

# Operating Manual

EN

SycoTec Controller Host operating software

ZDC002 Bootloader Host operating software

HF Inverter e@syDrive® 4330 (IP00), 4330-H (IP10)



INDUSTRIAL DRIVES





## ATTENTION

*This Operating Manual SycoTec Controller Host / ZDC002 Bootloader Host operating software is only valid in connection with the operating manual of HF Inverter e@syDrive 4330, 4330-H (material no. 2. 003.6718)!*

- ▶ *The safety information must be observed before commissioning!*

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# 1 User Information

## 1.1 Symbols used

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### Operating Manual

 <b>DANGER</b>	Indicates a hazardous situation that can directly cause death or serious injury.
 <b>WARNING</b>	Indicates a hazardous situation that can cause damage to property or moderate to serious injuries.
 <b>ATTENTION</b>	Indicates a hazardous situation that can cause damage to property or mild to moderate injuries.
 <b>i</b>	Important information for operator and engineer

## 1.2 Scope of supply

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Operating Manual SycoTec Controller Host/DC002 Bootloader Host operating software	Material no. 2.003.6926
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 *The current operating manuals and descriptions can be downloaded from the SycoTec website under [Downloads - SycoTec GmbH & Co. KG](#).*

## 1.3 Important Information

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This document is intended for machine manufacturers and persons responsible for putting into service and operating the inverter e@syDrive 4330, 4330-H.

 **ATTENTION**  
*The Operating Manual must be read by the user/operator before starting up the unit for the first time in order to avoid incorrect operation and other damage. Duplication and distribution of the operating manual require SycoTec prior consent.*

All specifications, information and properties of the product described in the Operating Manual correspond to the status at the time of printing.

Modifications and improvements to the product as a result of new technical developments are possible.

This does not imply any right to retrofitting of existing units.

SycoTec assumes no responsibility for damage arising through:

- External influences (poor quality of the media or faulty installation, natural phenomena, etc.)
- Use of incorrect information
- Improper use

This manual will give you basic knowledge of the functions and how to use the SycoTec Controller Host / ZDC002 Bootloader Host operating software for the inverter e@syDrive 4330, 4330-H.

The software serves for entering and modifying the performance parameters of the inverter systematically and clearly.

Besides, the functions for error diagnosis and application are described. Any settings that are adjusted will directly affect the operation of the inverter. Further information concerning the hardware of the inverter can be found in the Operating Manual HF Inverter e@syDrive 4330, 4330-H.

 *The safety instructions and application advice in the Operating Manual HF Inverter e@syDrive 4330, 4330-H (material no. 2.003.6718) must be observed strictly!*

 *The software and firmware version must be compatible with each other.*

## 1.4 Intended Use

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The SycoTec Controller Host / ZDC002 Bootloader Host operating software is used for commissioning and operating of following SycoTec frequency inverters:

	Material no.
HF inverter e@syDrive 4330 (IP00)*	2.003.3952
HF inverter e@syDrive 4330 (IP00) - C** (customized parameter-setting)	2.003.6383
HF inverter e@syDrive 4330-H (IP10)*	2.003.5721
HF inverter e@syDrive 4330-H (IP10) - C** (customized parameter-setting)	2.003.6378

\* Preset with default list of parameter settings. No spindle-profile activated. Profile have to be activated via Software.

\*\* Customer specific parameter installed and activated.

This document is valid for all hardware versions.

## 2 Safety Instructions and Warnings

Safe operation and protection of the device can only be assured if the device is used as intended, in accordance with the instructions for use, and using only approved tools.

