Specification

Evaluation Motor Driver Box MDB-48/10

General Information

Items	Box	Option
Product type	BLDC motor driver	
Product name	Micronel MDB-48/10	Micronel MDM-48/10
Part no.	H023B-048ZX-0	H013B-048ZX-0
Project no.	18008	
Modification	Standard Product	PCBA only

SWISS ENGINEERED

REACh Compliant

RoHS III Compliant

Description

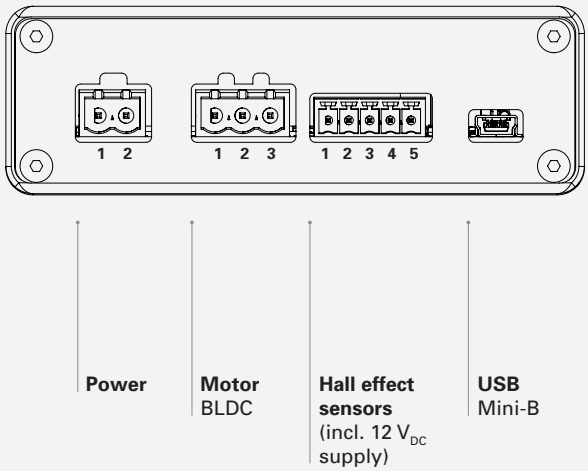
The Micronel Evaluation Motor Driver Box MDB-48/10 is a 4-quadrant motor driver evaluation tool which can be used for all Micronel fans and blowers using BLDC motors, for sensored or sensorless operation up to 480 Watts. The turnkey system incorporates all necessary mating connectors, including a USB cable for Windows® configuration and motor parameterization. The included configuration software provides a comprehensive parameter database for all Micronel fans and blowers and makes application testing and system integration quick and easy, while featuring various operation control and monitoring functions. The tool is also available as a module version.

Features

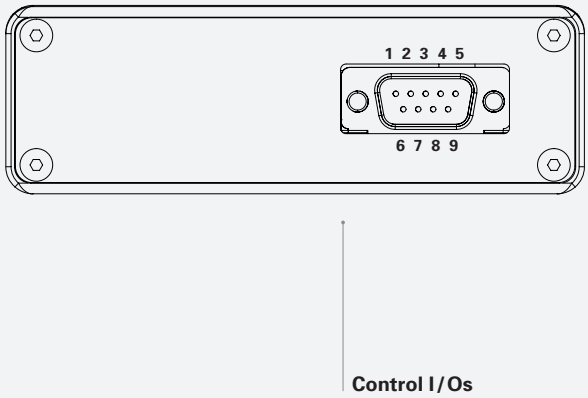
- 12 to 48 V_{DC} supply voltage with, 10 A_{RMS} output capacity
- Block commutation with 50 kHz PWM switching frequency
- Motor speed up to 100 000 RPM
- Sensored or sensorless operation
- Analog, PWM or parameter speed setting
- Speed control loop with adjustable PID parameters
- USB and RS485 configuration and control interfaces
- Included Windows® graphical user interface with parameter database for all Micronel fans and blowers
- Digital tacho output with selectable pre-scalers
- Additional I/Os for status, control and external sensors

Connectors

Front View



Rear View



Power	**Connectors and pin assignments**
Connector type	Cage-clamp, 2 pos., 5.08 mm spacing, Amphenol Anytek 20020110-H021A01LF Mating connector: Amphenol Anytek 20020006-H021B01LF
Pinout	**Pin 1** GND **Pin 2** V_{CC}
Motor	
Connector type	Cage-clamp, 3 pos., 5.08 mm spacing, Amphenol Anytek 20020110-H031A01LF Mating connector: Amphenol Anytek 20020006-H031B01LF
Pinout	**Pin 1** Motor phase U **Pin 2** Motor phase V **Pin 3** Motor phase W
Hall Effect Sensor	
Connector type	Cage clamp, 5 pos., 3.81 mm spacing, Amphenol Anytek OQ0532510000G Mating connector: Amphenol Anytek TJ0531530000G
Pinout	**Pin 1** GND **Pin 2** Hall effect sensor signal input 1 **Pin 3** Hall effect sensor signal input 2 **Pin 4** Hall effect sensor signal input 3 **Pin 5** 12 V_{DC} supply output
USB	
Connector type	Standard USB-Mini-B connector
Control I/Os	
Connector type	Standard D-Sub 9-Pol, male, Amphenol Anytek LD09P33E4GV00LF
Pinout	**Pin 1** Analog input **Pin 2** Digital output #1 **Pin 3** RS485-B **Pin 4** SetSpeed input (analog or PWM) **Pin 5** GND **Pin 6** Digital input **Pin 7** Digital output #2 **Pin 8** RS485-A **Pin 9** Tacho output **Shield** Connected to GND

