User Manual

Software for DSL
Digital Speed Switch

Software version from 1.0.6

Contents

Disclaimer of liability
The present manual was compiled with utmost care, errors and omissions reserved. For this reason Baumer Germany GmbH & Co. KG rejects any liability for the information compiled in the present manual. Baumer Germany GmbH & Co. KG nor the author will accept any liability for direct or indirect damages resulting from the use of the present information.

At any time we should be pleased receiving your comments and proposals for further improvement of the present document.

Baumer

Passion for Sensors

1   Symbols used

⚠ The note at the right of the symbol must be observed in all cases.

💾 The following path and file details refer to a hard disk
(use the correct drive letter).

Button Symbol for the corresponding button or key in the user interface.

low   Italic text, used here for the voltage level of a switched output (only for DSL.**R**).

bold   Bold italic text, used here for the file paths and file names.

2   Device versions

The DSL is a speed switch that is integrated into an incremental encoder. At the time of writing (edition: October 2014) it is supplied in two versions:

Version 1: DSL.R   suitable for operation with the external relay module DS 93 R.

- Version with 3 switched outputs that can be switched according to the speed. If the device is at standstill or the rotational speed n is less than the switching speed $n_{s(off)}$ then the corresponding switched output will be *high*. If $n \geq n_{s(on)}$ then it will be *low*.

- If an internal error occurs (for instance, dirt on the disk, so that the counted pulse rate is incorrect) then the outputs will switch to *low*.

Version 2: DSL.E   with three internal electronic relays (not available in combination with HOG 86).

- Integrated current monitoring for each relay: This checks whether, when the relay is closed, a current of at least 5 mA flows through the switched circuit.

- Two relay outputs (R1, R2) are switched according to the speed. If the device is at standstill or $n < n_{s(off)}$ then the corresponding relay is closed. If $n \geq n_{s(on)}$ then it will be open.

- The third relay output (C1) is a check output. If no current flows through at least one of the switched circuits of the relay outputs (R1, R2), although the relay is closed, then the check output (C1) will be opened.

- If no current flows through the switched circuit of the check relay (C1), although the relay is closed, then R1 and R2 will be opened.

- If an internal error occurs (for instance, dirt on the disk, so that the counted pulse rate is incorrect) then all relays will be opened

3   System requirements

PC with   - operating system Windows 7 or Windows 10
                   - USB connection
                   - at least 1 GB available on the hard disk.

The DSL is fitted with an RS 485 interface. Data exchange with the PC requires an RS 485 converter ("USB to RS 485" or "RS 232 to RS 485"). A "USB to RS 485" converter can be obtained from Baumer Germany GmbH & Co. KG (Order code: USB 485-Converter).

4 Installation

Graphical user interface and manual are available as download in the Internet at www.baumer.com.

After the download start **volume/setup.exe**. This will install the program and the runtime library. The installation language is only available in english.

After starting the setup program, the following screens will appear (Figure 1 to 4):
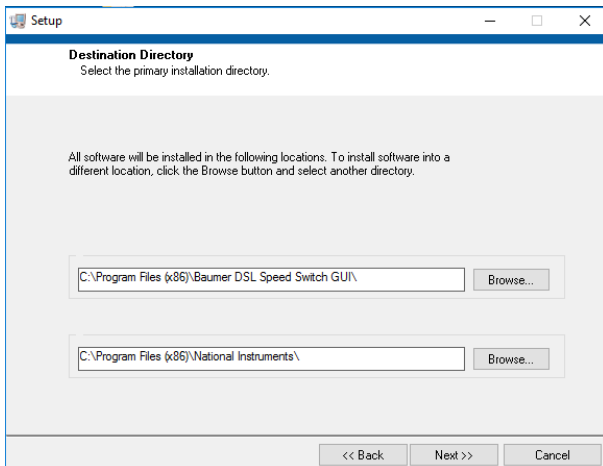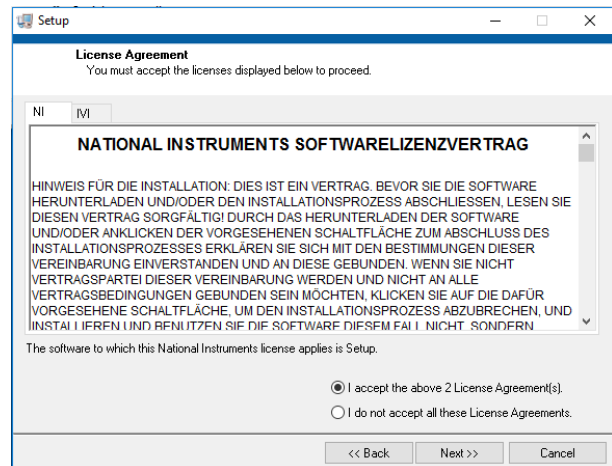
Figure 1: Installation

