R&R RR-P-569
CONTROLLER FOR 2 BLDC-MOTORS
Technical Data Sheet

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DESCRIPTION: RR-P-569 CONTROLLER FOR 2 BLDC-MOTORS

1. GENERAL

The motor-controller is used to control up to 2 brushless dc motors with hall sensors.
The motor controller can be used to control 2 separate axis or as electrical shaft.

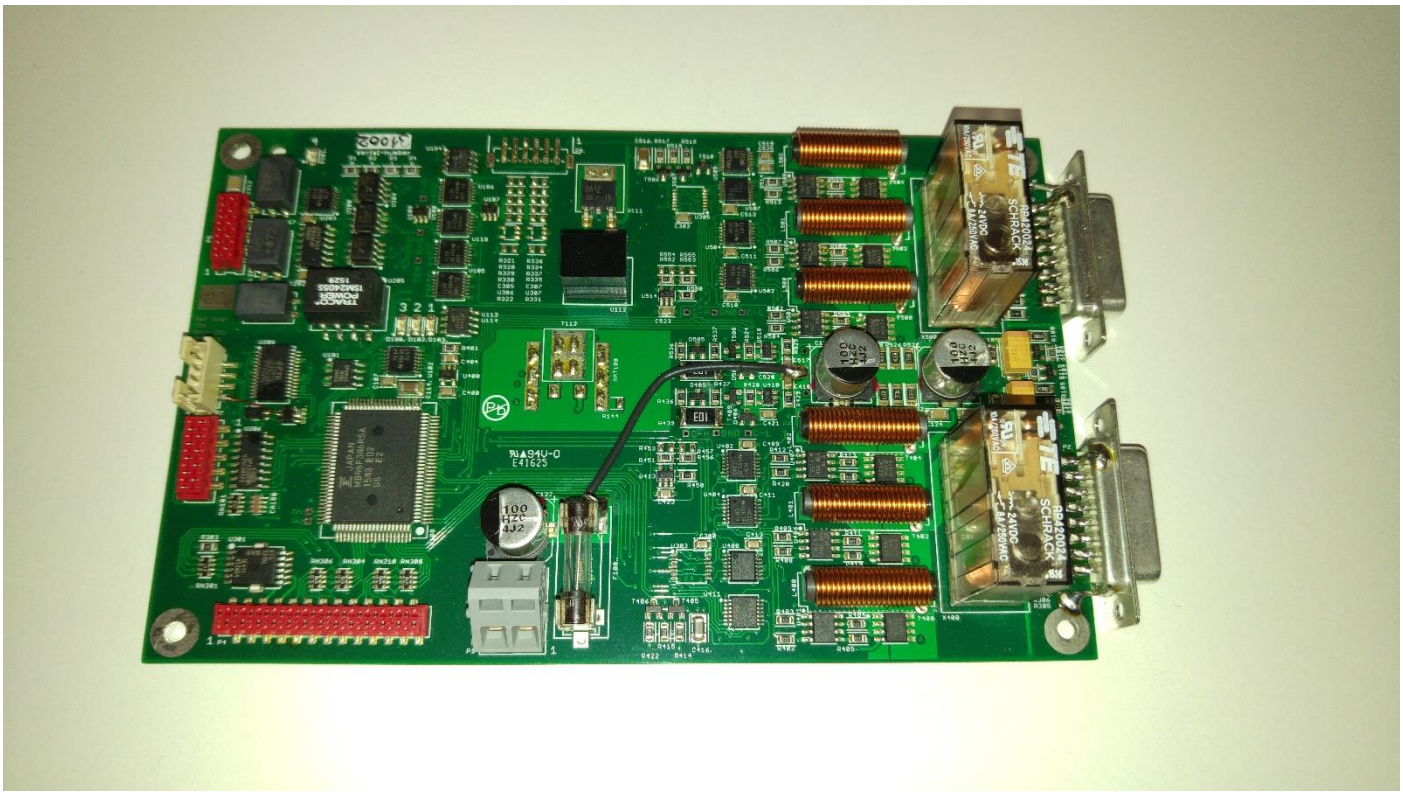

FIGURE 1: RR-P-569 CONTROLLER FOR 2 BLDC-MOTORS

TABLE 1: TECHNICAL PRINCIPLES

Drawing	DNR 20665
Dimension	160 x 100 mm
Mounting drills	3.5 mm at 150 x 90 mm
Voltage	24V-48V/DC
Absolute max. Current *1	14A
current	100 mA + motor currents (both motors) + digital outputs loads
Motor interface	2 x brushless DC Motor power stage with hall sensors.
User interfaces	1 x RS422 1 x RS232C 1 x USB 8 x digital I/O (function defined by software) 4 x digital outputs (1,5A max.) 2 x analogue inputs (0 – 5V 10Bits)
Internal sensors	temperature, current (peak and average), input voltage
Software	TBD

*1) Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device or a malfunction of the device.

