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| **4–Q Linear Servo – 03 A** | For Brush-Commutated DC Motors up to 75 W |

DA4303

- Servo amplifier in a small size, rugged aluminium housing in (bookshelf form)
- Different methods of mounting for fast installation
- Tool free connections for power terminations
- Inputs and outputs via RJ45-CAT5 plug
- Operation mode with simple DIP switch setting
- User adjustable current limit
- Wide range supply voltage between +11 and +30 VDC for different kinds of power supplies
- Protected against over temperature and over current
- Continuous current up to 3 A

Basic drive description: The DA4303 servo amplifiers are designed to drive DC brush type motors. They require a single DC power supply for operation. The drives are to be used with a single motor. They have the functionality to operate as an independent speed control or high performance servo. The drives are protected against short circuits, under voltage, over temperature, and over current. It has multiple modes of operation and serves as a reliable choice for your motion control needs.

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1. Safety & Installation

The DA4303 requires installation by qualified personal who must pay attention to safety and other regulatory standards. They should be thoroughly familiar with the entire system before beginning installation.

Before final operation of machine be sure to test hookup with motor disconnected from the load. Improper wiring could cause a "motor run away" condition, and cause severe injury or damage to the machine.

Before starting installation of the DA4303, be sure that main power is disconnected. After powering the drive it should not be touched by hand or risk shock.

Be care that in case of regeneration or in brake operation the energy recovery must be buffered by the power supply and / or a braking module. Ensure with electronically stabilized power supplies that protection circuit isn't react.

Don't switch off the power supply while the motor is turning, in this case the drive could be destroyed by regeneration.

We recommended connecting a capacitor in parallel close to power input, with 1000µF per each ampere output current.

Do not repair or open drives enclosure. Result would result in personal injury and would void all warranties.

The DA4303 comply with the European directive EN 61800-3 (1996). The followings points must followed:

- A metal mounting plate with correct grounding is mandatory.

- For installation purposes, tooth lock washers have to be used.

- For most wiring schemes, only shielded cables are admissible, to suppress interference with other devices. Damaged items have to be replaced.

- Provide for a large contact area between shields and mounting plate.

- The motor has to be grounded in the prescribed manner.

- The drive is an Electrostatic Sensitive Device (ESD). Electrostatic discharge needs to be avoided.

NOTE:

Certain applications may involve special requirements. Consult Factory!

2. Specifications:

2.1 Electrical Data

Power Supply Voltage	+11 to +30 VDC (Residual ripple <5 %) (The lower limit is monitored by integrated undervoltage trip) WARNING: Do not exceed 30V. Overvoltage will damage the drive.
Auxiliary Voltage Input	+5 to +30 VDC Supply voltage for the /Error output. (Refer chapter 7.2)
Nominal Current	3 A
Maximum Power (only achievable with additional heatsink & proper mounting, see accessories.)	75 W
Power connector	The diameter must be suited for the connecting wires of the current load. The recommendation is 1,5 mm^2 (AWG16), the minimum is 0,13 mm^2 (AWG28). Maximum wire diameter with respect to the plug contact is 2,5 mm^2. Strip the wire insulation of the cables on a length of 8 -10 mm. For stranded wire, use end sleeves with the corresponding length. Wire ends have to be inserted into the contact, until they reach the stop.
Signals	For the cabling of the RJ45 plugs, we recommended shielded CAT5 cables. The cables are available in different versions in the system accessories.

2.2 Mechanical Data

Mechanical Dimensions L x W x H	105 x 65 x 27.5 mm
Weight	180 g
Mounting	M3 screws or Din Rail Mounting

2.3   Ambient Conditions

Operation Temperature	-10 to +45 ^{o}C
Storage Temperature	-40 to +85 ^{o}C
Humidity (Non Condensing)	20 % to 80 % RH
Overtemperature Protection	+80 °C

2.4   Digital and Analog Inputs

| *Enable*	Active High TTL, +24 VDC; Resistance = 47 kOhm
/Ramp	Active Low; open or grounded WARNING: If not used don't connect any voltage, otherwise the input will damage.
I max	Analog 0 to +10 VDC ; Resistance > 10 kOhm
Set value	Analog -10 to +10 VDC ; Resistance = 20 kOhm
Tacho	Analog -50 to +50 VDC ; Resistance = 75 kOhm

2.5   Outputs

| */Error out*	Open Collector / Push Pull / TTL / +24 VDC; Resistance = 50 Ohm
Auxiliary Voltage Output *+10V*	+10 V / each 10 mA
Auxiliary Voltage Output *-10V*	-10 V / each 10 mA

2.6   Control LEDs

Power	LED green
	Note: The LED is lit when the operating voltage is present and the undervoltage protection circuit has not been initiated.
Error	LED red
	The lamp is lit at overtemperature. It disables only after reset the Enable input. If the error condition persists (i.e. temperature still too high), this is immediately visible by the red LED.

3. Block Diagram
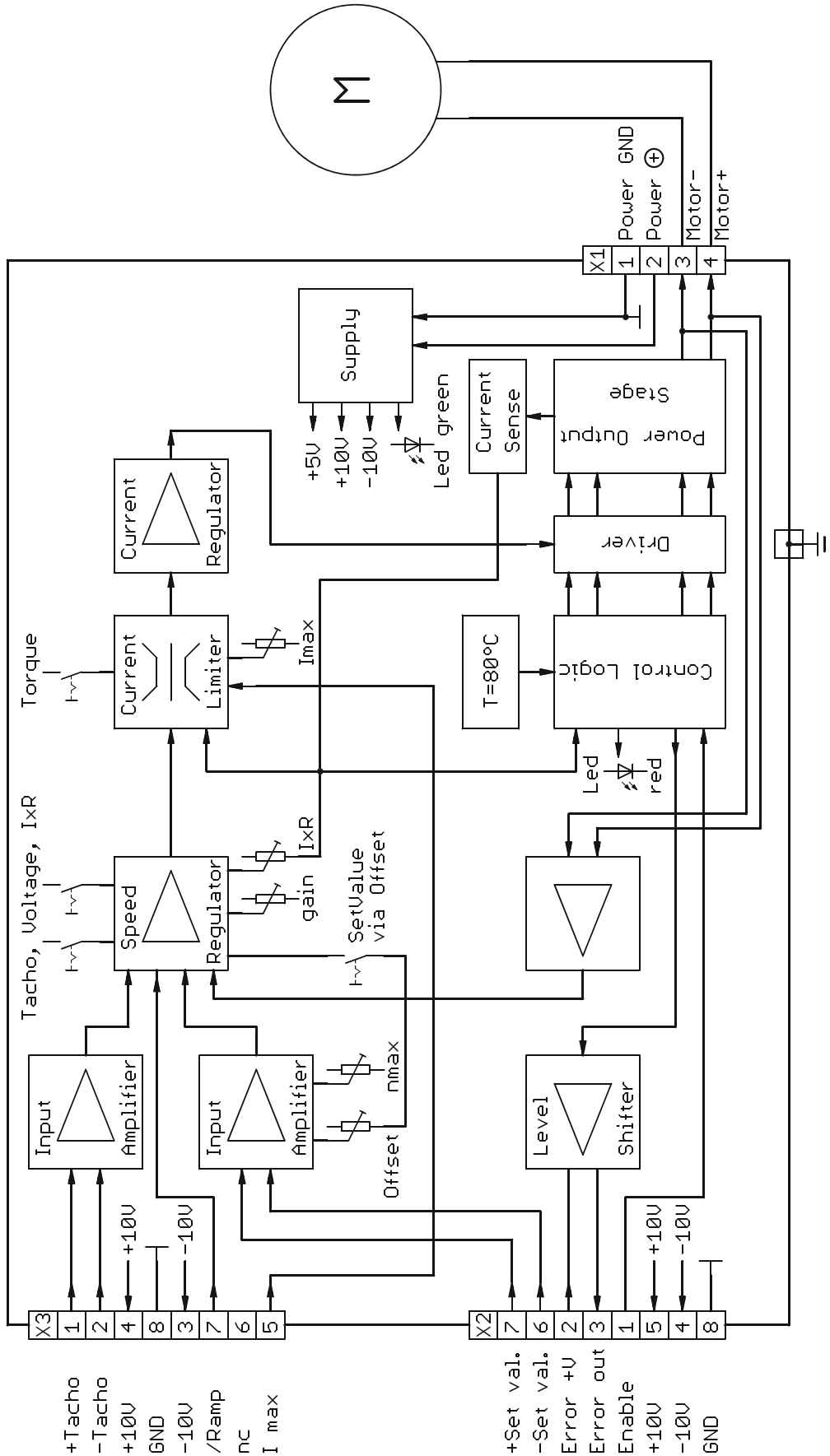
3.1 Control Elements
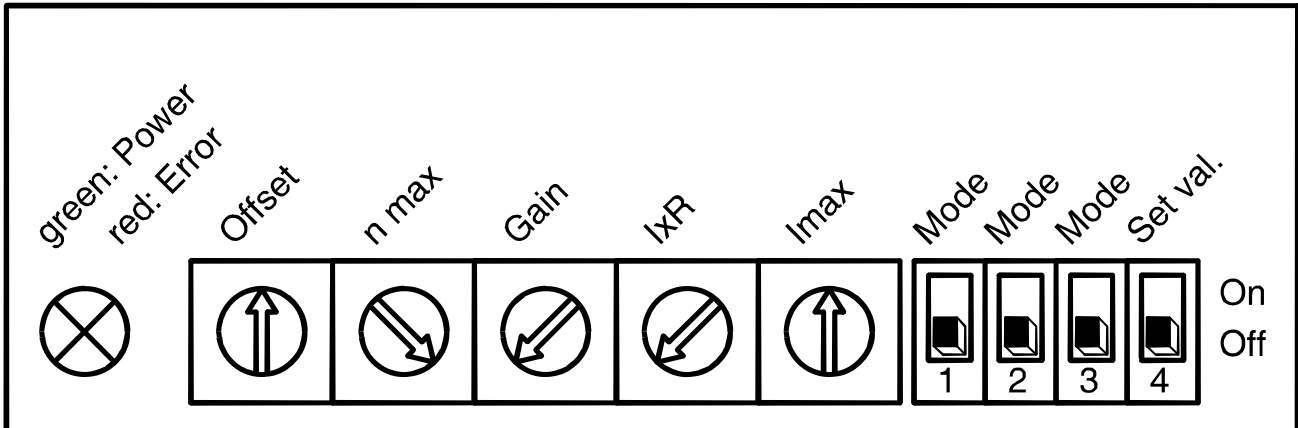
3.2 Operation Modes

