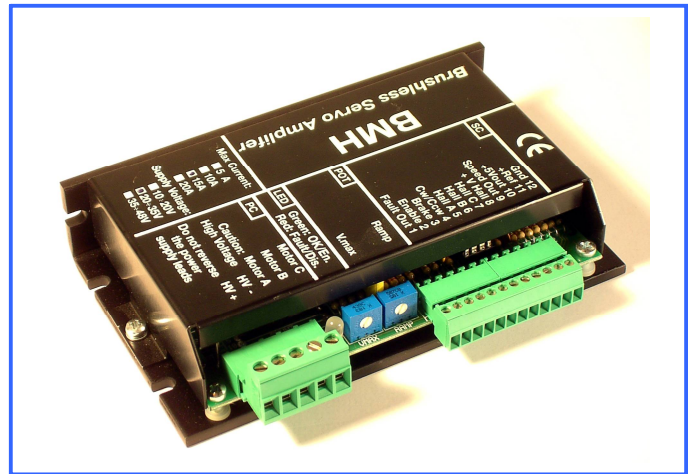
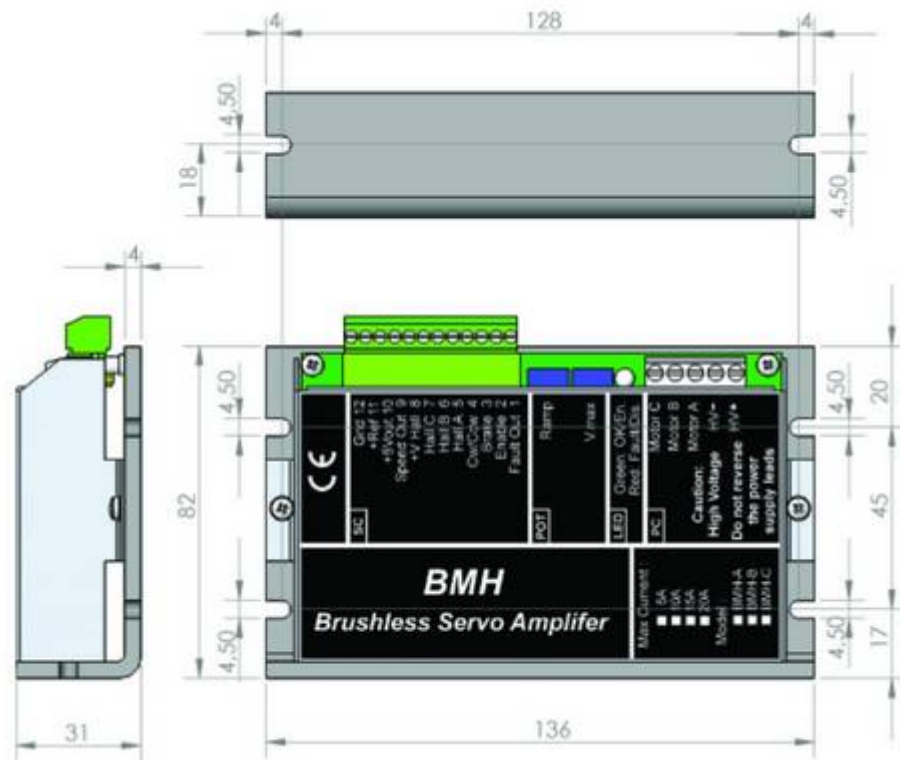


