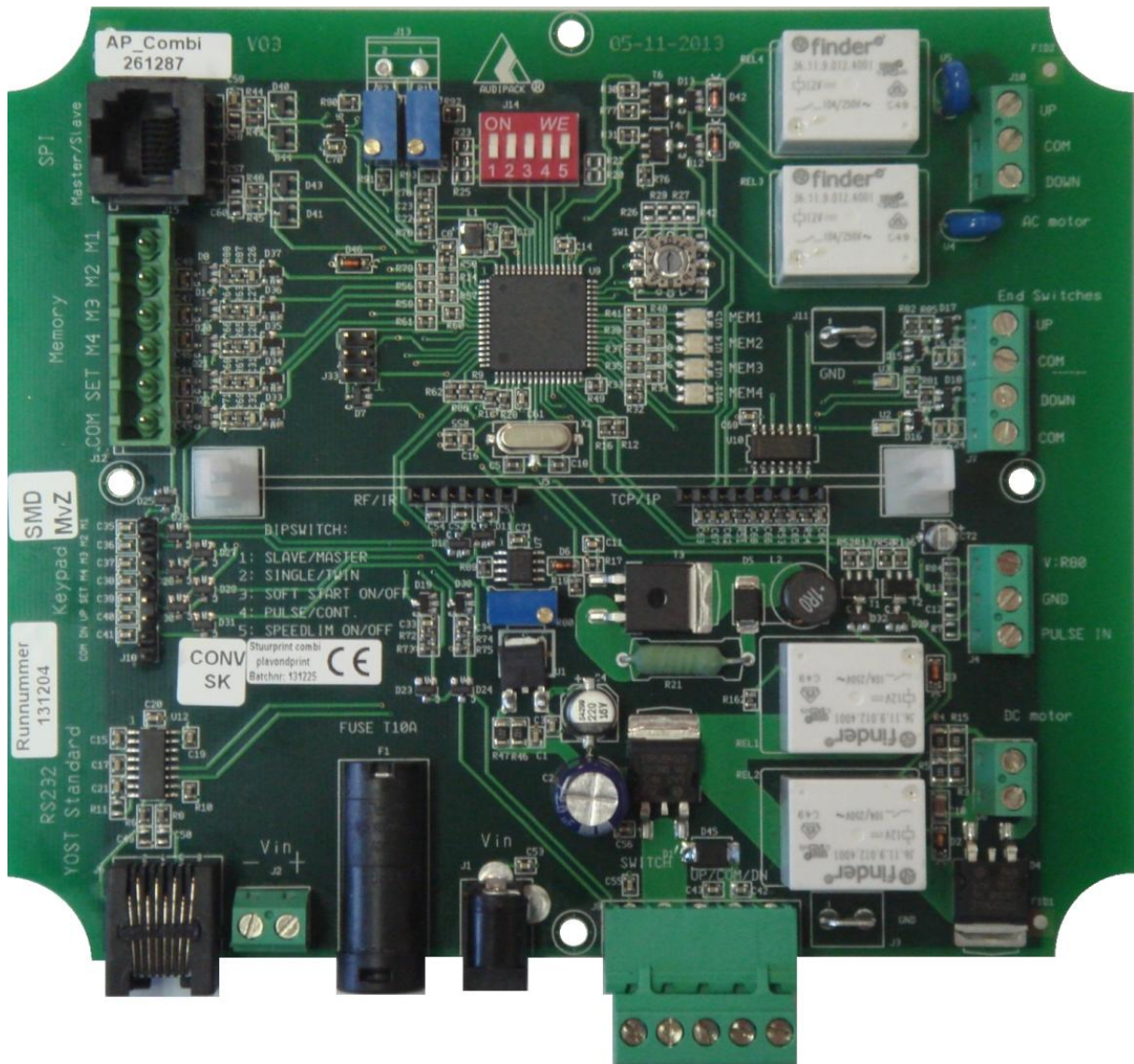# 261287-261377
Control board

User manual

Version 3.0

Read the manual carefully before installing.

Lees aandachtig de gebruiksaanwijzing alvorens te beginnen met de installatie.

Bitte beobachten Sie den Gebrauchsanleitung bevor Sie anfangen mit installieren!

S'il vous plaît, lisez attentivement le mode d'emploi avant commencer l'installation!

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Index

Table of Contents

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Product

1. Product description

The 261287 control board is developed to control DC-motors up to 30 VDC and AC 230 Volt motors.
It is also possible to control AC motors by relay dry contacts. Position control is possible for both types of motors.

The 261377 control board is developed to control only DC-motors up to 30 VDC. Position control is possible for DC motors.

1.1.   Scope of delivery

- Product (261287 or 261377)
- Manual
- 5-pole connector with jumper
- 6-pole connector

1.2.   Accessories

- Cable:
  RS232 serial communication RJ45 ⇔ Sub-D9 (female) (Part number 320137)
- Cable:
  serial adapter Sub-D9 (male) ⇔ USB (Part number 320139) is needed.
  (Only If the computer doesn't have a Sub-D9 serial port)
- Keypad(Part number 261288)
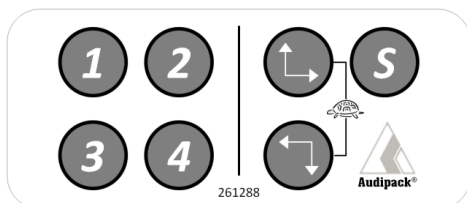
Keypad 261288

1.3.   End switches

End switches, also called limit switches restrict the movement of the motor in both directions. The limit switches are related to the rotation direction of the motor. It is important to connect the motor so that the direction of motion corresponds to the controls and limit switches.

In any case the movement stops on both switches, but when the motion direction and limit switch do not match, the two led's (U2 and U3) of the corresponding limit switches on the PCB start blinking.

Product

2. Keypad controls

Functions of the keypad in combination with the control board (261287 or 261377) button control

Table 1 – Buttons keypad (part number: 261288)

(1)					Go to memory position 1
(2)					Go to memory position 2
(3)					Go to memory position 3
(4)					Go to memory position 4
(S)					Set memory in combination with 1,2,3 or 4
(↑)					Moving direction Up/right
(↓)					Moving direction Down/left
(S)	+	(1)			Set memory position 1 Memory indicator LED1 turns from orange (pushed) to green (released)
(S)	+	(2)			Set memory position 2 Memory indicator LED2 turns from orange (pushed) to green (released)
(S)	+	(3)	→	Pin	Set memory position 3 with PIN-code Memory indicator LED3 turns from orange (pushed and released) to green (pin-code correct)
(S)	+	(4)	→	Pin	Set memory position 4 with PIN-code Memory indicator LED4 turns from orange (pushed and released) to green (pin-code correct)
(↑)	+	(↓)			Toggle between fast and slow motion (DC output only)
(↓)	+	(3)			"Homing"
(1)	(2)	(3)	(4)		"Reset" the control board by pushing all buttons together during power up. *Memory positions retain their current value*

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Change settings

3. Changing the settings

The main settings of the product are stored in the control board.
For changing the main settings you are in need of a tool and experience.