Voltage Mode

In the voltage mode the drive is watching the output voltage as a feedback voltage. The drive can not regulate the speed exactly if the motor is loaded with a higher load. This mode is used e.g. in conveyors with nearly constant load to control the speed.

Tacho Mode

In the tacho mode the feedback information is coming as a voltage signal from a tacho mounted at the motor. The speed regulation is very good at each load condition and qualified for each application to control exactly the speed of a system.

IxR Mode

The IxR mode is a voltage mode with an additional factor to correct the speed under changing the load. The factor which is adjusted with the IxR potentiometer is only an approximate value. The speed regulation is good but not stable for all load conditions. It is a compromise between voltage mode and tacho mode.

Torque Mode

In the torque mode the drive does only control the current in the motor. This control loop is very fast but the speed is moving with the load due to the constant current. This mode is used in application with force control or as a fast power amplifier for position systems.

4. Wiring

According to the safety directives, a correct cable selection is mandatory. Regular inspection is advisable. Damaged, burned or kinked items have immediately to be exchanged.

Power (*Power ⊕ - Power GND*)

- Normally no shielding required.

- When connecting several amplifiers to the same supply pack, use star point wiring.

Motor Wiring (> 30 cm)

- Only shielded cables are recommended.

- Connect the shield to the ground lug of the servo amplifier.

- A separate cable has to be used.

Connection between speedometer and sensor (> 30 cm)

- Only shielded cables are recommended.

- Connect the shield to the controller.

- A separate cable has to be used.

Analog Signals (*I max, +Set val., -Set val.*)

- In most cases no shielding required. This may be different for low level signals or in an environment with strong magnetic interference.

- Connect the shield on either end of the cable. For 50/60 Hz interference, remove the shield on one side.

Digital Signals (*Enable, /Ramp, Error out*)

- No shielding required.

To verify a trouble-free operation and the conformity to CE regulation, it makes only sense to test the system as a whole, with all components installed (motor, amplifier, supply pack, EMC filters cables etc.).

