

Brushless DC Motors

27H Series for Home Appliances and Office Automation Equipment

- ▶ 3-Phase, 12-Pole Brushless DC Motors
- ▶ Logic-Controlled Clockwise or Counterclockwise Rotation
- ▶ Hall Effect Commutation
- ▶ Locked Rotor Protection*
- ▶ Quiet Operation
- ▶ PWM or PLL Speed Control
- ▶ Open-Collector Tachometer Circuit
- ▶ Compact $\varnothing 48.9 \times 31.7$ mm Case



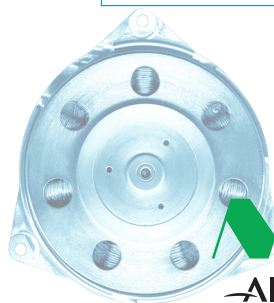
Electrical and Mechanical Characteristics

Parameter	Symbol	Conditions	Min.	Nom.	Max.	Units
Operating Voltage	V_M	Model 27H-24	21.6	24	26.4	V
Operating Current	I_{Run}	Continuous operation at nominal V_M , $T_A = +20^\circ\text{C}$				
		Model 27H-24, Type 1	—	—	1.10	A
		Model 27H-24, Type 2	—	—	1.17	A
		Model 27H-24, Type 3	—	—	1.13	A
		Model 27H-24, Type 4	—	—	0.99	A
Run Torque	T_{Run}	Continuous operation at nominal V_M , $T_A = +20^\circ\text{C}$				
		Model 27H-24, Type 1	—	—	32	mN·m
		Model 27H-24, Type 2	—	—	45	mN·m
		Model 27H-24, Type 3	—	—	55	mN·m
		Model 27H-24, Type 4	—	—	63	mN·m
Power	P_{OUT}	Continuous operation at nominal V_M , $T_A = +20^\circ\text{C}$				
		Model 27H-24, Type 1	—	—	16.5	W
		Model 27H-24, Type 2	—	—	17.5	W
		Model 27H-24, Type 3	—	—	15.9	W
		Model 27H-24, Type 4	—	—	13.4	W
No Load Speed	ω_{NL}	Model 27H-24, Type 1, $V_M = 24\text{V}$	—	6000	—	rpm
		Model 27H-24, Type 2, $V_M = 24\text{V}$	—	5000	—	rpm
		Model 27H-24, Type 3, $V_M = 24\text{V}$	—	4000	—	rpm
		Model 27H-24, Type 4, $V_M = 24\text{V}$	—	3100	—	rpm
Rotor Inertia	J_M		—	40	—	$\text{g}\cdot\text{cm}^2$
Sound Pressure	N_M	No load, $f = 0$ to 20 kHz, 30 cm from motor	—	—	50	dB(A)
Operating Temperature	T_A	Relative humidity 5% - 90%, non-condensing	10	—	50	$^\circ\text{C}$
Life Expectancy†	L_{10}	Continuous operation, no load, $T_A = +20^\circ\text{C}$	5,000	—	—	hours
Motor Weight	W_M		—	210	—	g

Note: Values of maximum current, torque and output power are typical under stated operating conditions with motors mounted on 170 cm² aluminum test fixtures.

* Automatic shutdown at locked rotor condition: Restart at power OFF/ON.

† L10 bearing life expectancy at relative humidity 5% - 90%, non-condensing, and nominal operating voltage: The point in time at which 90 percent of a sample lot can be expected to survive. Failure criteria for life testing that establishes this figure include a 20% reduction in speed or a 20% increase in operating current.