2. INTERFACES

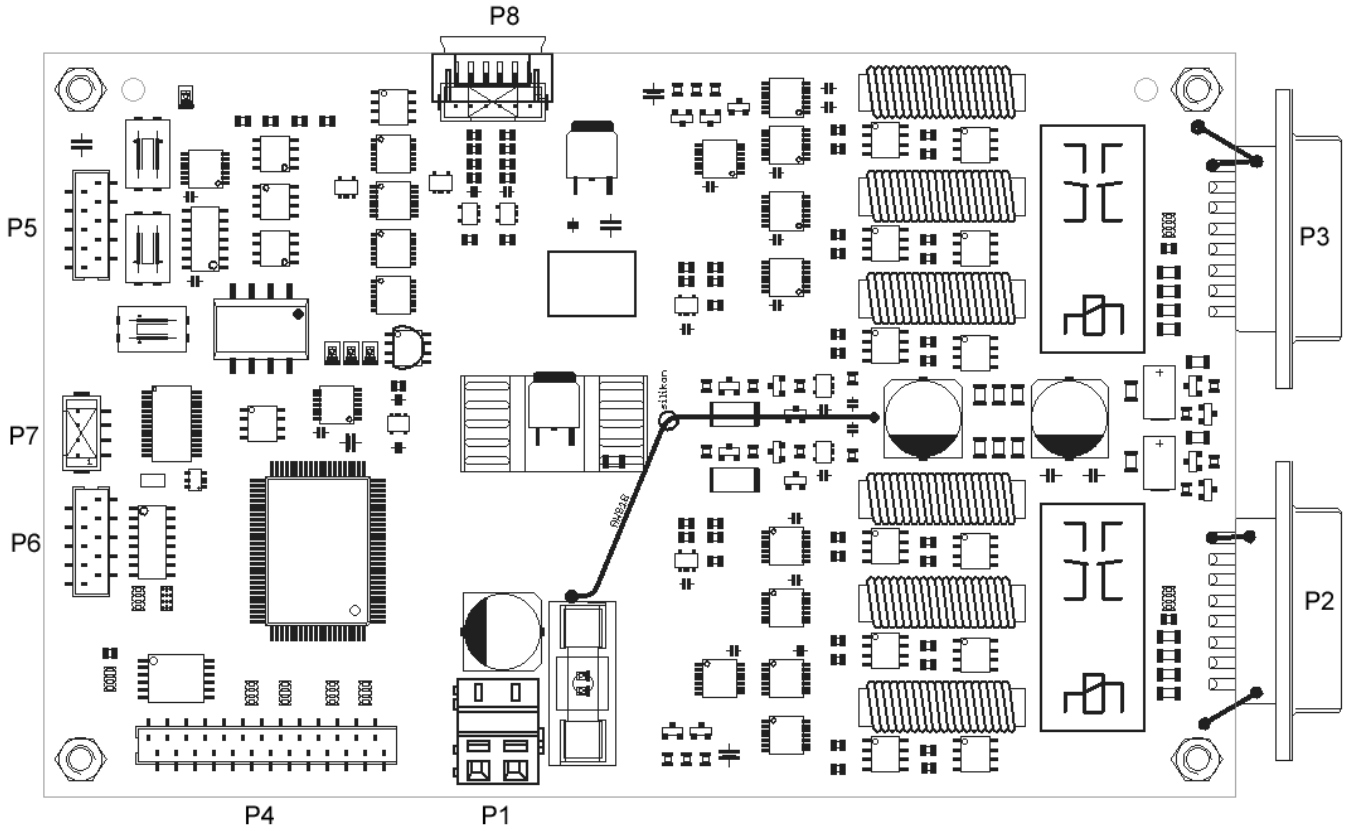

FIGURE 2: RR-P-569 CONNECTOR LAYOUT

TABLE 2: LIST OF CONNECTORS

Connector	designation	Interface type
Power supply	P1	
Motor interface 1	P2	
Motor interface 2	P3	
Digital I/O	P4	
Serial interface 1	P5	RS422 / RS485
Serial interface 2	P6	RS232C
Serial interface 3	P7	USB 2.0
Analogue Interface	P8	