**Speed control for  
three phases  
brushless DC  
motors with Hall  
sensors**

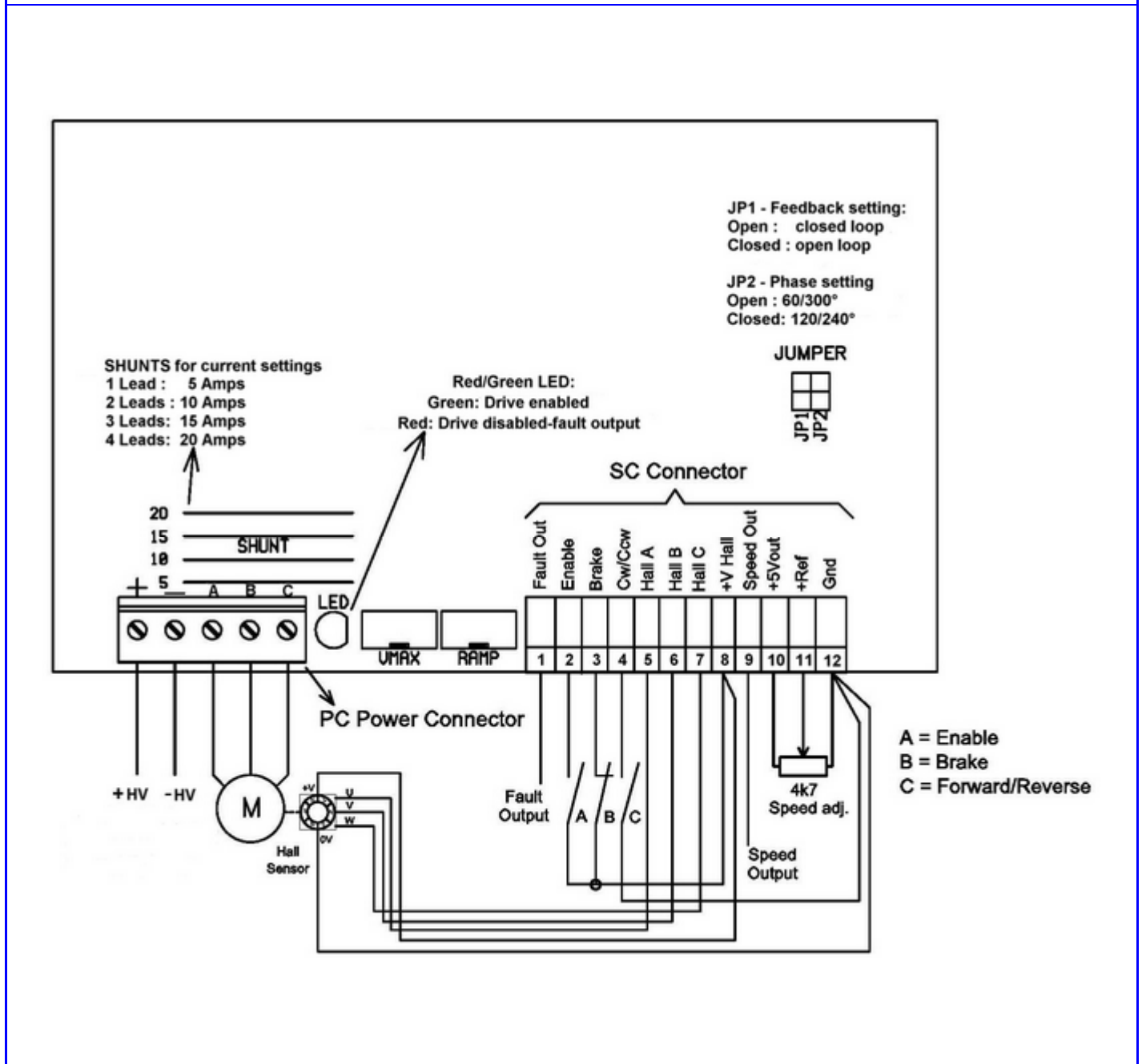


- SPEED CONTROL BY ANALOG REFERENCE INPUT
- POSSIBLE SPEED ADJUSTMENT BY POTENTIOMETER
- CW/CCW ROTATION
- MAXIMUM CURRENT LIMIT: ADJUSTABLE AT FOUR LEVELS
- 3 POWER SUPPLY RANGES
- ACCELERATION/DECELERATION RAMPs
- SPEED MONITOR
- SHORT CIRCUIT PROTECTION



Model	Power supply (V dc)			Maximum current	Speed range (*)	Analogue reference input	Weight	Dimensions (mm)
	Min.	Tipico	Max					
<b>BMH-A</b>	11,9	14	16,1	20 A	300 RPM ÷ N max	0÷5 V c.c.	250 g	136x82x31
<b>BMH-B</b>	22,1	26	29,9	15 A	300 RPM ÷ N max	0÷5 V c.c.	250 g	136x82x31
<b>BMH-C</b>	40,8	48	55,2	10 A	300 RPM ÷ N max	0÷5 V c.c.	250 g	136x82x31
PWM switching frequency: 20 KHz					(*) For 4 poles motor			
Analog reference input characteristics: 10 KΩ					Overtemperature: shutdown at 75 ° C on heatplate			
Storage temperature range: -30/ +85° C					Operating temperature range: 0-70°C			

