



TeKne Dental

Application Notes

BMC40 ELECTRONIC BOARD

February 2010



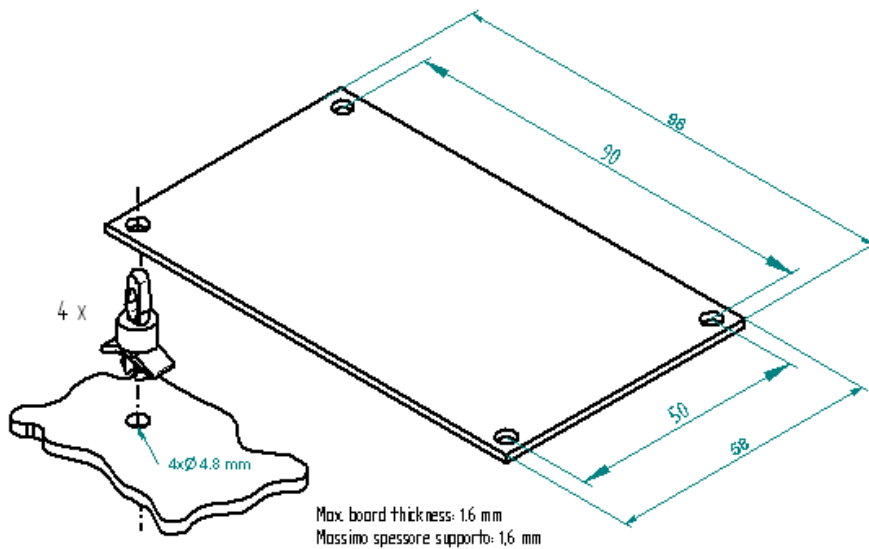
DESCRIPTION

The BMC40 electronic board (REF 390.00) provides power supply and allows to control speed of the DEFINITIVE[®] brushless electric motor, with or without light device.

The board also provides power supply for the high-brightness LED integrated in the DEFINITIVE[®]LED micromotor.

ASSEMBLY

Board can be fixed to the desired location by means of the four supplied plastic supports. It is only necessary to make four holes as shown on figure.

**CONNECTION**

Connect power supply and external signals to J1 connector, as shown on attached diagrams.

GND POWER (pin 9) and GND SIGNAL (pin 1) are connected together inside the board.

Wirings for the DEFINITIVE[®] (REF 600.00) micromotor: connect the three red, black and brown wires of the silicone Hose (REF 322.8x) to the J2 connector on the BMC40 board, as shown on attached diagrams.

Wirings for the DEFINITIVE[®]LED (REF 602.00) micromotor: connect the four red, black, brown and blue wires of the silicone Hose (REF 322.8x.01) to the J2 connector on the BMC40 board, as shown on attached diagrams.

In SWITCH mode, board is enabled by closing the START switch on pin 6 (Fig.1) or by applying $V_{STR} = 0$ V (Fig.2). At the moment of power-up of the board, the START switch must not be closed (connected to GND) otherwise a proper reset cannot be carried out: for this reason the START switch cannot be definitively kept closed to GND.

Rotation mode can be changed by closing the DIR switch on pin 5 (Fig.1) or by applying $V_{DIR} = 0$ V (Fig.2). The normal rotation mode is clockwise.

All inputs are 5 V tolerant. Board may break if input signals exceed this limit.

An actuator, such as a solenoid valve (DC current) to control cooling air or other, can be connected to pin EV of J1.

SPEED ADJUSTMENT

Speed can be adjusted by means of:

- External potentiometer (4.7 K Ω or 10 K Ω , not supplied) (Fig.1)
- External voltage, variable from 0 to 5 Vdc (V_{SPD} on Fig.2)
- External PPOT pneumatic potentiometer (REF 395.00)
- Digital connection by means of the RS232 serial interface

START OPTION

- a. SWITCH: in this mode motor start-up procedure is activated by closing the START switch. This signal, normally high because of a pull-up resistor, is connected to a Schmitt-trigger input so that start is effective on the low-going edge. At start-up, even if analogue input SPEED voltage is zero, starting speed is always 2000 rpm.

FIRST DIP SWITCH position: OFF.

- b. AUTO: in this mode motor start-up procedure is activated as soon as the analog input SPEED voltage is greater than 0.30 V. Viceversa, to stop motor, such input voltage must be less than 0.25 V. In this mode, it is also possible to connect the PPOT pneumatic potentiometer in place of the normal electric potentiometer.

FIRST DIP SWITCH position: ON.

