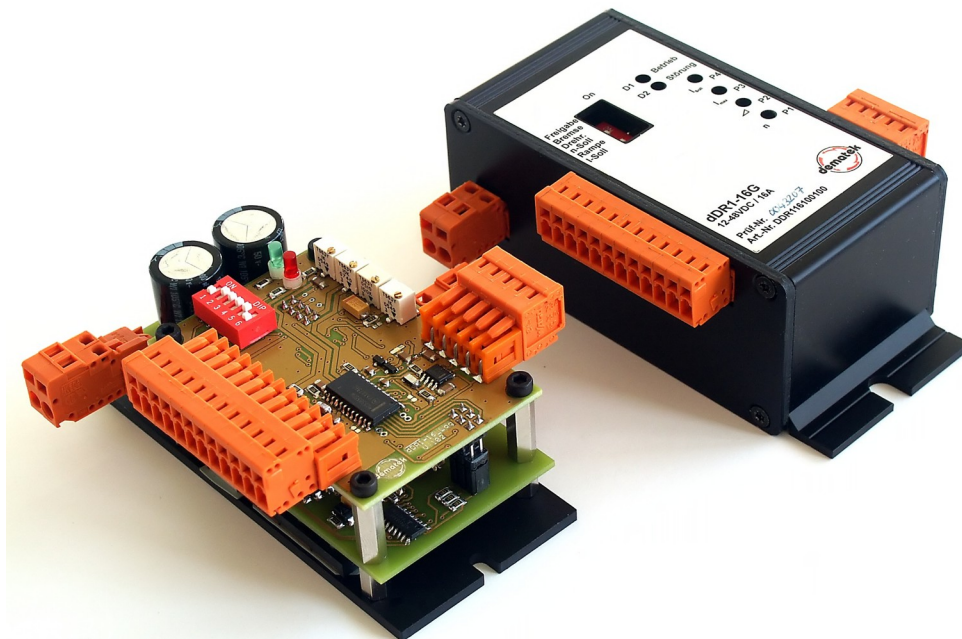


**1Q-Controller dDR1-05/ -10/ -16**

**3.2**



The speed controller series **dDR1-XX** is used for the simple control of brushless DC motors such as the **dematek series BL** in 1Q block commutation. The control accuracy is approx. 1%, the control range is 30:1. Correct commutation requires a rotor position sensor with a 120 ° sensor arrangement. In order to achieve an optimal function of the integrated current limitation, adapted current measuring resistors are equipped, depending on the intended motor. This results in the model variants corresponding to **5**, **10** and **16A** rated current.

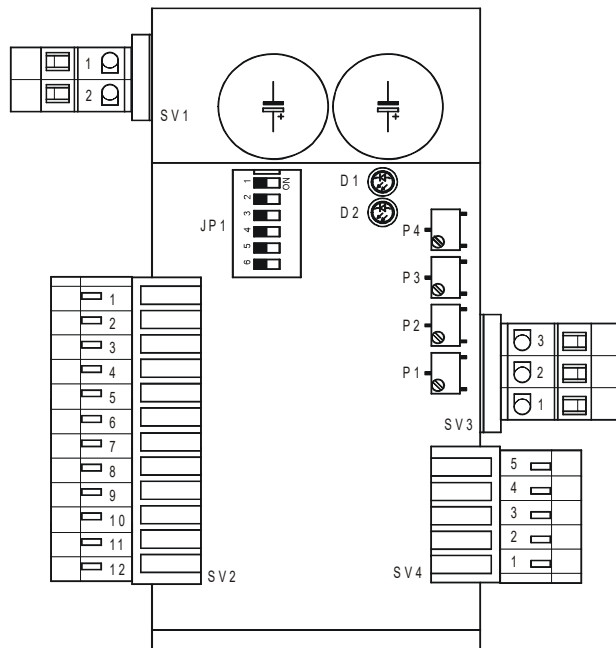
Optional available versions:

- Version "G" in aluminium housing
- Version with Open-Emitter-Pulse outputs for better adaptation to an existing PLC control
- Attenuated control circuit for operation as speed controller (avoids unwanted control oscillations)