3.1. Required tools

The following tool is required;
- (voltage tester) screwdriver for wiring & program settings

3.2. Experiences

Basic electrical knowledge is recommended.
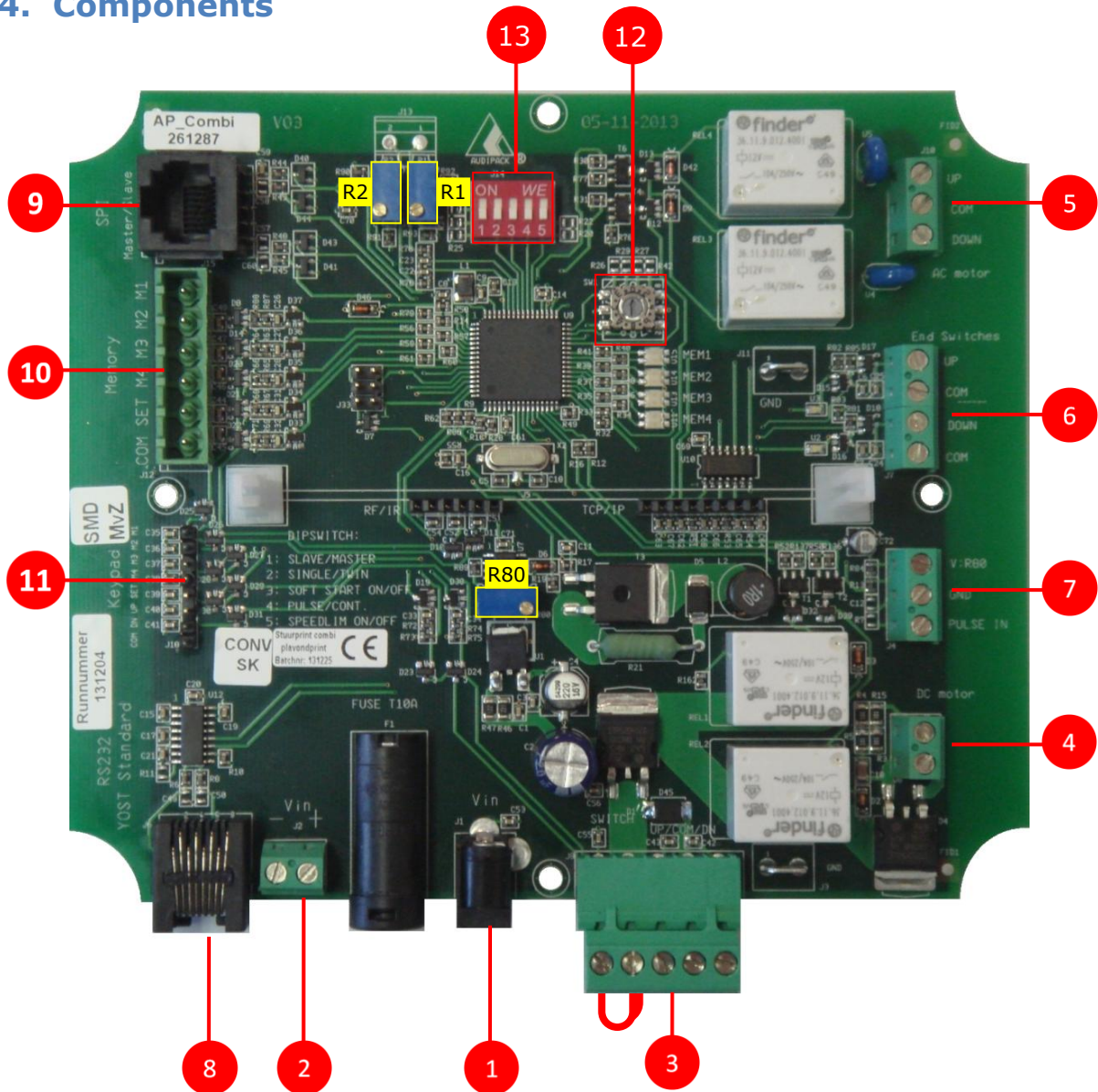
4. Components

Electrical components

1 and **2** are power supply connections up to 30 Volt DC.

Connector **1** is suitable for a barrel plug with a diameter of 5.5 mm.
The inner contact also called tip is the positive pole (+)

3 Connector external control

JUMPER
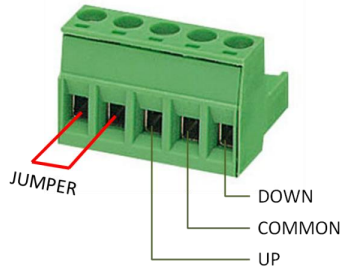
DOWN
COMMON
UP

4 Motor terminal DC

5 Relays output UP/DOWN

6 Terminal limit switches

7 Sensor counter

8 Serial communication (RS232)

9 Heartbeat cable connector

10 Connector memory position control and memory store function

11 Connector keypad

R1   =   Potentiometer for maximum motor current
R2   =   Potentiometer for maximum motor voltage (% of power supply)
R80 =   Potentiometer supply voltage counter sensor (factory setting = 5VDC)

12 Rotary switch

13 Dipswitch

Electrical components

12 Rotary switch (SW1)

Precautions

Before changing the program state disconnect the power from the control board. Set memory positions under load. Place the projector or flat screen before storing the memory positions.

Rotary switch positions versus functions

Rotary switch on position "0" = DC motors up to 30VDC without position control
Rotary switch on position "1" = DC motors up to 30VDC, column lifts with intern limit switches and position control.
Rotary switch on position "2" = DC motors up to 30VDC with external limit switches and position control, auto homing.
Rotary switch on position "3" = DC motors up to 30VDC with external limit switches and position control, manual homing.
Rotary switch on position "4" = Single phase AC tube motors with external limit Switches .
Rotary switch on position "5" = Single phase AC tube motors with external limit Switches and position control, manual homing.

(4 & 5 not applicable on PCB 261377)

Rotary switch positions versus product examples

Rotary switch on position "0" = MKT-150WS, MKT-200WS, MKT-250WS, MKT-265WS
Rotary switch on position "1" = FFCL-XXXX, Column lifts
Rotary switch on position "2" = PRK-250, PRK-500, PRK-750, PCL-M350, PCL -X350 and MKT-C150
Rotary switch on position "3" = PRK-250, PRK-500, PRK-750, PCL-M350, PCL -X350 and MKT-C150
Rotary switch on position "4" = Universal AC tube motors
Rotary switch on position "5" = PCL-1070, PCL-2050, PCL-3050, PCL-5050 Switches and position control, manual homing.

