BRUSHLESS DC MOTOR FAMILY

Series NT™ HST Geared Brushless DC Permanent Magnet Motor

The NT™ HST is designed to provide:

- Fast dynamic response
- High power density
- Compact package size
- Long life ball bearing system
- Wide Selection of Gear Ratios and Features
- Inline, Right Angle, and Metric
- High Torque and Low Backlash

Some factors to consider in maximizing your application system's performance:

- Torque Multiplication
- Speed Reduction
- Inertia Matching
- Radial Loading
- Axial Loading
- Noise

Planetary gearheads are generally specified for their high rated torque and high input speed. Planetary gearheads are more robust with higher accuracy, lower backlash, and longer life than spur gearheads. They are well suited for higher load applications in small packages ranging from nut runners and nut setters to small medical tools, pumps, and other devices.

The gearhead solution (Spur Vs. Planetary) is primarily dependent upon the application. Some factors to be considered in making proper trade-offs between cost and performance are shown below.

DESIGN FACTORS	GEARHEAD TYPE	
	SPUR	PLANETARY
Torque Capacity	Lower	Higher
Power to Weight Ratio	Lower	Higher
Power to Size Ratio	Lower	Higher
Torsional Stiffness	Lower	Higher
Backlash	Higher	Lower
Available Number of Gear Ratios	Higher	Lower
Operating Speed	Lower	Higher
Size	Larger	Smaller
Cost	Lower	Higher

NT™ HST BLDC Motor Specifications

- Standardized Modules
  - Brings high volume pricing to low volume orders
  - Makes product performance easy to specify
  - Ensures maximum product quality
- Flexible Performance
  - Operates from 12-48Vdc power sources
  - Operates in speed or torque mode
  - 4 quadrant closed loop or 2 quadrant open loop
  - Compact integrated encoder option

Electrical

- Integral Motor Controls Matched to a Motor Winding
- 2 or 4 Quadrant Operation
- 10Vdc-48Vdc Range (depending on motor control)
- Up to 347 in-lb [39.2 N-m] Torque
- Ultra Smooth Precision Motion Quality
- UL Approved Class B Insulation System
- 100% Final Tested
- Custom Windings Available

Mechanical

- Long Life Ball Bearing System
- NEMA 23 Mounting Flange
- Neodymium Ring Magnets (not arcs)
- Stainless Steel Shaft
- Over 20,000 Hours of Design Life @ Rated Torque
- Standard Molex® Connectors
- Small Package Size with Low Rotor Inertia

Reliability

- Over 1.5 Million Hours of Combined Life and Reliability Testing
- In Use at Major OEM's in Demanding Applications
- Our Proven Design can Help Reduce the Test Time Needed to Validate Your Design
- Contact Hurst for Detailed Life and Reliability Date

Integral Motor Control and Encoders

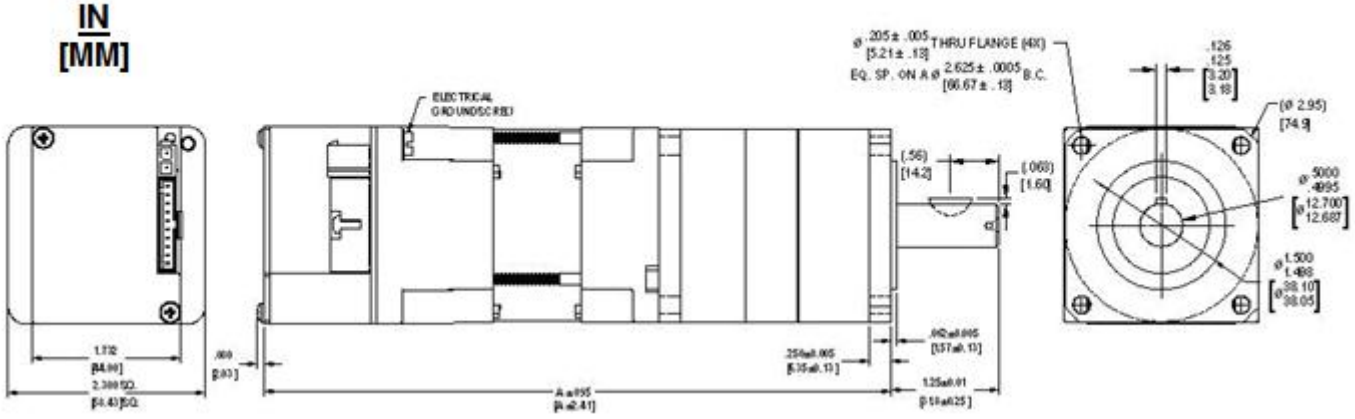
- External Motor Module
  - For Use with Customer Supplied Motor Control
  - Provides Hall Sensor and/or Encoder Outputs
- Analog Motor Control
  - Economical Control via a Simple Speed Pot or a 0-5Vdc Control Signal
- PWM Motor Control
  - Control via Customer Generated PWM Signal