Figure 2: Accept both licenses, press next

It is recommended that you keep to the default installation path.
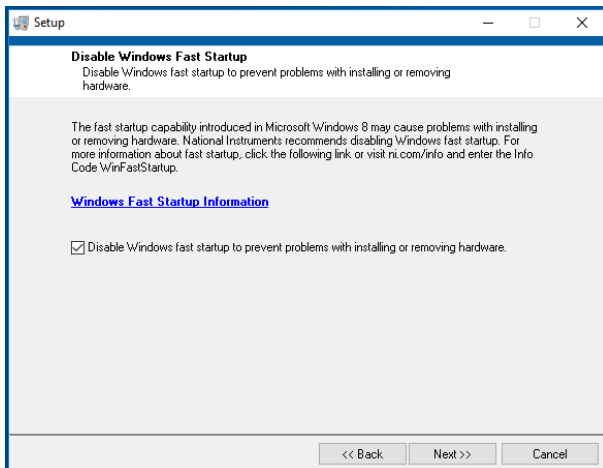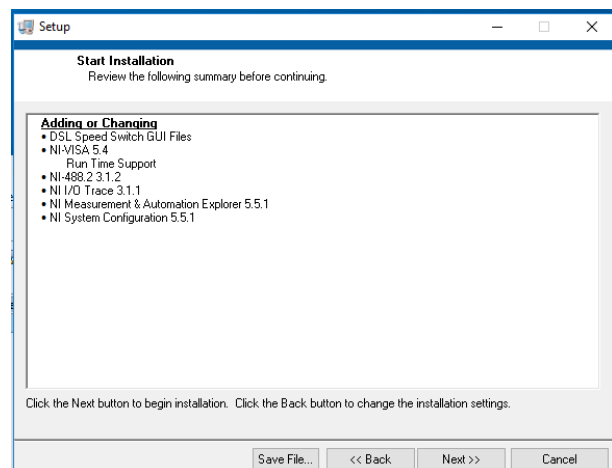
Figure 3: Press next

Figure 4: Press next

When installation has been completed successfully, a corresponding message will appear (Figure 5).
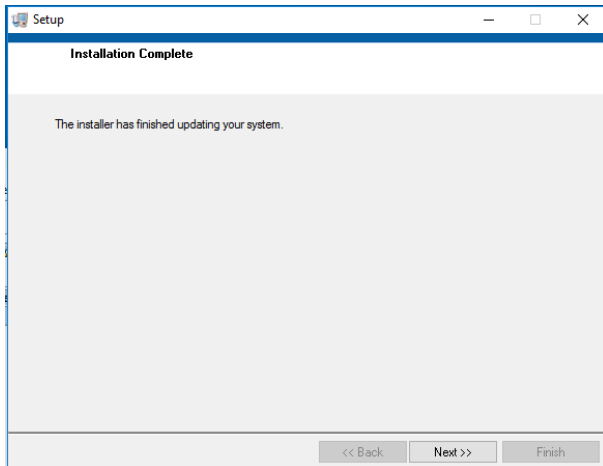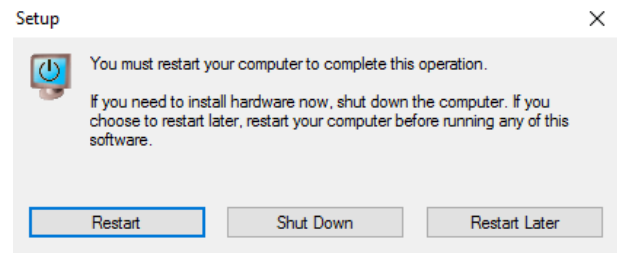

Figure 5: End of installation

Figure 6: Restart

A restart is necessary.

Start the program after a standard installation with

Start $\Longrightarrow$ DSL Speed Switch GUI $\Longrightarrow$ DSL Speed Switch GUI

5   First program start

⚠️   <u>Before</u> the program start the RS485-Converter has to be connected otherwise the serial interface used by the converter will not appear in the overview of all usable serial interfaces.

The first time the program is started, a selection screen will appear where you can choose the language for the user interface and the system interface (Figure 7). The software version of the user interface is displayed in the header of this window.

You can use Close program to terminate the software at any time. Parameter changes that have not been saved will be lost.
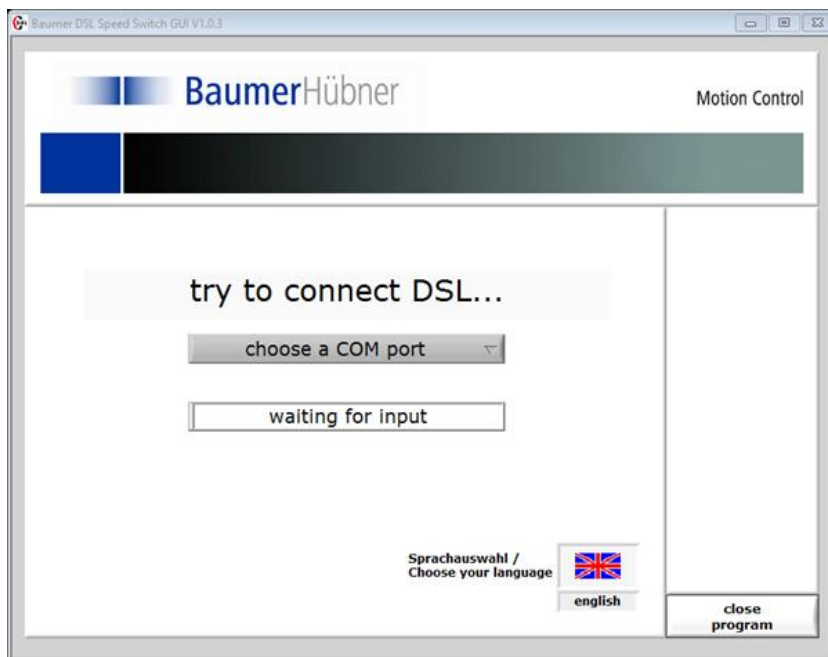
5.1   Language setting

Figure 7: Start screen

Clicking on the national flag will call up a selection of languages that have been implemented for the user interface. The required language can be selected by clicking on the appropriate national flag.