Note: Unused pins can be left open

Absolute Maximum Ratings

Parameters	Values
Supply voltage	53 V_{DC}
Hall effect sensor supply load	50 mA
Hall effect sensor inputs	13 V_{DC}
Control inputs (analog and digital)	11 V_{DC}
Digital outputs	26 V_{DC}, 40 mA
Tacho output	11 V_{DC}, 5 mA
RS485 bus voltage	-7, +12 V_{DC}

Stresses at or beyond listed conditions may cause permanent damage to the device!

Handle in power-off conditions only!

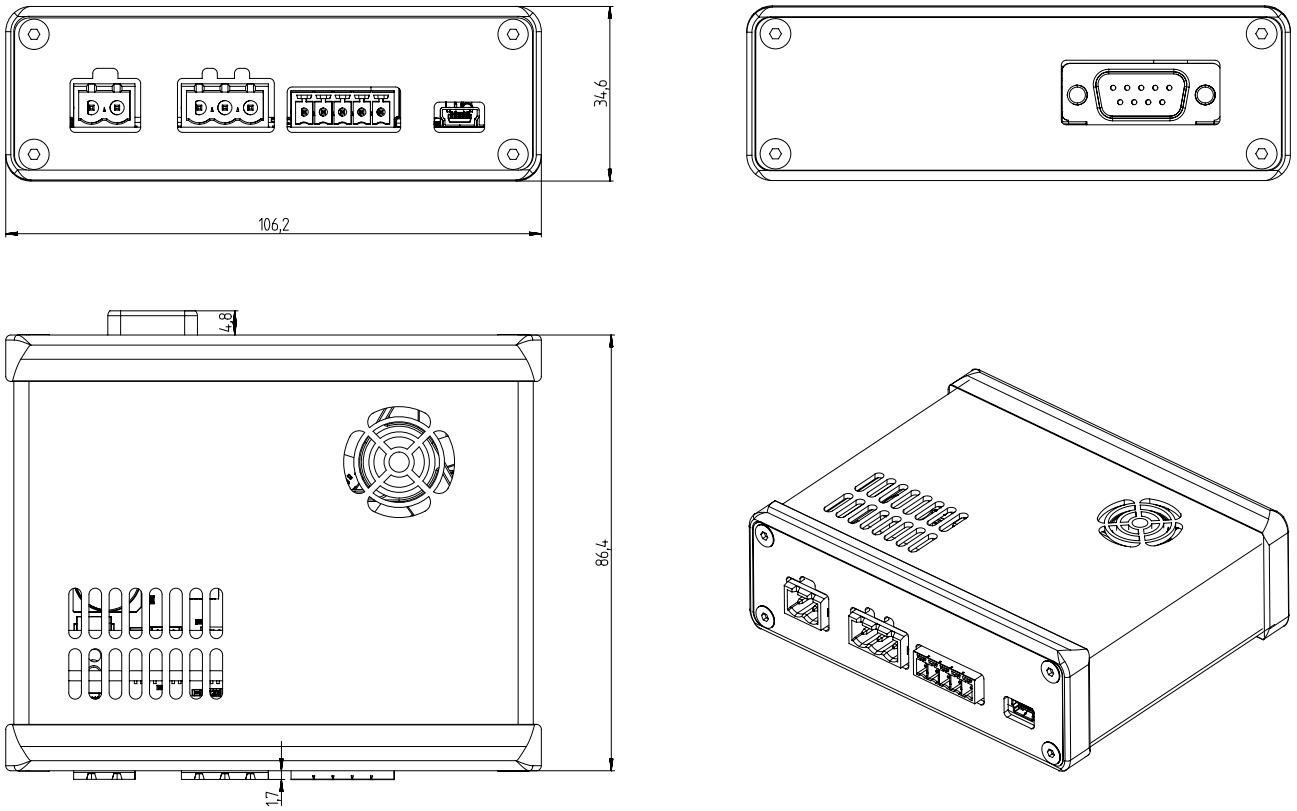
Technical Data

Parameters	Operation Conditions / Features
Supply input	12 to 48 V_{DC} (±10 %) 500 µF ±20 % total input capacitance
Output current	Maximal 10 A_{RMS}
PWM switching frequency	50 kHz
Motor speed	Maximal 100 000 RPM (with 2 pole motors) Speed tolerance ≤ 1%
Hall effect sensor supply output	Nominal 12 V_{DC} (11.3 to 12.5 V_{DC}) Short circuit protected for 60 seconds
Hall effect sensor inputs	For digital type Hall effect sensors Logic level: Low = 0 to 2 V_{DC}, high = 5 to 12.5 V_{DC} Internal pullup resistor 10 kΩ connected to internal 12 V_{DC}
Analog input	For data acquisition or external sensor control loop Analog range: 0 to 12 V_{DC} (12-bit resolution, ±5% accuracy), input current < 1 mA
SetSpeed input	Analog or PWM Analog range: 0 to 10 V_{DC} (12-bit resolution, ±5% accuracy), input current < 1 mA PWM logic levels: Low = 0 to 1 V_{DC}, high = 3 to 10 V_{DC} PWM input frequency: 1 to 10 kHz PWM duty cycle: 1-99 % (±1 % accuracy)
Digital input	For operational control Logic levels: Low level = 0 to 1 V_{DC}, high level = 3 to 10 V_{DC}, input current < 1 mA