The following must also be observed:

- The occupational health and safety regulations
- The accident prevention regulations



### **DANGER**

- *The inverter e@syDrive 4330, 4330-H controls dangerously rotating mechanical parts. If the instructions provided in this Operating Manual are not followed, this could result in serious damage to property, personal injury and even death.*
- *Hazard-free operation of this device is dependent on the proper installation, handling and operation of the device.*
- *Only properly qualified personnel must commission, service and work on this device. Only specialist personnel are permitted to connect up and commission the device and to rectify faults.*
- *The device must only be used for the purpose intended by the manufacturer. Unauthorized modifications and the use of additional equipment not recommended by the manufacturer can cause fires, electric shocks and injuries.*
- *Only combinations of parameter sets and spindles approved by SycoTec may be used. Other combinations can lead to dangerous situations during use.*



### **ATTENTION**

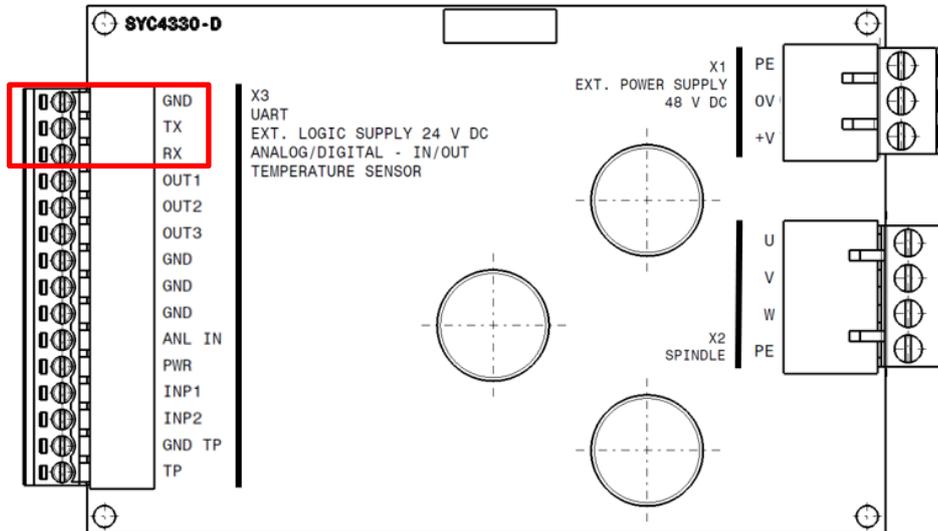
*General ESD measures must be taken when handling the inverter.*

Änderungen an und in den Geräten dürfen nur nach vorheriger Absprache mit SycoTec durchgeführt werden.

### 3 Connecting the inverter to the PC

The inverter is connected to the PC via pin 1-3 of the X3 connector.

To connect the PC and the inverter, please use the USB connection cable 2.003.6326.



The UART connection is used to parameterize the inverter using a PC.

It is also possible to control the spindle via control commands.

The interface description describes the UART commands and the responses of the inverter.

The interface description can be downloaded from the SycoTec homepage ([Downloads - SycoTec GmbH & Co. KG](#)).

PIN		USB cable	
1	GND	GND	Black
2	TX	RX	Yellow
3	RX	TX	Orange



### 4 Installation

No installation is necessary to operate the **SycoTec Controller Host** operating software and the **ZDC002 Bootloader Host** operating software. The .exe files of the two programs can be downloaded from the SycoTec homepage ([Downloads - SycoTec GmbH & Co. KG](#)) and will be started with a double click.

## 5 Software Description

The inverter e@syDrive 4330, 4330-H can be controlled via a PC using the **SycoTec Controller Host** operating software. In addition, motor profiles can be loaded and edited. The **ZDC002 Bootloader Host** operating software can be used to load the firmware including motor profiles onto the inverter.

Both programs communicate via the UART interface of the inverter. The interface is described in detail in Chapter 3.

### 5.1 SycoTec Controller Host

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Using the **SycoTec Controller Host** operating software, the inverter can be controlled via a UART connection. In addition, motor profiles can be loaded and edited.



## 5.1.1 Start page



On the **start page**, the main data of the inverter are displayed when one is connected to the inverter and presses the "Get" key. In addition, the motor profiles can be selected and activated. The profile selection is described in Chapter 5.1.3.

Under the **File** tab, the configuration of the COM port can be saved to the PC or loaded from the PC. In addition, an SPL file can be created (combination of firmware and motor profiles) which can be loaded with the **ZDC002 Bootloader Host**.