5.2 Interface

To establish a connection with the DSL, the serial interface (to which the RS 485 converter is connected) must be set up in the selection field (Figure 8).
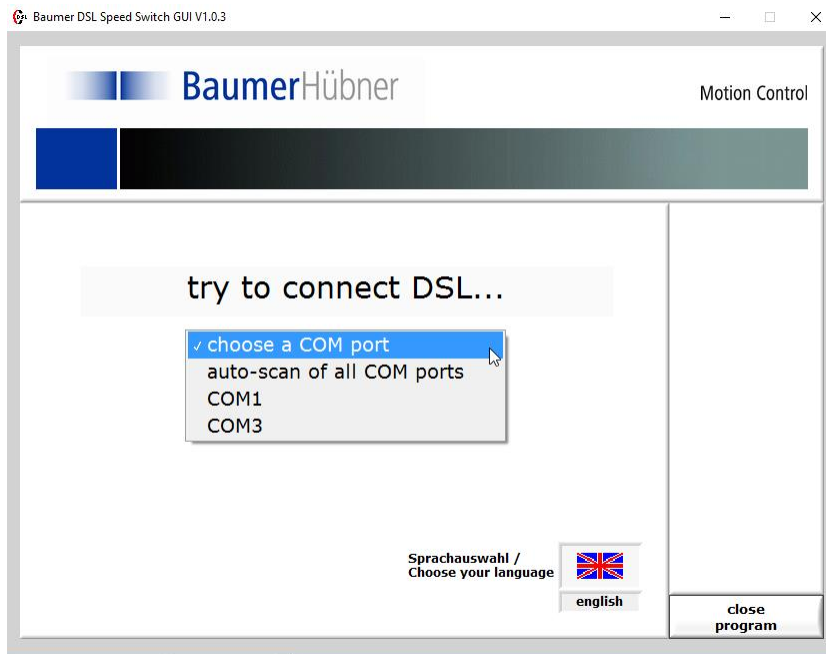

Figure 8: COM port selection

The Auto-Scan function can be used in following cases:

1. If the RS485-Converter was connected after the program start and the serial interface does not appear in the overview
2. If the serial interface is not known

This transmits an identification to every serial interface (COM1 to 8) and waits for a response telegram from the attached DSL.

> ⚠ Because of insufficient implementation of virtual serial interface driver (e.g. bluetooth) problems can appear during the Auto-Scan. In that case please choose the serial interface manually.

> ⚠ If other devices are connected to the individual serial interfaces, then it cannot be ruled out that they may interpret the transmitted ID as a message directed to them.

If a serial interface is discovered that has a DSL attached, then this will be indicated (Figure 9).
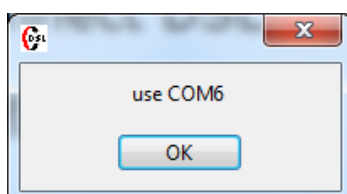

Figure 9: COM port confirmation

5.3 Saving the settings

The language selected and the serial interface that is used are recorded in a configuration file
c:\Users\<user>\AppData\Local\Baumer DSL\DSL Software.ini. For subsequent program starts, the
settings are read out from this file and the start window will not appear again.

⚠️ To alter the language setting at a later date, the software must be started without a DSL being
connected. In this case, the start screen will appear once more.

6 User interface

When the DSL has been detected on a serial interface, the parameters will be read out from the internal memory of the device (Figure 10).
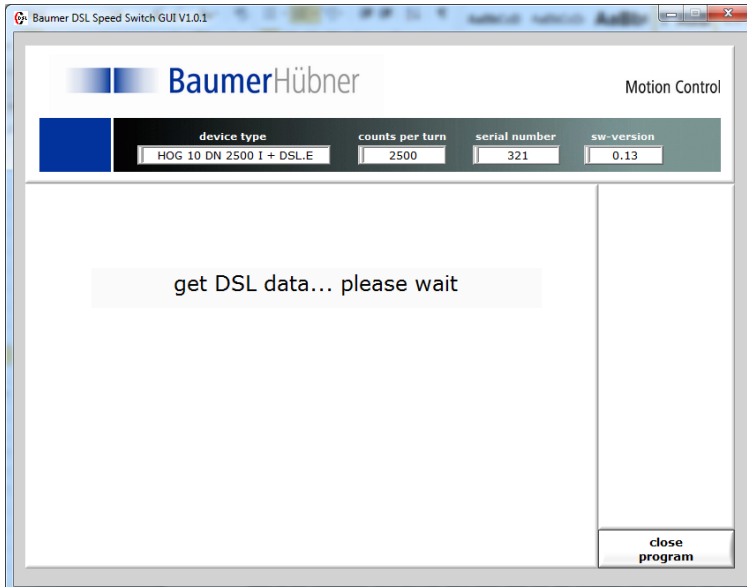