(4 & 5 not applicable on PCB 261377)

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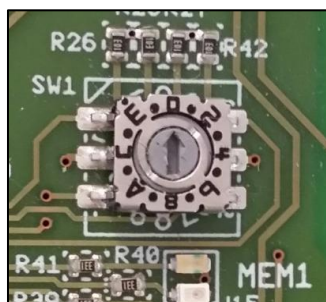
Electrical components

🔴13 Function dipswitches (J14)

Dipswitch position 1 = Master/slave - slave "on" (in twin-mode only)

 slave
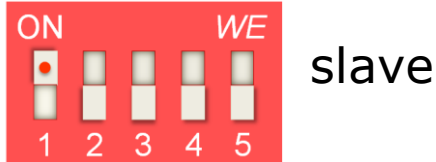
Dipswitch position 2 = Single/twin - single mode "on"

 single

Dipswitch position 3 = Soft start/stop on/off - soft start/stop "on"

 soft start/stop on

Dipswitch position 4 = Pulse/continue - pulse "on"

!! When pulse is "on", the direction buttons are working as a latching switch !!

 pulse
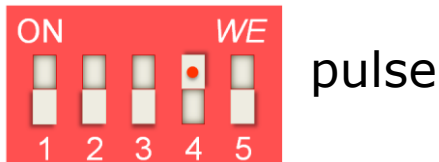
Dipswitch position 5 = Speed limit on/off – speed limit "on"

 speed limit on
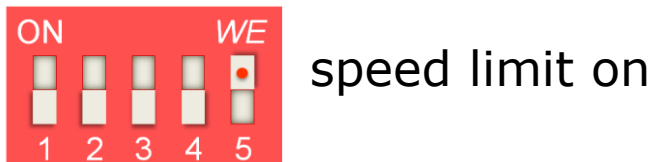
Electrical components

4.1. Inputs

Power supply

RJ45 input

5-Pole Connector

Keypad

6-Pole Connector

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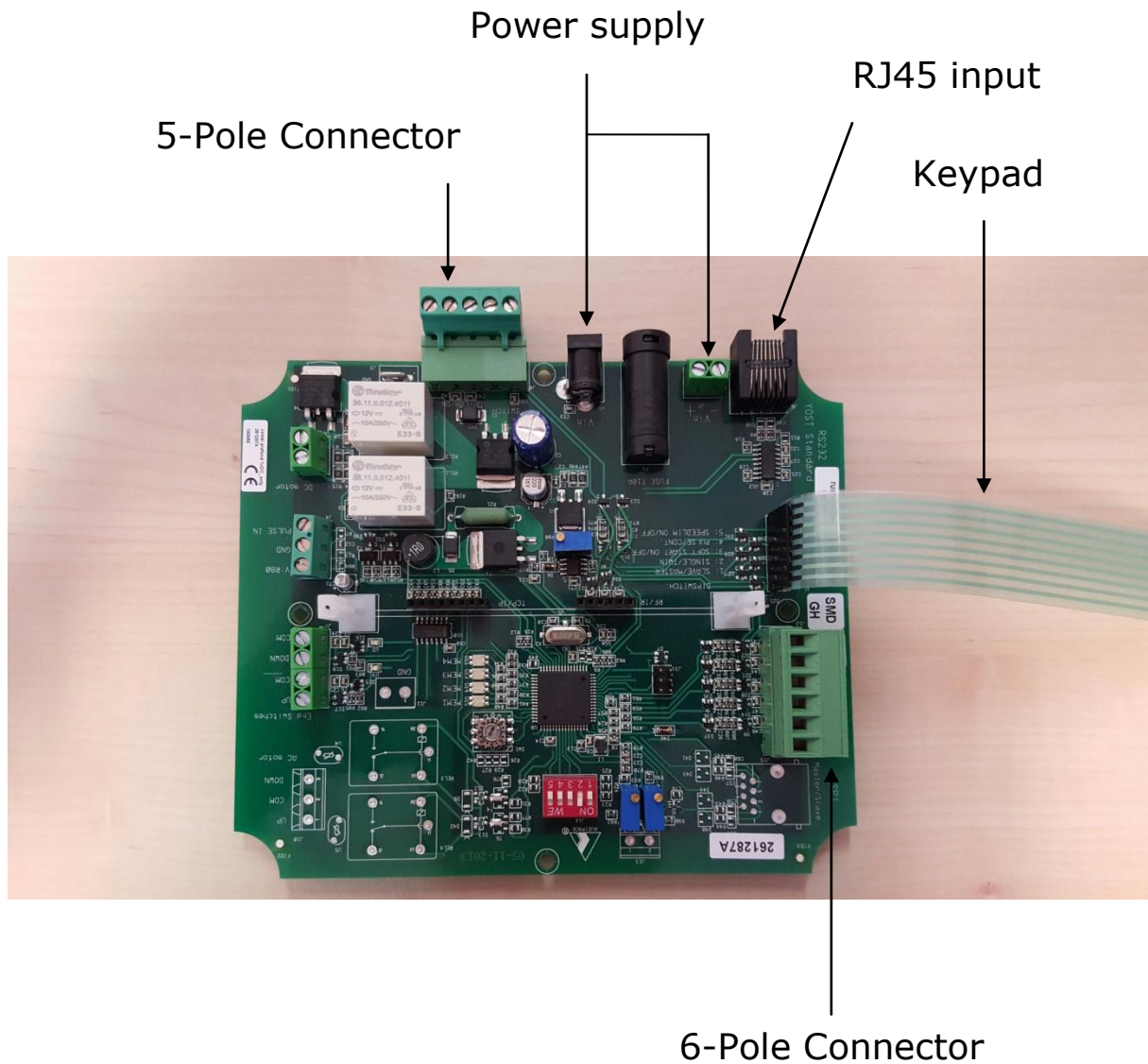
Electrical components

5. Control by inputs 6-pole connector

M1
M2
M3
M4
SET
COM
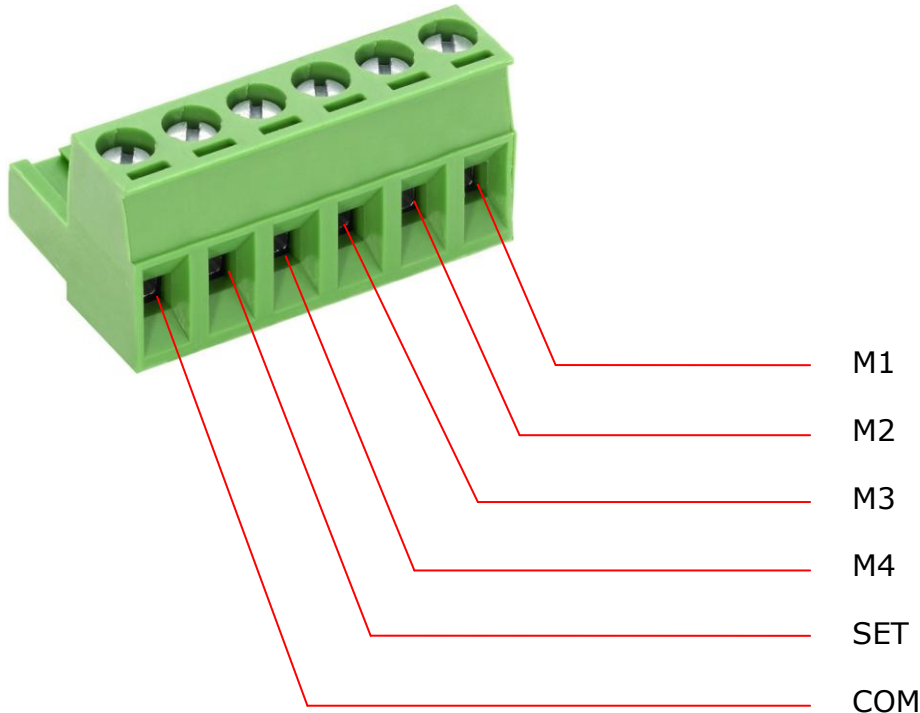
5.1. Moving to memory positions

Move to memory position 1 make a connection between COM + M1
Move to memory position 2 make a connection between COM + M2
Move to memory position 3 make a connection between COM + M3
Move to memory position 4 make a connection between COM + M4

5.2. To set a memory position

To set a memory position:

- Make an interconnection between COM + SET
- Maintain this interconnection, and make an interconnection between COM + M1, M2, M3 or M4,
  depends on the memory you want to store.
- Disconnecting all the above connections will set the required memory position. (an audible "click" is notable)

6. Control by inputs 5-pole connector
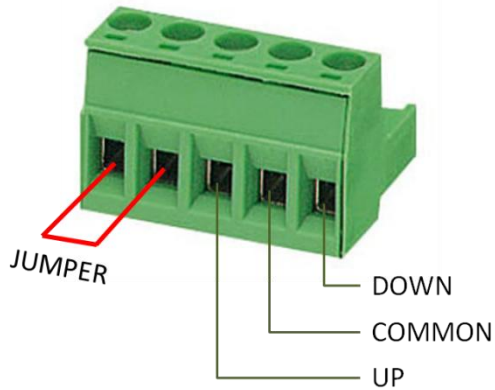
The connection of the jumper can be replaced by a safety or emergency contact. Removing the jumper completely will disconnect the power from the control board.