Under the **COM** tab the settings of the **COM** port can be adjusted. Chapter 5.1.2 describes the settings in more detail.

Under the tab **View, Control/Status** the inverter can be controlled, furthermore operating values and errors are displayed.

Chapter 5.1.4 describes the function in more detail.

The software version is displayed under the **Help/About** tab.

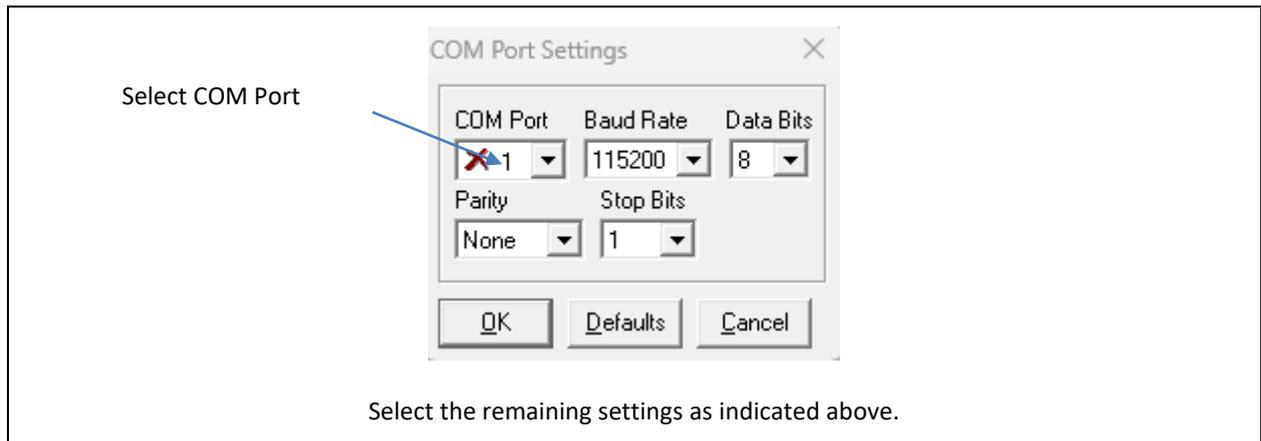
### 5.1.2 Establishing a connection

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To control the inverter on the PC using the **SycoTec Controller Host** operating software, select the **COM Port Settings** tab on the **start page**.

Then select the correct\* "COM Port", the "Baud Rate 115200", "Data Bits 8", "Parity None" and "Stop Bits 1". Now the connection can be established with **COM/Open**.

By pressing "Get" on the start page, the connection can be checked.  
If information appears in the upper columns, the connection is active.



\*The correct "COM port": In the device manager, you can check which COM port is added when connecting the inverter. This COM port must be selected here.

5.1.3 Profile selection

To operate a spindle, the correct profile (parameter set) must be selected in the software. Under start page, the motor profiles from the inverter must be loaded into the software by pressing "Get all from Controller". In order to activate the desired motor profile, "Activate" must be selected for the corresponding motor profile P01...P06.

If a parameter set is changed, it must first be deactivated "Deactive All", saved with "Save Cont" and activated again "Activate".

The screenshot shows the Sycotec Controller Host V1.3A software interface. The window title is "Sycotec Controller Host V1.3A". The menu bar includes "File", "COM", "View", and "Help".

**Drive Information:** Fields for Name, Serial No, Version, and Hardware ID, with a "Get" button.

**Motor Profiles:** A table with columns for "Load INI", "Save INI", "Edit", "Get Cont", "Save Cont", and "Activate". The "Activate" column contains radio buttons and the text "<undefined>".