**Technical specifications**

Voltage range	12 – 48VDC	
Nominal current	5A, 10A and 16A	
Peak Current	2x nominal current	
PWM frequency	15 kHz	
Temperature range	Storage	-40...+80°C
	Operation	-10...+40°C
Humidity range	Not condensing	20% -80% rel. humidity

## Pin assignment



## Description

	Designation	Function respectively feature
D1	Green LED	Ready
D2	Red LED	Current overflow/ Low Voltage/ Sensor fault
JP1	DIP-Switch	Internal Control of motor functional set
P1	Trimmer	Internal speed rated value setting
P2	Trimmer	Ramp-up time
P3	Trimmer	Current / Torque limit
P4	Trimmer	Internal Current Boost <sup>(*)</sup>
SV1	Terminal	Power Supply Input
SV2	Terminal	External Control inputs of motor functional settings
SV3	Terminal	Motor outputs
SV4	Terminal	Connections for rotor position sensors

- (\*) The current / torque peak value set with P3 can be **increased** with this function. Depending on the engine design, this function may only be used for a **short time**.

## Safety Instructions:

- The installation and operating may only be done by capable and qualified personal.
- The controller may only be operated with mains isolated low voltage (<60VDC).
- First operation may be done at no-load of the drive.
- The drive may exclusively be operated at low-ripple DC-Voltage. Permissible voltage values according type plate +10% .
- Changing the direction of rotation is exclusively possible by setting the signal line (W2-7) or DIP-Switch JP1-3.  
**Never reverse the power supply input lines (danger of destruction).**
- Functions set "ON" by DIP-Switches must not be overlapped by signal through the respective external terminal lines W2.
- When setting the current limit (corresponds to a torque limit), the permissible rated current of the motor must be taken into account. If the limit current is set higher than the rated value, **no permanent operation** is allowed in this state.
- At high load and / or increased ambient temperature (> 40 ° C) adequate heat dissipation must be ensured. For this purpose the bottom of the housing is to be mounted on a cooling surface. Use thermal grease or equivalent.
- For larger distances (> 30cm) between the motor and the controller, shielded cables should be used for the sensor cables and the motor cables.

## Operating Instructions:

### 1. Checking Off-Settings :

All DIP-Switches remain in position „OFF“.  
Signal-lines on terminal SV2-1 up to SV2-12 are power free.

### 2. Connecting Power lines to Terminal SV1:

SV1-1: (GND) Power Ground  
SV1-2: (+VM) DC-Voltage according Type Plate +10%

### 3. Drive Operation

The drive operation settings (see chapter 3a) may either be done by the DIP-Switches (JP1) or by applying an external voltage at the signal inputs (see chapter 3b). As the DIP-Switches JP1 and the Signal Lines on SV2 are internal connected, it is only allowed to use the external signal lines SV2 when the equivalent DIP-Switches JP1 are set „OFF“.

### 4. Setting the current limit (normal mode and boost mode)

The controller has a two-stage current or torque limitation. For operation with rated load, the normal mode is provided: It should be set so that the current controller intervenes when the rated load is exceeded. In this case the speed drops significantly. The boost mode is intended for start-up under difficult conditions or for overcoming short-term peak loads. It may only be used for a short duration (a few seconds to a few minutes), depending on the degree of boost.

#### Setting the normal mode (default):

1. Switch **JP1-6** to "OFF" and **terminal SV2-5** to zero-potential (or leave open).
2. Drive the motor at nominal load and adjust trimmer P3 so that the LED (D2) does not light up and the current limit is not yet engaged

#### Setting the current limit to boost mode (optional for overload operation):

1. Switch **JP1-6** to "ON" and **terminal SV2-5** to zero-potential (or leave open).
2. Drive the motor with the required (over-)load and adjust trimmer P4 so that the LED (D2) does not light up and the current limit is not yet engaged

The current boost is influenced by applying of an analogue voltage at terminal SV2-5. In this way, it is possible to increase the current limit to different values by external voltages (**note: When using an external signal at SV2-5, the switch JP1-6 must be in position "OFF"!**).

