

Silencer™ Series Brushless Controllers

TYPICAL APPLICATIONS

Control of Brushless Motors for:

- Medical pumps and blowers
- Air-handling equipment
- Packaging and printing products
- Semiconductor handling and insertion machines
- Industrial automation equipment
- Office automation and equipment

FEATURES

- Powerful 4-quadrant PWM speed controller for electronically commutating three-phase brushless motors with Hall sensor spacing of either 60 or 120 degrees
- Integral short-circuit and overheat protection
- Three jumper-selectable modes of operation:
 - Torque Control
 - Velocity Control using digital encoder feedback
 - Velocity Control using Hall sensor feedback
- Maximum constant current can be adjusted via an on-board potentiometer
- Wide operating voltage range (11 to 70 volts)
- Robust aluminum case with mounting holes
- Removable screw terminal connectors allow fast installation and removal
- Compact design allows optimum utilization of real estate
- Controller output stage has been constructed using POWER-MOS-FET technology, resulting in very high efficiency (up to 95%)

BENEFITS

- Compact packaging minimizes space demands
- Matched drives and motors from a single supplier
- Complete system testing provides high reliability
- Terminal block connections for ease of wiring
- Multiple methods of speed control
 - Input voltage
 - Internal potentiometer
 - External potentiometer
 - External voltage reference

Kontakt: Schweiz und Fürstentum Liechtenstein

Peromatic GmbH

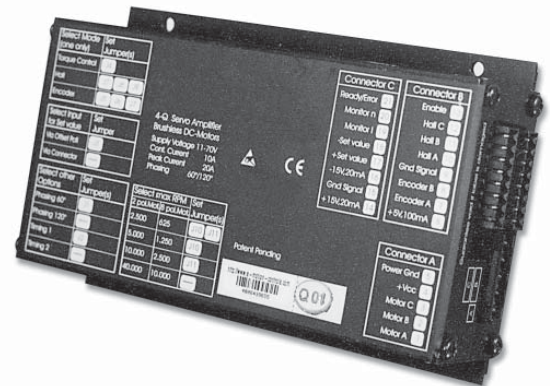
Gubelstrasse 28 CH-8050 Zürich
 rue Confédération 29 CH-2300 La Chaux-de-Fonds
 info@peromatic.ch www.peromatic.ch

Fon +41-(0)43 300 60 60
 Fon +41-(0)32 927 37 20

Fax +41-(0)43 300 60 79
 Fax +41-(0)32 927 37 22

BDA-Q4-70-10

*4-quadrant speed controller
for brushless motors*



Silencer™ brushless controllers are available in a variety of voltage and current ratings. Their compact packaging minimizes space demands. All controllers have generous terminal blocks to facilitate ease of wiring.

Silencer drives are compatible with Silencer Series Brushless DC Motors. Silencer motors are available in sizes 12, 17, 23, 28, 34 and 42 in standard frames with 1.2" to 4.15" diameters. They offer speeds up to 20,000 rpm and continuous torques ranging from 1.2 to 519 oz-in. Standard options include gearheads, resolvers and encoders.

If you have questions about Silencer drives or would like to speak to an applications engineer, please call us or visit our web site.

BDA-Q4-70-10 SPECIFICATIONS

Electrical Data	BDA-Q4-70-10
Operating Voltage (+input and Gnd)	11 - 70 VDC
Current Ratings	20 A
- Peak (Impulse)	20 A
- Continuous	10 A
Frequency of Power Output Stage	49 kHz
Efficiency	95%
Bandwidth of Current Controller	2.5 kHz

Inputs	BDA-Q4-70-10
Set Value (+ Set value, - Set value)	+/- 10 VDC
Encoder Input Signals (Encoder A, Encoder B)	Channel A, B-TTL-max 100 kHz
Enable (Enable)	8 - 30 VDC (active high)

Outputs	BDA-Q4-70-10
Current Monitor (Monitor I)	0.5 volts / amp
Speed Monitor (Monitor n)	10 VDC full scale of nMax
Supervision Output Signal (Ready/Error)	Open Collector - 30 VDC max
Auxiliary Voltage Sources	-15 VDC - 10 mA max
(-15 V, 10 mA)	-15 VDC - 10 mA max
(+15 V, 10 mA)	+15 VDC - 10 mA max
(+5 V, 200 mA)	+5 VDC - 200 mA max

Display
2-color LED Green-Ready, Red - Error

Temperature Range
Storage -104 to 176°F (-40 to +80°C)
Operation -50 to 113°F (-10 to +45°C)

Moisture Range
20 to 80% non-condensed

Mechanical Data	BDA-Q4-70-10
Weight (including terminal connectors)	22.9 oz (650.0 grams)
Dimensions (L x W x H)	7.09 in x 3.94 in x 1.57 in (180 mm x 100 mm x 40 mm)
Mounting	4 x M4 with a distance between holes of 4.78 in x 3.54 in (121.5 mm x 90 mm)

