AIR PERFECTLY ENGINEERED

User Manual

Evaluation Motor Driver Box MDB-48/10

We strongly recommend reading
this user manual before use.

Index

1. Quick Starter Guide

1.1. System Requirements and Installation

1.1.1. System Requirements

Tablet or personal computer with

- USB 2.0 or faster
- Windows® operating system, Windows® 7 or newer.

1.1.2. Software Installation

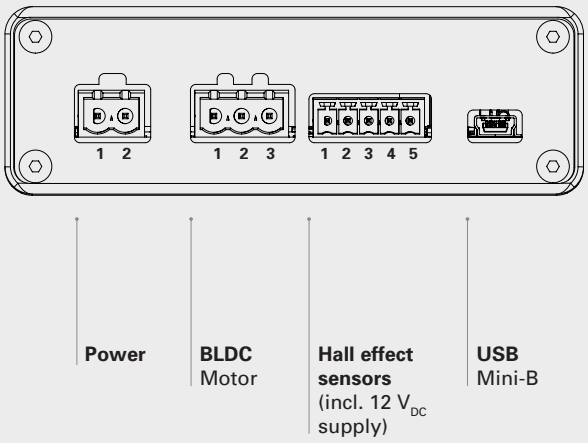
Create a folder on the computer and copy the following files from the Zip file to it:

Software
Micronel Application Software.exe
MicronelBlowerDatabaseM.dat

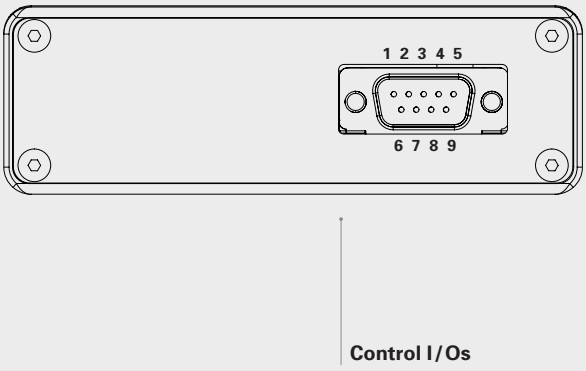
1.2. Setup

1. Connect the Micronel Evaluation Motor Driver Box MDB-48/10 to
   1) the power supply,
   2) fan or blower motor
   3) and the USB port of the computer.

Front View



Rear View



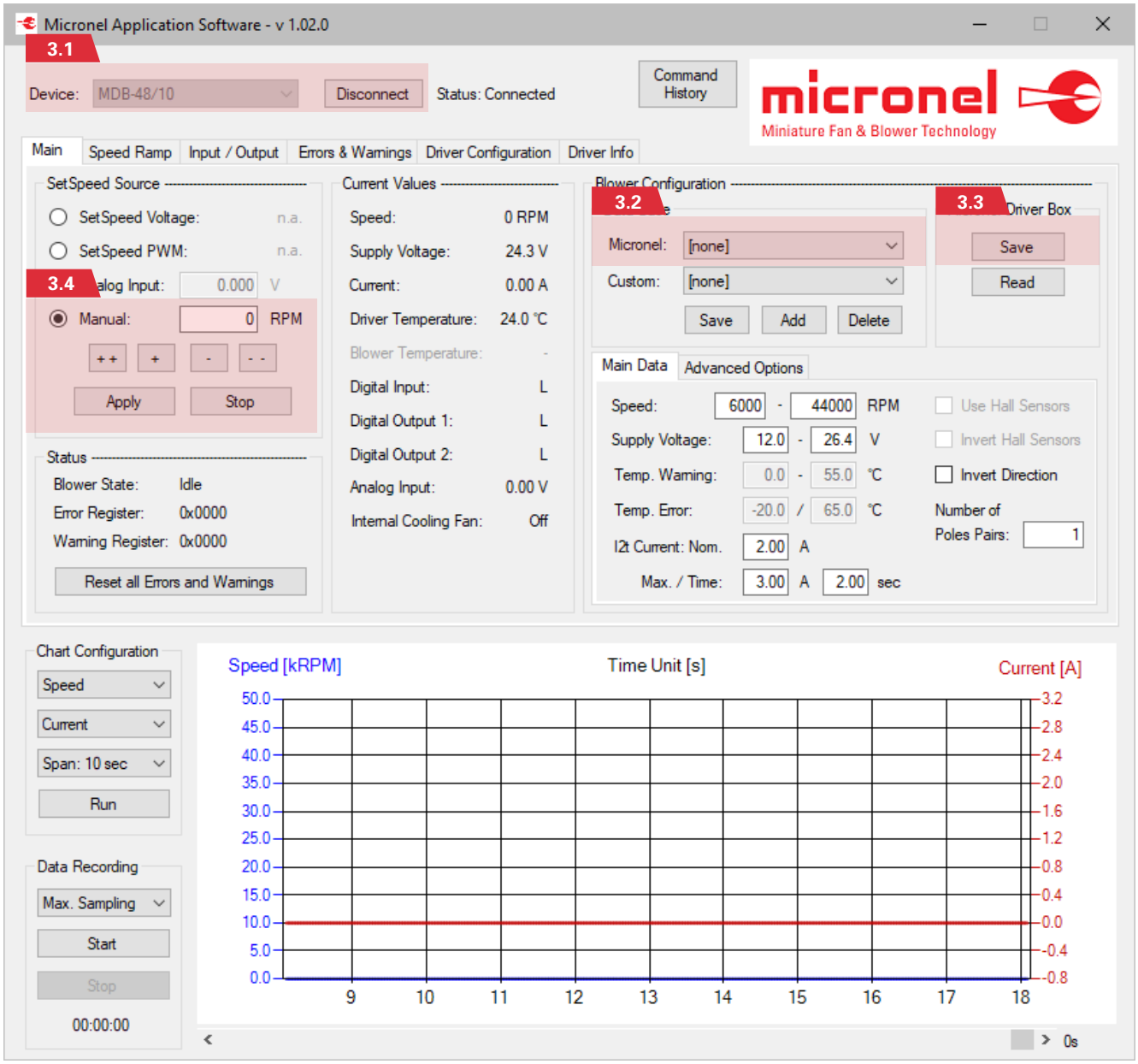
NOTE Connecting the Micronel Evaluation Motor Driver Box MDB-48/10 the first time to your personal computer the operating system recognizes it as new hardware device and takes a few seconds to initialize. Proceed with step 2.