**COM-Port Status:** A bar at the bottom shows "COM Closed" and "COM3: 115200 8 none 1".

**Annotations:**

- Blue arrow: "Load .ini file (Parameter set) from the inverter" pointing to "Get all from Controller".
- Red arrow: "Save .ini file (Parameter set) into the inverter" pointing to "Save all to Controller".
- Yellow arrow: "Deactivate .ini file (Parameter set)" pointing to "Deactive All".
- Green arrow: "Save .ini file on PC" pointing to "Save INI" in the P01 row.
- Brown arrow: "Load .ini file from PC into the software" pointing to "Load INI" in the P01 row.
- Purple arrow: "Edit .ini file (Parameter set)" pointing to "Edit" in the P01 row.
- Orange arrow: "Activate .ini file (Parameter set)" pointing to the "Activate" radio button in the P01 row.
- Blue arrow: "COM-Port closed" pointing to "COM Closed".
- Blue arrow: "COM-Port open" pointing to "COM3: 115200 8 none 1".

**i** A connection exists when the values of Tx and Rx increase. However, if only the Tx values increase, the COM port settings should be checked or measures against electromagnetic interference (EMC) should be taken.

COM7: 115200 8 none 1	Tx 0	Rx 0	TO 0	Errs 0	Busy 0
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## 5.1.4 Motor Profile Viewer/Editor

The motor profiles are stored in an .ini file. The Motor Profile Viewer/Editor window allows access to the motor profiles. To open the window, "Edit" must be pressed on the **start page** at the desired motor profile.

**WARNING**

*Only make adjustments to motor profiles in consultation with SycoTec, otherwise safe operation cannot be guaranteed by SycoTec.*

The screenshot shows the 'Motor Profile Viewer/Editor' window with the 'Controller' tab selected. The 'Motor Profile' section at the top shows 'Motor Type' set to 'DC', 'Profile: P01', 'Name' as 'Default', and 'Comment' as 'P01'. Below this are tabs for 'Controller', 'Controller I/O', 'Motor', 'DC Motor', and 'AC Motor'. The 'Controller' tab contains several numerical input fields: 'Over Temp. Trip (C)' (80), 'Reset Temp. Trip (C)' (75), 'PWM Frequency (KHz)' (90), 'Braking Ratio' (8), 'Under Voltage Trip (V)' (35.0), and 'Over Voltage Trip (V)' (51.0). At the bottom are 'OK', 'Defaults', and 'Cancel' buttons.

The parameters of the inverter are specified under the **Controller** tab.

By pressing "Defaults", all changes made since opening the window are reset.

The screenshot shows the 'Motor Profile Viewer/Editor' window with the 'Controller I/O' tab selected. The 'Motor Profile' section at the top is identical to the previous screenshot. The 'Controller I/O' tab contains four digital input/output pairs: 'Input 1' and 'Output 1', 'Input 2' and 'Output 2', 'Output 3', and 'Output 4'. Each input and output has a dropdown menu set to '-ve edge'. Below these is an 'Analogue Input Scaling (RPM/V)' field set to '100'. At the bottom are 'OK', 'Defaults', and 'Cancel' buttons.

Under the **Controller I/O** tab, the parameters of the digital and analogue inputs and outputs are specified. The digital inputs and outputs can be inverted here. In addition, the scaling factor for the analogue input can be adjusted. This is described in more detail in Chapter 5.2.

By pressing "Defaults", all changes made since opening the window are reset.

The motor parameters are indicated under the **Motor** tab. The maximum values for the effective value of the phase current and for the absorbed power are indicated. Parameters for the acceleration, deceleration ramps can be set as follows:

Example:  $Acceleration = \frac{Acceleration}{Dec./Acc.Period} = \frac{2\text{ Hz}}{10\text{ ms}} = 200 \frac{Hz}{s}$

**⚠ WARNING**  
*Deceleration ramps that are too fast can destroy the braking resistor!*

The values entered for "Minimum Resistance" and "Maximum Resistance" correspond to the minimum and maximum resistance values, respectively, multiplied by 10, at which no motor temperature error is triggered. In the picture above, the temperature sensor may have a resistance between 50 and 60 ohms. In the field below, temperature monitoring can be activated or deactivated. Speed limits can be adjusted. The number of pole pairs is also indicated.

By pressing "Defaults", all changes made since opening the window are reset.

The **DC Motor** tab contains the parameters for controlling DC motors.

If an AC motor is selected, everything in this tab is greyed out.

The start and commutation settings are listed on the left-hand side and the controller settings on the right-hand side.