Figure 10: Fetching device data

After all the parameters from the DSL have been read out, the complete user interface will appear (Fig. 11).
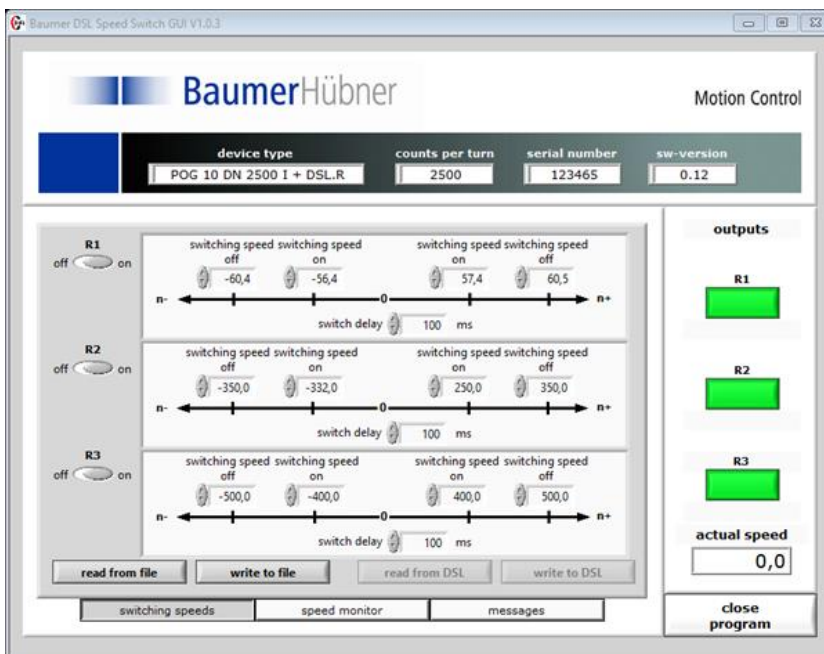

Figure 11: User interface

This is divided into three sections:

6.1 Information window

Figure 12: Information window

The data for the connected device are shown in the information window (Figure 12), with the exact type designation, serial number, device software version, number of counts per turn.

Because of the same electronics, the HOG 86 register itself as HOG 10.

If the DSL is protected by a password, then a small padlock symbol will appear in the information window.

If the user is not logged in to the DSL, it will appear red and locked 🔒 , after log-in it changes to green and unlocked 🔓 .

After the connected device has been changed, a new log-in is required, even if both devices have the same password.

If an error occurs in the device, the warning symbol ⚠ will appear. The reason for the warning can be called up in the register card Messages in the main window, after which the warning can be deleted.

6.2 Status window
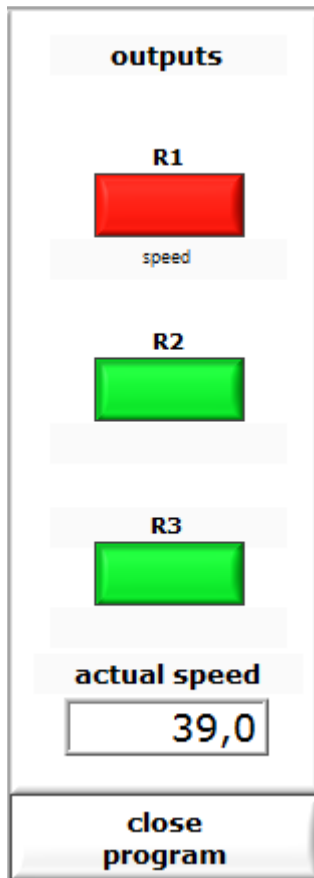

Figure 13: Status window

The status window (Figure 13) shows the current speed of the connected device and the states of the three outputs (DSL.**R**) or the three relays (DSL.**E**) through indicator lights.

- Indicator light is green:
  Relay is closed and at least a current of 5 mA flows (DSL.**E**), or switched output is *high* (DSL.**R**).

- Indicator light is yellow:
  Relay is closed but no current or less than a current of 5 mA flows (DSL.**E**), or switched output is *high* (DSL.**R**).

- Indicator light is red:
  Relay is open, or switched output is *low.*
  The reason for the open relay or *low* switched output is shown below the red indicator.

  The following causes are possible for a DSL.**R**:
  − Speed (exceeded the switch-off speed)
  − Internal error (wrong number of pulses, or initialization error)
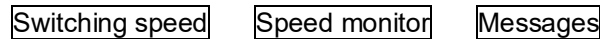
  The following causes are possible for a DSL.**E**:
  − Speed (exceeded the switch-off speed)
  − Internal error (wrong number of pulses, or initialization error)
  − I-control (appearing at R1 and R2): there is no current flowing through the control circuit, even though relay C1 is closed.
  − I-output 1 or 2 (appearing at check output C1): there is no current flowing through the circuit of R1 or R2, even though the relay is closed.

Because of the serial data transmission between the device and the PC, there may be a delay before the output states are displayed.

6.3 Main window

The register cards at the bottom of the window can be used to switch between the three main software functions:

Switching speed   Speed monitor   Messages

6.3.1 Register: Switching speeds

After the device data have been read out, the register Switching speeds appears, in which the parameters that are stored in the DSL can be read out and edited.
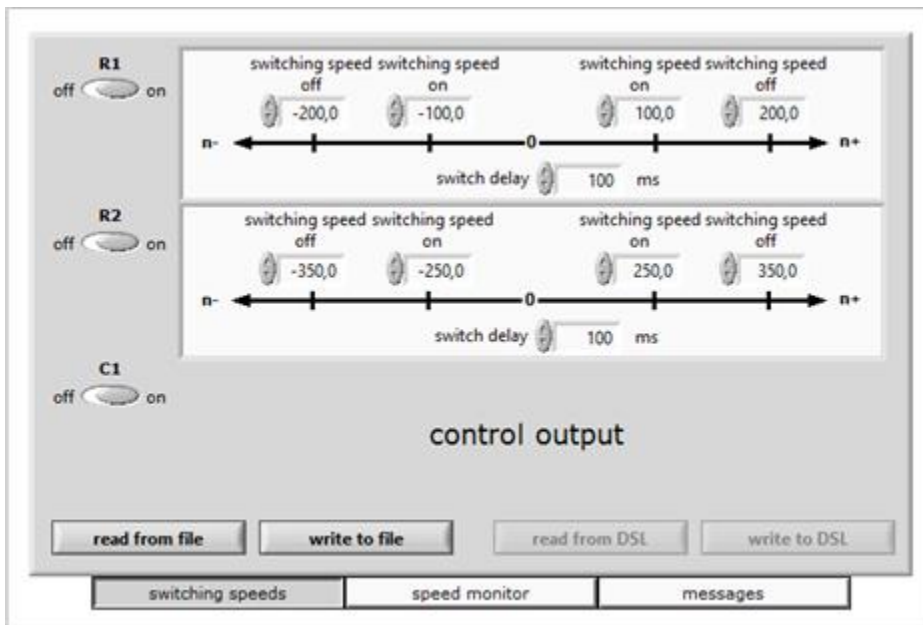

Figure 14: "Switching speeds" register for DSL.E

The third output shown in Figure 14 is the check output of the DSL.**E** (described above under 6.2). On a DSL.**R**, a third field for making settings for switching speeds will appear instead (see Figure 11).

The parameters for each output are set up separately. In addition, individual **ON** and **OFF** switching speeds can be set up for clockwise (right-handed) and anti-clockwise (left-handed) rotation, i. e. up to 4 different switching speeds for each output). System requirements impose a minimum hysteresis of 5% or 2 rpm. Furthermore, a switching delay from 0 to 500 msec can be entered for each switched output, in order to be able to ignore very short speed peaks.

- The maximum **OFF** switching speeds that can be entered as parameters are the maximum encoder speeds (see separate data sheet). Higher values will be reset to this maximum value. If an **OFF** switching speed is set to be lower than the corresponding **ON** speed, then the **ON** speed will be corrected to the maximum possible value (the **OFF** switching speed minus the minimum hysteresis).

- The maximum **ON** switching speeds that can be entered as parameters are the minimum speeds as specified in the data sheet for the encoder. If smaller values are entered, these will be reset to the minimum possible value. The maximum value that can be entered as a parameter for the **ON** switching speed is the **OFF** switching speed minus the minimum hysteresis, larger values will be corrected to this maximum value.

An unused input can be de-activated by the sliding switch "Output on/off" that is shown on the left.

⚠️ On the DSL.**E** version, any unused output (R1, R2, C1) must be de-activated. This is necessary because the current monitoring will detect an error condition if the output switches without any load being connected.

Alterations to parameters are activated by operating the Save parameters button. The altered values will only be written to the DSL and become effective when this has happened. In order to be able to save parameters, the user must be logged in to the device (see Chapter 7 "Log-in"). At the same time, the new parameters will be incorporated in the
c:\ProgramData\Baumer DSL\DSL_Parameter.txt log file.

The parameters shown inside the input mask can be stored in separate files by pressing write to file. With read from file stored parameters can be loaded back into the input mask.
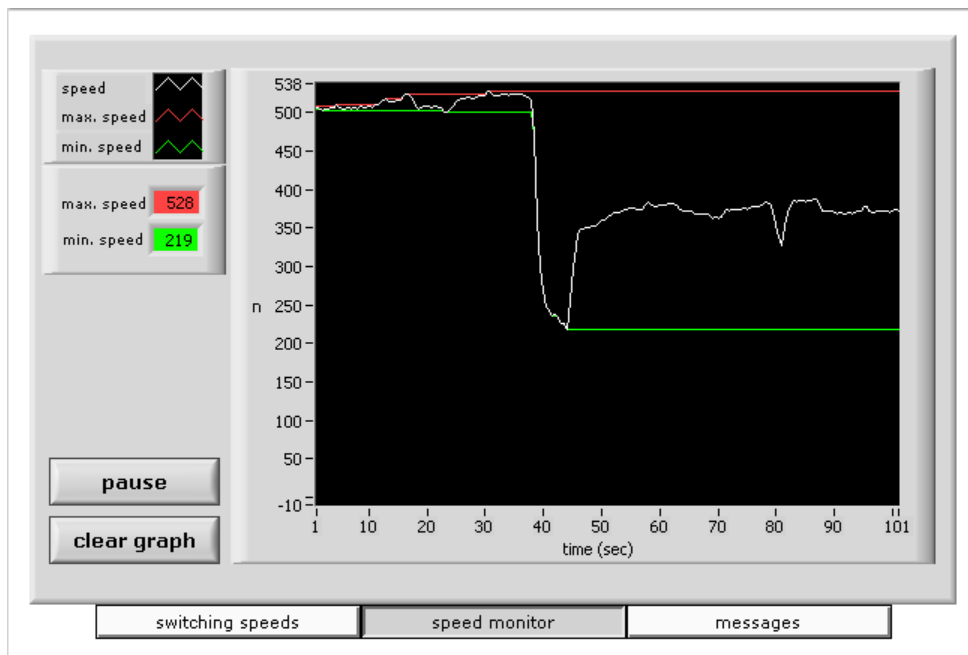
6.3.2 Register: Speed monitor

Figure 15: "Speed monitor" register

The Speed monitor register (Figure 15) shows the present speed curve as a function of time. The highest and lowest speed values that have occurred since the start of recording are marked respectively by a red line (maximum value) and a green line (minimum value). The ordinate scaling is made automatically to match the minimum and maximum that have been recorded.