2. Start the Windows application by double clicking the 'Micronel Application Software.exe' file.

3. Follow the next steps:

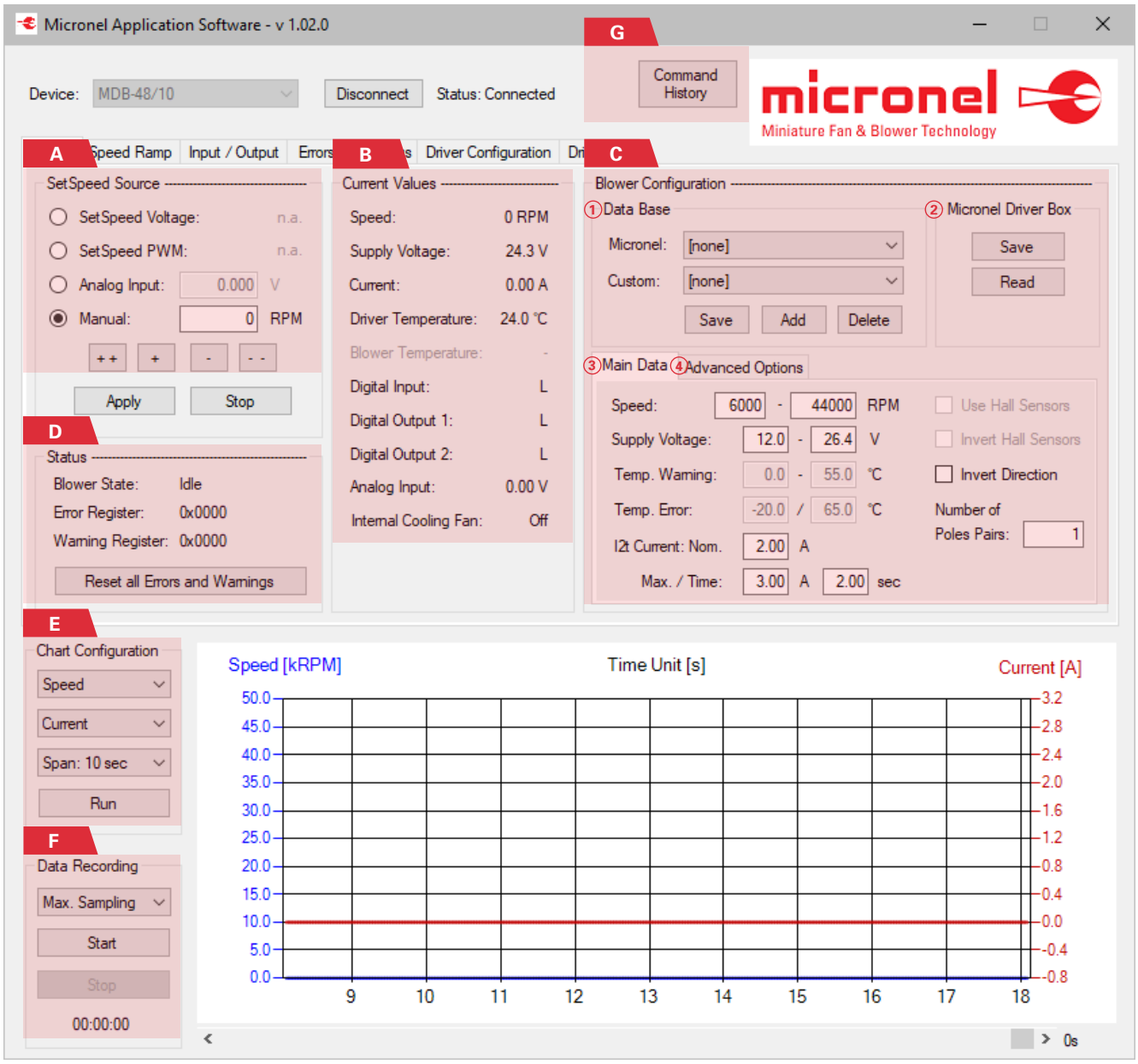
3.1. Wait until the Micronel Evaluation Motor Driver Box MDB-48/10 is listed in the dropdown menu, then select it and click on 'Connect'.
3.2. Select your fan or blower type. This will load the configuration for the selected MAG blower to the user-interface.
3.3. Click on 'Save' to write the currently loaded configuration to the Micronel Motor Driver Box MDB-48/10 with the parameters of the selected fan or blower type.
3.4. Set 'SetSpeed Source' to 'Manual' and enter a speed value. Then click 'Apply' below.

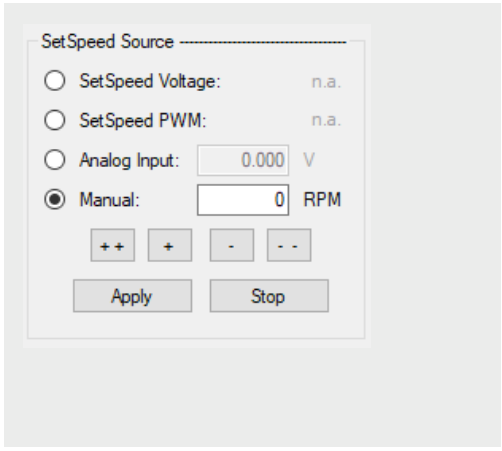
ATTENTION This will make the fan or blower start up immediately!



2. Detailed Information and Guides

2.1. 'Main' Tab

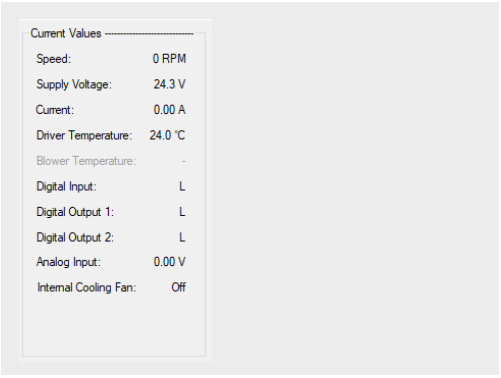




2.1.1. Section A
SetSpeed

In this section, you can select the SetSpeed source between analog voltage input, or PWM input, or manually from the value in the input text box. See the description for the 'Input/Output' tab on how to configure the SetSpeed input pin. The easiest way is to use the manual speed. After the USB connection has been established, the current SetSpeed selection of the Micronel Motor Driver Box MDB-48/10 will be loaded from the device.
See 2.3.2. Section B on how to use the 'Analog Input' as a SetSpeed source.

'Apply' will apply the selected source for speed and/or the manual speed.
'Stop' will stop the blower and set the source to 'Manual'.