2.1 POWER SUPPLY

TABLE 3: PIN ASSINGMENT CLAMP P1 – POWER SUPPLY

P1: Power supply	
Connector type	Spring clamps
1	+ 24V DC up to 48VDC
2	GND

2.2 MOTOR INTERFACES

TABLE 4: TECHNICAL DETAILS MOTOR INTERFACE

Number of BLDC-motor interfaces	2
power stage	3 half bridges for 24 up to 48 volts
Nominal current	7A
Absolute max. Current *1	10A
Over current shut down	Average current 0 – 10A (adjustable) Peek current 20A (fix)
Hall-sensors	3
end-switches	Contact bounce suppression by hardware for none delay Contacts NO, NC and COM. Internal pull-up resistors 5 volts operation
over-current shutdown direction 1	Shutdown is hardware controlled. Controlled by Digital potentiometers with none volatile memory. Adjusted via setup (see below)
delay 1	Delay 1 is hardware controlled. Digital potentiometers with none volatile memory Adjusted via setup (see below)
over-current shutdown direction 2	Shutdown is hardware controlled. Controlled by digital potentiometers with none volatile memory. Adjusted via setup (see below)
delay 2	Delay 2 is hardware controlled. Digital potentiometers with none volatile memory Adjusted via setup (see below)
Special function	Manual override Relays are used to disconnect the power stages from the motors.

*1) Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device or a malfunction of the device.

TABLE 5: PIN ASSINGMENT CONNECTOR P2 (MOTOR INTERFACE 1)

P2 motor 1					
Connector type		15 pin sub-D female			
(housing) PE	1	O			
			O	9	motor line U
motor line V	2	O			
			O	10	motor line W
hall 0V	3	O			
			O	11	hall A
hall B	4	O			
			O	12	hall C
hall +5V	5	O			
			O	13	stop1 COM
stop1 NC	6	O			
			O	13	NO stop1
stop2 COM	7	O			
			O	15	NC
stop 2 NO	8	O			

TABLE 6: PIN ASSINGMENT CONNECTOR P3 (MOTOR INTERFACE 2)

P3 motor 2				
Connector type		15 pin sub-D female		
(housing) PE	1	O		
			9	motor line U
motor line V	2	O		
			10	motor line W
hall 0V	3	O		
			11	hall A
hall B	4	O		
			12	hall C
hall +5V	5	O		
			13	stop1 COM
stop1 NC	6	O		
			13	NO stop1
stop2 COM	7	O		
			15	NC
stop 2 NO	8	O		

2.3 DIGITAL INPUTS AND OUTPUTS

Purpose: User interface

TABLE 7: TECHNICAL DETAILS DIGITAL INPUTS AND OUTPUTS

Output 0 – 3 max. current	1,5 A high side switches short circuit proof
Inputs 0 – 7 / Output 4 -11	Function defined by software
Input 0 - 7	0/24V internal pull-up resistors 4.7 k ohms
Output 4 – 11	TTL-level, 5mA

TABLE 8: PIN ASSINGMENT CONNECTOR P4 (DIGITAL INPUTS AND OUTPUTS)

P4: digital I/O				
Connector type:		WR-MM 26 pin female		
		O	1	output 3
0V (GND)	2	O		
		O	3	output 2
0V (GND)	4	O		
		O	5	output 1
0V (GND)	6	O		
		O	7	output 0
0V (GND)	8	O		
		O	9	Input 0 / output 4
0V (GND)	10	O		
		O	11	Input 1 / output 5
0V (GND)	12	O		
		O	13	Input 2 / output 6
0V (GND)	14	O		
		O	15	Input 3 / output 7
0V (GND)	16	O		
		O	17	Input 4 / output 8
0V (GND)	18	O		
		O	19	Input 5 / output 9
0V (GND)	20	O		
		O	21	Input 6 / output 10
0V (GND)	22	O		
		O	23	Input 7 / output 11
0V (GND)	24	O		
		O	25	NC
0V (GND)	26	O		

2.4 SERIAL INTERFACE 1 (Isolated RS422 bus interface)

Used to connect several controllers and for remote control.
Customized Software and protocol.
Software TBD

TABLE 9: PIN ASSINGMENT CONNECTOR P5 (ISOLATED RS422 BUS INTERFACE)

P5 isolated RS422 bus interface					
Connector type:		10 pin WR-MM 10-pin female			
		O	1		B
R_t	2	O			receiver pair
		O	3		A
(housing) PE	4	O			
		O	5		Z
R_t	6	O			transmitter pair
		O	7		Y
(housing) PE	8	O			
		O	9		isolated GND
(housing) PE	10	O			

2.5 SERIAL INTERFACE 2 (RS232C SERVICE INTERFACE)

Used for service only.
Programming, Testing, Setup.
Connected parallel to USB interface
Connect only J7 or J5

To access the service screen use a terminal program (VT100 mode).
We are using Tera Term (shareware).
Parameters: 19200, 8, N, 1 (Baud, Bits, Parity, Stopbits)
Follow the instruction on the service screen.