Explanation of controller settings:

- PID Frequency: Frequency in Hz at which the PID algorithm runs (possible values 64, 128, 256, 512 or 1024)
- $K_p$ : proportional gain. Value by which the speed error is multiplied

$$K_p = \frac{K_p \text{ Multiplier}}{2^{K_p \text{ Divisor}}}$$

The higher the value, the faster the speed control loop reacts. If it is set too high, the speed control loop begins to oscillate.

Example with the values from above:

$$K_p = \frac{2}{2^0} = 2$$

- $K_i$ : integral gain. Value by which the integral of the speed error is multiplied.

$$K_i = \frac{K_i \text{ Multiplier}}{2^{K_i \text{ Divisor}}}$$

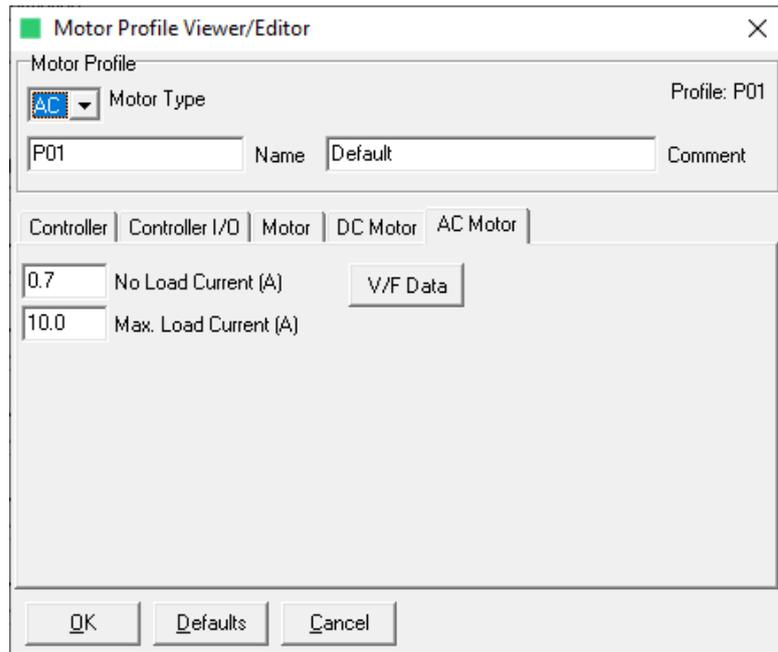
The higher the value, the faster the speed control loop reacts. If it is set too high, the speed control loop begins to oscillate.

By pressing "Defaults", all changes made since opening the window are reset.



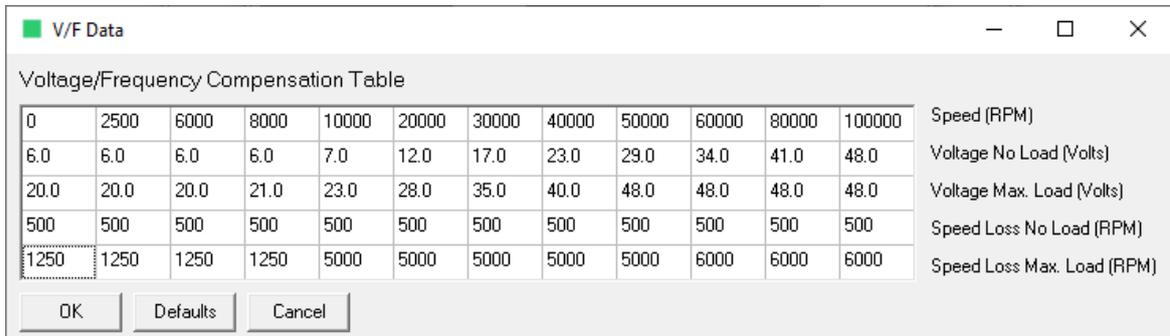
**WARNING**

*The adjustment of the values is only intended for the manufacturer!*



Under the **AC Motor** tab, the parameters for the control of AC motors are specified. If a DC motor is selected, everything in this tab is greyed out. The U-f characteristic is accessed via "V/F Data".