Note: To improve the resistance to the noise immunity, always connect unused logical inputs to a fix potential (*GND* or *+5V*), except */Ramp* input.
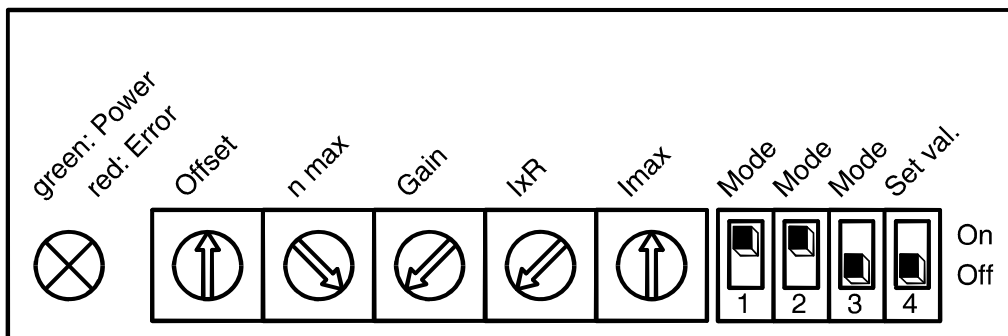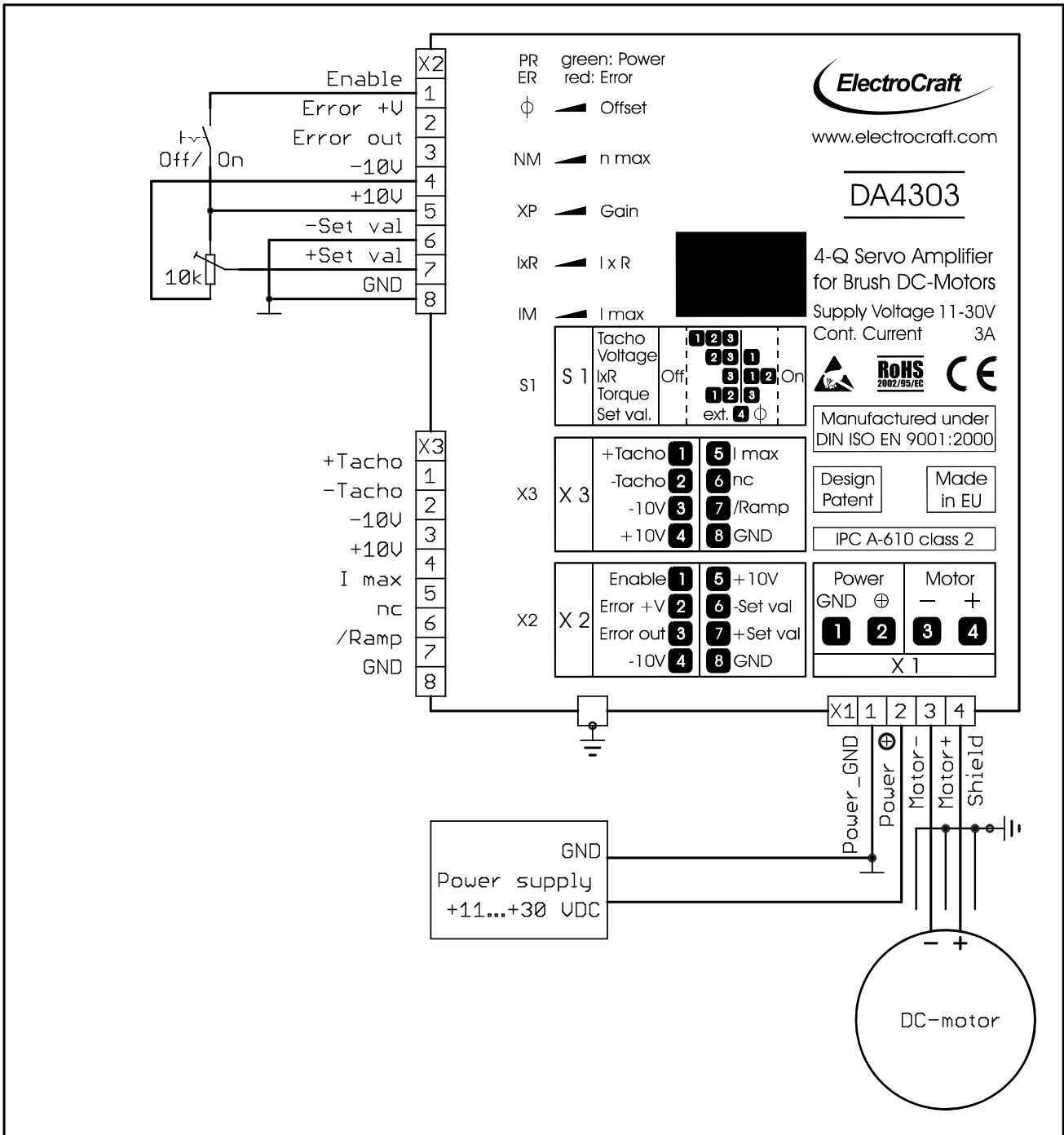
4.1 Wiring Example – Voltage Mode
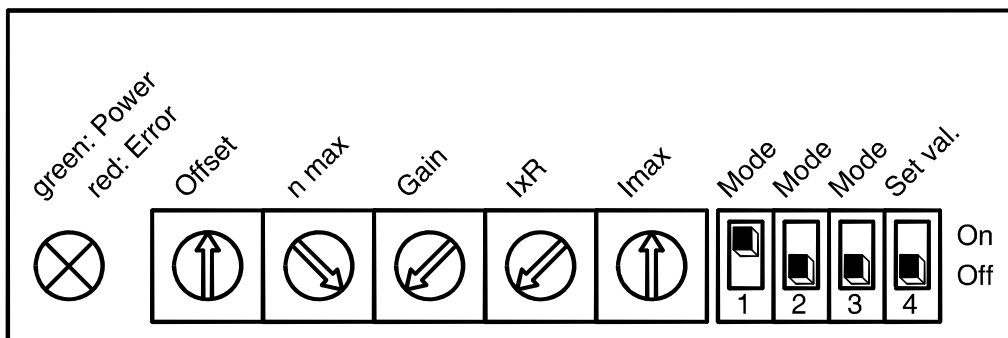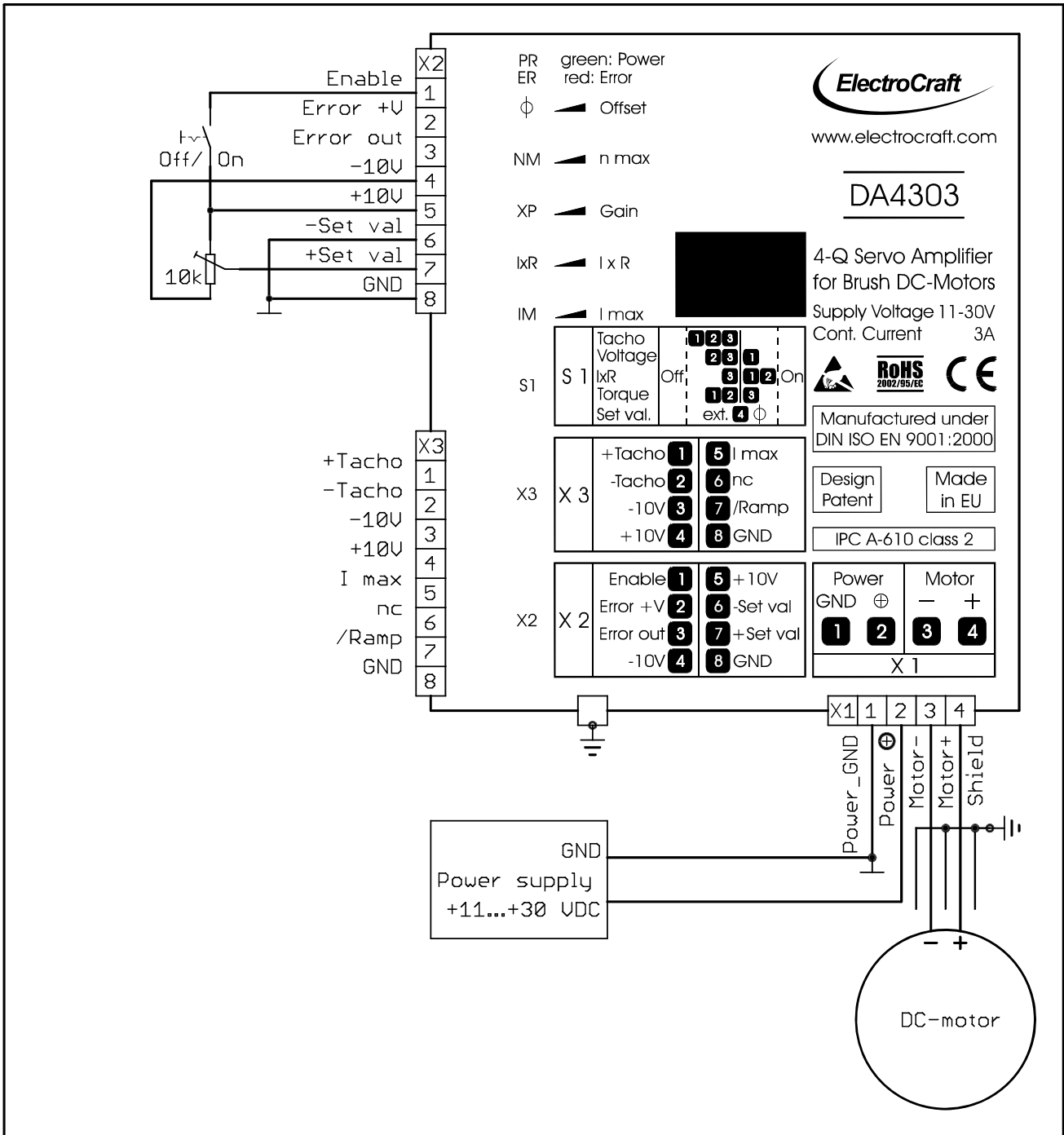
4.1.1 Adjustment procedure for *Voltage* mode

1. Choose the maximum set value (e.g. 10 V). Turn the potentiometer *n max*, until the desired maximum speed is reached with unloaded motor.

2. Adjust the current limiter to a value requested by you with the *I max* potentiometer. It is of major importance that this value is lower than the maximum admissible constant current (see motor data sheet).

3. Slowly raise the value of the *Gain* potentiometer. If the motor begins to work unsteadily, to vibrate or to cause excessive noise, carefully lower the gain factor again, until the instability symptoms have disappeared for all load selections

4. Adjust the *Offset* potentiometer so that the motor is stable at 0 rpm given a zero set value.

4.2 Wiring Example – IxR Comp Mode

4.2.1 Adjustment procedure for *IxR* mode

1. Choose the maximum set value (e.g. 10 V). Turn the potentiometer *n max*, until the desired maximum speed is reached with unloaded motor.

2. Adjust the current limiter to a value requested by you with the *I max* potentiometer. It is of major importance that this value is lower than the maximum admissible constant current (see motor data sheet).