TABLE 10: PIN ASSINGMENT CONNECTOR P6 (RS232C SERVICE INTERFACE)

P6: RS232C for service only					
Connector type:				WR-MM 10-pin female	
		O	1	program mode	
+5V	2	O			
		O	3	RX	
RTS	4	O			
		O	5	TX	
CTS	6	O			
		O	7	reset	
setup	8	O			
		O	9	0V (GND)	
	10	O			

2.6 USB SERVICE INTERFACE

On board USB to RS232C Converter
Connected parallel to serial interface 2
Used for service only.
Programming, Testing, Setup.
Connect only J7 or J5

To access the service screen use a terminal program (VT100 mode).
We are using Tera Term (shareware).
Parameters: 19200, 8, N, 1 (Baud, Bits, Parity, Stop bits)
Follow the instruction on the service screen.

TABLE 11: PIN ASSINGMENT CONNECTOR P7 (USB SERVICE INTERFACE)

P7 USB	
Connector type	JST PH 5pin
1	5V-USB
2	D-
3	D+
4	GND

2.7 ANALOGUE INPUTS

TABLE 12: TECHNICAL DETAILS ANALOGUE INPUTS

Analogue 1 (internal)	Temperature: -40°C up to +100°C resolution approx. 1/2 degree Celsius
Analogue 2 (internal)	Operation voltage 0 up to 55V resolution about 55mV
Analogue 3 (internal)	Average motor current 1, 0 up to 9A resolution approx. 9mA
Analogue 4 (internal)	Average motor current 2, 0 up to 9A resolution approx. 9mA
Analogue 5 (general purpose)	0 – 5V DC, resolution 10 bits
Analogue 6 (general purpose)	0 – 5V DC, resolution 10 bits

TABLE 13: PIN ASSINGMENT CONNECTOR P8 (ANALOGUE INPUTS)

P8 analogue inputs	
Connector type	JST PH 6pin
1	Analogue 5
2	Analogue 6
3	GND
4	GND
5	+5V
6	+5V