Digital outputs	For status indication Open collector, max. 24 V_{DC}/40 mA Internal pullup resistor 10 kΩ connected to internal 5 V_{DC} Short circuit protected against 12 V_{DC} for 60 seconds, or 24 V_{DC} for 10 seconds
Digital speed tacho output	Open collector output, max. 10 V_{DC}, 5 mA Internal pullup resistor 10 kΩ connected to internal 5 V_{DC} Frequency range: 100 to 20 000 Hz, with selectable pre-scalers (±1% accuracy)
RS485 interface	VA-VB threshold > ±200 mV No internal pre-biasing or termination resistor equipped
Configuration/control interfaces	RS485 and USB 2.0 Windows® (7 or higher) graphical user interface provided, no driver installation needed RS485 protocol commands can be displayed instantly for copying into customer's own application (e.g. PLC controls)
Safety and protection	Power supply and all control I/Os are clamping and ESD protected in accordance with IEC61000-4-2; power supply input is not polarity protected I^2t protection Overcurrent surge protection
Cooling	Internal fan (temperature controlled)
Box dimension	106.2 x 86.4 x 34.6 mm
Weight	230 g (without cables and mating connectors)

Unless otherwise stated all data are measured at nominal voltage and are valid at 25 °C ambient temperature.

Drawings

Dimensions in mm



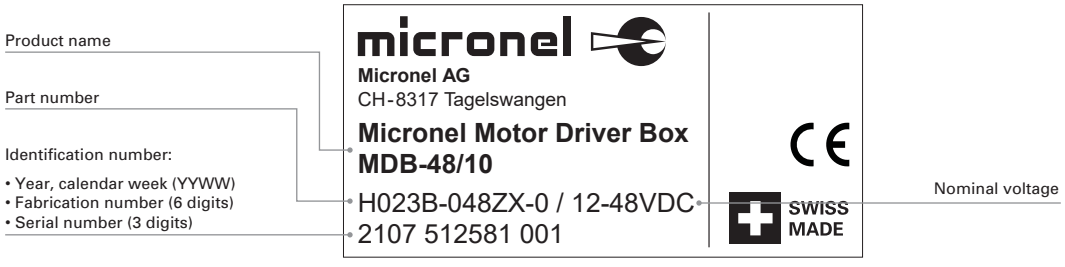
Materials

Components	Material
Box housing	Aluminum main housing Zinc-coated metal screws Plastic holders Rubber feet
Electronics	FR4 board
Labels	Polyester Synthetic film
Flammability	UL 969