SPEED CONTROL OPTION

- a. LINEAR: in this mode, motor speed is directly proportional to the analog voltage at the SPEED input pin, considering that the maximum speed of 40000 rpm is achieved when such voltage is 4.90 V.

SECOND DIP SWITCH position: OFF.

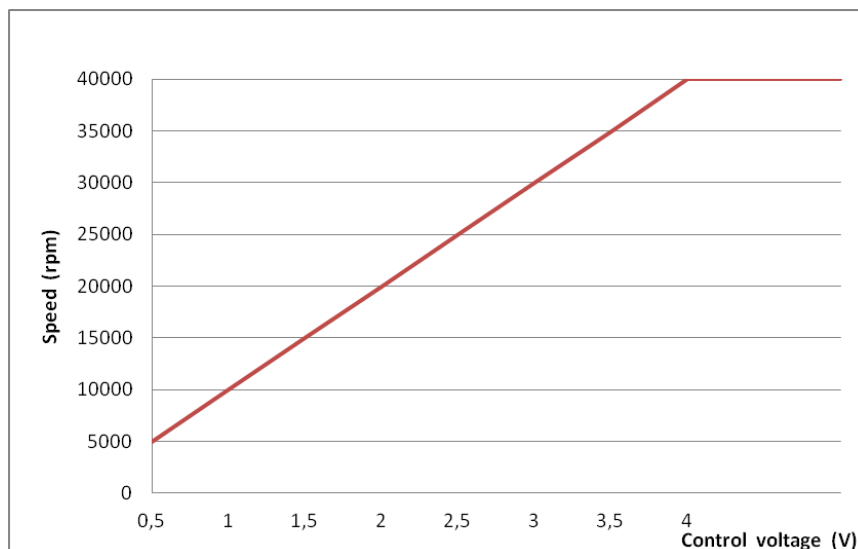
- b. EXP: in this mode, motor speed is an exponential function of the analog voltage at the SPEED input pin, considering that the speed of 20000 rpm is achieved when such voltage is $5 \frac{3}{4} \text{ V} = 3.75 \text{ V}$. Maximum speed is still at 4.90 V

SECOND DIP SWITCH position: ON.

MAXIMUM SPEED LIMIT

In AUTO mode it is possible to limit the maximum speed by employing the second optional potentiometer, connected as shown on Fig.1. By using the potentiometer, it is possible to vary the control voltage at the LIMIT input pin: maximum speed can therefore be set at a value between 5000 rpm and 40000 rpm, as shown on the figure.

In case this pin is left unconnected, an internal pull-up will keep such voltage at over 4 V and therefore the default maximum speed is 40000 rpm.



BMC40 SPECIFICATIONS

The board:

- does not produce electromagnetic interference and meets the requirements of CEI EN 60601-1-2 Standard
- is not suitable for use in the presence of a flammable anaesthetic mixture with air or with oxygen or nitrous oxide
- must be connected to a power transformer having a minimum insulation strength of 500 V between secondary winding and earth and a minimum insulation strength of 4000 V between secondary winding and mains

Standard conformity:	CEI EN 60601-1 and CEI EN 60601-1-2
Nominal power supply:	32 Vdc \pm 15 %
Maximum continuous current:	5 A
Maximum peak current:	6 A (10 s)
Overcurrent protection:	8 A \pm 10 %
Rotation speed:	2000 \div 40000 rpm
Motor LED brightness:	adjustable by means of the LIGHT trimmer.
LED turn-off delay:	30 s
Protections:	undervoltage, overvoltage, overcurrent, overspeed, zero speed, phase loss, startup failure.
Fault status:	shown by the red LED; fault status is cleared at every new start-up of the motor.
Analog input (0 \div 5 V) for:	speed control from 2000 to 40000 rpm
Analog input (0 \div 5 V) for:	speed maximum limit
Input (TTL) for:	motor START / STOP; normally kept high by a pull-up resistor.
Input (TTL) for:	direction mode; normally kept high by a pull-up resistor.
Maximum inputs voltage:	5.5 V
Actuator output:	open-collector output to activate a solenoid valve. A protection internal diode is connected to this pin.
Auxiliary output:	AUX (for future uses).
LCD output:	auxiliary connector to drive a LCD display.
Start-up option:	SWITCH / AUTO
Speed control option:	LINEAR / EXP
Optional digital interface:	RS-232 (V.28)
Board sizes:	98 x 58 mm
Working temperature:	0 \div 40 $^{\circ}$ C
Storage temperature:	-10 \div 100 $^{\circ}$ C
Working humidity:	30 \div 90 %
Storage humidity:	10 \div 90 %



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