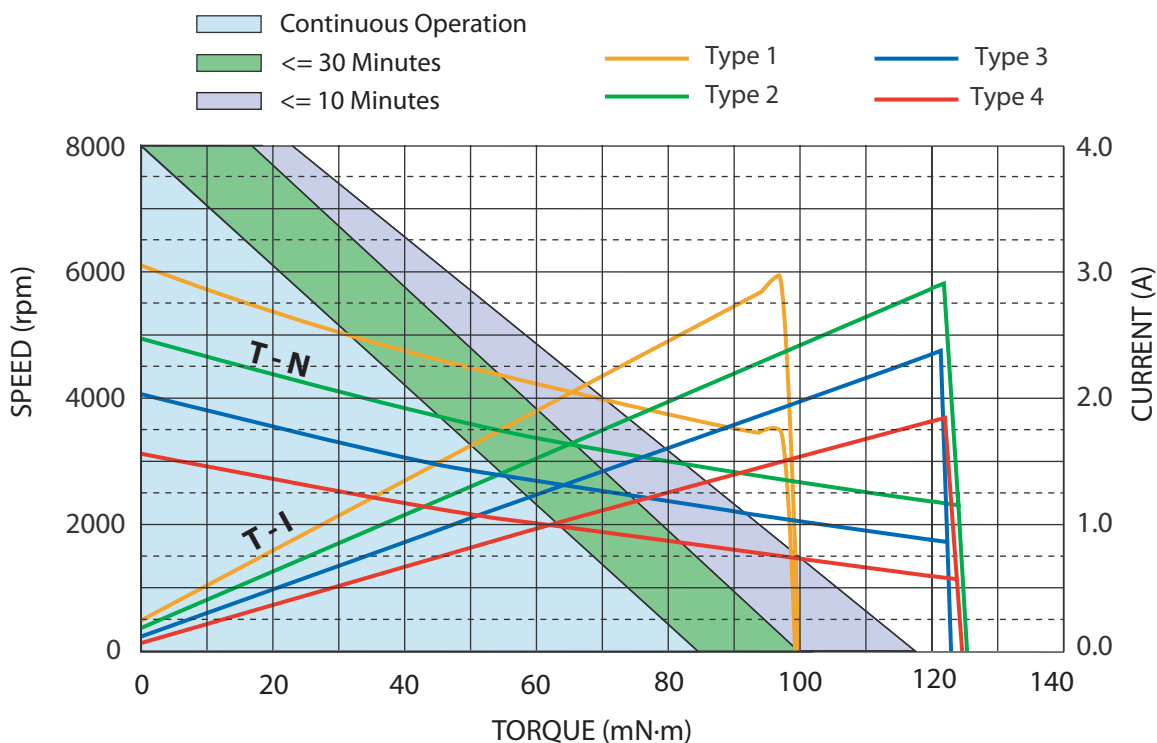
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Brushless DC Motors

27H Series

Performance Characteristics⁽¹⁾

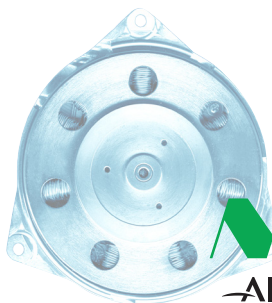


Motor Options⁽²⁾

Feature	27H Standard	27H Options
Shape of Motor Shaft	Round	D-Cut
Surface of Motor Shaft	Smooth	Knurled

⁽¹⁾ Performance characteristics are measured with motors mounted on 170 cm² aluminum fixtures; T_A = +20°C.

⁽²⁾ Series 27H motors are semi-custom sleeve bearing designs with speed-control circuitry built into the motors. Control circuit parameters can be modified to meet application-specific requirements for speed and load conditions.



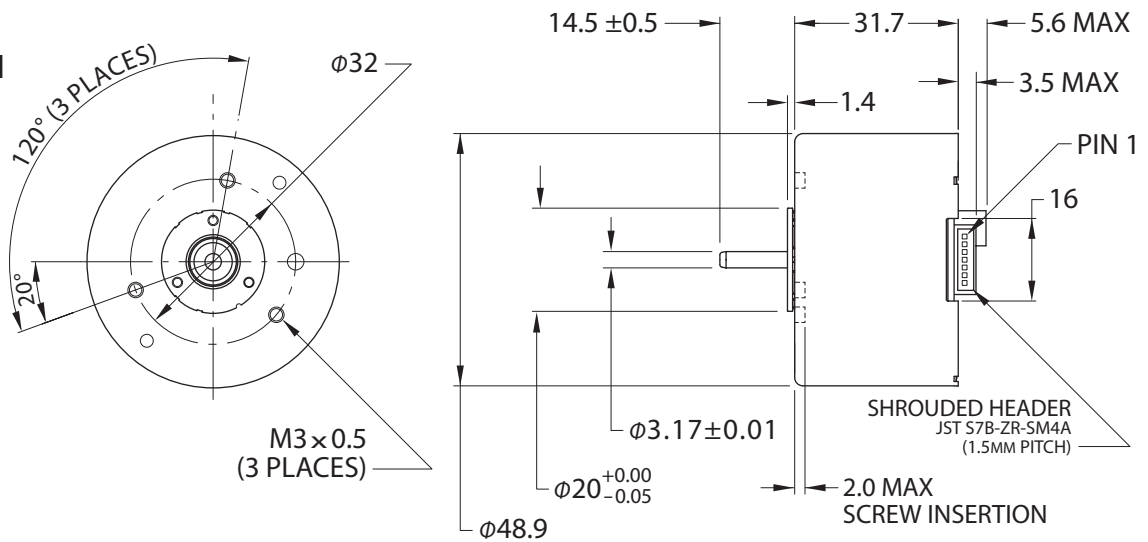
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Brushless DC Motors