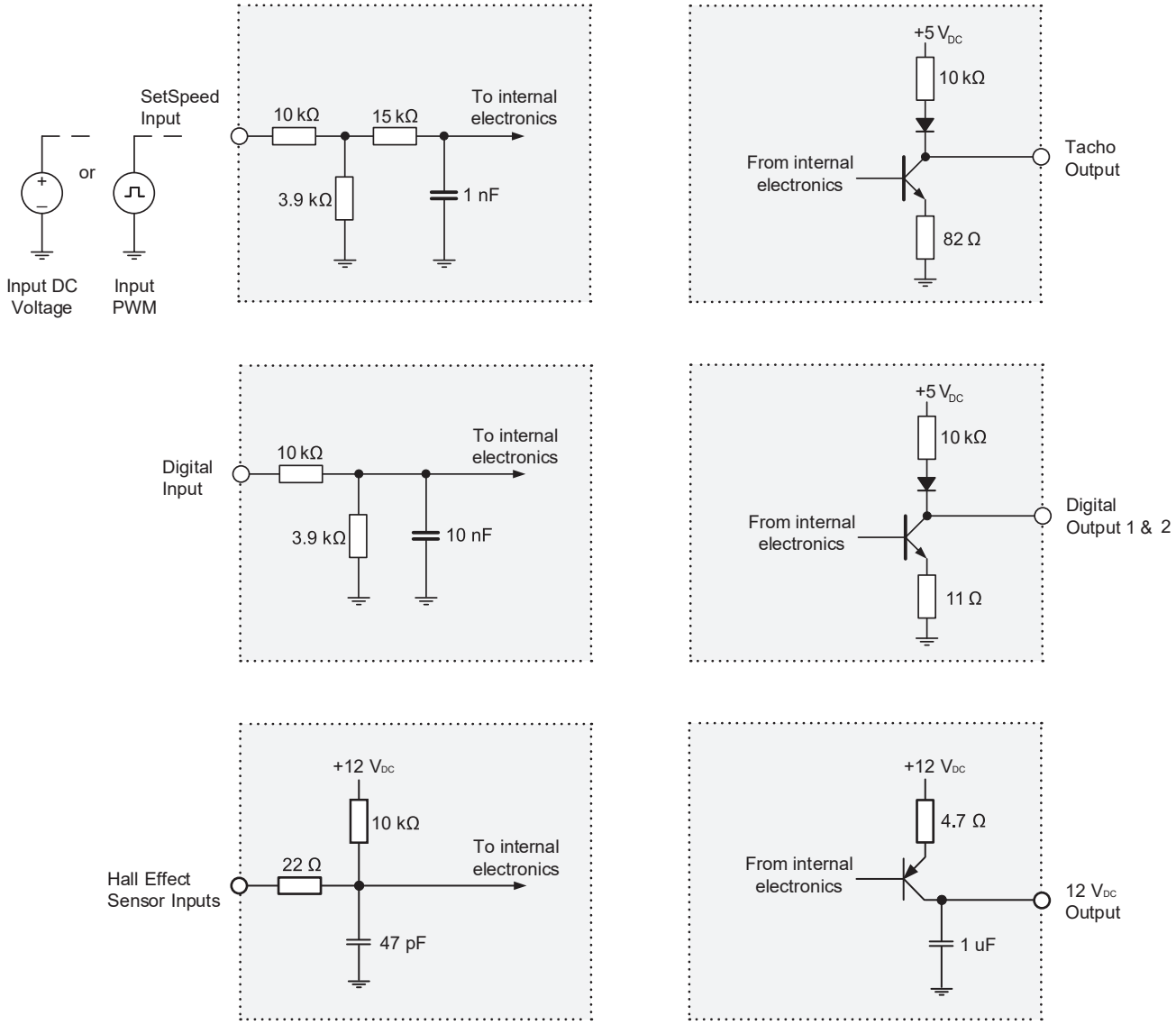
Identification

Label

Design



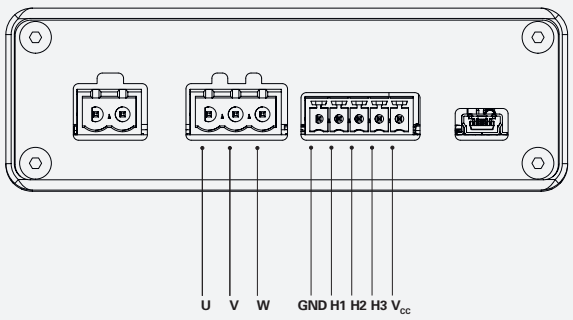
Internal Circuits of Control I/Os



Scope of Delivery

Items	Micronel MDB-48/10	Micronel MDM-48/10
Box with integrated cooling fan	●	
USB cable	●	
4 mating connectors	●	●
Graphical user interface (available upon request via E-Mail)	●	●

Connector Assignment



Motor Phase Pin Assignment

Pinout

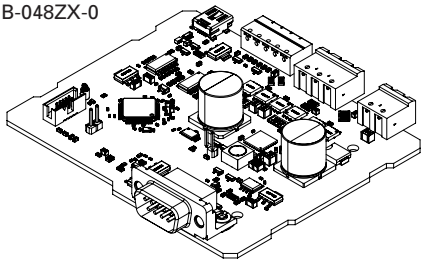
Pin 1 Motor phase U
Pin 2 Motor phase V
Pin 3 Motor phase W

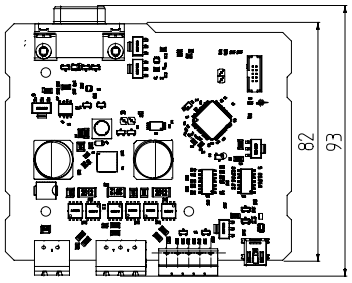
Pin 1 GND
Pin 2 Hall effect sensor signal input 1
Pin 3 Hall effect sensor signal input 2
Pin 4 Hall effect sensor signal input 3
Pin 5 12 V_{DC} supply output

