

Dip Switch 3

Reserved for future use

To activate the updated DIP switch settings, power off and then power on the Media Converter**.**

LED Indicators

The front panel of the Media Converter contains several LED indicators. The function of each LED is described in the table below.

LED	Color	State	Description
PWR1	AMBER	On	Power is being supplied to power input PWR1
		Off	Power is **not** being supplied to power input PWR1
PWR2	AMBER	On	Power is being supplied to power input PWR2
		Off	Power is **not** being supplied to power input PWR2
FAULT	RED	On	When the corresponding PORT alarm is enabled, and the port's link is inactive.
		Off	When the corresponding PORT alarm is enabled and the port's link is active, or when the corresponding PORT alarm is disabled.
10M	GREEN	On	TP port's 10 Mbps link is active
		Blinking	Data is being transmitted at 10 Mbps
		Off	TP Port's 10 Mbps link is inactive
100M (TP)	GREEN	On	TP port's 100 Mbps link is active
		Blinking	Data is being transmitted at 100 Mbps
		Off	100BaseTX Port's link is inactive
100M (FX)	GREEN	On	FX port's 100 Mbps is active
		Blinking	Data is being transmitted at 100 Mbps
		Off	100BaseFX port is inactive
FDX/ COL	GREEN	On	100BaseFX port is being transmitted at full duplex
		Blinking	Collision occurs
		Off	100BaseFX port is being transmitted at half duplex

Auto MDI/MDI-X Connection

The Auto MDI/MDI-X function allows users to connect the Media Converter's 10/100BaseTX ports to any kind of Ethernet device, without paying attention to the type of Ethernet cable being used for the connection. This means that you can use either a *straight-through* cable or *cross-over* cable to connect the Media Converter to Ethernet devices.

Dual Speed Functionality and Switching

The Media Converter's 10/100 Mbps RJ45 switched port auto negotiates with the connected device for the fastest data transmission rate supported by both devices. All models of Weidmüller Media Converter are plug-and-play devices, so that software configuration is not required at installation, or during maintenance. The half/full duplex mode for the RJ45 switched ports is user dependent and changes (by auto-negotiation) to full or half duplex, depending on which transmission speed is supported by the attached device.

Auto-Negotiation and Speed Sensing

All of Weidmüller Media Converter's RJ45 Ethernet ports independently support auto-negotiation for transmission speed in the 10BaseT and 100BaseTX modes, with operation according to the IEEE 802.3u standard. This means that some nodes could be operating at 10 Mbps, while at the same time, other nodes are operating at 100 Mbps.

Auto-negotiation takes place when a RJ45 cable connection is made, and then each time a link is established. The Media Converter advertises its capability for using either 10 Mbps or 100 Mbps transmission speeds, with the device at the other end of the cable expected to advertise similarly. Depending on what type of device is connected, this will result in agreement to operate at a speed of either 10 Mbps or 100 Mbps.

If the Media Converter's RJ45 Ethernet port is connected to a non-negotiating device, it will default to 10 Mbps speed and half-duplex mode, as required by the IEEE 802.3u standard.

Specifications

Technology	
Standards	IEEE 802.3 for 10BaseT, IEEE 802.3u for 100BaseT(X) and 100Base FX, Link Fault Pass-through
Interface	
RJ45 Ports	10/100BaseT(X)
Fiber Ports	100BaseFX ports (SC/ST connector, multi/single-mode)
LED Indicators	Power, Fault, 10/100M, Full Duplex/Collision
DIP Switch	Port break alarm mask, 100BaseFX Full/Half Duplex selection
Alarm Contact	One relay output with current-carrying capacity of 1A @ 24 VD

Optical Fiber

			Multi-mode	Single-mode
Fiber Cable Type		OM1	50/125 μm 800 MHz*Km	G.652
Typical Distance		4 km	5 km	40 km
Wavelength	Typical (nm)	1300		1310
	TX Range (nm)	1260 to 1360		1280 to 1340
	RX Range (nm)	1100 to 1600		1100 to 1600
Optical Power	TX Range (dBm)	-10 to -20		0 to -5
	RX Range (dBm)	-3 to -32		-3 to -34
	Link Budget (dB)	12		29
	Dispersion Penalty (dB)	3		1

Note: When connecting 40 km single-mode fiber over a short distance, we recommend putting an attenuator to prevent the transceiver from being damaged by excessive optical power.

Typical Distance: To reach the typical distance of a specified fiber transceiver, please refer to the following formula: Link budget(dB) > dispersion penalty(dB) + total link loss(dB).

Power	
Input Voltage	24 VDC (12 to 45 VDC), 2 redundant inputs
Input Current	0.16 A @ 24 V
Connection	One removable 6-pin terminal block
Overload Current Protection	1.1 A
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	IP30 protection, metal case
Dimension (W x H x D)	53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Weight	630 g
Installation	DIN-rail
Environmental	
Operating Temperature	-0 to 60°C (32 to 140°F) -40 to 75°C (-40 to 167°F) for -T models
Storage Temperature	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% (non-condensing)
Regulatory Approvals	
Safety	UL 60950-1, UL 508
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C, and

	D; ATEX Zone 2: Ex nA nC IIC T4 Gc
EMC	EN 55032/24
EMI	FCC Part 15 Class A, CISPR 32
EMS	IEC 61000-4-2 ESD IEC 61000-4-3 RS IEC 61000-4-4 EFT IEC 61000-4-5 Surge IEC 61000-4-6 CS IEC 61000-4-8 PFMF
Shock	IEC 60068-2-27
Free Fall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF	
Time	401,000 hrs
Database	MIL-HDBK-217F
Warranty	
Time Period	5 years

WARNING This equipment is intended to be used in a restricted access location.

HOT SURFACE!! Before touching it, special attention or protection is required.

Disposal Information

Observe the notes for proper disposal of the product. You can find the notes here: www.weidmueller.com/disposal.

Weidmüller gives a 5-year warranty on this product in accordance with the warranty terms as described in the general conditions of sale of the Weidmüller company which has sold the products to you. Weidmüller warrants to you that such products the defects of which have already existed at the time when the risk passed will be repaired by Weidmüller free of charge or that Weidmüller will provide a new, functionally equivalent product to replace the defective one. Safe where expressly described otherwise in writing in this catalogue/product description, Weidmüller gives no warranty or guarantee as to the interoperability in specific systems or as to the fitness for any particular purpose. To the extent permitted by law, any claims for damages and reimbursement of expenses, based on whatever legal reason, including contract or tort, shall be excluded. Where not expressly stated otherwise in this warranty, the general conditions of purchase and the expressive liability commitments therein of the respective Weidmüller company which has sold the products to you shall be applicable.

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