2.1.2. Section B
Current Values

This section indicates all current values whereas the refresh rate (data aquisition) is moderate. For faster data acquisition, see "2.1.5. Section E: Data Acquisition".

2.1.3. Section C
Blower Configuration

Section C1

This section includes two blower configuration data bases: a) A data base provided by Micronel (upper drop-down menu), which cannot be edited by the user, and b) a data base with your custom settings (lower drop-down menu) which can be edited by the user. If you select a data base entry from the drop-down menu, the sections C3 and C4 will be filled with the corresponding configuration parameters.

Important: A data base entry contains many more configuration parameters than displayed in sections C3 and C4, e.g. startup parameters. Values in sections C3 and C4 can be edited. Thus, if you create a custom data base entry, you must derive it from a data base entry of Micronel first. 'Save' will overwrite the selected custom entry, 'Add' will add it as a new entry, and 'Delete' will delete the selected custom entry.

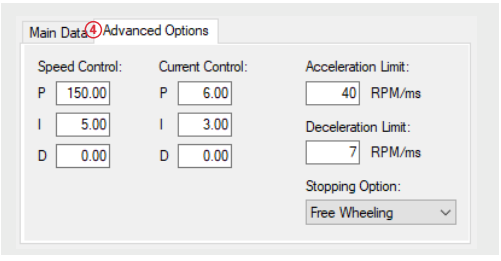
Section C2

'Save' will write the selected configuration to the Micronel Motor Driver Box MDB-48/10. After power off, the Micronel Motor Driver Box MDB-48/10 will start up with the stored configurations.

'Read' will read the current configuration settings from the Micronel Motor Driver Box MDB-48/10 hardware and display it in 'Blower Configuration'.

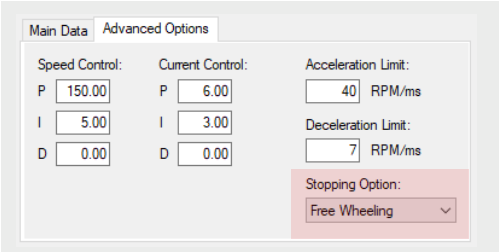
Section C3

Indicates the fan or blower configuration values, such as current limits etc. Please consider the maximum ratings when editing these configurations. The fan or blower temperature cannot be monitored by the Micronel Motor Driver Box MDB-48/10, that's why it is grayed out.



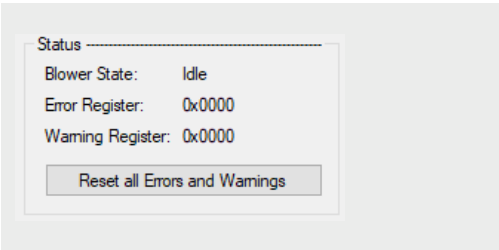
Section C4

Here you can define some blower specific parameters like the PID control parameters for the speed and the current. Additionally it is possible to set acceleration and deceleration limits, as well as a Stopping Option.



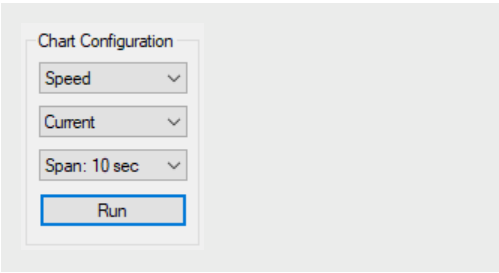
Free Wheeling – All motor phases are disconnected from the power stage and the blower wheels to a halt.
PID Control – The blower wil be decelerated to the minimal allowed speed, before freewheeling to a stop. The deceleration is executed with the set deceleration limit, and may cause recuperation.
Short Motor Phases – The motor phases will be short circuited, which results in a rapid deceleration. This method causes high currents to flow within the motor windings and is therefore to be used with care.

IMPORTANT NOTE
For Micronel fans and blowers the D-gain is not commonly used, therefore grayed out. Only experienced users should change these values in this section. Large values for the deceleration limit may result in recuperation respectively in increasing power supply voltage which may damage or shut down the power supply and/or the Micronel Motor Driver Box MDB-48/10.



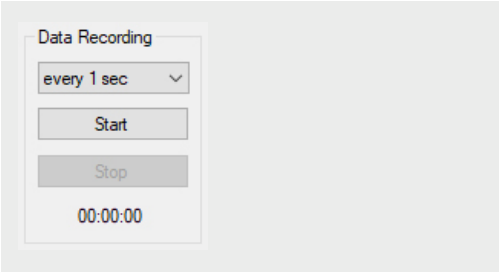
2.1.4. Section D
Status

Here you see the current blower state, and also error and warning codes in hex format. If you double click a value, you will be led to the tab 'Errors & Warnings' where the codes are explained.
'Reset all Errors' will clear all errors and warnings if possible.



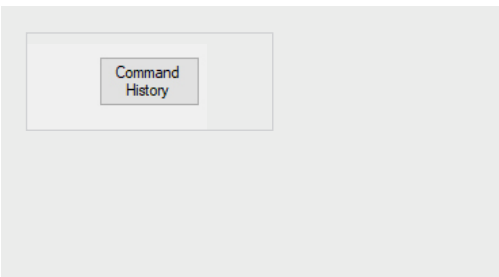
2.1.5. Section E
Data Acquisition

The first two drop down lists contain variables that can be plotted on the chart. 'Span' will vary the horizontal timeline. 'Pause' will pause the plotting. The maximal data acquisition rate is 25 samples per second.