3. DRAWINGS

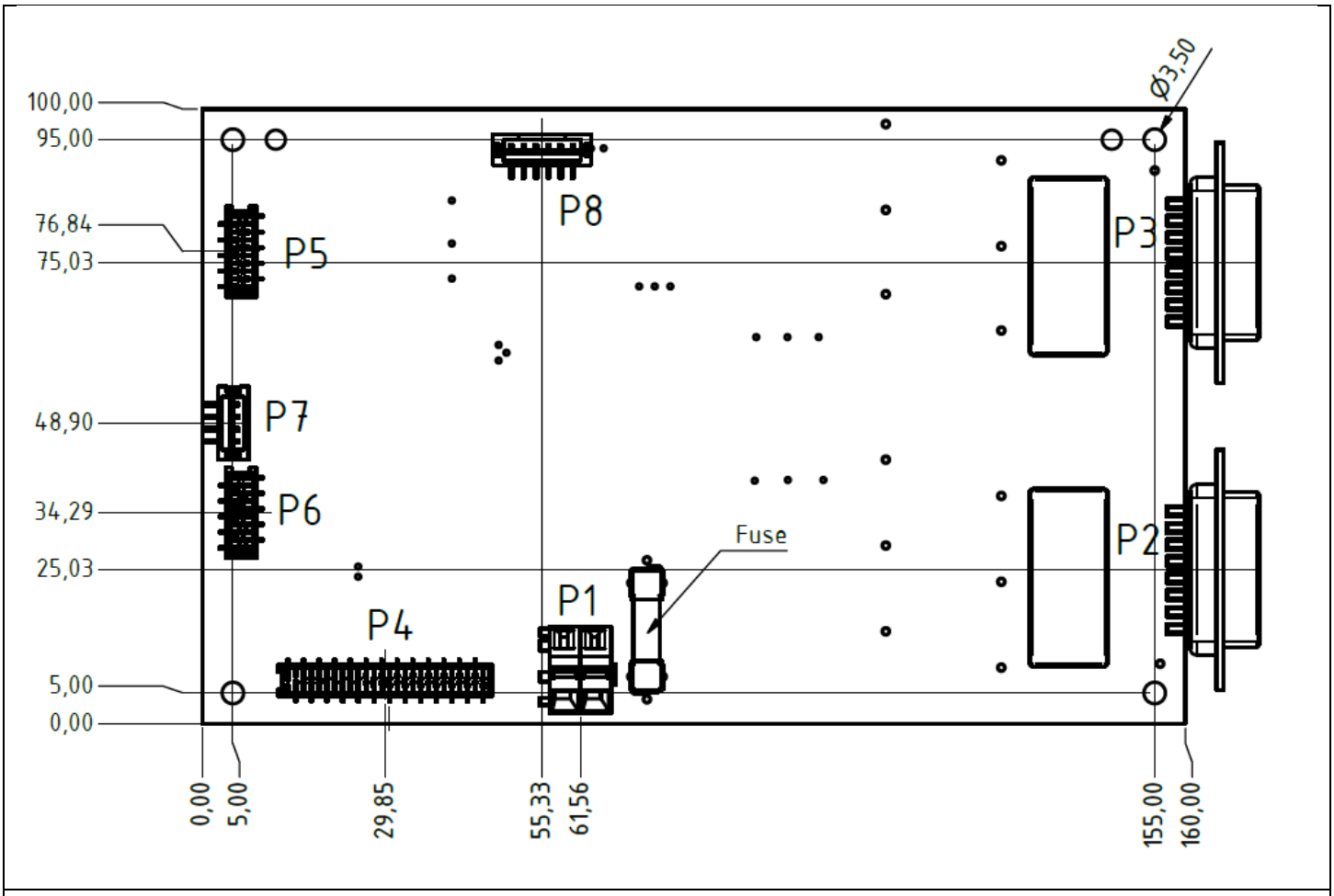

FIGURE 3: RR-P-569 TOP VIEW

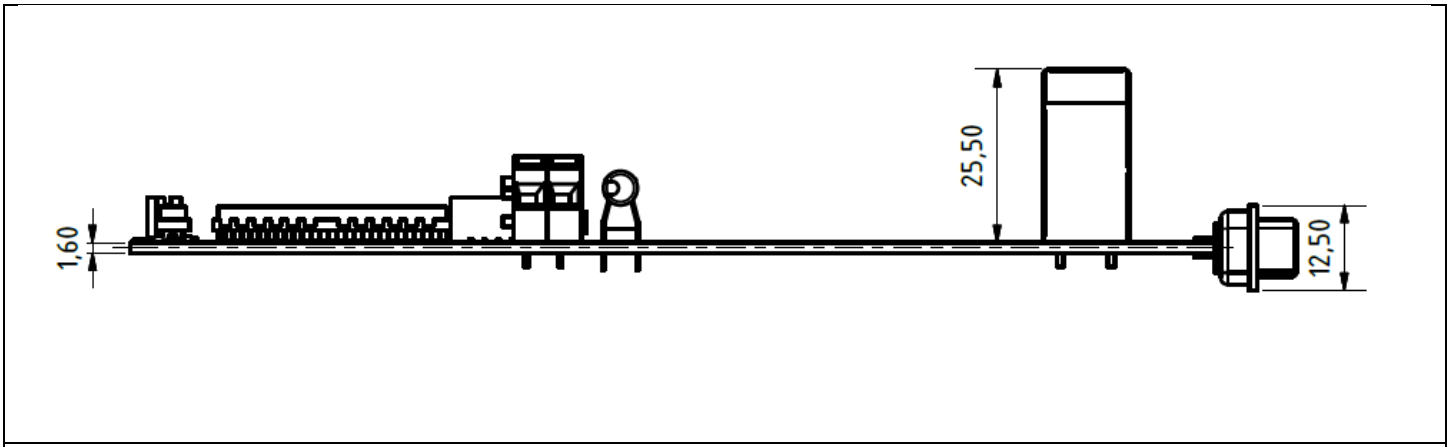

FIGURE 4: RR-P-569 SIDE VIEW

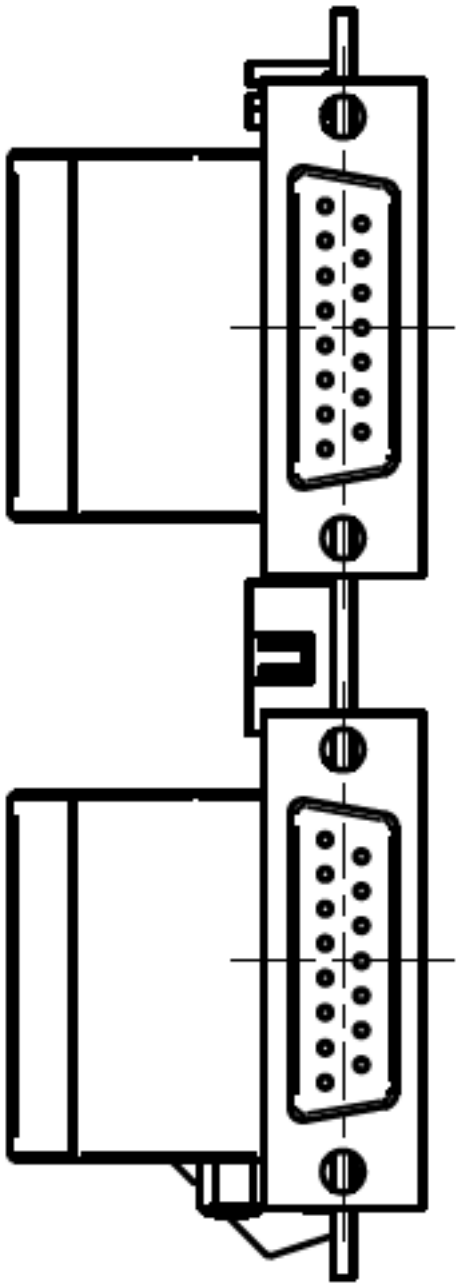

FIGURE 5: RR-P-569 SIDE VIEW

4. RR-P-569 SETUP

The ST107 (motor controller RR-P-569) does have an USB to serial converter on board.
Use a VT100 compatible terminal program (TeraTerm or comparable).