### 3a Drive Operation with DIP-Switch JP1

Switch	Position „ON“	Position „OFF“ <sup>(1)</sup>
JP1-1	Drive Enable	No Enable
JP1-2	Short Circuit Brake inactive	Short Circuit Brake active
JP1-3	Direction of Rotation CCW	Direction of Rotation CW
JP1-4	Internal Speed setting	External Speed setting
JP1-5	Speed Ramp active	Speed Ramp inactive
JP1-6	Internal current intensification by means of P4	Standard current limitation. Intensification possible by means of external signal line SV2-5

The drive turns if following DIP-Switches are in position „ON“:

JP1-1 (Drive Enable)  
JP1-2 (Brake deactivated)  
JP1-4 (Internal Speed Setting)

Direction of rotation can be changed by switching switch JP1-3. Due to the high dynamic of the drive, we recommend to perform changes in direction of rotation only in standstill, to avoid heavy wear or damages of attached mechanics as e.g. gears.

<sup>(1)</sup> Attention: In position „OFF“, functions can be controlled ex-

ternally by means of signal lines of terminal SV2.

### 3b Operation by means of external Control, Terminal SV2-1 bis SV2-12

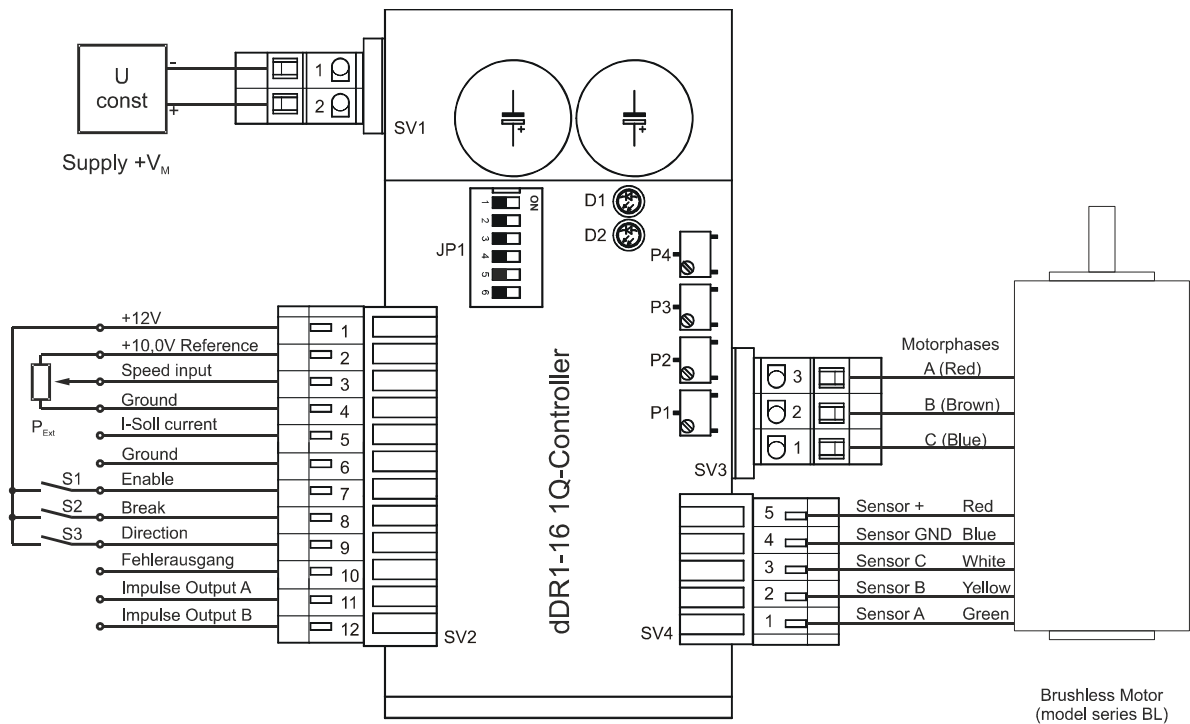
Terminal	Function	Input Resistance
SV2-1	+12V Auxiliary voltage, load capacity: 500mA max.	
SV2-2	+10,0V Reverence Voltage for speed setting, load: 10mA max.	
SV2-3	Analogue Input for speed setting 0..10V (10V corresponds to the rated speed)	10kOhm
SV2-4	Reverence Voltage Ground (same potential as Supply voltage Ground)	
SV2-5	I-Soll Current set-point input (raising the current limit)	10kOhm
SV2-6	Reverence Voltage Ground, see SV2-4	
SV2-10	Failure Output for Over Current/ Low Voltage <sup>(3)</sup>	
SV2-11	Impulse Output A, 2 Impulses per revolution (Motor Shaft) <sup>(4)</sup>	
SV2-12	Impulse Output B, 2 Impulses per revolution (Motor Shaft), 120° Phase-Shift <sup>(4)</sup>	