3. Slowly raise the value of the *Gain* potentiometer. If the motor begins to work unsteadily, to vibrate or to cause excessive noise, carefully lower the gain factor again, until the instability symptoms have disappeared for all load selections

4. Set the set value to zero and adjust the *Offset* potentiometer, to the standstill of the motor.

5. Slowly increase *IxR* value. The gain must be sufficient, that even for a higher motor load, the number of revolutions does not significantly decrease.
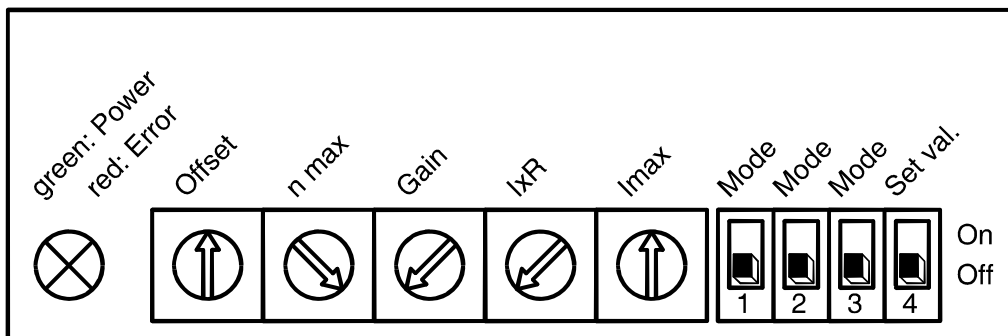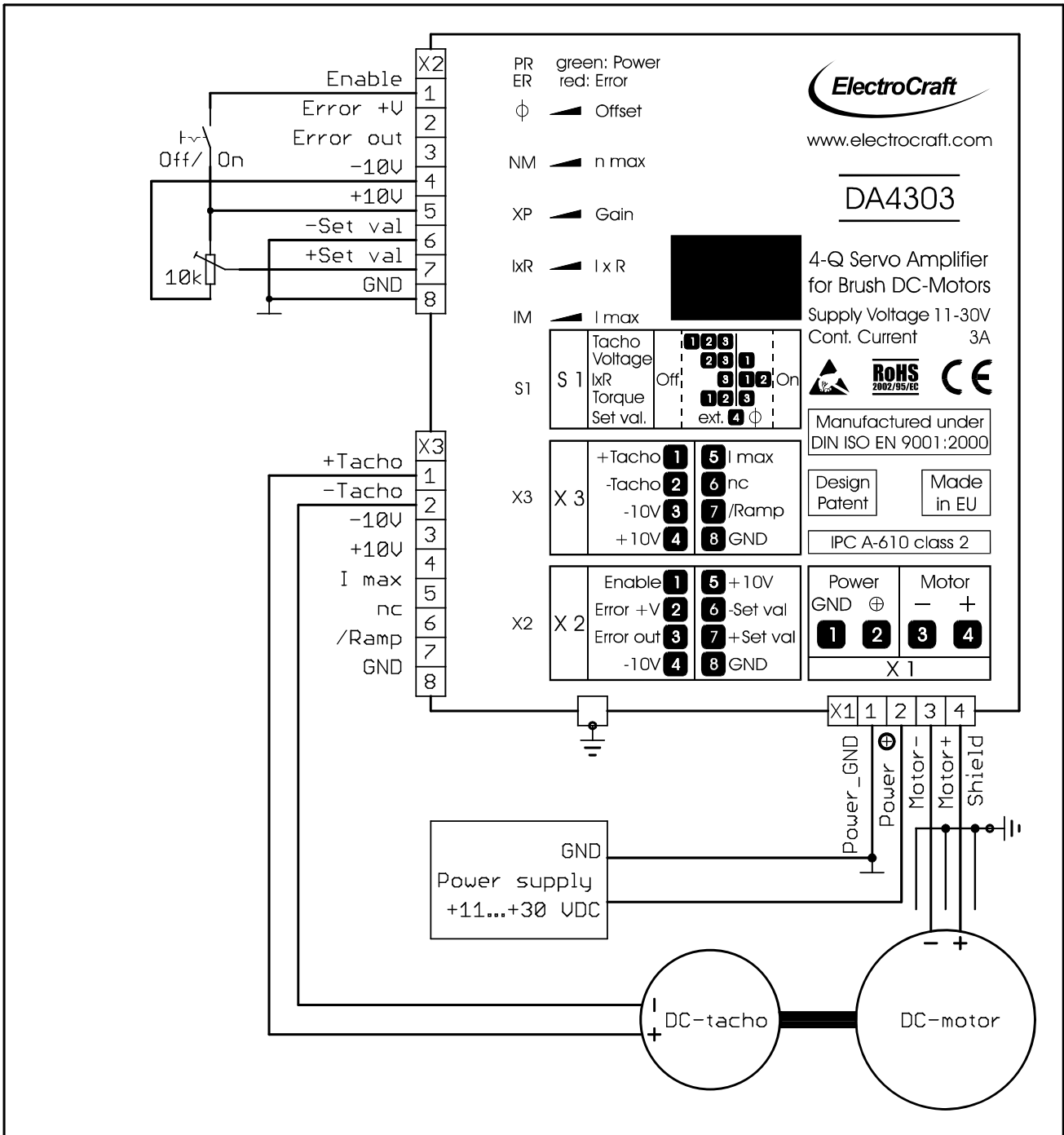
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4.3 Wiring Example – Torque Mode
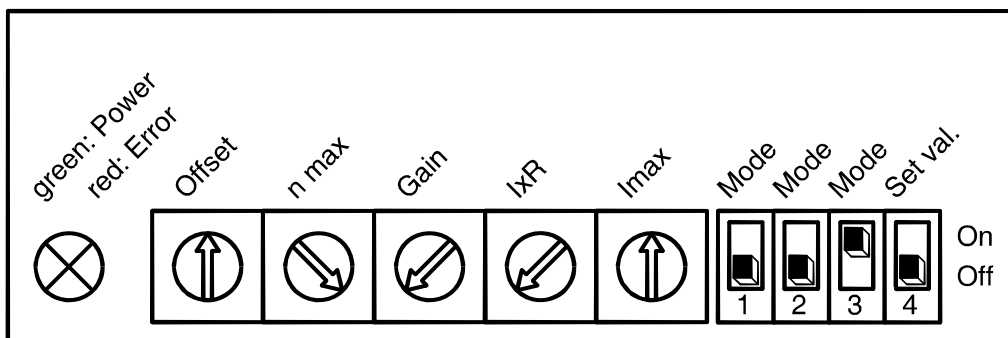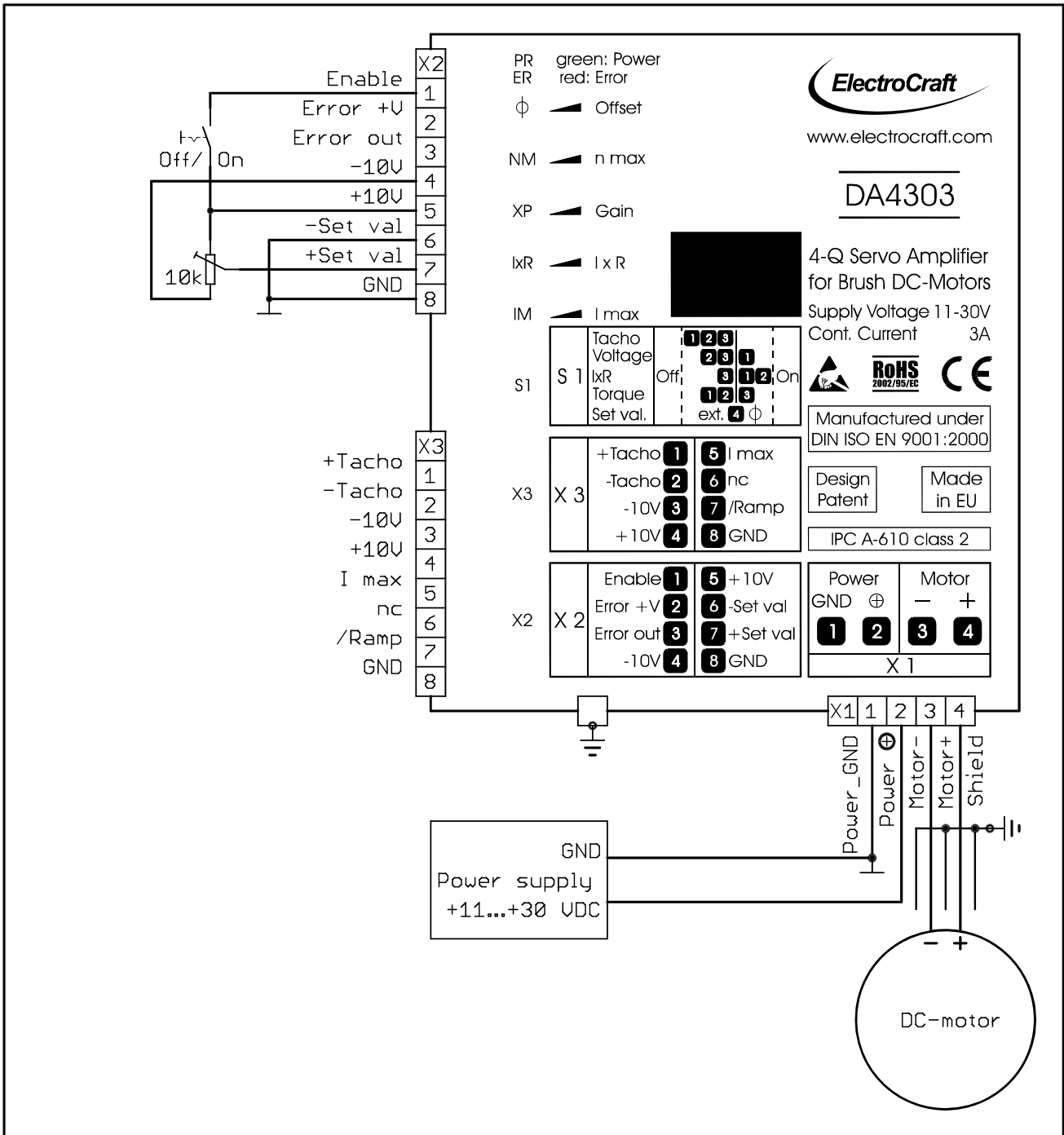
4.3.1 Adjustment procedure for Torque mode