Procedure:
The Motor controller and the pc are switched off.
Connect the USB or serial cable on both sides.
Switch on the pc.

Start the terminal program.
Select the correct com port.
The TeraTerm terminal program does support only COM1, COM2, COM3, COM4!

Use the following Parameters: 19200, 8, NONE, 1, NONE

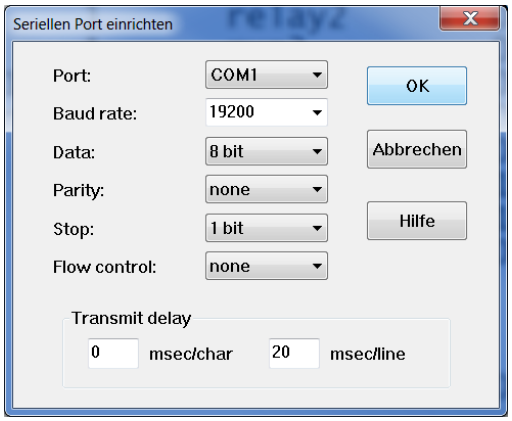

FIGURE 6: SERIAL PORT SETUP

Save the setup

Switch on the motor controller (connect the power supply to P1).

Note:
The controller RR-P-569 is streaming data on the serial port.
Windows operating system may try to install a mouse driver when streaming data is detected on a serial port! This can block the access to serial port.

Then menu may vary for different applications.

Example:

The following menu will appear:

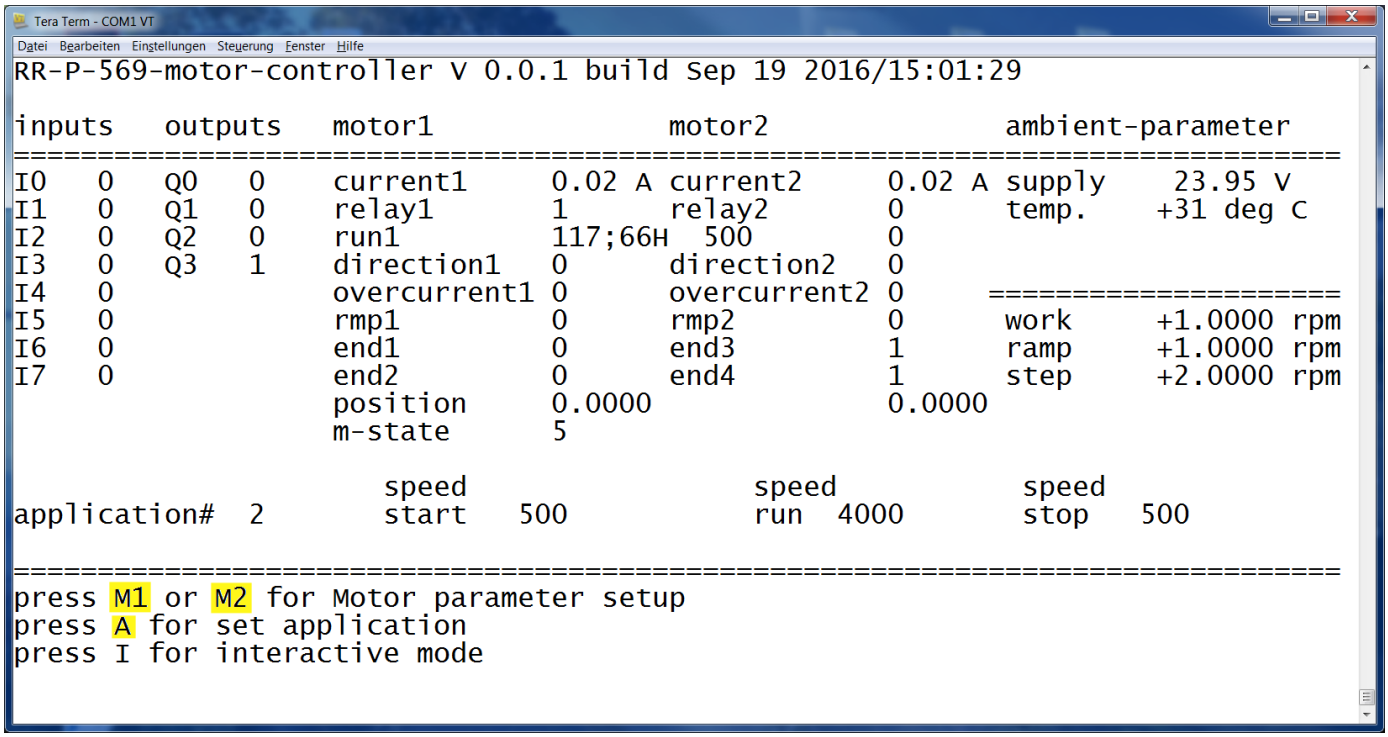

FIGURE 7: RR-P-569 MAIN MENU

Press space to redraw.

Press M1 to modify the current max values of Motor 1.
Press M2 to modify the current max values of Motor 2.
Use the same parameters for both motors
The menu is case sensitive!
The following menu will appear:

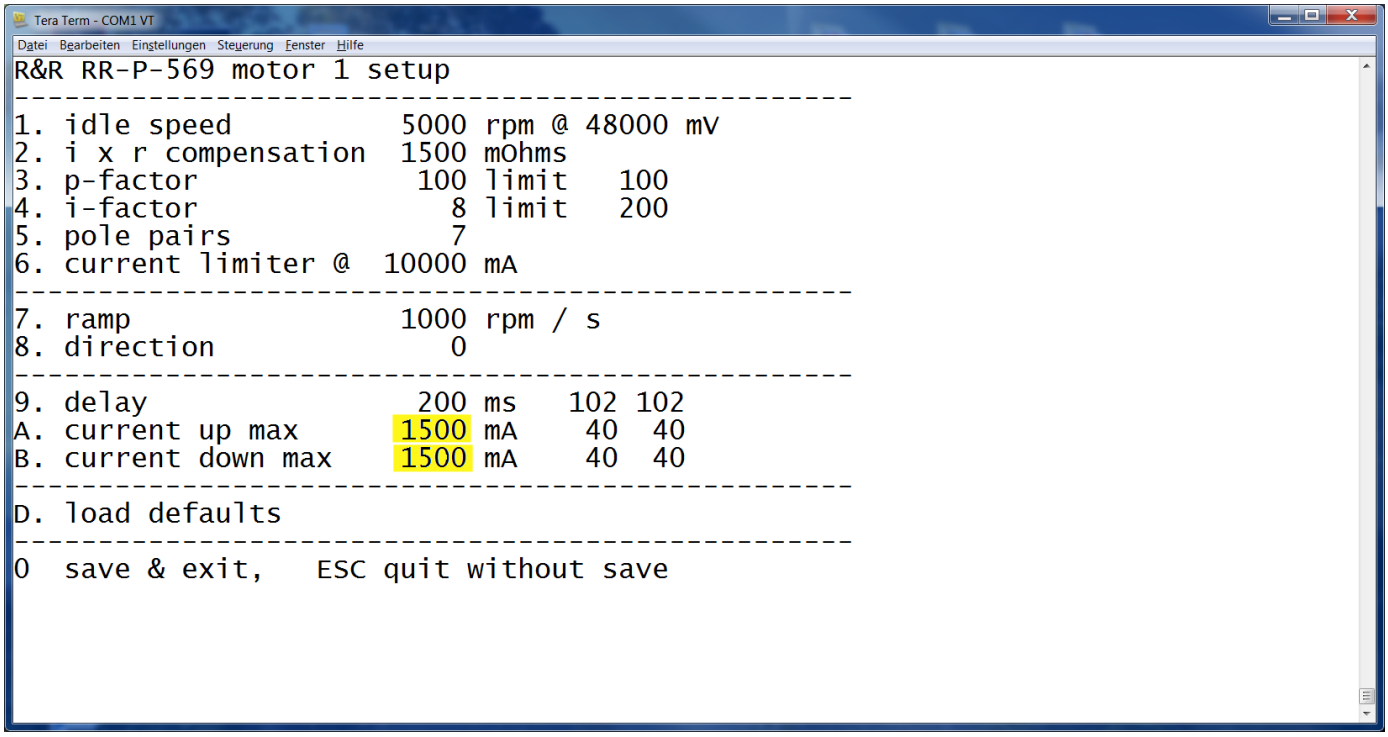

FIGURE 8: MENU RR-P-569 MOTOR 1 SETUP

Increase the values in steps of 100mA.

Press A to change current up max.
Press B to change current down max.

Don't change other parameters.
Press “0” (Zero) to save the changes.
Use ESC to exit without saving.