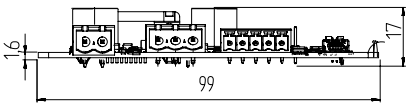
Micronel Radial Blower	Phase connections			Hall sensor connections				
	Phase U	Phase V	Phase W	GND	H1	H2	H3	V_{cc}
U51DL-012KK-5	Orange	Red	Brown					
U51DL-024KK-5	Orange	Red	Brown					
U65ML-024KS-5	Orange	Red	Brown					
U65ML-024KT-5	Orange	Red	Brown					
U65MN-024KS-5	Brown	Red	Orange	Green	Blue	Black	Grey	Yellow
U65HN-024KS-6	Red	Black	White	Blue	Yellow	Brown	Grey	Orange
U71HL-024KM-5	Brown	Red	Orange	Green	Blue	Black	Grey	Yellow
U85HL-024KH-5	Brown	Red	Orange	Green	Blue	Black	Grey	Yellow
U85MX-024KX-5	Brown	Red	Orange	Green	Blue	Black	Grey	Yellow

Option

Micronel MDM-48/10
H013B-048ZX-0



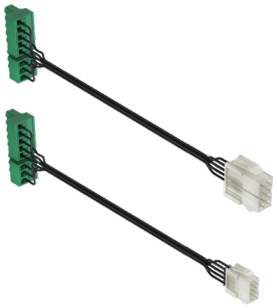




Dimensions in mm

Accessories

Not included!