Recording is stopped by operating the Pause button, and the graph is deleted by operating Clear graph. Changing to another register in the main window will also delete the speed curve.
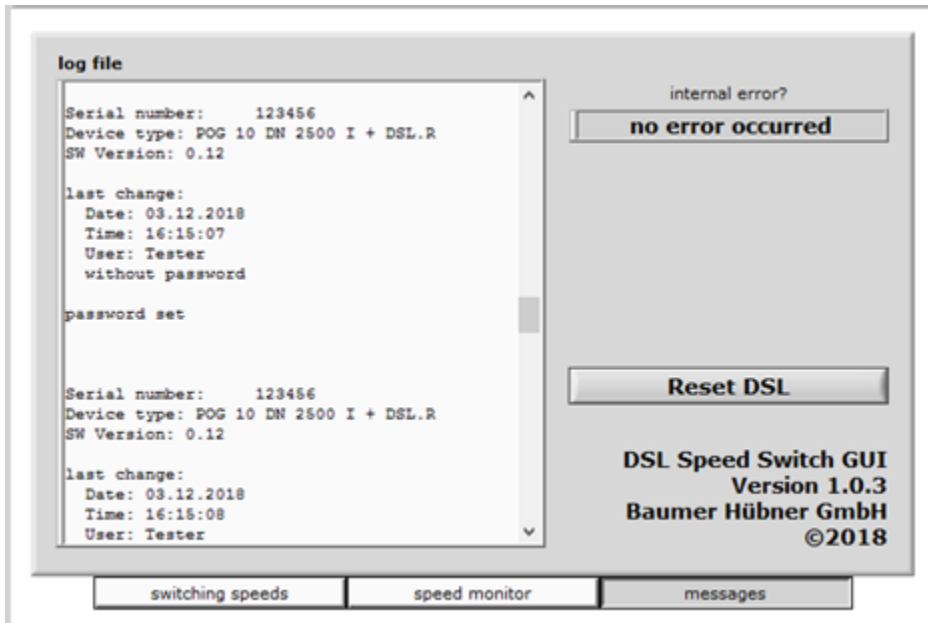
6.3.3 Register: Messages

Figure 16: "Messages" register

The Messages register (Figure 16) shows the contents of the
log file ▣ *c:\ProgramData\Baumer DSL\DSL_Parameter.txt* which is stored on the computer. The scroll
bar can be used to scroll through the entire text.

If the warning symbol ⚠ appears in the information window (see Chapter 6.1 "Information window"), the
reason for the warning will also be displayed. Delete error can be used to remove the warning. The removal
of a warning will also be noted in the log file, and requires a previous log-in (see Chapter 7 "Log-in").

A software reset inside the DSL will be executed by pressing the Reset DSL button.

7   Log-in

Before switching speeds can be programmed or errors can be deleted, a log-in is required. To do this, it is necessary to enter a user name (Figure 17).

This name is stored in the DSL and in the
🖫 *c:\ProgramData\Baumer DSL\DSL_Parameter.txt* log file. If the DSL is protected by a password, this password will also be requested.

After entering the user name and (if required) the password, the user can choose between Log-in and Log-in and new password.

Figure 17: Log-in

⚠️ If more characters are entered for the user name and password than the maximum number permitted (15 or 8 respectively), the string will automatically be cut off at the maximum length. Special characters may be used, and a distinction is made between capital (upper-case) and lower-case letters.

The device is delivered without password protection.
An incorrect password triggers an error message, and the log-in window remains open until either the correct password is entered or Cancel is operated.

If Log-in and new password is chosen, then a new entry template appears (Figure 18), with the request to enter the new password twice.

⚠️ To cancel a password protection that has been entered, leave both fields empty.

If Cancel is operated in this template, then the user remains logged in to the device with the old password.

An alteration to a password is recorded in the
🖫 *c:\ProgramData\Baumer DSL\DSL_Parameter.txt* log file, but the password itself is not recorded here.

Figure 18: New password

8 Communication error

If the communication between the PC and DSL is faulty (for instance, because the connecting cable has been disconnected or the supply voltage was interrupted) then the following message will appear:
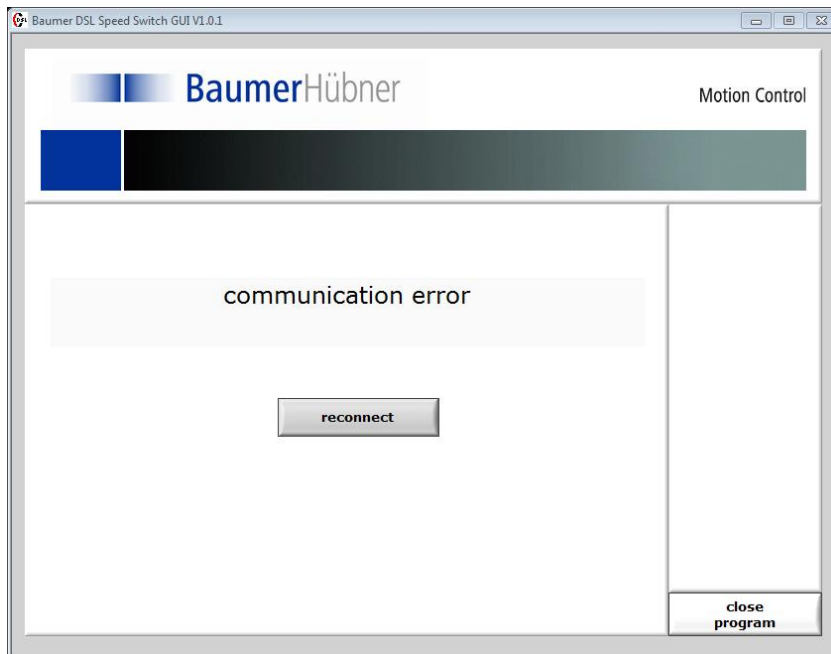