6.1. Moving to memory positions

Move to memory position 1 or down/left direction make a connection between COMMON and DOWN.
Move to memory position 2 or up/right direction make a connection between COMMON and UP.

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Serial comminucation

7. Serial communication with the RS-232

7.1.   Cables

Put the RJ-45 male connector into the female connector **8** (see page 8) on the control board and into the Sub-D9 male connector of your computer.
(Part number 320137)
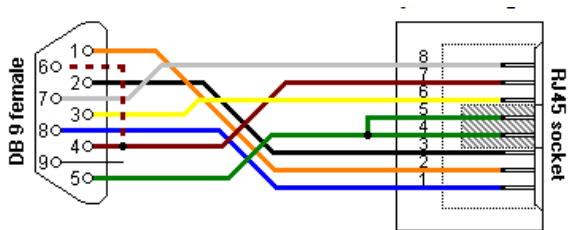
If your computer doesn't have a serial Sub-D9 serial port connector, a serial adapter Sub-D9 (male) ⇔ USB cable is needed. (**Part number 320139**)

Serial comminucation

7.2.   Software

An example of a terminal emulator software to control the control board is "PuTTY" and can be found to follow this link:
http://the.earth.li/~sgtatham/putty/latest/x86/putty.exe

Insert the USB and install the driver.
Follow these next steps to configure Putty settings:

Starting screen of Putty:
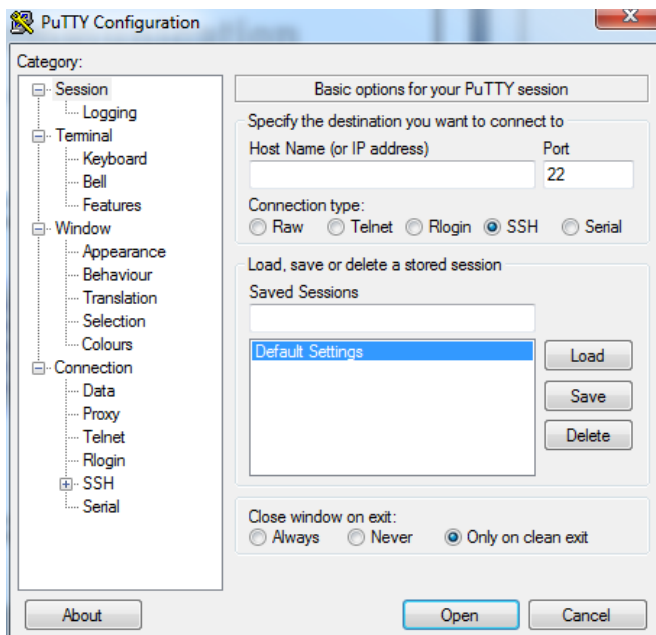
Go to "serial" and set the following settings:

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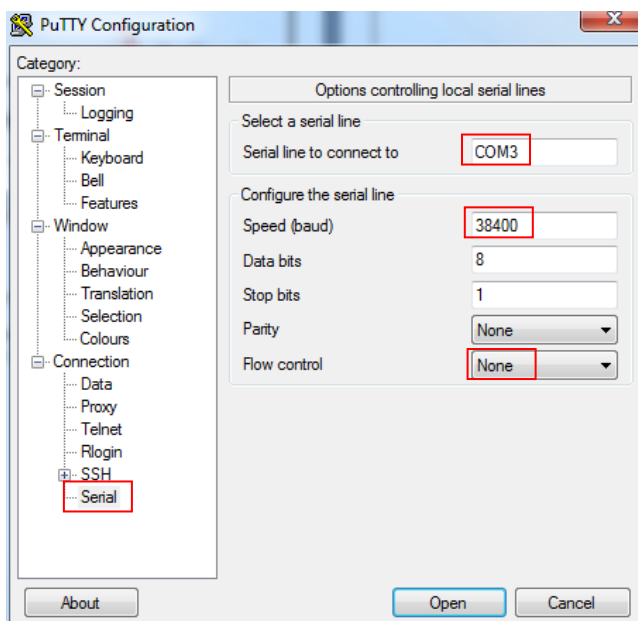
Serial comminucation

Go to "terminal" and set the following settings:
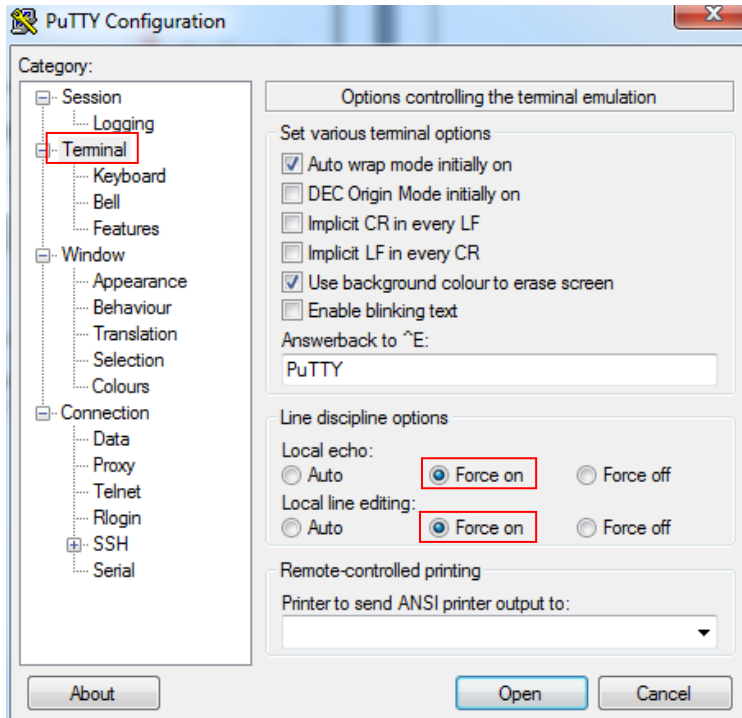
Set The Connection type: to Serial and save these settings:
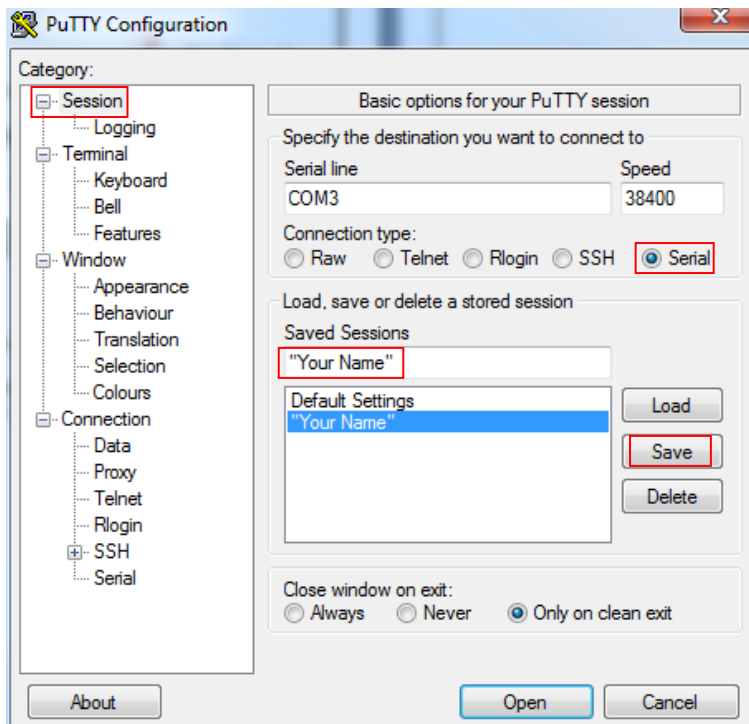
Serial comminucation