1. Adjust the current limiter to a value requested by you with the *I max* potentiometer. It is of major importance that this value is lower than the maximum admissible constant current (see motor data sheet).

2. Choose the maximum set value (e.g. 10 V). Turn the potentiometer *n max*, until the desired maximum current is reached.

3. To optimize the response time, slowly raise the value of the *Gain* potentiometer. If the motor begins to work unsteadily, to vibrate or to cause excessive noise, carefully lower the gain factor again, until the instability symptoms have disappeared for all load selections.

4. Set the set value to zero and adjust the *Offset* potentiometer, to the standstill of the motor.
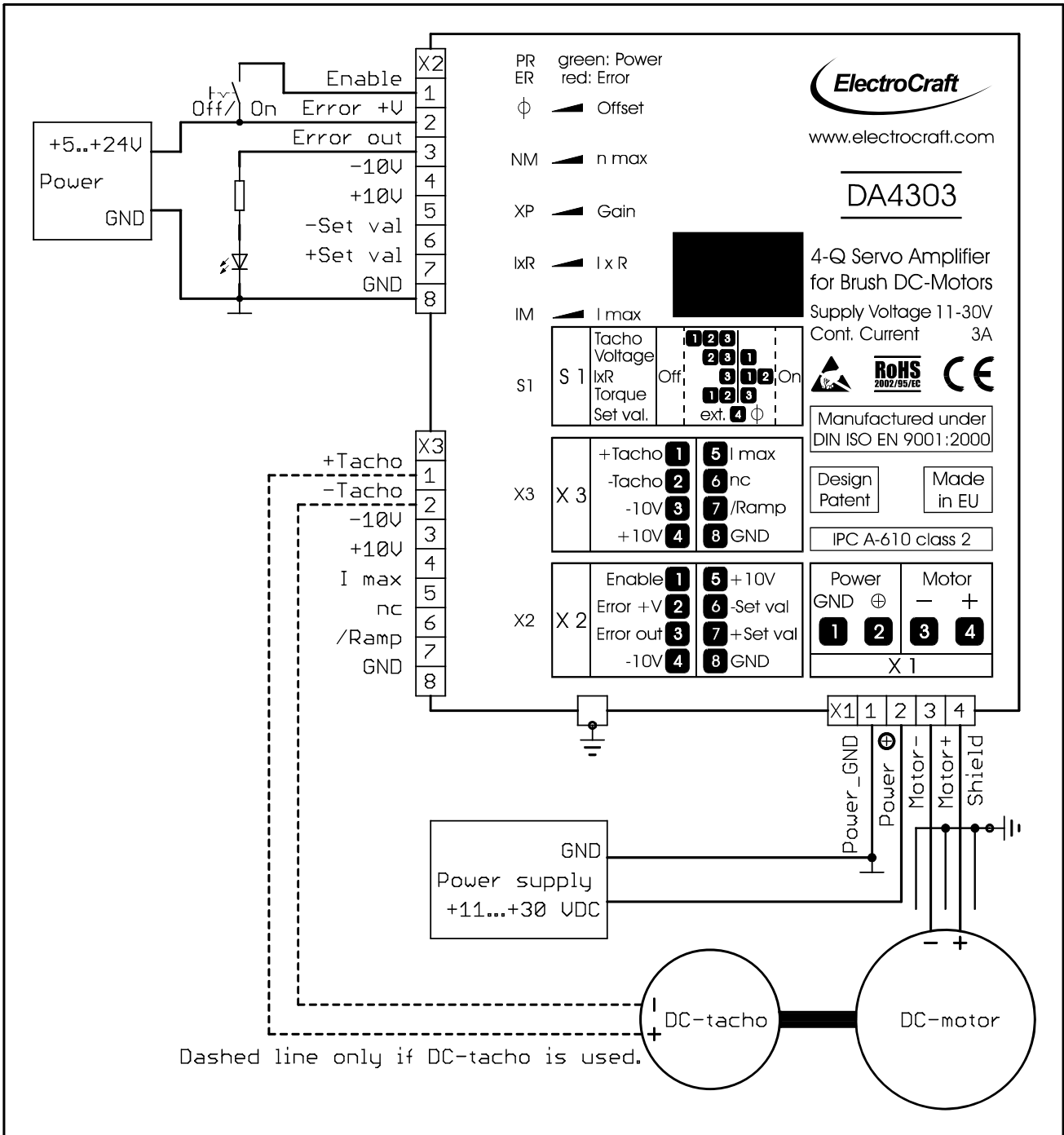
4.4 Wiring Example – Tacho Mode

4.4.1 Adjustment procedure for *Tacho* mode

5. Choose the maximum set value (e.g. 10 V). Turn the potentiometer *n max*, until the desired maximum speed is reached with unloaded motor.

6. Adjust the current limiter to a value requested by you with the *I max* potentiometer. It is of major importance that this value is lower than the maximum admissible constant current (see motor data sheet).

7. Slowly raise the value of the *Gain* potentiometer. If the motor begins to work unsteadily, to vibrate or to cause excessive noise, carefully lower the gain factor again, until the instability symptoms have disappeared for all load selections

8. Set the set value to zero and adjust the *Offset* potentiometer, to the standstill of the motor.
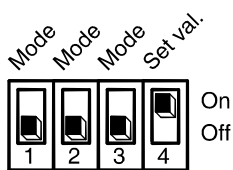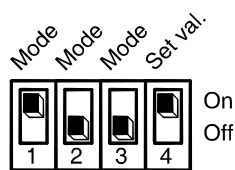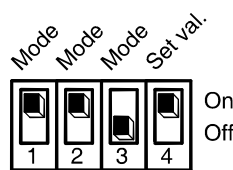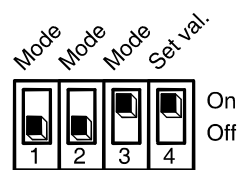
4.5 Wiring Example I

Setting of S1:

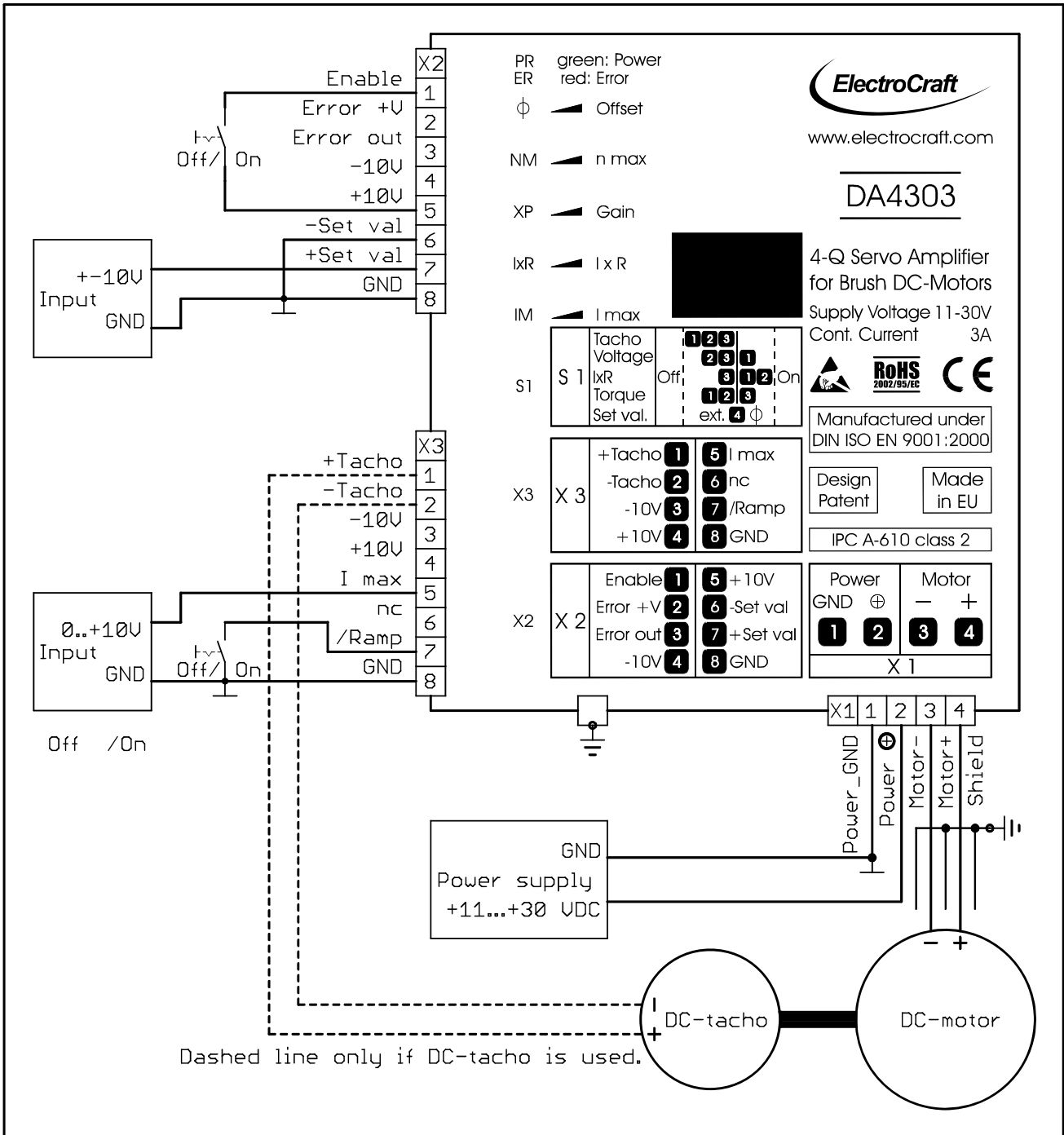Tacho Mode   Voltage Mode: IxR Comp Mode   Torque Mode

4.6 Wiring Example II

Setting of S1:

Tacho Mode
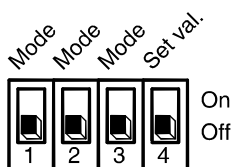
Voltage Mode:
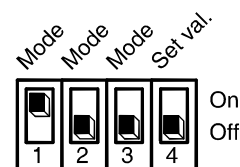
IxR Comp Mode
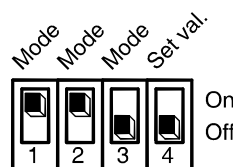
Torque Mode
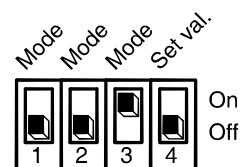
5. Explanation of Terminals, Dip Switches, & Potentiometers

5.1 Terminals

Terminal	Label	Description
S1	S 1 Tacho / Voltage / IxR / Torque / Set val. Off [1 2 3] / [2 3] [1] / [3] [1 2] / [1 2 3] / ext. [4] φ On	S1-1; S1-2; S1-3 select mode. S1-4 change set value to *Offset*-pot.
X1	Power: GND ⊕ Motor: — + [1] [2] [3] [4] X 1	Pin 1 & 2 connect to power supply. Pin 3 & 4 connect to motor.
X2	X 2 Enable [1] [5] +10V Error +V [2] [6] -Set val Error out [3] [7] +Set val -10V [4] [8] GND	Pin 1 input *Enable*. Pin 2 voltage input for *Error +V*. Pin 3 output signal *Error out*. Pin 4 & 5 voltage output -+10 VDC. Pin 6 & 7 input set value. Pin 8 GND.
X3	X 3 +Tacho [1] [5] I max -Tacho [2] [6] nc -10V [3] [7] /Ramp +10V [4] [8] GND	Pin 1 & 2 input tacho feedback. Pin 3 & 4 voltage output -+10 VDC. Pin 5 input *Imax* extern. Pin 6 do not connect. Pin 7 input /*Ramp*. Pin 8 GND.

5.2 Potentiometers
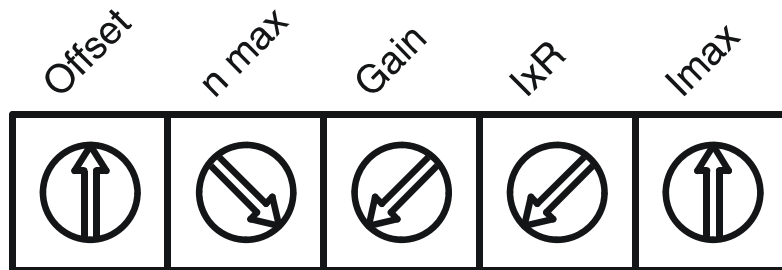
Potentiometer	Function	Turning to the Left (ccw)	Turning to the Right (cw)
Offset	Zero Offset (motor stands still)	Motor rotates counterclockwise	Clockwise rotation
n max	Definition of max. number of revolutions	Value is decreased	Value is increased
Gain	Gain	Factor lowered	Factor raised
IxR	IxR offset compensation	Low compensation	High compensation
I max	Set value for max. current	Upper limit lowered	Upper limit raised

5.3 Dip switches
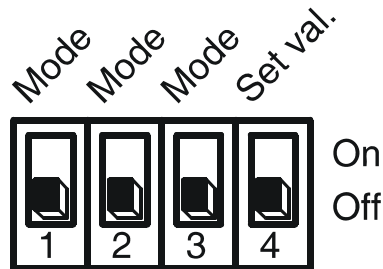
S1-1	S1-2	S1-3	Function Mode
Off:	Off:	Off:	Speed Control by DC-Tacho
On:	Off:	Off:	Speed Control by Voltage
On:	On:	Off:	IxR Compensation
Off:	Off:	On:	Torque Control

S1-4	*Set val.*	Methods of entering the set value
Off:	*Set val.* extern	External selection using a voltage between X2/6 and X2/7.
On:	*Set val.* intern	The internal *Offset* potentiometer is used.

6.   Glossary

Offset

There are two distinct functions for the *Offset*-Potentiometer:

1. Levelling the position at which the motor stands still.

2. Selection of the Set Value. This task requires the switch S1-4 (*Set val.*) to be in *On* position. In any mode, this feature is available and offers the possibility of a quick functional test.

It is advisable to begin the subsequent levelling procedure with an idle run of the motor. However you cannot expect this calibration to be stable in the long term, because the motor as well as the controller are always subject to thermal influences.

n max

Use this potentiometer to adapt the desired maximum speed to the amplitude of the present set value.

Take care not to exceed meaningful limits. An exaggerated value may entail problems for the control of the servo amplifier, making it impossible e.g. to line-up the system in speed control operation under load.

Gain

The dynamical behaviour of the servo amplifier must be compatible to the particular connected motor. The adjusting procedure is performed using the *Gain* potentiometer. A bad adaptation (i.e. if the *Gain* value has been selected too high) can be easily recognized by excessive motor vibration or noise. Consequential mechanical damages cannot be excluded, furthermore an overtemperature situation may arise, due to high currents inside the motor.

When setting the *Gain* value during a stop, the result most probably will have to be accommodated one more time, because the dynamical reaction of the motor at a higher speed will not be sufficient.

Always remember that this potentiometer does not only act on the gain itself, but also on the frequency of the entire control loop.

IxR

This potentiometer is helpful to stabilize the speed in a certain range after a change of the load. First detect the number of revolutions at the lower level, then raise the load and adapt the speed using the *IxR* potentiometer.