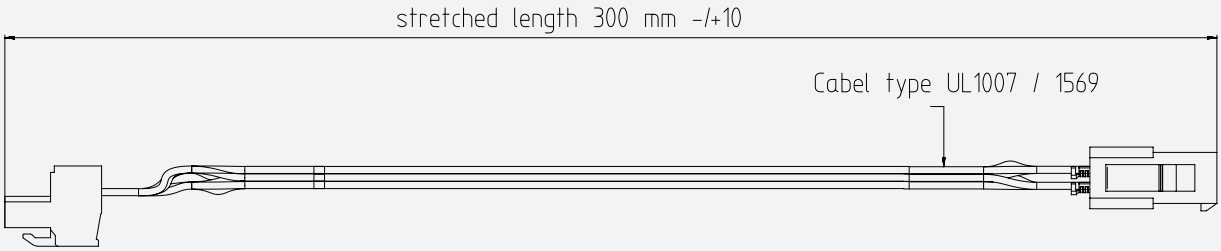


Micronel MDB Adapter Cables
M450X-587A9
M450X-588A9

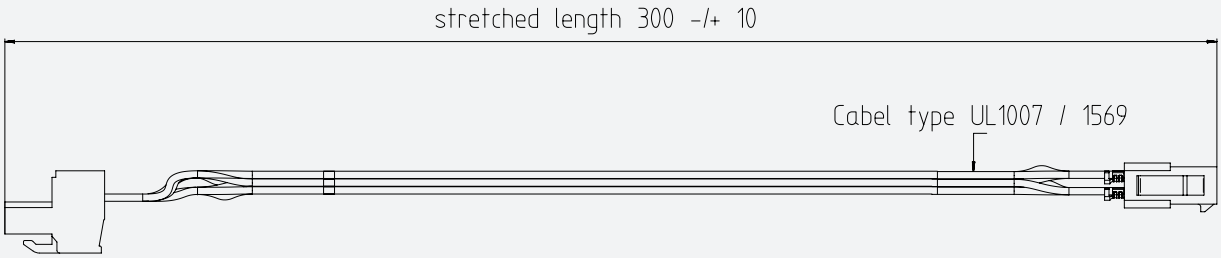
These adapter cables allow limited selection of Micronel blowers to be connected directly to the Micronel Motor Driver Box MDB-48/10.

Parameters	M450X-587A9	M450X-588A9
Size	Stretched length 300 mm +/- 10 mm	Stretched length 300 mm +/- 10 mm
AWG	5 x AWG24 3 x AWG18	5 x AWG24 3 x AWG22
Protection class	Cable type UL1007 / 1569	Cable type UL1007 / 1569
Connector	Amphenol TJ0531530000G / Amphenol 20020006-h031b01lf / Molex 39-01-2081	Amphenol TJ0531530000G / Amphenol 20020006-h031b01lf / Molex 43020-0800
Suitable blowers	U71HL-024KM-5/51/52/53, U85HL-024KH-5/51/52/53, U85MX-024KX-5/51/52/53, U85MX-024KE-5, U85MN-024KE-5	U51D2-024KX-6, U65H2-024KX-6, U65H4-024KX-6, U65HN-024KS-6, U65MN-024KD-5, U65MN-024KS-5, U65MN-024KS-6, U71HX-024KX-6, U71MX-024KX-5

Micronel MDB Adapter Cable M450X-587A9



Micronel MDB Adapter Cable M450X-588A9



Dimensions in mm

Accessories

Not included!

Micronel Choke Module MCM-33/10
S0500-00001

In order to run a low inductance motor with the MDB-48/10 it is advisory to use the Choke Module to reduce ripple currents. The module comes with mating connectors.

Properties

- 3 coils with 33 µH inductance for each phase, Currents: 10.7 A_{RMS} / 15 A_{Sat}
- Reduction of ripple currents
- Raises system efficiency
- Reduces unwanted power dissipation and heat generation in the internals of the motor
- Improves EMC
- Extends lifetime of the fan
- Two Amphenol Anytek 20020110-H031A01LF PCBA terminal blocks
- Two Amphenol Anytek 20020006-H031B01LF mating connectors included

Parameters

Size	60 x 50 x 13 mm	
Recommended for the blowers	Micronel Radial Blower	U65HN-024KS-6, U71HN-024KX-6

Notice

Handle in power-off conditions only!

Please see separate accessories list or contact Micronel Sales for a full list of options and accessories.

All data are subject to change without advanced notice.
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