2.1.6. Section F
Data Recording

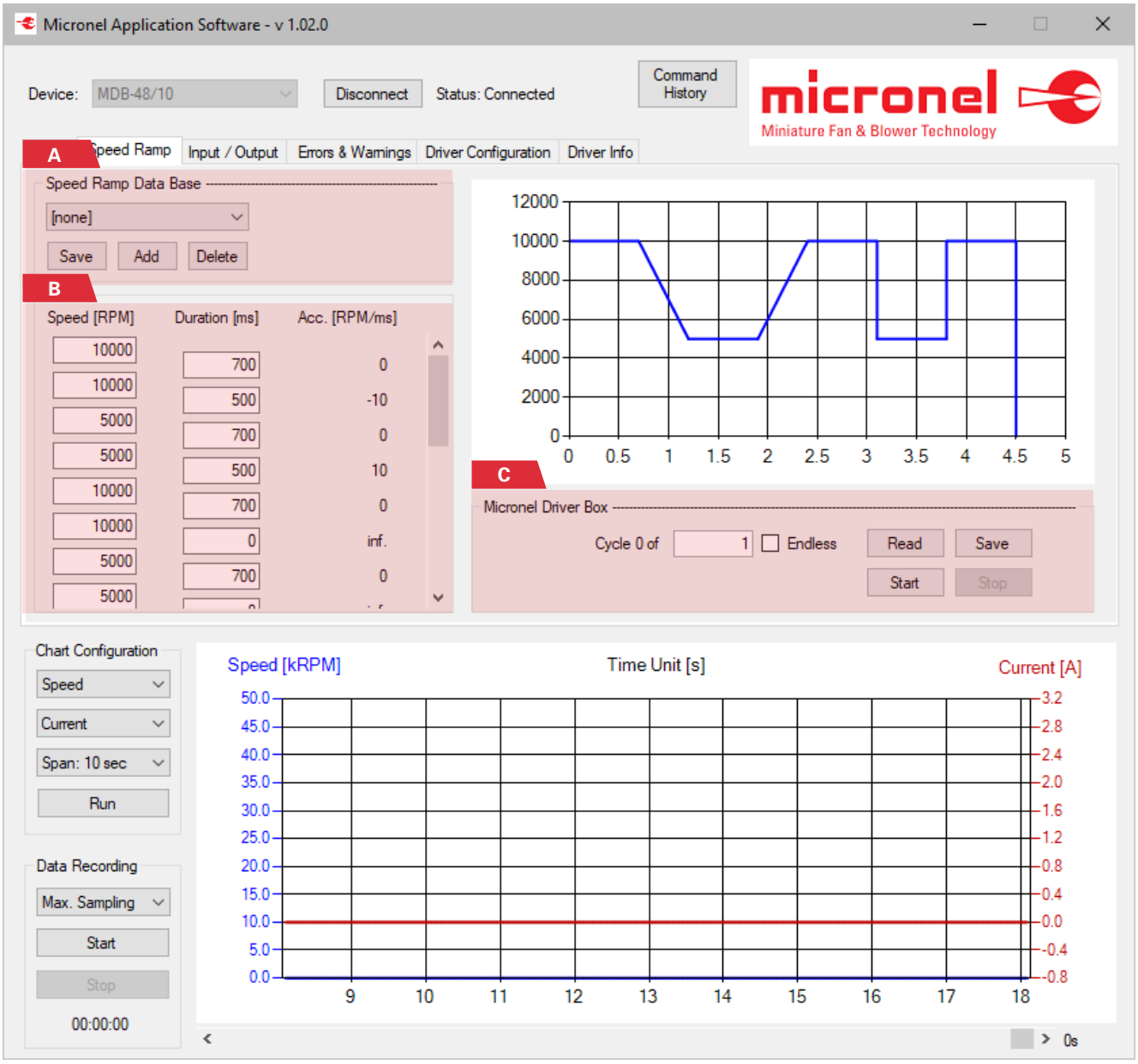
Here you can start a data recording. While the data recording is in process, you cannot change the sampling rate anymore. The generated file will be created in the same folder as the application is located (see chapter "2.7 File Information"). The maximum data acquisition rate is 25 samples per second.

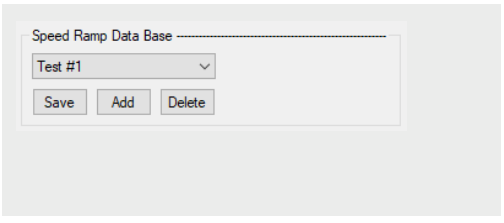


2.1.7. Section G
Command History

By clicking this button, a Windows will open indicating sent and received data between the Windows GUI and the Micronel Motor Driver Box MDB-48/10. This will help the user to set up the driver with his own application and communication (e.g. with PLC). The RS485 communication protocol is available on request.

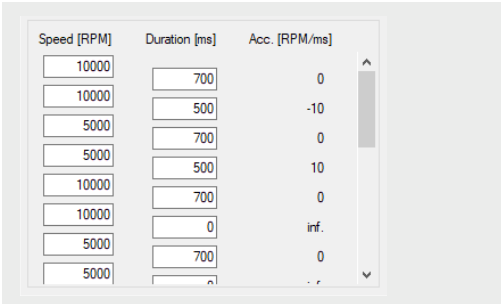
2.2. 'Speed Ramp' Tab





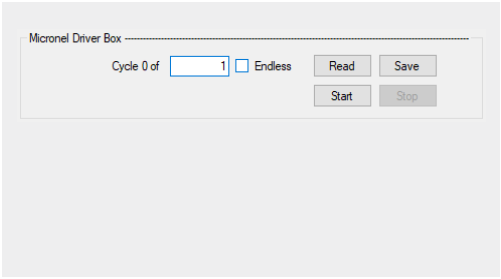
2.2.1. Section A
Speed Ramp Data Base

Here you can select, save, add or delete a stored speed ramp entry.
NOTE 'Save' will overwrite the selected data base entry with the current data in sections B and C.