Figure 19: Communication error

Use Reconnect to establish communication once more – a fresh log-in is not required.

⚠ In exceptional cases, the program will have to be stopped and then restarted.

9 Log file

When altered data (switching points, password …) are saved in the DSL, an entry is made in the
📄 *c:\ProgramData\Baumer DSL\DSL_Parameter.txt* log file.

Example: Entry for switching points

```
Serial number: 2271560481
Device type: POG10DN2500I+DSL.R
SW Version: 0.07

Last change:
  Date: 06.04.2005
  Time: 15:15:17
  User: Tester
  with password

Switched output 1:
  Switching speed  off n+ :    11 rpm
  Switching speed  on n+  :     6 rpm
  Switching speed  on n-  :    -6 rpm
  Switching speed  off n- :    -8 rpm
  Delay: 100 msec
  Output activated

Switched output 2:
  Switching speed  off n+ :     8 rpm
  Switching speed  on n+  :     6 rpm
  Switching speed  on n-  : -1800 rpm
  Switching speed  off n- : -1920 rpm
  Delay: 120 msec
  Output: activated

Switched output 3:
  Switching speed  off n+ :  1009 rpm
  Switching speed  on n+  :   800 rpm
  Switching speed  on n-  : -1700 rpm
  Switching speed  off n- : -1921 rpm
  Delay: 200 msec
  Output: activated
```

10 Appendix

10.1 Technical data

for the **combination**	(version DSL.**R** or DSL.**E**) POG 10 + DSL, HOG 10 + DSL, POG 11 + DSL, HOG 11 + DSL, HOG 16 M + DSL, HOG 16 + DSL, HOG 165 + DSL
for the **combination**	(only version DSL.**R**) HOG 86 + DSL

permissible device temperature	-20°C … +85°C (HOG 16 [M] + DSL, HOG 165 + DSL) -30°C … +85°C (xOG 10 + DSL, xOG 11 + DSL, HOG 86 + DSL)

max. speed in rpm   electronic: $\dfrac{7,2 \times 10^6}{z}$ mechanical: 6000

square-wave cycles / turn   z   512, 1024, 2000, 2048, 2500, 4096, 5000 (depending of encoder type)

logic level HTL or TTL

max. switching frequency   120 kHz

switching speeds ns (DSL)
± 16 … 6000 rpm for z =   512
± 8 … 6000 rpm for z =   1024
± 5 … 3600 rpm for z =   2000
± 4 … 3500 rpm for z =   2048
± 3 … 2900 rpm for z =   2500
± 3 … 1750 rpm for z =   4096
± 3 … 1440 rpm for z =   5000

maximum response time   40 msec

only for DSL.**R**

operating voltage UB   +15 … +30 V DC
max. 200 mA (no load)

3 outputs   *high* (12 V)   for n < n_s
low (0 V)   for n $\geq$ n_s
load capability per output: max. 20 mA

only for DSL.**E**

operating voltage UB   +9 … +30 V DC
max. 200 mA (no load)

2 electronic make contacts   closed for   n < n_s
open for   n $\geq$ n_s
230 V AC/DC, max. 250 mA

1 electronic make contact   closed for   "no error"
open for   "error"
230 V AC/DC, max. 250 mA