Safety Notes

- Installation to be performed by skilled personnel only
- Operating voltages exceeding the specified values, or improper connections will destroy the controller and will void the product warranty
- Unauthorized opening and attempted repair will put the user in danger and will void the product warranty
- Device contains ESD sensitive components. Do not touch any of the terminal connector pins
- For initial commissioning, the motor shaft should be free to turn (no load applied to the motor)

Termination Table - Connector A

Terminal #	Nomenclature	Description
1	φ B	Motor Phase B
2	φ C	Motor Phase C
3	φ A	Motor Phase A
4	+ Input	Positive Power Supply Connection
5	Power Gnd	Negative Power Supply Connection

Peromatic GmbH

Gubelstrasse 28
rue Confédération 29
info@peromatic.ch

CH-8050 Zürich
CH-2300 La Chaux-de-Fonds
www.peromatic.ch

Fon +41-(0)43 300 60 60
Fon +41-(0)32 927 37 20

Fax +41-(0)43 300 60 79
Fax +41-(0)32 927 37 22

BDA-Q4-70-10 SPECIFICATIONS

Termination Table - Connector B

Terminal #	Nomenclature	Description
6	+5 V, 200 mA	+5 volt supply for Hall switches and/or Incremental Encoder
7	Encoder A	Channel A Encoder Input
8	Encoder B	Channel B Encoder Input
9	Signal Gnd	Ground for Hall Switches and/or Incremental Encoder
10	S1	Hall Switch #1
11	S2	Hall Switch #2
12	S3	Hall Switch #3
13	Enable	Enable Input (active high)

Termination Table - Connector C

Terminal #	Nomenclature	Description
14	+15 V, 10 mA	Auxiliary Voltage Source — +15 VDC
15	Signal Gnd	Signal Ground
16	-15 V, 10 mA	Auxiliary Voltage Source — -15 VDC
17	+ Set Value	Positive Voltage for Velocity Control
18	- Set Value	Negative Voltage for Velocity Control
19	Monitor I	Current Monitor Output
20	Monitor n	Speed Monitor Output
21	Ready / Error	Ready Signal Output

INPUTS

- **Set Value (17,18)** – These inputs are used to control the velocity of the motor. They have a range of –10 to +10 VDC, and are connected internally to a differential amplifier. The input impedance is 20 kilohms. An input of 0 volts to +10 volts will result in a motor speed of 0 rpm to maximum motor rpm, with the motor rotating **CWVSE (clockwise viewing shaft end)**. An input of 0 volts to –10 VDC will result in a motor speed of 0 rpm to maximum motor rpm, with the motor rotating **CCWVSE (counter-clockwise viewing shaft end)**.
- **Encoder A (7) – Encoder B (8)** – Inputs from digital encoder (channels A and B). These inputs are used when the **velocity mode using encoder feedback** is selected. (jumpers 5,6,and 7 set)
- **ϕ A (3), ϕ B (1), ϕ C (2)** – These are the motor phase lead inputs. Connect motor phase A to input A, motor phase B to input B, and motor phase C to input C.
- **S1 (10), S2 (11), S3 (12)** – These are the motor Hall sensor inputs. Connect motor Hall sensor S1 to input S1, motor Hall sensor S2 to input S2, and motor Hall sensor S3 to input S3.
- **Enable (13)** – Enables or disables the controller. Pulling this input high (**connecting to terminal 14**) will **enable** the controller, and voltage will be applied to the motor windings. Leaving this input with no connection or connecting it to ground (**terminal 15**) will **disable** the controller, and no voltage will be applied to the motor windings.
- **+ Input (4), Power Gnd (5)** – These inputs are for the supply voltage (11-70 volts). **Please Observe Polarity!** + Input connects to the **positive supply lead**, while the Power Gnd connects to the **negative supply lead**.

OUTPUTS

- **+5V, 200 mA (6)** – This output is an auxiliary voltage source for the supply of Hall switches and/or an incremental encoder. Use in conjunction with **Signal Gnd (terminal 9)**.
- **+15V, 10 mA (14), -15V, 10 mA (16)** – These outputs are auxiliary voltage sources for use as reference voltages for velocity control when using an external potentiometer.
- **Monitor I (19)** – This output is for supervisory purposes when it is necessary to monitor motor current. This analog signal (voltage) is directly proportional to **motor current**, and is output at the rate of 0.5 volts per amp of motor current. The output range is –10 VDC to +10 VDC.
- **Monitor n (20)** – This output is for supervisory purposes when it is necessary to monitor motor speed. This analog signal (voltage) is directly proportional to **motor speed**. The output range is –10 VDC to +10 VDC. The output impedance is 10 kilohms. The output proportionality is 10 VDC = Maximum Speed.
- **Ready/Error (21)** – This output signal is to show the status of the drive, and can be used to provide a feedback signal to other devices and controls. The open-collector output is normally turned on, which means the output is pulled to GND (low logic state) if there is no fault within the drive system. In the case of a fault (faults include: **under-voltage, over-voltage, overheat or overcurrent**), the output goes high (high logic state). Maximum input range is 30 VDC @ 20 mA. **A FAULT CAN BE RESET BY TOGGING THE ENABLE (TURNING THE ENABLE OFF THEN ON).**