5. RR-P-569 FIRMWARE UPDATE

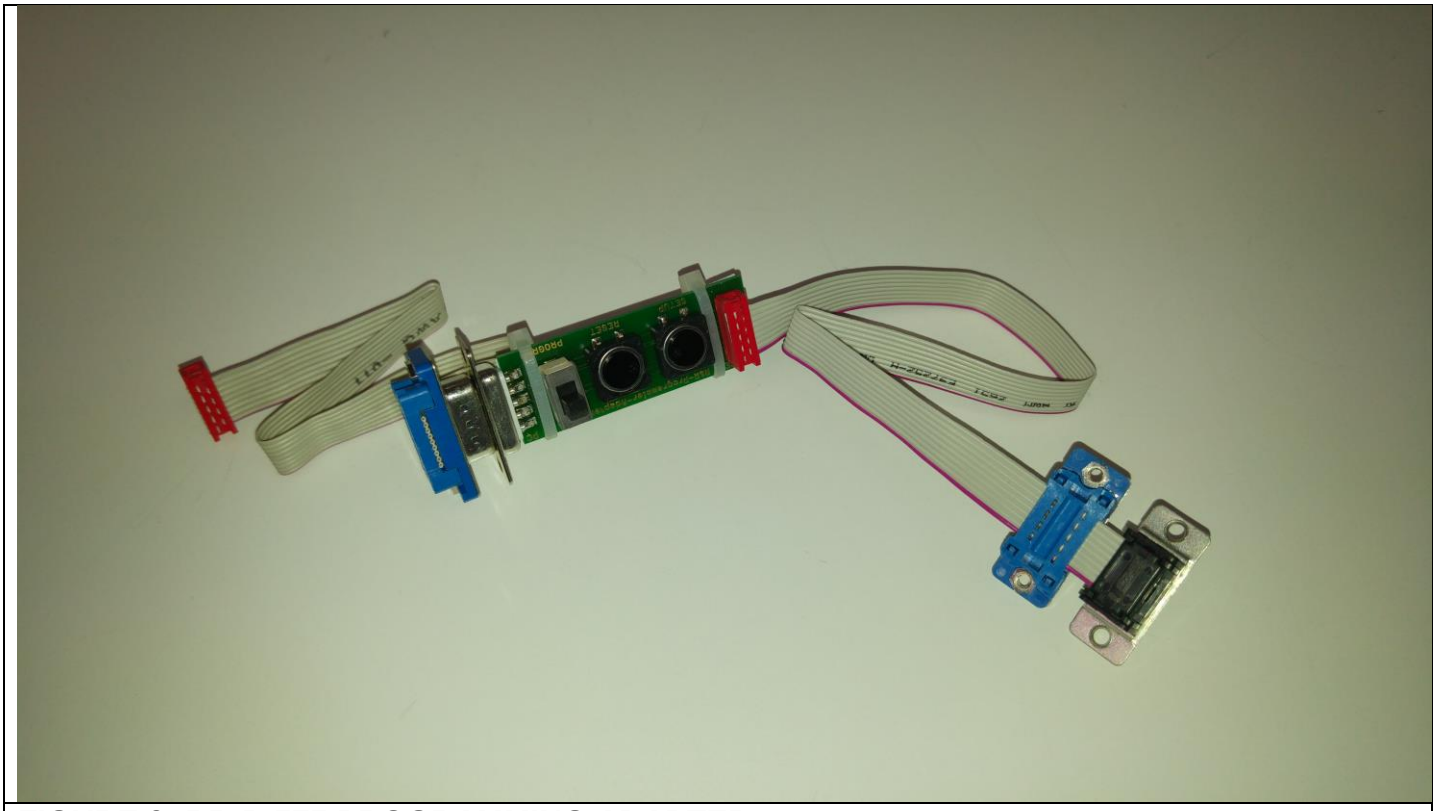

FIGURE 9: RR-P-575 PROGRAMMING ADAPTER

Connect the Programming Adapter RR-P-575 to the service interface (connector P6).
Switch on the motor controller (connect the power supply to P1)
Use a Switch between PIN 1 and PIN 6 to select the Program mode PIN 1 must be connected permanently to +5V DC. Use a push button between PIN 4 and PIN 6 Push the button to perform a Reset (The PIN 4 must be set to +5V PIN 6) Connect the serial port to a windows PC.

Programming operation
Use the supplied flash utility. Start the program. Load the firmware file. Download the control program to the processor. – Download - Erase the flash memory. Perform a reset. Download the new firmware by using the FULL-OPERATION Wait until the download is completed. Leave the program mode. Perform a Reset. Release the ON-Button. The firmware is now loaded. The machine is running normally. Close the programming utility. Access the service screen of the machine. All parameters must be controlled. If you have any doubts load the default parameters.