Now you are able to "Load" the saved settings and start the commando screen
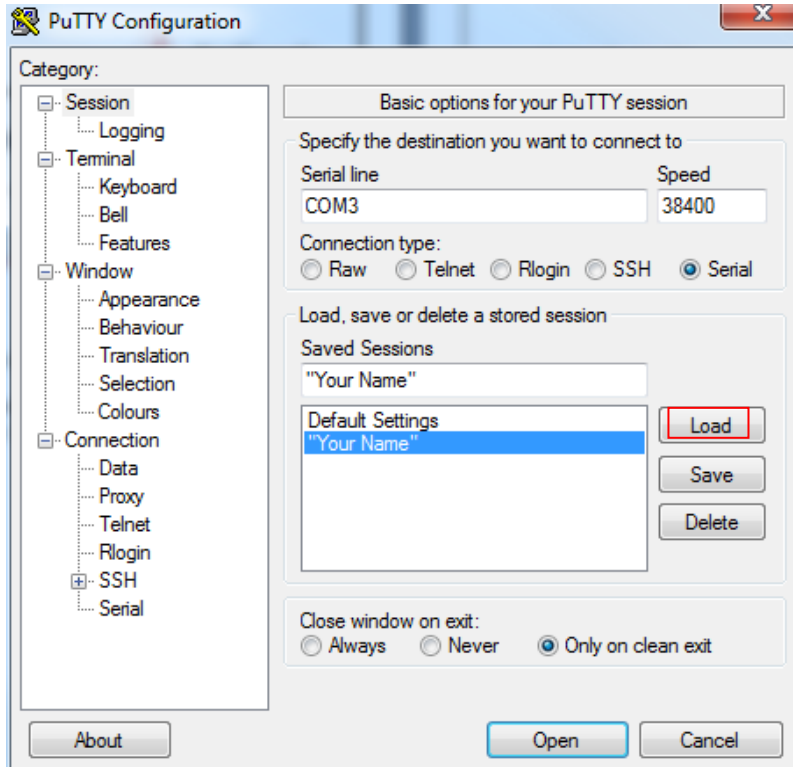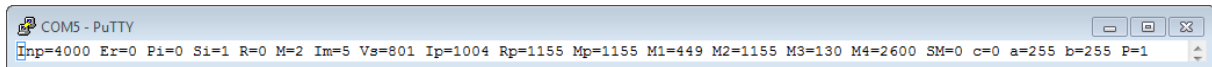
Commando screen (PuTTY):

Serial comminucation

Opening the RS-232, will show a black commando screen.
Pressing **[D]** (debug) and **[ENTER]** will show the current values
In the next chapter are all the commando's listed which are used by the RS-232.

7.3. Debug line

```
COM5 - PuTTY                                                                    □ ▣ ▩
Inp=4000 Er=0 Pi=0 Si=1 R=0 M=2 Im=5 Vs=801 Ip=1004 Rp=1155 Mp=1155 M1=449 M2=1155 M3=130 M4=2600 SM=0 c=0 a=255 b=255 P=1
```

Er = Error (Register R1011)

M   = Current memory position

I_M = Actual motor current

V_S = Output voltage (PWM regulation 1023 = 100%) by Potentiometer P2

I_P = Preset motor current limit (1023 = approximately 10 Amperes) by potentiometer P2

R_P = Requested position

M_P = Memory position (actual position)

M1 = Preset memory value position 1

M2 = Preset memory value position 2

M3 = Preset memory value position 3

M4 = Preset memory value position 4

Commands

8. Commando's

8.1.   Definitions

Homing   - Move motor to zero or reference point (counter)
Twin mode - Parallel or synchronous mode for 2 separate drive units

8.2.   Memory position control

Memory position M1 to M4 can be set in three different ways.

- By the keypad on the electrical control box
- By the memory and motor control terminal **10**
- By serial communication via RS-232

In program number "**1**" M3 and M4 are protected and can only be stored using a PIN-code.

Set the memory position by the foil switch

8.3.   Memory positions and directions

The memory positions M1 to M4 must be set in a specific order in between the two limit switches. They differ of the selected program and are also related to the buttons of the remote control.

Program "0" and "4"
M1 correspond with the left/down direction
M2 correspond with the right/up direction
M3 is not assigned
M4 is not assigned

Program "1"
M1 correspond with the left/down memory position between **M3** and **M4**, and down position of the RC (free programmable)
M2 correspond with the right/up memory position between **M3** and **M4**, and up position of the RC (free programmable)
M3 lowest memory position, close to limit switch down (factory setting)
M4 upper memory position, close to limit switch up (factory setting)

Program "2", "3" and "5"
M1 correspond with down position of the RC (free programmable)
M2 correspond with the up position of the RC (free programmable)
M3 memory position is free programmable
M4 memory position is free programmable

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Commands

8.4. Error reset

All errors can be reset by disconnecting the power from the control board or typing command **S <enter>** to prevent automatic running after error erase.
Type command **E <enter>** to erase the error.
After the error erase, try homing to get a secure and aligned starting point.

Take at least 10 seconds to power up.

The only exception is if two control boards are in twin mode.
If an synchronous error occurs then both motors have to be reset and homed separately. Taking into account of possible mechanical damage.

8.5. Homing

If the control board will be used with position control, the reference or home position have to be set.
Position control is available in program number "1", "2", "3" en "5".

The procedure for homing is as follows:
* The motor runs in low speed to down limit switch
* The motor stops when the (down) limit switch is activated
* The motor runs in low speed in de reverse direction
* The motor stops 10 count after the (down) limit switch is deactivated

!! In program number "5" homing is in the opposite direction !!
(limit switch "UP" will be activated)

Homing can be activated by:

* Keypad
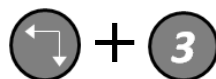
* RS-232   home, enter
* Program number "2"   auto homing

Specifications

9. Instructions RS232

9.1. Terminal input instructions

The terminal input or instruction by other devices thru RS232 or not context sensitive.