By pressing "Defaults", all changes made since opening the window are reset.



## 5.1.5 Motor Control/Status

To control the motor using the operating software on the PC and to be able to read out its operating data, select **View,Control/Status** tab on the **start page**.

Motor control

Motor information

Messages error messages

UART connection detection

1. **UART connection detection**  
**Check the "Continuous Get" box and then press "Get".**  
 This is necessary for safety reasons to detect a disconnection of the UART cable and to stop the spindle automatically.  
 If the check mark is not set, the spindle will stop automatically after approx. 2 seconds, even if there is a UART connection.  
 The value "Repeat Period (ms)" determines how fast the information is exchanged between the software and the inverter. A lower value enables faster communication. However, commands cannot be sent simultaneously during the data exchange. Therefore, the value should be set to about "800". This allows commands to be received more securely.
2. **Motor control**  
 The desired speed can be set in the field to the right of Speed and saved in the inverter by clicking on "Speed".  
 With "Start", the inverter starts with the set speed.  
 With "Stop", the motor is run down to speed 0.  
 "Reset" acknowledges a pending error and the motor coasts down with the motor running.
3. **Motor information**  
 The following information is displayed:
 

Phase Current:	RMS value of the phase current in Amperes (A)
Phase Power:	Absorbed power of the motor in watts (W)
Controller Temp:	Temperature of the inverter in degrees Celsius (°C)
Motor Temp:	Resistance value of the temperature sensor in Ohm (R)
Bus Voltage:	Voltage of the intermediate circuit in Volt (V)
Speed:	Speed in RPM
Status:	Hex code of the status of the inverter
Internal Status:	Hex code of the internal status of the inverter
Torque:	Torque in Newton metres (Nm)
4. **Messages, error messages**  
 In addition to the error display by the LED on the inverter the error messages are also displayed here.

## 5.2 Setpoint input via I/Os

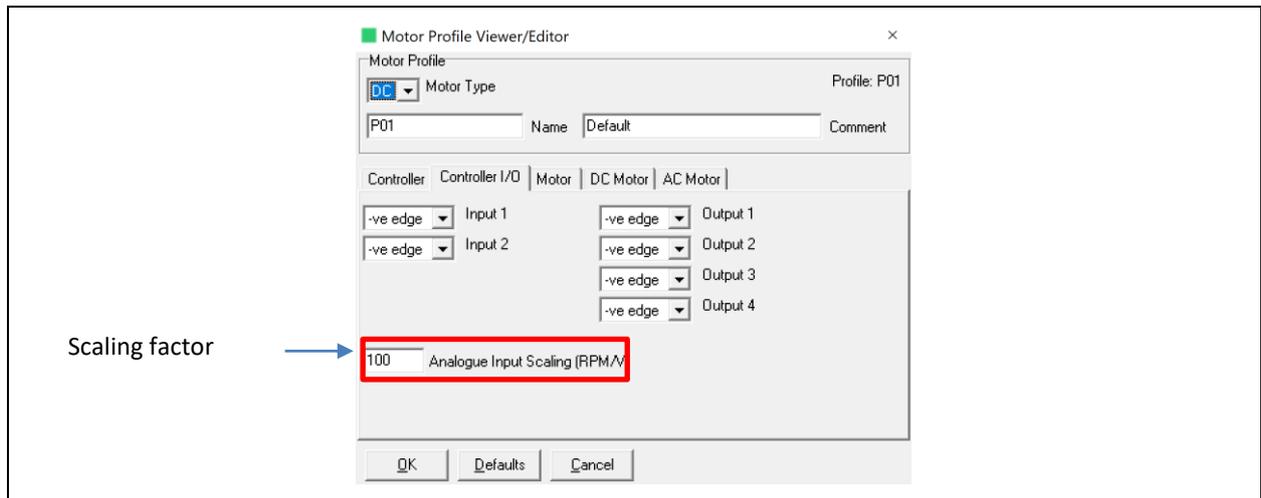
The target speed can be set with the help of the analogue input.