Terminal	Input Resistance	Function at „High“-Level (12-24V)	Function at „Low“-Level (< ca. 5V)
SV2-7	20kOhm	Drive Enable (active)	No Enable (standstill)
SV2-8	20kOhm	Brake deactivated, drive idle	Short Circuit Brake activated <sup>(5)</sup>
SV2-9	20kOhm	Direction of rotation CCW	Direction of rotation CW

<sup>(3)</sup> Open Collector Output 45V 100mA max.

<sup>(4)</sup> Open Collector Output, optional Open Emitter-Output

<sup>(5)</sup> Short Circuit Brake only functional with applied supply voltage



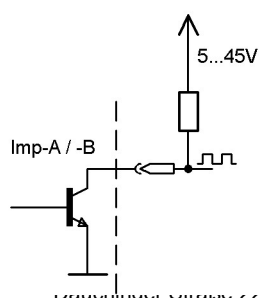
Picture: Basic Pin Assignment for operation with external signals

After closing Switch S1 and S2 the motor runs with a speed (rpm) proportional to the adjusted input voltage at the speed input (SV2-3). A voltage of 10V is equivalent to the nominal speed printed on the motor type plate. The input voltage in the illustrated example is achieved by a Potentiometer P<sub>EXT</sub> (Value approx. 10kOhm).

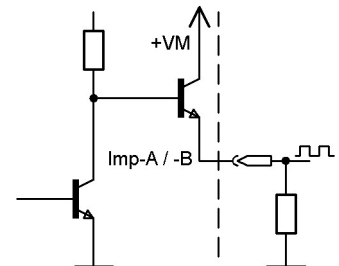
**Note:** The reference GND is connected to the Supply Voltage GND.

The pulse outputs A and B each provide a square wave signal with two periods per revolution. Since the two signals are phase-shifted by 120° from each other, in addition to the speed also the direction of rotation can be determined.

Open-Collector-Output

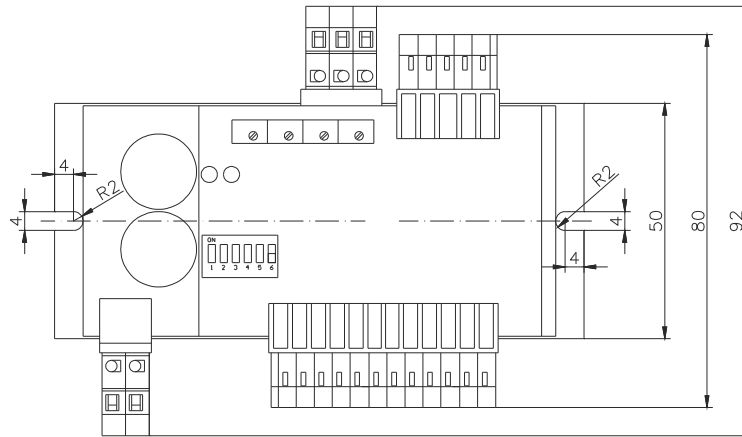
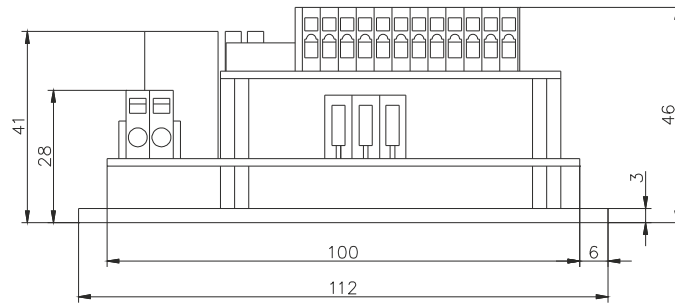


Open-Emitter-Output (optional)



# Dimensions

## dDR1-XX



## dDR1-XX-G