2.2.2. Section B
Speed Ramp Data

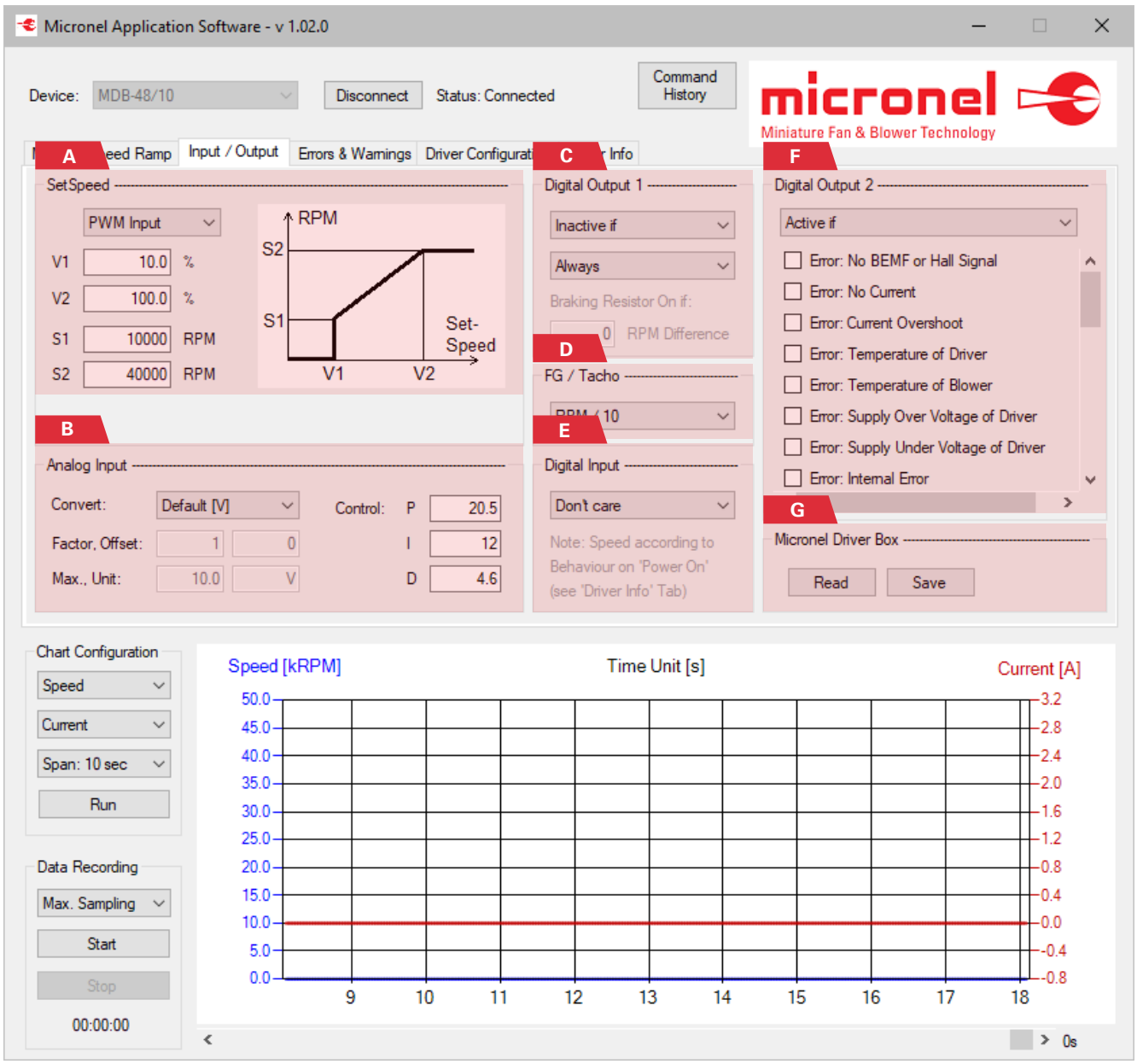
Here you can enter Speeds and step durations, the acceleration or deceleration will be calculated automatically, also the speed graph will be plotted on the right upper chart.
NOTE Click on the acceleration label to toggle between 'Acc. [RPM/ms]' and 'Acc. [Hz/s]'.

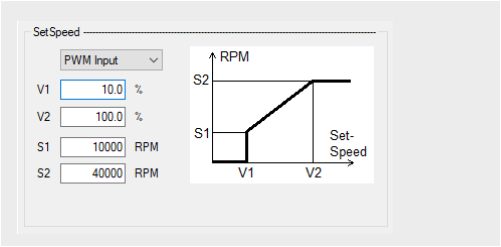


2.2.3. Section C
Micronel Driver Box

You can define whether the speed ramp is repeated for a certain number of times or endlessly. 'Save' will save the settings permanently into the Micronel Motor Driver Box MDB-48/10, 'Read' will read the settings from the Micronel Motor Driver Box MDB-48/10 and overwrite the displayed values in the GUI.

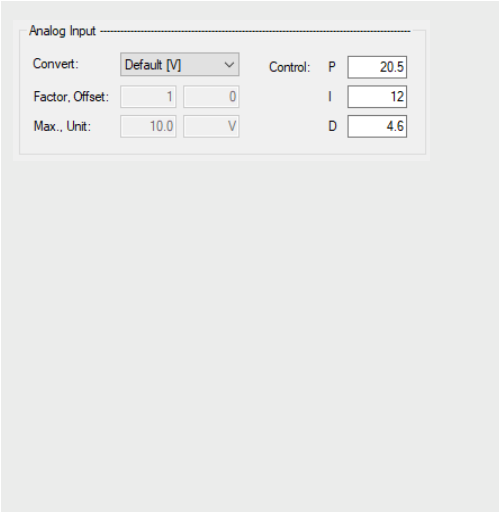
2.3. 'Input/Output' Tab





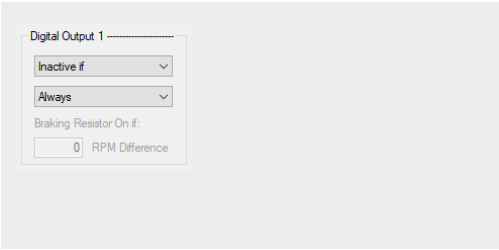
2.3.1. Section A
SetSpeed

The SetSpeed pin of the hardware can be used as analog voltage input or as PWM input. The upper drop-down menu defines in which way the input is processed. The following four variables define the "interpretation" of the SetSpeed input according to the picture displayed on the right.



2.3.2. Section B
Convert Analog Input

This section defines how the value of the analog input voltage is converted. The conversion is for displaying purposes only. This means that by changing the parameters, only the value "appearance" in the chart and in the data recording is affected.
Furthermore, the MDB-48/10 is able to control the motor speed based on an external analog voltage signal (e.g. a pressure sensor), if 'Analog Input' is selected as the SetSpeed Source in the Main tab (see 2.1.1. Section A). It will apply an additional PID control loop to eliminate the error between the output voltage of the external analog voltage signal, and the 'Analog Input' SetSpeed value. The PID control values are only considered when "Analog Input" is selected in 'SetSpeed Source' on the tab 'Main'. The PID control values are only considered when "Analog Input" is selected in 'SetSpeed Source' on the tab 'Main'.



2.3.3. Section C
Digital Output 1

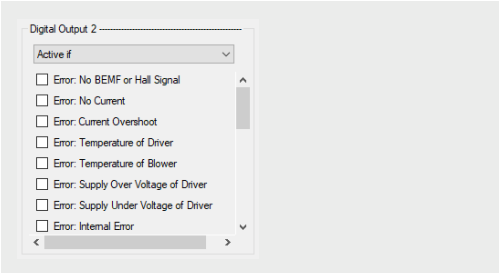
This section defines how the digital output 1 is used for indicating the drivers state.

2.3.4. Section D
FG / Tacho

FG (Frequency Generator) outputs a square wave frequency proportional to the current speed. Here you can select the divider of the speed versus output frequency.

2.3.5 Section E
Digital Input

This section defines how the digital input is used for changing the driver's state.