9.2. Instructions to control the motor

B = Switch slow/fast model (*DC Output only*)
N = Move motor down
O = Move motor up
S = Motor stop

9.3. Instructions to move the motor to a memory position

M1 = Go to memory position 1
M2 = Go to memory position 2
M3 = Go to memory position 3
M4 = Go to memory position 4

9.4. Program memory positions

P1 = Set new value for memory position 1
P2 = Set new value for memory position 2
P3 = Set new value for memory position 3
P4 = Set new value for memory position 4
PF = Set memory positions to factory settings / reset

P3 and P4 can only be stored in factory mode.

9.5. Factory mode

To set the control board into the factory mode, type: **[Esc]~[Enter]**
(During factory mode you're able to change the main settings.)
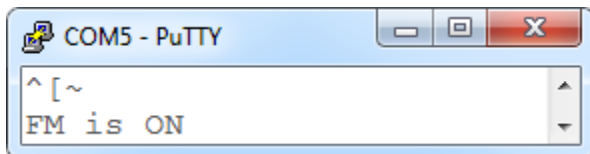
Returns with the text: "FM is ON"

To turn the factory mode off, type: **[Esc] [Enter]**

Commands
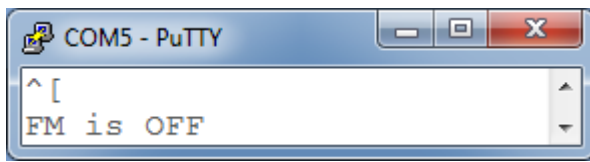
Returns with the text: "FM is OFF"

9.6.   Miscellanious instructions

D	=	Switch debug on/off (Show settings)
R<X>	=	Read register <X>
W<X>=<data>	=	Write <data> into register X
V<X>	=	Set PWM motor speed <X> (0 < X > 1023)
K<X>	=	Set motor position in counts (50 < X > 60000)

9.7.   Register R1000 [Device Name]

In register "R1000" the device name is stored .
R1000[Enter]
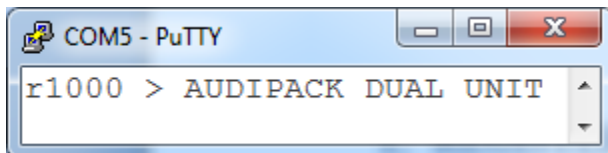
Returns "AUDIPACK DUAL UNIT"

9.8.   Register R1001 [Input Status]

In register "R1001" the status of the inputs can be viewed.
The result is a DEC number.

Register R1001	131072	65536	32768	18384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1
18 Bits	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Description	Dipswitch 1	Limit Switch Up	Limit Switch Down	Dipswitch 2	Dipswitch 5	Dipswitch 4	Dipswitch 3	Rotary switch bit3	Rotary switch bit2	Rotary switch bit1	Rotary switch bit0	Down	Up	Store	Preset M4	Preset M3	Preset M2	Preset M1

R1001[Enter]


```
COM5 - PuTTY
r1001 > 118912
```
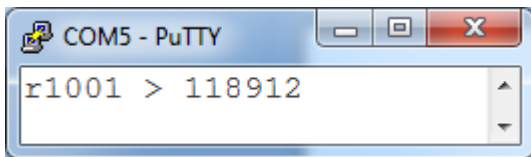
Returns decimal number "118912" (DEC)
and is equal to a 18-Bits binary "011101000010000000" (BIN)

(Tip; use an online converter decimal to binary)

18 Bits	0	1	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0
Description	Dipswitch 1	Limit Switch Up	Limit Switch Down	Dipswitch 2	Dipswitch 5	Dipswitch 4	Dipswitch 3	Rotary switch bit3	Rotary switch bit2	Rotary switch bit1	Rotary switch bit0	Down	Up	Store	Preset M4	Preset M3	Preset M2	Preset M1

Status check

9.9. Register R1002 [Control Function]

In register "R1002" the status of the control function input is stored.
This number could be between "0" to "5" according the rotary switch position.

R1002[Enter]
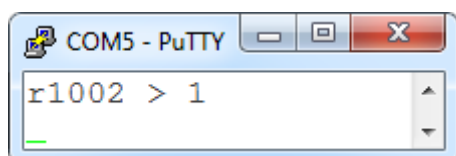
Returns "1"

Table 2 – Rotary switch control function

Position	Description	Connector
0	DC motor control without position control	**4** (manual)
1	DC motor control with position control and build in limit switches (e.g. columns)	**4** (manual)
2	DC motor control with position control auto homing	**4** (manual)
3	DC motor control with position control manual homing	**5** (manual)
3	Relay output control without position control	**5** (manual)
4	Relay output control with position control	**5** (manual)

(See "Electrical components" for connectors)

Status check

9.10. Register R1003 [UP/DOWN Status]

In register "R1003" the status of the UP/DOWN motor sequence is stored.

Register R1003				
DEC	3	2	1	0
Description	UP/DOWN STOP	UP/DOWN RELEASED	UP/DOWN PRESSED	UP/DOWN START

R1003[Enter]

```
COM5 - PuTTY
r1003 > 2
```
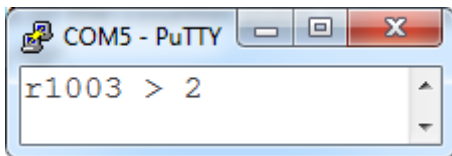
Returns decimal number "2".
Number "2" equals "UP/DOWN RELEASED".

9.11. Register R1004 (Motor Status]

In register "R1004" the status of the motor can be viewed.
The result is a DEC number.

Register R1004	512	256	128	64	32	16	8	4	2	1
10 Bits	9	8	7	6	5	4	3	2	1	0
Description	MOTOR CONNECTION ERROR	MOTOR CURRENT ERROR		MOTOR DOWN	MOTOR UP		MOTOR PRESET 4	MOTOR PRESET 3	MOTOR PRESET 2	MOTOR PRESET 1

R1004[Enter]


```
COM5 - PuTTY
r1004 > 64
```
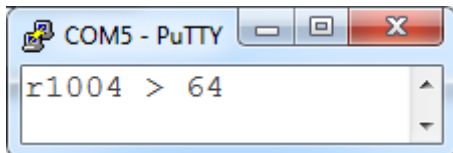
Returns decimal number "64" (DEC)
and is equal to a 10-Bits binary "0001000000" (BIN) number.
(Tip; use an online converter decimal to binary)

10 Bits	0	0	0	1	0	0	0	0	0	0
Description	MOTOR CONNECTION ERROR	MOTOR CURRENT ERROR		MOTOR DOWN	MOTOR UP		MOTOR PRESET 1	MOTOR PRESET 1	MOTOR PRESET 1	MOTOR PRESET 1

Status check

9.12. Register R1005-R1008 [Memory Preset Values)

In the registers "R1005" to "R1008" the preset values of the memory positions are stored.
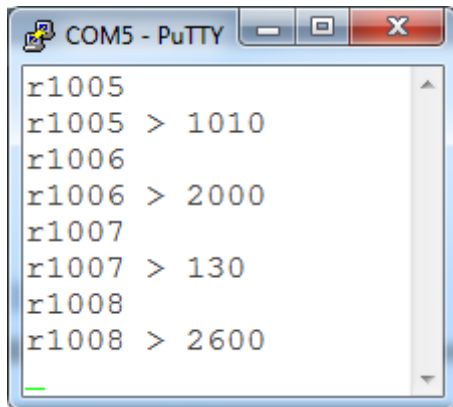
Register	Description	Value range
R1005	M1 counter value	50-60000 counts
R1006	M2 counter value	50-60000 counts
R1007	M3 counter value	50-60000 counts
R1008	M4 counter value	50-60000 counts

R1005[Enter]
R1006[Enter]
R1007[Enter]
R1008[Enter]

```
COM5 - PuTTY
r1005
r1005 > 1010
r1006
r1006 > 2000
r1007
r1007 > 130
r1008
r1008 > 2600
```
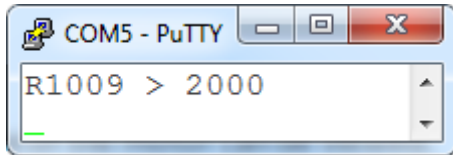
Returns decimal numbers "1010", "2000", "130", "2600".