27H Series

27H Motor with PWM Speed Control



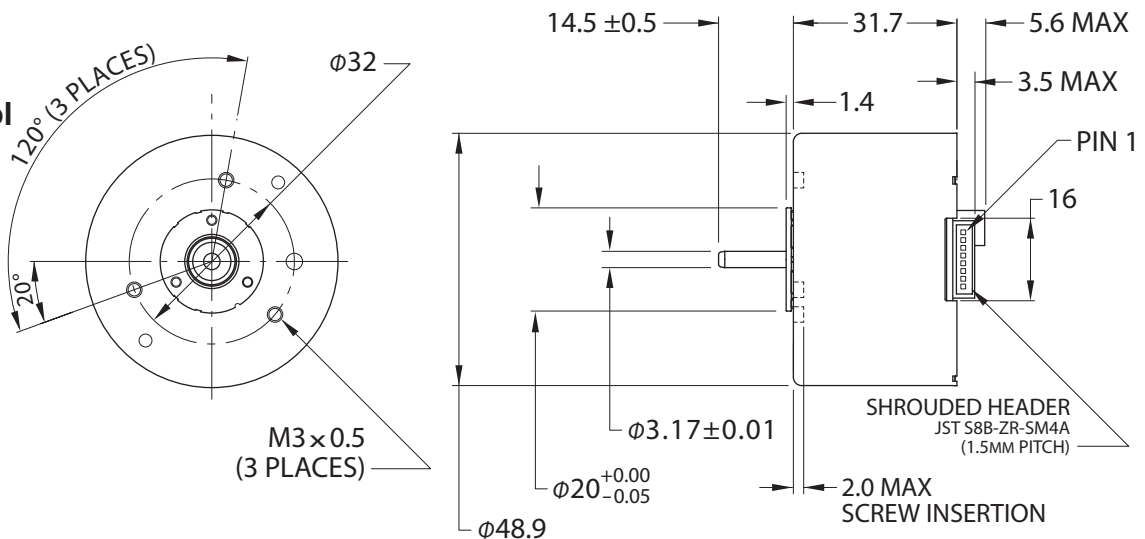
DIMENSIONS IN MILLIMETERS

Pinout

Pin	Function
1	Open-collector tachometer, 20 pulses per revolution, $I_C(\text{MAX}) = 3.0 \text{ mA}$
2	Logic Supply, +5V
3	HIGH = clockwise, LOW = counterclockwise

Pin	Function
4	PWM: $f_{in} = 500 \text{ Hz to } 50 \text{ kHz}$, $V_{IN(\text{LOW})} < 1.0\text{V}$, $V_{IN(\text{HIGH})} = 2.5 \text{ to } 5.0\text{V}$, duty cycle = 20% to 100%
5	HIGH = start, LOW = stop
6	Supply ground
7	Motor supply voltage, 24V nominal.

27H Motor with PLL Speed Control



DIMENSIONS IN MILLIMETERS

Pinout

Pin	Function
1	PLL gain
2	Speed lock (LOW) or open-collector tachometer
3	HIGH = clockwise, LOW = counterclockwise
4	Clock in: $\text{rpm} = 60 f_{\text{CLK}}/20$

Pin	Function
5	HIGH = stop, LOW = start
6	Logic supply, +5V
7	Supply ground
8	Motor supply voltage, 24 VDC nominal

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