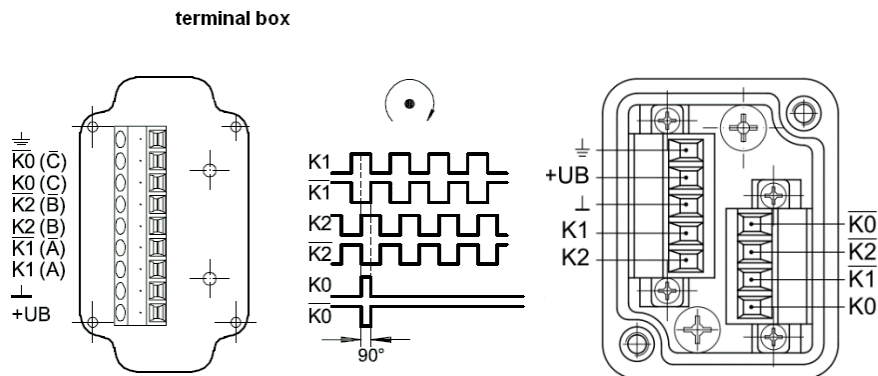## 10.2 Terminal assignments

terminal box
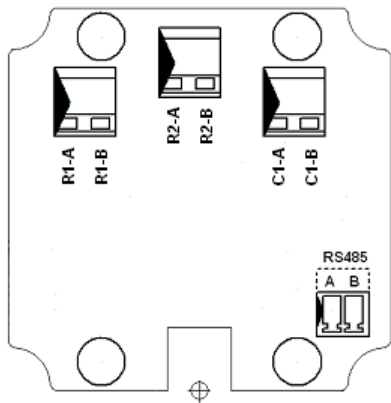

Figure 20: POG/HOG terminal assignments

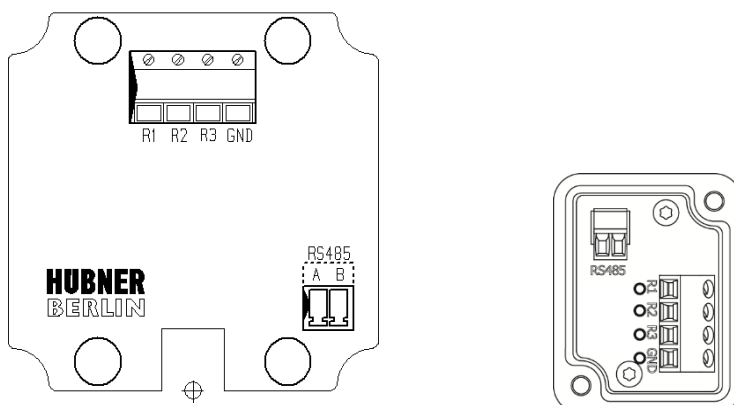Figure 21: DSL.E terminal assignments

Figure 22: DSL.R terminal assignments

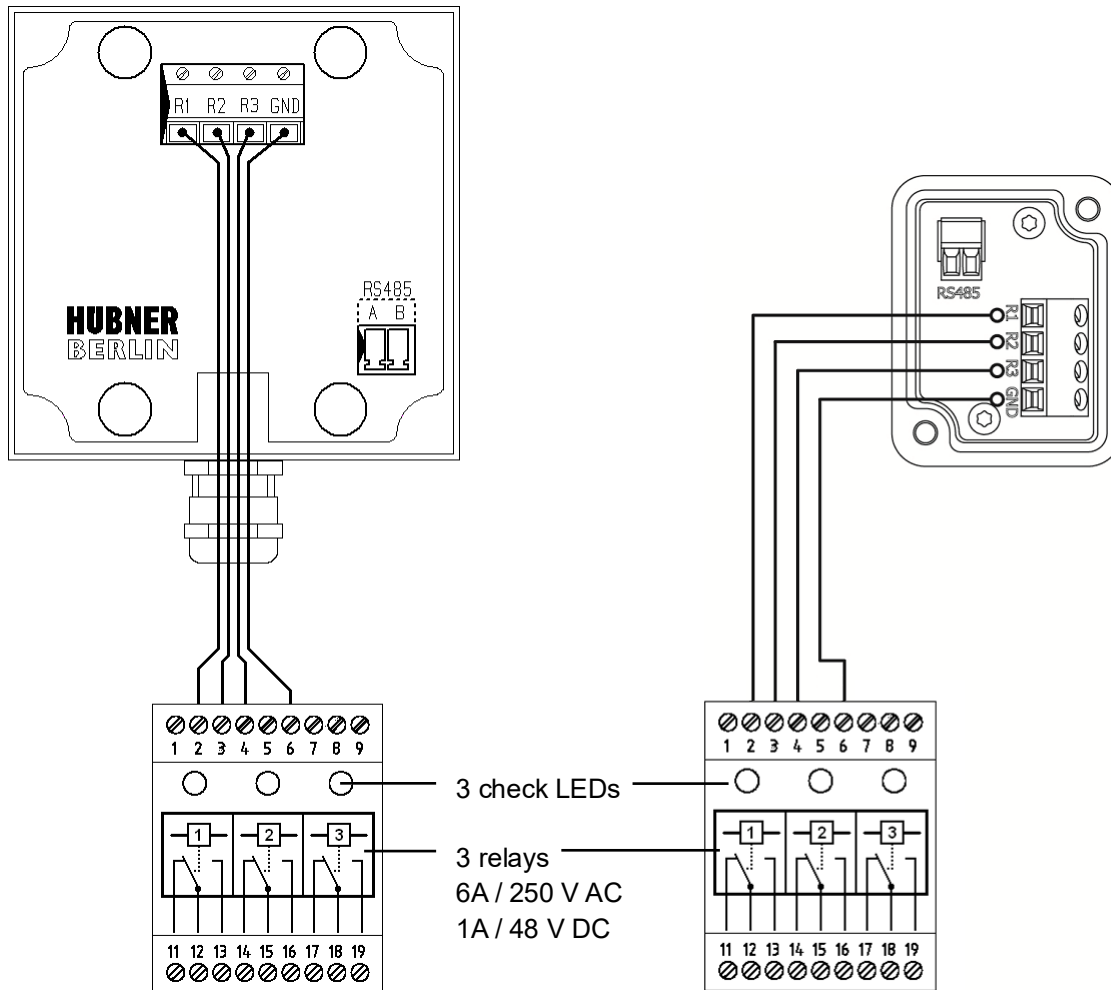## 10.3 Connections for the DS 93 R relay module (only with DSL.R)

Figure 23: Connections for DS 93 R

Figure 23 shows the relay states when no voltage is applied to the DSL.**R** or the speed is higher than all the three parameterizable switching speeds: All relays have dropped out.