## MOTOR CONNECTIONS



PIN FUNCTIONS			
CONNECTOR	PIN	NAME	DESCRIPTION
PC Screw terminals	1	HV +	D.C. Power Supply +
	2	HV -	D.C. Power Suppli -
	3	MOTOR A	Motor Phase A connection
	4	MOTOR B	Motor Phase B connection
	5	MOTOR C	Motor Phase C connection
SC Screw terminals	1	FAULT OUT	Open collector output becomes low during overcurrent, undervoltage, disable, wrong phasing of hall sensors.
	2	ENABLE	This <b>TTL</b> level input signal turns on all power devices of the power bridge when pulled to high (+6 V).
	3	BRAKE	This input provides to stop the motor when pulled to low level ( <b>0V</b> ). Do not use with high inertia loads.
	4	CW/CCW	Rotation direction : right/left viewing motor shaft from front. Pull this input to ground (Pin 12) to change rotation.
	5	HALL A	Hall sensors input, logic levels. Maximum high level is <b>5 V D.C.</b>
	6	HALL B	
	7	HALL C	
	8	+ V HALL	Power for HALL sensors and Enable : <b>+5 V</b>
	9	SPEED OUT	Actual speed value output: 12 pulses per 360 ° (electrical) with 4 poles motor - <b>Push Pull</b> output
	10	+ 5 V out	<b>+ 6 V</b> -Power supply for speed adjustment by potentiometer.
	11	+ REF IN	Analog reference input: <b>0-6 V</b>
	12	0 V	Ground
DISPLAY			
REDLED		Fault error: disable, overtemperature, short circuit protection, low power supply level.	
GREEN LED		Drive OK	
GREEN/RED LED		Blinking at the same time: current limit protection.	

## DESCRIPTION

The **BMH** series PWM amplifier is designed to drive brushless D.C. motors in HALL velocity mode. This drive requires only a single unregulated D.C. power supply . All auxiliary voltages are generated directly internally to the drive.

It provides six-step commutation of three-phase D.C. brushless motors using 60° or 120° Hall sensors on the motor .The motor current is internally limited to the maximum value by 4 shunts. It is possible to reduce the maximum current value by cutting one, two or three shunts : each shunt cut is equivalent to a 5 Amps reduction.

The direction of rotation can be changed trough the Cw/Ccw input and the speed can be adjusted by applying a reference signal value of 0-6 V to the input **+REF IN**.

Enable command is selectable by an external signal or pushing the input to the active level (+5 V HALL output available on the board). The brake is active when the jumper between the Pin 3 and Pin 8 is open. The motor rotation can be reversed connecting 0V to CW/CCW terminal. To have motor rotation, drive must be enabled and Pin 3 (Brake) must be connected to Pin 8 (+V Hall); to have motor braking this contact must be open.

The device is equipped by a **RAMP** function that enables the motor speed to have a controlled run-up when drive is enabled and if the reference analogue input changes.

The acceleration/deceleration time is adjusted by the potentiometer RAMP. The acceleration time will be valid for acceleration ramp only. The deceleration time will be than equal or longer than the acceleration time. The acceleration/deceleration values depend by speed and load inertia.

A "speed monitor" is available at the *Speed Out* (Pin 9); the speed resolution depends on number of motor poles. As example a 4 poles motor will produce 12 ppr.

The amplifier delivers an Error Output when:

driver is disabled, overcurrent, overtemperature, undervoltage, wrong hall sequence connection.

Only one single DC Voltage supply is required. It is mandatory that the DC Voltage supply respects the specification for each different model.

Please consult the **instruction manual** to determine the proper components of the power supply (transformer, fuses, capacitors, rectifier).

Minimum motor inductance is 400µH.

For the reasons due to the environment temperature or the maximum current used an additional heatplate and/or cooling could be necessary to avoid over-temperature shutdown (75°C). Three versions are available: with power supply 14 V, 26 V, 48 V D.C..

All connectors are on one edge for easy connection and adjustment.

## CURRENT LIMIT ADJUSTMENT

This amplifier deliver always a maximum current. Four different current steps are possible.

The value of each shunt is **5 amps**.

With 1 shunt cut : maximum current = **15 Amps**

With 2 shunt cut : maximum current = **10 Amps**

With 3 shunt cut : maximum current = **5 Amps**

With all shunt installed : maximum current = **20 Amps**.

Please be careful that the **maximum number of** shunt for each version is the following:

**BMH-A – 20A** : 4 shunts

**BMH-B – 15 A** : 3 shunts

**BMH-C – 10 A** : 2 Shunts

## IMPORTANT NOTICE

Certain application using power products may involve potential risks of death, personal injury, severe damage to property or environment (critical applications).

Servotrade products are not designed, authorized or warranted to be suitable for use in life-support devices or other critical applications systems. Inclusion of Servotrade products in such applications is understood to be fully at purchasers's own risk.