An optimum precision of the compensation however is not realistic, because the behaviour of the motor after a load change is only predictable in a certain tolerance.

If the motor current during the alignment procedure starts to oscillate, these disturbances may be suppressed using the *Gain* potentiometer.

I max

The following action requires the motor to be operated with maximum load. The motor current may be measured e.g. using current probe with effective value display, or by means of an ammeter located in the motor line.

I max decides on the maximum possible motor current.

The following limits have to be observed:

- Left stop: 10 % of rated current of 3A

- Right stop: 100 % of rated current + (0 – +10 %)

Note:

Do not overheat the motor. For this reason, the *I max* limit should always be selected lower than the maximum admissible constant current.

Back EMF

The voltage generated when a permanent magnet motor is rotated. This voltage is proportional to motor speed and is present regardless of whether the motor winding(s) are energized or de-energized.

Closed loop

A broadly applied term, relating to any system in which the output is measured and compared to the input. The output is then adjusted to reach the desired condition. In motion control, the term typically describes a system utilizing a velocity and/or position transducer to generate correction signals in relation to desired parameters.

Cogging

A term used to describe non-uniform angular velocity. Cogging appears as a jerkiness, especially at low speeds.

Commutation

A term which refers to the action of steering currents or voltages to the proper motor phases so as to produce optimum motor torque. In brush type motors, commutation is done electromechanically via the brushes and commutator. In brushless motors, commutation is done by the switching electronics using rotor position information obtained by Hall sensors.

Continuous rated current

The maximum allowable continuous current a motor can handle without exceeding the motor temperature limits

Continuous stall torque

The amount of torque at zero speed, which a motor can continuously deliver without exceeding its thermal rating. Determined by applying DC current through two windings with rotor locked, while monitoring temperature. Specified with motor windings at maximum rated temperature, with motor in 25 °C ambient, mounted to a heat sink. Refer to individual specs for heat sink size.

Controller

A term describing a functional block containing an amplifier, power supplies, and possibly position-control electronics for operating a servomotor or step motor.

Demag current

The current level at which the motor magnets will start to be demagnetized. This is an irreversible effect, which will alter the motor characteristics and degrade performance.

Drive

An electronic device that controls torque, speed and/or position of an AC or brushless motor. Typically a feedback device is mounted on the motor for closed-loop control of current, velocity and position.

Driver

Electronics which convert step and direction inputs to high power currents and voltages to drive a step motor. The step motor driver is analogous to the servomotor amplifier's logic.

Efficiency

The ratio of power output to power input.

Feedback

A signal which is transferred from the output back to the input for use in a closed loop system.

Four quadrant

Refers to a motion system which can operate in all four quadrants; i.e., velocity in either direction and torque in either direction. This means that the motor can accelerate, run, and decelerate in either direction.

Inductance

The electrical equivalent to mechanical inertia; that is, the property of a circuit, which has a tendency to resist current flow when no current is flowing, and when current is flowing has a tendency to maintain that current flow.

Linear Servo Drives

Linear servo amplifiers are ideal for low friction applications requiring high bandwidth, low noise and minimal distortion from the power electronics. Linear drives are going hot at higher output currents caused by the technique of the power output stage.

NTC - Negative Temperature Coefficient

A negative temperature coefficient thermistor is used to detect and protect a motor winding from exceeding its maximum temperature rating it is also used in a servo amplifier. Resistance of the device decreases with an increase in temperature.

Open-loop

A system in which there is no feedback. Motor motion is expected to faithfully follow the input command. Stepping motor systems are an example of open-loop control.

Pulse Width Modulation (PWM)

1. A PWM controller (amplifier) switches DC supply voltage on and off at fixed frequencies. The length of the on/off interval or voltage waveform is variable.

2. Pulse width modulation (PWM), describes a switch-mode (as opposed to linear) control technique used in amplifiers and drivers to control motor voltage and current. PWM offers greatly improved efficiency compared to linear techniques.

Regeneration

The action during motor braking, in which the motor acts as a generator and takes kinetic energy from the load, converts it to electrical energy, and returns it to the amplifier.

Resonance

Oscillatory behaviour caused by mechanical limitations.

Ringing

Oscillation of a system following a sudden change in state.

Speed

Describes the linear or rotational velocity of a motor or other object in motion.

Tachometer

A small generator normally used as a rotational speed sensing device. The tachometer feeds its signal to a control which adjusts its output to the motor accordingly (called "closed loop feedback" control).

Thermal protection

A thermal sensing device mounted to the motor to protect it from overheating. This is accomplished by disconnecting the motor phases from the drive in an over temperature condition.

Torque

A measure of angular force which produces rotational motion. This force is defined by a linear force multiplied by a radius; e.g. lb-in. Torque is an important parameter of any motion control system.

Watt

One horsepower equals 746 watts.

7. Description of Inputs and Outputs

7.1 Digital Inputs

Enable: Activating or Disabling the Output Stage

If the *Enable* input is at GND potential or not wired at all, the output stage remains in the locked state. The motor stands still or slow down without brake. To reactivate the output stage, a voltage signal >3.5V to the *Enable* input is necessary.

If the ramp function is applied as well, it will immediately be carried out after the activation of the connector.

Range of Input Voltage	0 to +24 VDC
Input Impedance	4.7 kOhm to GND
Permanent Input Protection	-0.6 to +50 VDC
Enable activated	>3.5 VDC
Enable disabled	<0.6 V, open or connected to GND

/Ramp:

To externally turn the Ramp function on/off use Plug X3, pin 7 to pin 8 (GND).

Input Impedance	100 kOhm pullup to +10V
/Ramp activated	Connect to GND
/Ramp deactivated	open
Ramp Time	5 sec

Note:

If not using the Ramp function don't connect any voltage to this input.

7.2   Digital Outputs

Error: Monitoring Output

Whenever a system failure occurs (i.e. overtemperature or over current), the *Error out* output responds (HIGH position), and the red LED on the front panel is lit. The drive output stage is switched off and the error will not reset until the user resets the drive by switching the enable input. If the error occurs again the problem still exists.

The output is applicable in three different modes:

A) As Open-Collector, LO active, TTL-compatible or up to +30 V industrial logic.

B) As Push-Pull output with an impedance = 50 Ohm, when connecting the upper voltage signal to input *Error +V* With *Error +V* = +24 V, an SPS with photocoupler inputs can directly be controlled.

C) Together with a bridge between the *+5V* output and *Error +V* input, applicable as Push-Pull-output for a connection to TTL or CMOS-Logics without external upper voltage signal.

Range of Output Voltage	0.6 V to (*Error +V* – 0.6 V) with *Error +V* = +5 V to +30 V
Output Impedance	50 Ohm
Permanent Output Current	100 mA max., source and sink

Note:

The logical state of this output is clearly visible by the red *Error* LED on the front panel.

7.3   Analog Inputs

+Set val. –Set val.: Inputs for Set Values

An external +10/-10 V analog signal for speed or current are entered using +*Set val.* and –*Set val.* inputs. If the effective voltage is 0V, the motor stops. If the effective voltage is positive, there is also a positive voltage between *Motor+* and *Motor-* output. If the input is negative, the output consequently will be negative as well.

These inputs are given in form of a differential amplifier, so each of them can be related to ground. This offers the possibility to preset the level control in only one direction.

Range of Input Voltage	-10 V to +10 V
Input Impedance	20 kOhm
Permanent Input Protection	-20 V to +20 V

As an alternative, the set value can be entered using an external potentiometer (10 kOhm). For this purpose, connect the slide resistance to +*Set val.*, the left stop to *-10V* and the right stop to +*10V*. This procedure requires that the -*Set val.* input to be bridged to *GND* (see also chapter 4.1).

The admissible range for the set value is limited by the programmed *max* speed value. In this case, the desired maximum speed can be selected according to the maximum input voltage.

If the motor does not stop at input voltage = 0 V, fine tuning has to be performed using *Offset* potentiometer.

+Tacho –Tacho: Analog Tachometer Feed Back

The +*Tacho –Tacho* inputs transmit an analog set value for the number of revolutions from a tachometer coupled to the motor, back to the servo amplifier. This feature improves the accuracy of speed control, stable even in cases of a large load change.

|	
Range of Input Voltage	-50 V to +50 V
Input Impedance	50 kOhm
Permanent Input Protection	-60 V to +60 V

WARNING:

Correct polarity is crucial. Otherwise the motor operates at maximum speed without any control.