A voltage between 0 - 10 V at the analogue input "ANL" of connector "X3" is required and controls the speed of the spindle.

The scaling can be adjusted in the software. This is configured under **Start page** the desired motor profile "Edit", tab **Controller I/O** and "Analogue Input Scaling (RPM/V)".

The spindle can then be started with 24 V on the digital input "X3, Input 1".

The spindle stops as soon as the 24 V is no longer present.



Scaling speed:

The voltage at the analogue input is multiplied by the scaling factor and by 100. This gives the desired motor speed in rpm. Some examples are given below:

$$\text{Scaling factor} = 100 \frac{\text{rpm}}{\text{V}}$$

Analogue voltage = 4.3 V

$$\text{Desired motor speed} = 100 * 4.3 * 100 = 43,000 \text{ rpm}$$

$$\text{Scaling factor} = 50 \frac{\text{rpm}}{\text{V}}$$

Analogue voltage = 6.8 V

$$\text{Desired motor speed} = 50 * 6.8 * 100 = 34,000 \text{ rpm}$$

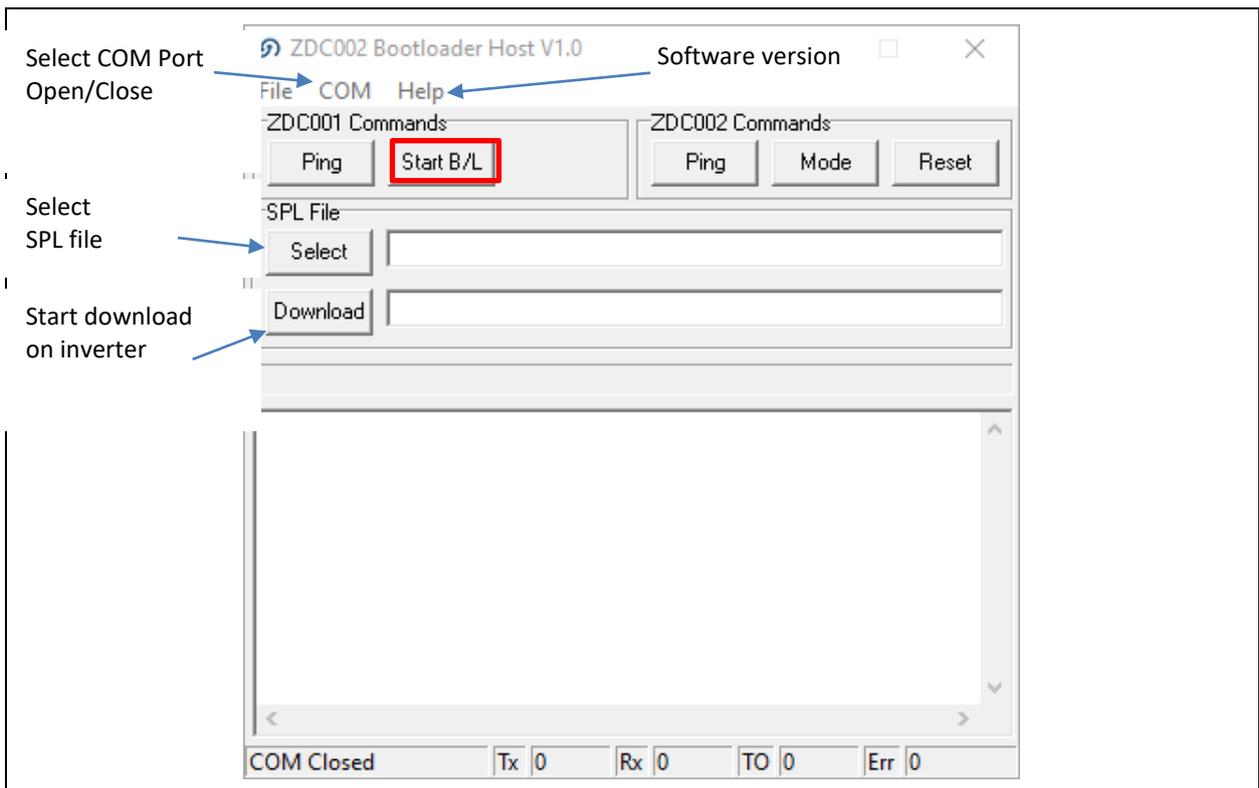
### 5.3 ZDC002 Bootloader Host

Using the **ZDC002 Bootloader Host** software, the firmware including motor profiles can be uploaded to the inverter via UART connection.