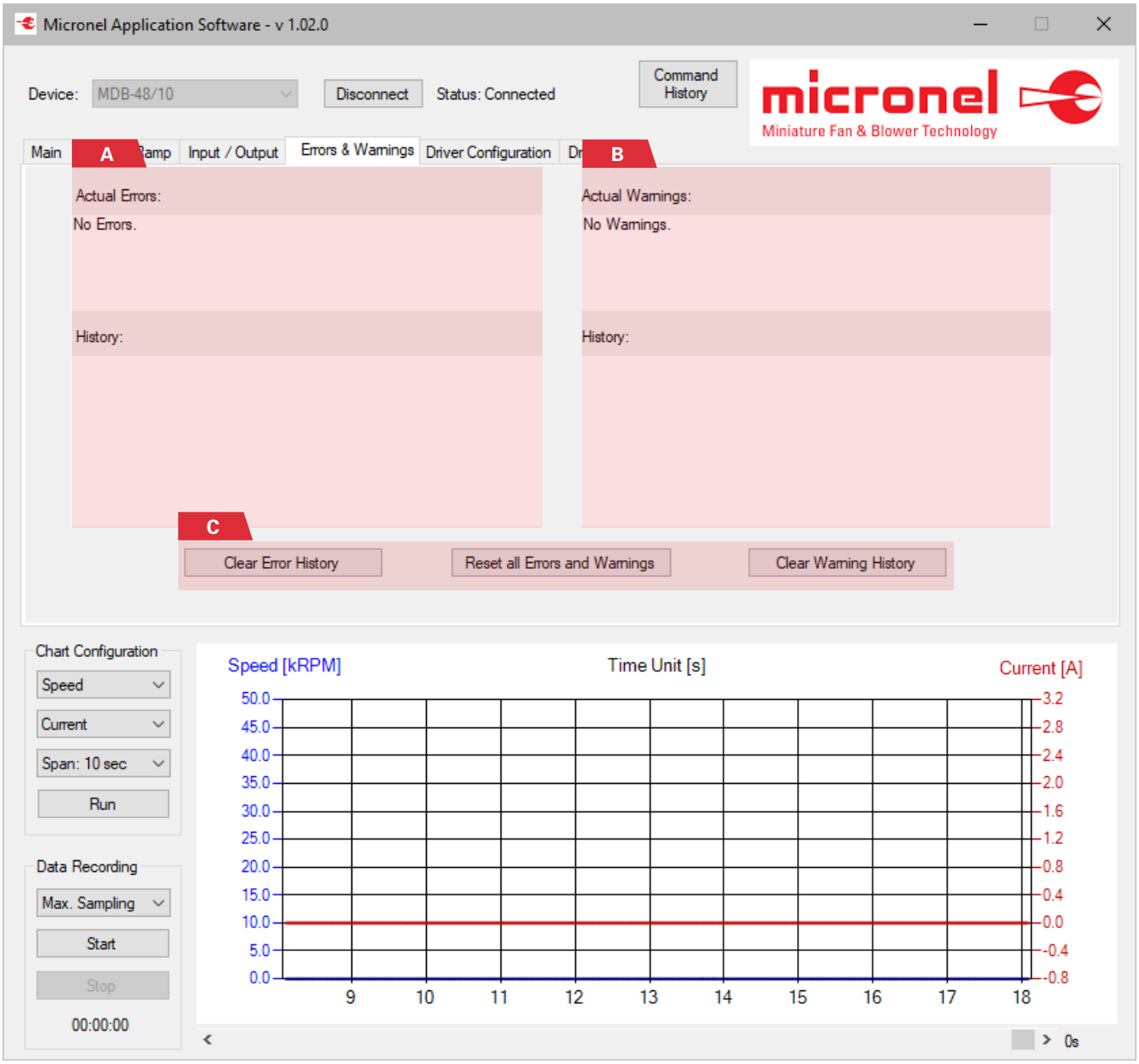
2.3.6. Section F
Digital Output 2

This section defines how the digital output 2 is used for indicating the error and/or warning states by selecting/deselecting the corresponding options.

2.3.7. Section G
Micronel Driver Box

'Save' will save the settings permanently into the Micronel Motor Driver Box MDB-48/10, 'Read' will read the settings from the Micronel Motor Driver Box MDB-48/10 and overwrite the displayed values in the GUI.

2.4. 'Errors & Warnings' Tab



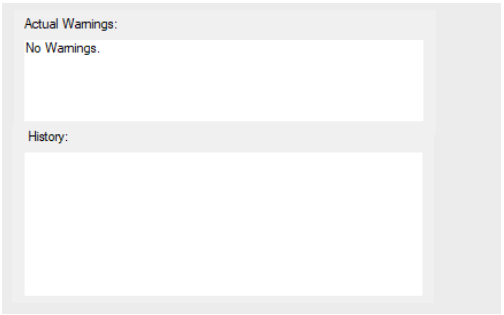
2.4.1. Section A

Actual Errors

All current errors are listed in this text field as hex values and readable texts. See also "2.1.4. Section D: Status".

Error History

All occurred errors are listed in this text field with time/date stamps.



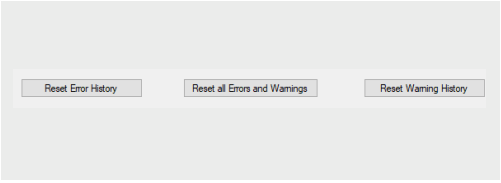
2.4.2. Section B

Actual Warnings

All current warnings are listed in this text field as hex values and readable texts. See also "2.1.4. Section D: Status".

Warning History

All occurred warning are listed in this text field with time/date stamps.