Status check

9.13.   Register R1009 [Request Count]

In the register "R1009" the "Requested count" is stored.
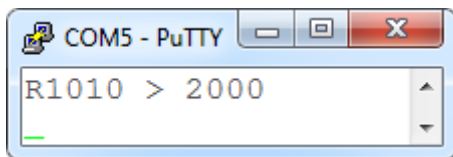
R1009[Enter]

Returns decimal number "2000".

9.14.   Register R1010 [Motor Position Count]

In the register "R1010" the "Motor position" is stored.

R1010[Enter]
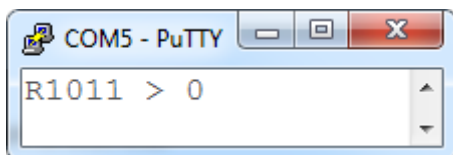

Returns decimal number "2000".

Status check

9.15. Register R1011 [Motor Error]

In the register "R1011" the "Motor error" is stored.

| Register	Value Hexadecimal [decimal]	Error
R1011	1[1]	Current error (DC output only) Current is higher than adjusted current value or Current is too low when motor is activated
	2[2]	Motor connection error (DC output only) Limit switch up activated when motor runs down Limit switch down activated when motor runs up
	4[4]	Motor sync error (parallel mode) Number of pulses between master and slave is too many
	8[8]	Heartbeat error (parallel mode) Slave receives no heartbeat from master (connection error)
	10[16]	Limit switch error Limit switch up/down activated when motor is between memory position M1 or M2
	20[32]	Pulse error Time between pulses is too long
	40[64]	CRC error EEPROM error
	80[128]	Memory error Motor didn't reach the requested position
	100[256]	Slave error (parallel mode) Error occurred in slave device
	200[512]	Master error Error occurred in master device

R1011[Enter]

```
COM5 - PuTTY
R1011 > 0
```

Returns decimal number "0". No error occurred.

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Status check

If an error occurs and the light U2 and U3 turn on, on the PCB.

Please check the following list:

- One of the end switches lost connection with the control board.
  (To check if this is true, turn of the power of the control board and turn it back on. If the lift is still able to move in one direction then the end switch lost connection or one light is only active U2 or U3).
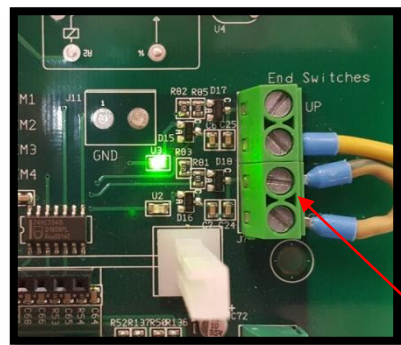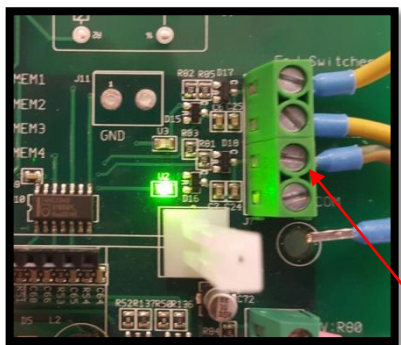
- The motor lost connection with the control board or the power supply is too low.
  (If it takes 2 seconds for the control panel to light the error lights then the connection is lost with the motor. If the lights turn on instant then the power supply is too low. % The power is adjustable by tweaking the potentiometer (see page 8 object R2).

- The pulse supply lost connection with the control board.
  (To check if this is true, set the rotary switch on "1" this setting ignores the pulse supply).
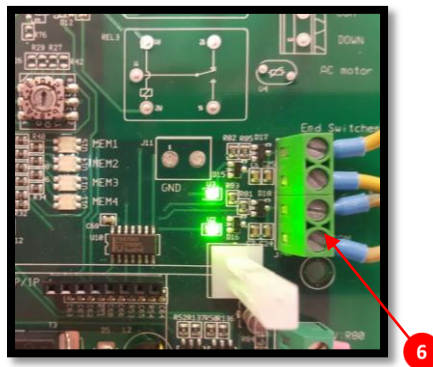
Specifications

R1011[Enter]

```
COM5 - PuTTY
R1011 > 641
```
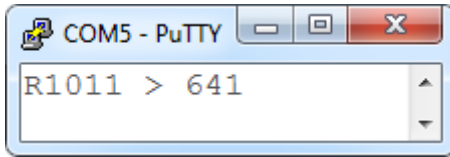
Returns decimal number "641". 641 decimal = 281 hexadecimal.

(Tip; use an online converter decimal to hexadecimal)

When we look at the error table we find the following numbers:
1   =   Current error
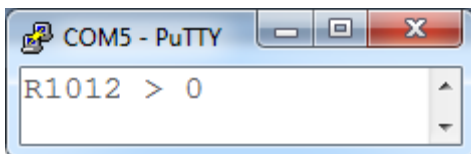80   =   Memory error
200   =   Master error

9.16.   Register R1012 [Motor Speed Slow mode]

In the register "R1012" the preset status "Slow mode" is stored.
(DC output only)

1   =   Slow mode
0   =   Normal mode

R1012[Enter]

```
COM5 - PuTTY
R1012 > 0
```

Returns decimal number "0".
This represents preset: Normal mode

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Status check

9.17. Register R1013 [Memory Preset Status]

In the register "R1013" the status "Calibration" is stored.

0   =   Memory preset ready

1   =   Preset memory position 1 request

S	+	1			Set memory position 1 Memory indicator LED1 turns from orange (pushed) to green (released)

2   =   Preset memory position 2 request

S	+	2			Set memory position 2 Memory indicator LED2 turns from orange (pushed) to green (released)

4   =   Preset memory position 3 request
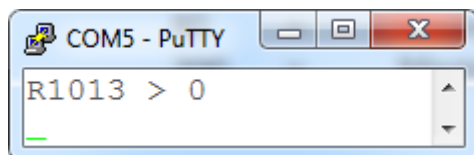
S	+	3			Set memory position 3 with PIN-code Memory indicator LED3 turns from orange (pushed) to green (released)

8   =   Preset memory position 4 request

S	+	4			Set memory position 4 with PIN-code Memory indicator LED4 turns from orange (pushed) to green (released)

16   =   New value is stored

R1013[Enter]

```
COM5 - PuTTY                    □ ▣ ✕
R1013 > 0                       ▲
_                               ▼
```
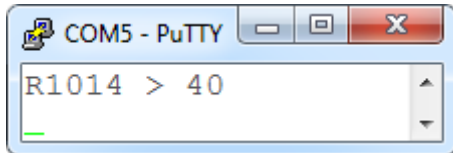
Returns decimal number "0".
This represents preset: Ready to preset a memory position

Status check

9.18.   Register R1014 [Delta pulse]

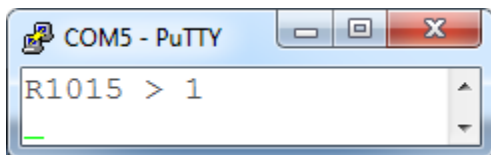In the register "R1014" the "delta pulse" is stored.