For firmware updates, an SPL file with the latest firmware including the standard motor profiles is made available on the SycoTec homepage ([Downloads - SycoTec GmbH & Co. KG](#)).



#### 5.3.1 Start page



Before the firmware can be downloaded to the inverter, the connection between the PC and the inverter must be established. This is described in more detail in Chapter 5.3.2.

As soon as the connection is established, the "Start B/L" is activated.

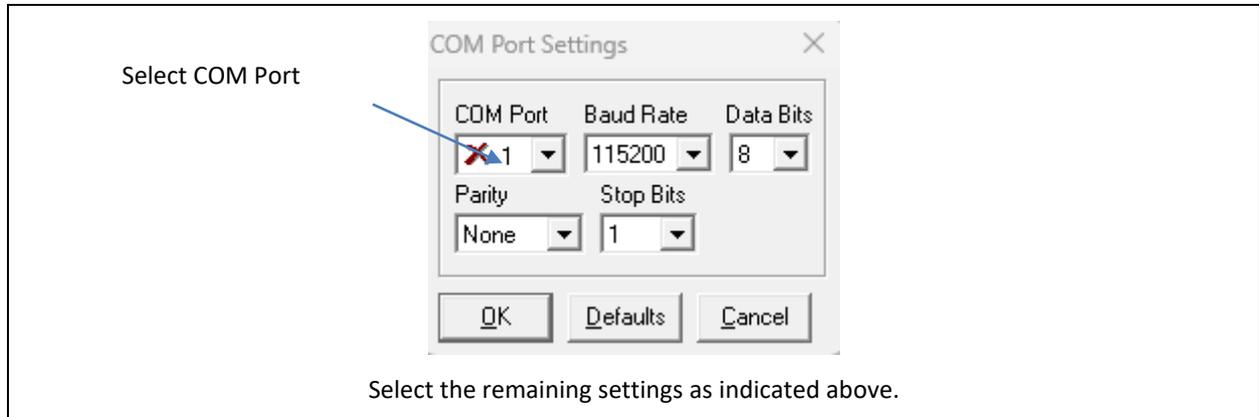
The SPL file to be loaded can be loaded via "Select". The SPL file is played to the inverter as soon as "Download" is pressed. The download can take a few minutes. When the loading bar has run through and no more characters appear in the lower field, the firmware update is complete.

### 5.3.2 Connection setup

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To load a new firmware to the inverter via the **ZDC002 bootloader Host**, select Settings in the COM tab on the **start page**. Then select the correct "COM Port", the "Baud Rate 115200", "Data Bits 8", "Parity None" and "Stop Bits 1". The connection is now established.

If the Rx counts up on the start page, the connection is working.



## Warranty Conditions

Under current SycoTec delivery and payment conditions, SycoTec undertakes warranty for satisfactory function and freedom from faults in material and manufacture for a period of 12 months from the date of sale certified by the vendor.

In the event of justifiable complaints, SycoTec shall supply spare parts or carry out repairs free of charge under warranty. SycoTec accepts no liability for defects and their consequences which have arisen or could have arisen as a result of natural wear and tear, improper handling, cleaning or maintenance, non-compliance with the maintenance, operating or connecting instructions, corrosion, impurities in the air supply or chemical or electrical influences which are unusual or not admissible in accordance with SycoTec's standards. The warranty claims shall become null and void if defects or their consequences can be attributed to interventions in or modifications to the product. Warranty claims can only be validated if they are notified immediately in writing to SycoTec.

A copy invoice or delivery note clearly showing the manufacture number shall be attached if products are returned.

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(DE = original)

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