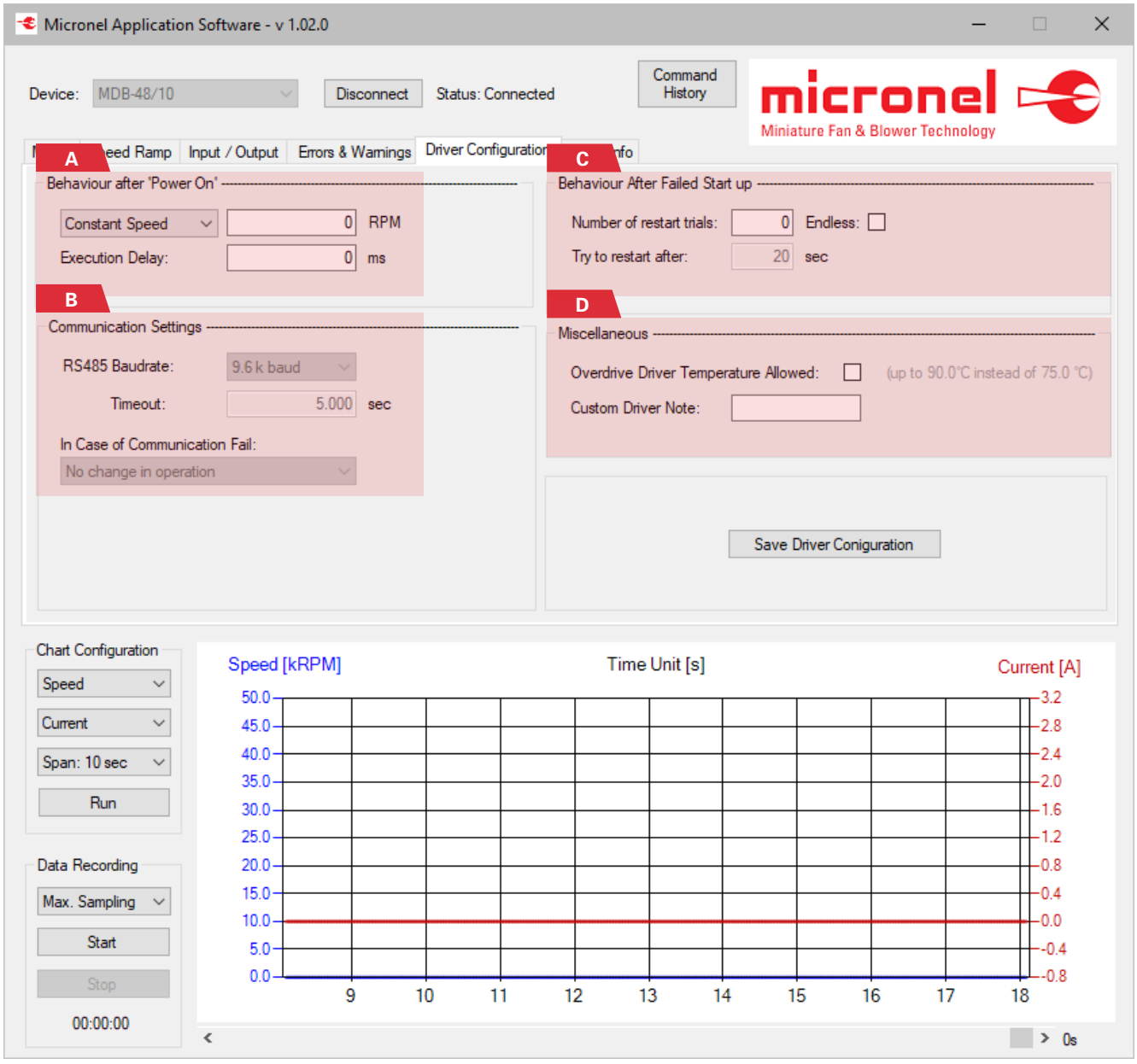
2.4.3. Section C
Buttons

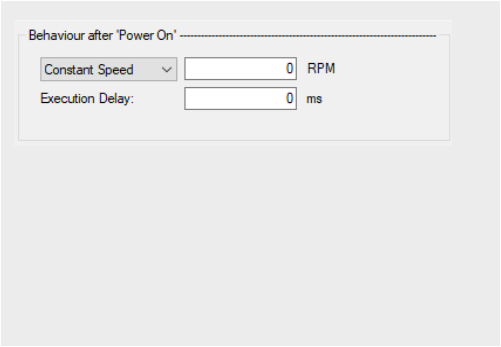
'Reset Error History' will clear the listed errors but it doesn´t reset the errors.

'Reset all Error and Warning' will reset all errors and warnings if its possible.

'Reset Warning History' will clear the listed warnings but it doesn´t reset the warnings.

2.5. 'Driver Configuration' Tab

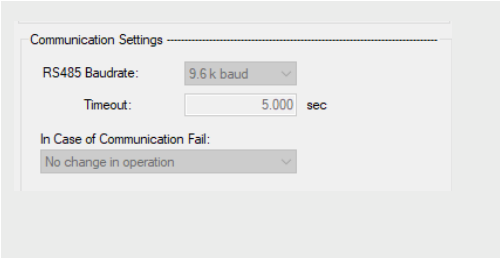




2.5.1. Section A
Behaviour after 'Power On'

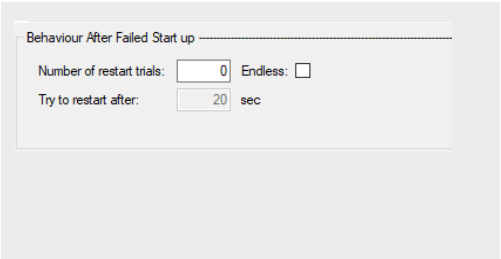
You can define the Micronel Motor Driver Box MDB-48/10's Set Speed source after power on. E.g. selecting 'constant speed' with a target value of 20 000 RPM and 'Execution Delay' with 3000 ms will cause the driver to accelerate the motor to the chosen speed 3 seconds after the power was applied.

NOTE After the USB connection has been established, the current power on behavior settings of the Micronel Motor Driver Box MDB-48/10 will override the selection of this section once.



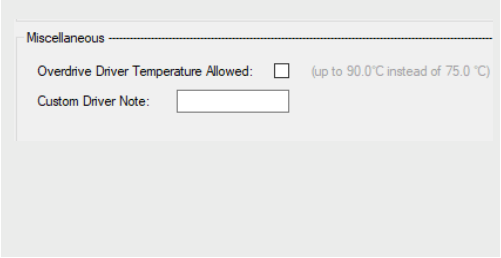
2.5.2. Section B
Communication Settings

You can define the RS485 baud rate and the reaction to communication failures.



2.5.3. Section C
Behaviour After Failed Start up

You can define how often the driver tries to re-start after a failed start-up, and also the delay between attempted re-starts.