The input is given in form of a differential amplifier without ground connection.

I max: Current limit

Normally the *I max* potentiometer is used to adjust the maximum current required for the motor. With this analog input it is possible to do that by an external signal from 0 to +10 VDC or with an external 10 kOhm potentiometer (see also chapter 4.6). For this purpose, connect the slide resistance to *I°max*, the left stop to GND and the right stop to *+10V*.

Range of Input Voltage	0 to +10 VDC
Input Impedance	10 kOhm
Permanent Input Protection	20 V
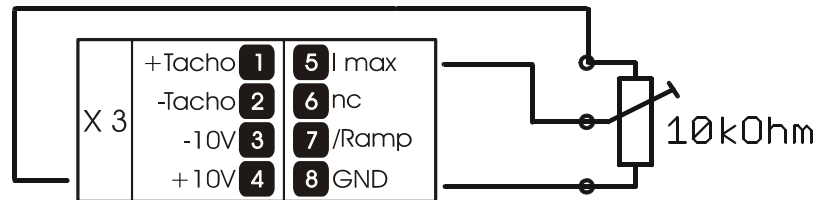
Note:

If the current controlled by the *I°max* input, set the internal *I°max* potentiometer to the left stop.

8. Basic Troubleshooting

Motor oscillates

- The gain of the servo amplifier is too high. Reduce the gain pot or in IxR mode the IxR pot.

Motor runaway

- The feedback loop is open. Check wiring.

- The polarity of the motor or of the tacho is permuted.

- No load at torque mode.

- Reduce the maximal speed with pot n max.

Motor noise

- Reduce gain with gain pot.

Motor has no torque

- Increase the admissible current with I max pot.

Motor drifts at standstill

- Adjust the offset with the offset pot.

- The input value for the set value isn't stable.

Motor is going hot at standstill

- If the Motor is blocked reduce the current.

Motor speed too low

- Increase the range with pot n max.

- Increase the admissible current with I max pot.

- Supply voltage too low.

No motion even though enable is on

- Check power supply and the wiring.

- Overheating protection is active.

Overtemperature

- Use an additional heatsink (see accessories).

- Reset the amplifier.

Note:

Beware that the maximal working temperature of 80°C in the driver is not reached; otherwise the drive will be switched off.

9. Accessories & Options

- Mounting adaptor for Din rail   MA0025

- Connecting module   WA2509

- Heatsink (No Fan)   HA2008

- Heatsink (1 Fan)   HA2018

- Heatsink (2 Fans)   HA2028

- Shielded CAT5 Cables:

CA2005	Red	50 cm / 20"
CA2010	Red	100 cm / 39"
CA2020	Red	200 cm / 79"
CA2030	Red	300 cm / 118"
CA8005	Yellow	50 cm / 20"
CA8010	Yellow	100 cm / 39"
CA8020	Yellow	200 cm / 79"
CA8030	Yellow	300 cm / 118"
CA4005	Grey	50 cm / 20"
CA4010	Grey	100 cm / 39"
CA4020	Grey	200 cm / 79"
CA4030	Grey	300 cm / 118"
CA6005	Blue	50 cm / 20"
CA6010	Blue	100 cm / 39"
CA6020	Blue	200 cm / 79"
CA6030	Blue	300 cm / 118"

- Braking module ASO-BM-70-30.

10. Warranties & Disclaimers

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For Warranty, Repair, or Technical Assistance contact:

Customer Support, North America / USA & Canada

Motion Control Technologies: (800) 697-6715   Email: info@electrocraft.com

Customer Support, Europe (except Germany), Middle East, Africa, Australia, Central & South America
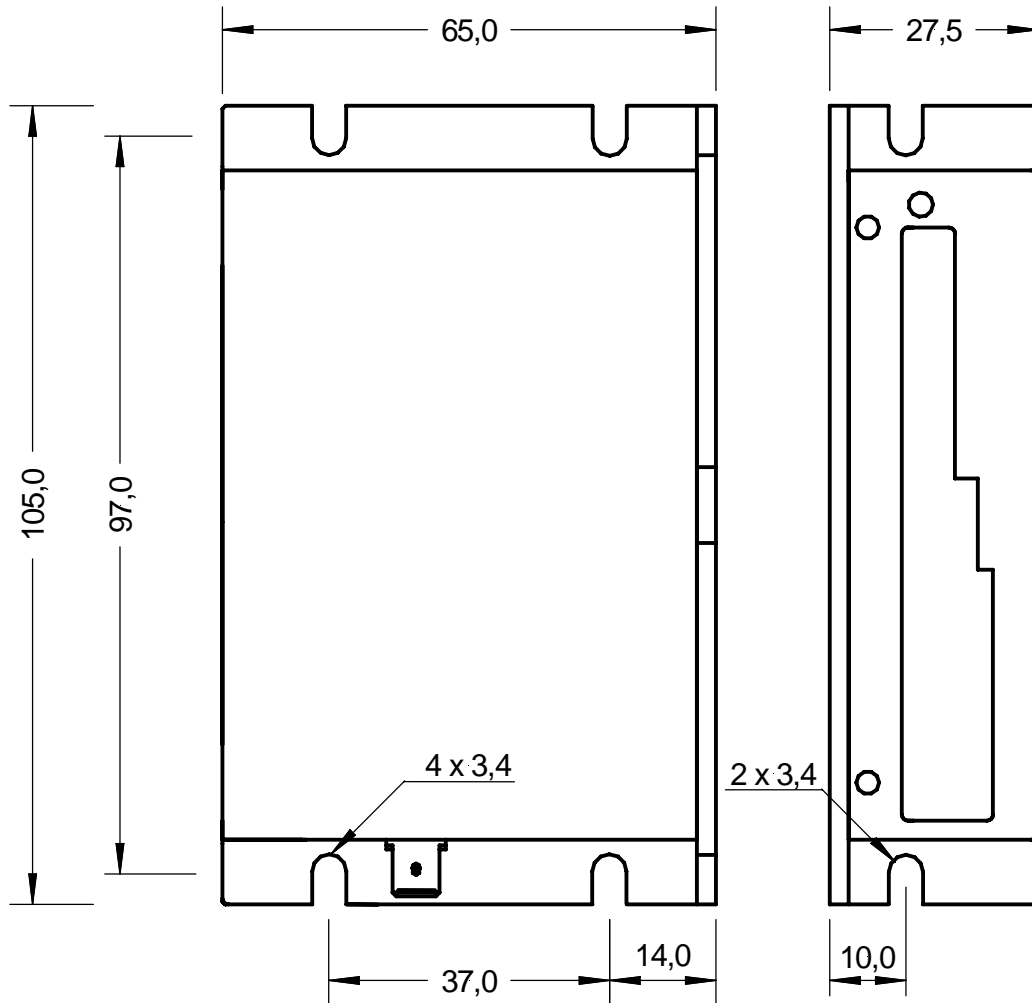
Customer service at +44 (0) 127 050 8800   Email: EMEAsales@electrocraft.com

Customer Support, Germany

Customer service at +49 (0) 711 727205 0   Email: info@electrocraft.de

11. Dimensions

65,0

27,5

105,0

97,0

4 x 3,4

2 x 3,4

37,0

14,0

10,0

All dimensions in mm.

12. Mounting Din rail adapter

DIN7982 3,5x9,5
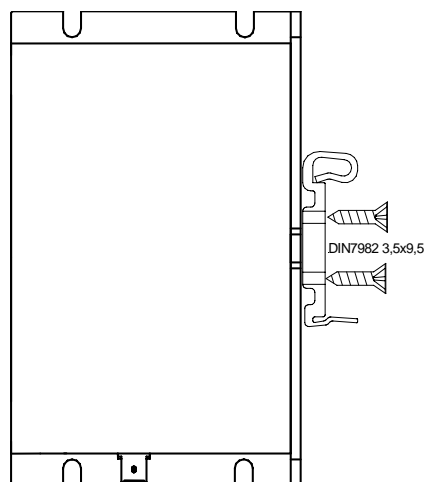
DA4303_L08   Subject to change without prior notice.