R1014[Enter]

Returns decimal number "40".

9.19.   Register R1015 [Master/Slave Mode]

In the register "R1015" the preset "Master/Slave mode" is stored. (DC output only)

1	=	Master
0	=	Slave

R1015[Enter]

Returns decimal number "1".
This represents preset: Master
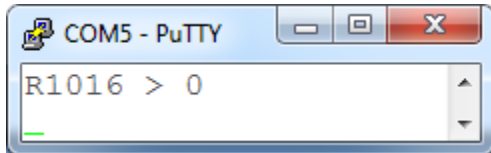

(Dipswitch pos 1, pag 11)

Status check

9.20. Register R1016 [Single/Parallel Mode]

In the register "R1016" the preset "Single/Parallel mode" is stored. (DC output only)

0   =   Single mode
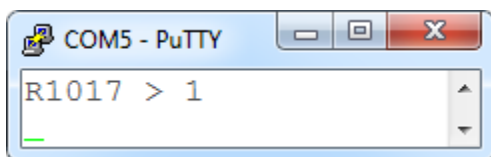1   =   Parallel mode

R1016[Enter]

```
COM5 - PuTTY
R1016 > 0
```

Returns decimal number "0".
This represents preset: Single mode

(Dipswitch pos 2, pag 11)

9.21. Register R1017 (Soft Start Mode]

In the register "R1017" the preset status "Soft start mode" is stored. (DC output only)

0   =   Ramp up/down
1   =   No ramp up/down

R1017[Enter]

```
COM5 - PuTTY
R1017 > 1
```

Returns decimal number "1".
This represents preset status: No ramp up/down

(Dipswitch pos 3, pag 11)

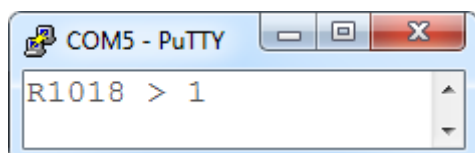## 9.22.   Register R1018 [Pulse/Continue Mode)

In the register "R1018" the preset "Pulse/Continue mode" is stored.
(DC output only)
0   =   Pulse (latch)
1   =   Continue (closed contact)

R1018[Enter]

```
COM5 - PuTTY
R1018 > 1
```

Returns decimal number "1".
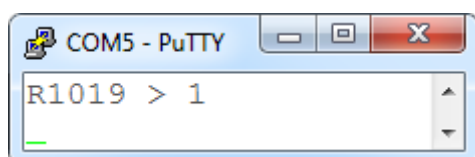This represents preset: Continue (Up/Down NO-contact must be continue closed to run the motor)

(Dipswitch pos 4, pag 12)

9.23.   Register R1019 [Adjustable Speed Limit Mode]

In the register "R1019" the preset status "Speed limit " is stored.
(DC output only)
0   =   Speed limit
1   =   No speed limit

R1019[Enter]

```
COM5 - PuTTY
R1019 > 1
```

Returns decimal number "1".
This represents preset status: No speed limit

The speed (PWM output voltage) can be adjusted by potentiometer R2.
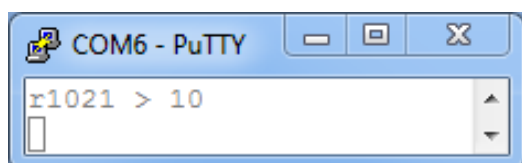!! The output voltage is a percentage of the supply voltage !!

(Dipswitch pos 5, pag 12)

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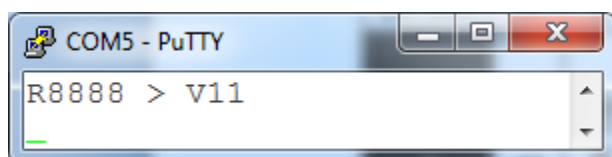## 9.24. Register R1021 [limit switch hysteresis homing]

In the register "R1021" the value of the limit switch hysteresis for homing is stored. The factory setting is "10"

R1021[Enter]

9.25. Register R8888 [Software Version]

In register "R8888" the software version is stored .
R8888[Enter]

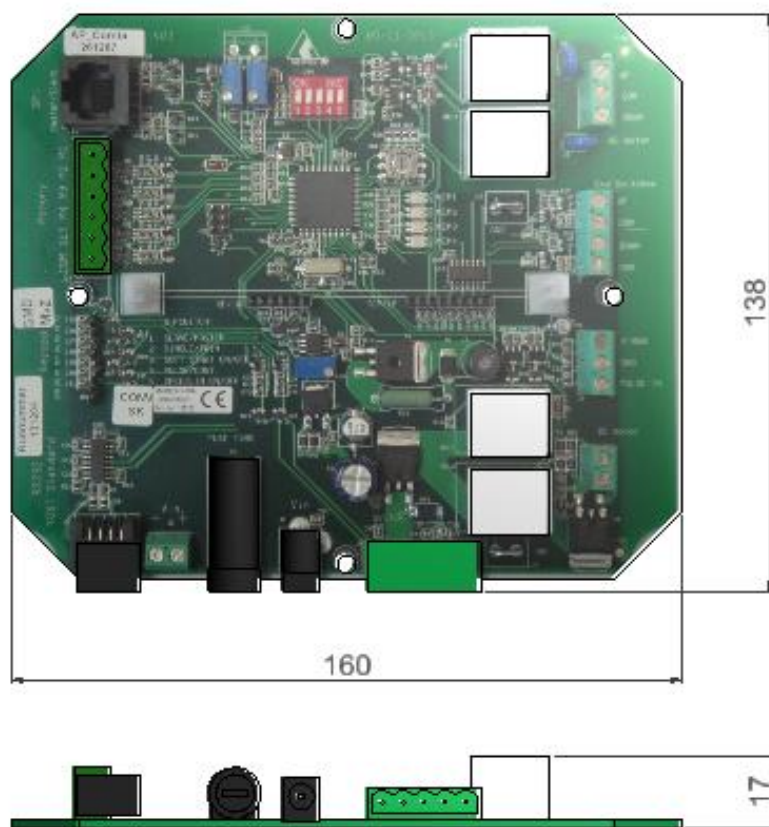Returns "V11"

Specifications

10. Specifications

10.1. Technical data

V_{input}	:	12-30	Volt DC
$I_{max.output}$	:	10	Ampere
$V_{out.counter}$	:	5-14	Volt DC
$V_{in.counter}$	:	5	Volt DC

10.2. AC output relays (261287)

V_{max}	:	230	Volt AC
I_{max}	:	10	Ampere
P_{max}	:	500	Watt

11. Dimensions and illustrations

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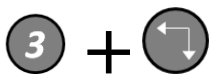It's great to have solutions...

12. Maintenance

Not applicable

13. Frequently asked questions

- There is an abnormality in the position that you want?
  Re: Follow the procedure for manual homing.

  3 + ⟲

- Control board doesn't react without error message
  Re: Follow the procedure for manual homing.

  3 + ⟲

- The two led's (U2 and U3) of de corresponding limit switches are both blinking synchronous
  Actuated limit switch do not match the motor direction of rotation or

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