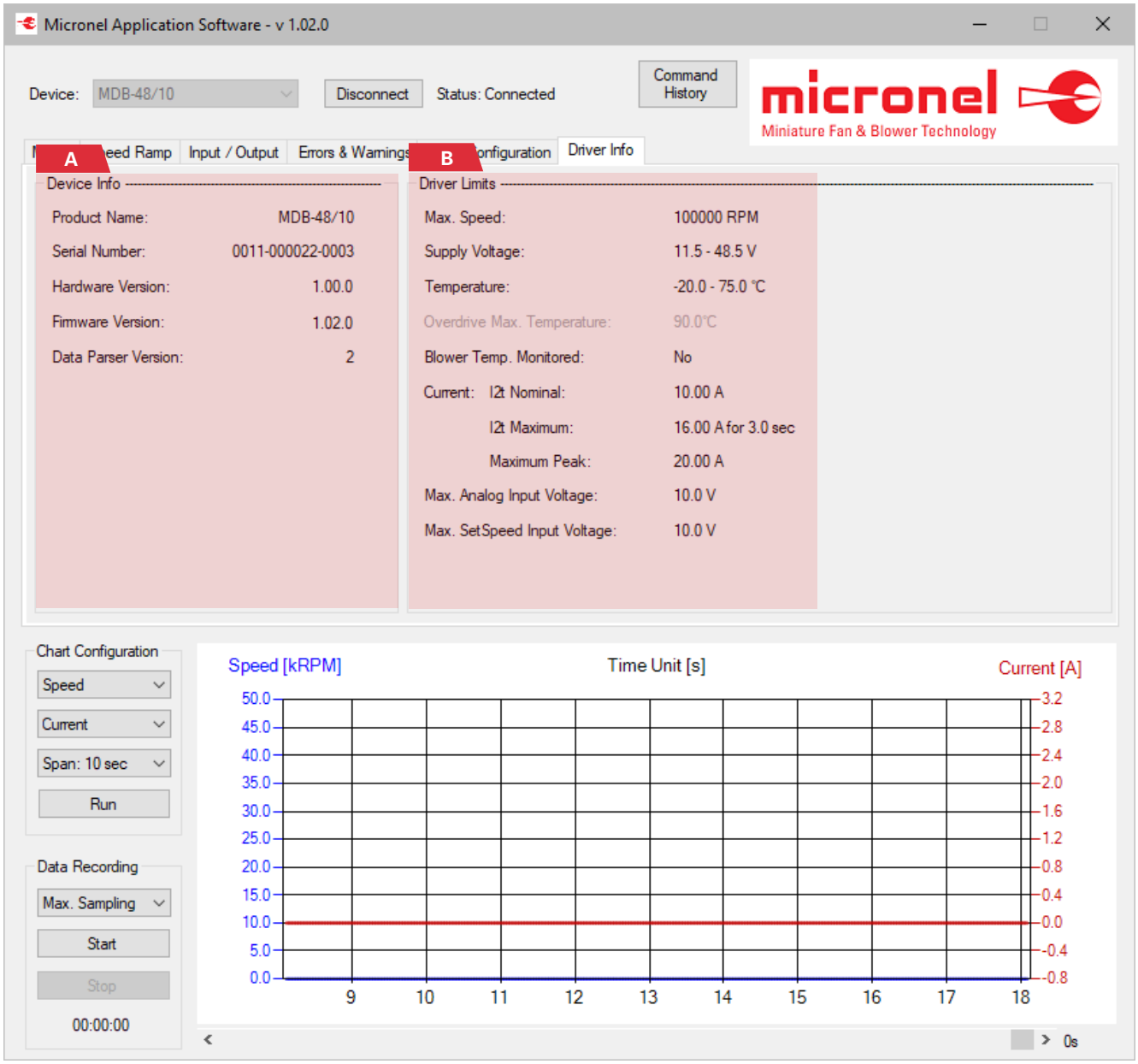


2.5.4. Section D
Miscellaneous

The 'Overdrive Driver Temperature Allowed' will override the default maximal driver temperature. Consider that extended surface temperatures of the driver may harm its environment.

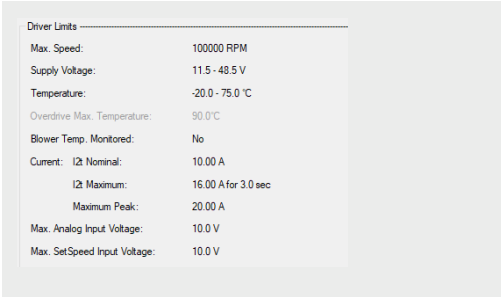
'Custom Driver Note' can be used to save a personal note to the MDB-48/10.

2.6. 'Driver Info' Tab



2.6.1. Section A
Device Info

This section lists the main information about the hardware like serial number etc. A hardware specific note is displayed optionally.



2.6.2. Section B
Driver Limits

This section lists the driver's operational limits.

NOTE Driver limits may compromize fans and blower limits and vice versa. If two limits are contradicting each other, the MDB-48/10 will always apply the lower one during operation.
(see "2.1.3. Section C: Blower Configuration")

2.7. File Information

The following files are used in conjunction with the Micronel Application Software:

Software	
Micronel Application Software.exe	MicronelBlowerDatabaseC.dat
DataLog 2021-05-26 09.13.55.csv	MicronelBlowerDatabaseM.dat
MicronelAppSettings.txt	MicronelSpeedRampDatabase.dat

Micronel Application Software.exe

This is the executable application for the user GUI (graphical user interface). It runs on the .NET frame supported by the Windows operating system.

DataLog 2021-05-26 09.13.55.csv

This file is generated when you start a data recording. For each start a new file will be generated containing the start date and time in the file name. During data recording, the file will be updated every minute, thus it is not recommended to open the file while the data recording is in process. You can make a copy of it at any time to read the already acquired data.

MicronelAppSettings.txt

This file contains GUI relevant settings like screen location etc. If you delete this file the application will restart with default values and will generate a new file automatically.

MicronelBlowerDatabaseM.dat

This file contains a configuration data base for Micronel fans and blowers. Do not delete this file.

MicronelBlowerDatabaseC.dat

This file contains a configuration data base for custom fans and blowers. It can be edited by clicking on 'Add', 'Save' or 'Delete' in the 'Blower Configuration' section. If you delete this file you will lose your custom saved blower configurations.

MicronelSpeedRampDatabase.dat

This file contains a configuration data base for Speed Ramps. It can be edited by clicking on 'Add', 'Save' or 'Delete' in the 'Speed Ramp Database' section. If you delete this file you will lose your custom saved Speed Ramp configurations.

NOTES

- The application doesn't need any additional drivers to be installed. It runs on the .NET framework supported by the Windows operating system and contains all needed drivers for the Micronel Motor Driver Box MDB-48/10 by default.
- The application will never write in or to files or locations of your personal computer other than in the above listed files. Furthermore, the Micronel application will not spam your registry either.
- The application will not send any data to Micronel or 3rd parties.
- You can move or copy all the above listed files (or preferably the whole folder) to any location at any time. The application will start with the same content/settings and data bases again from the new location.
- You mustn't mix files from different versions of the Micronel Application Software (for example using MicronelBlowerDatabaseM.dat of version 1.01.0 with the executable of version 1.02.0). Data formats may change between software versions, mixing files from different firmware or software iterations may lead to errors during operation.

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