- Encoders – 100, 250, 256 with Index Pulse, 400, or 1000 Line Resolution

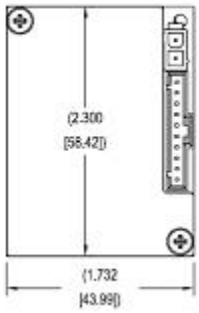
INTEGRATED CONTROL DRAWINGS

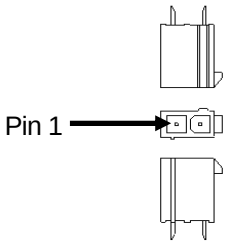
NEMA 23 PLANETARY GEAR MOUNTING

IN
[MM]

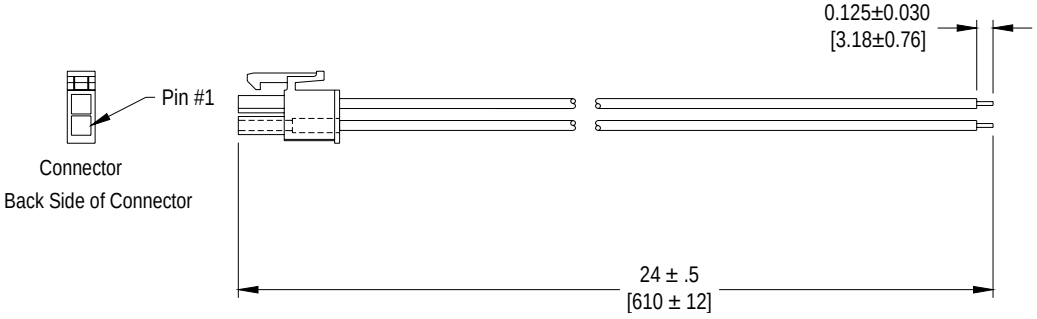


Model	Overall Length (A) in [mm]		Model	Overall Length (A) in [mm]
1	7.27 [184.7]		2	8.27 [210.1]
1*	8.09 [205.5]		2*	9.09 [230.9]
* Gear Reductions 16:1 and higher				





Pin No.	Description	Input/ Output	Notes
1	+DC	Input	12-45 Vdc
2	GND	Input	



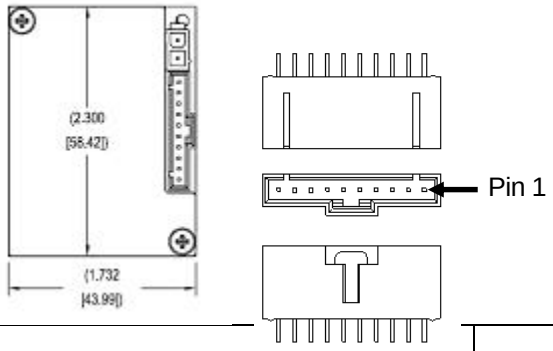
Pin #	Color
1	Red
2	Black

22 AWG

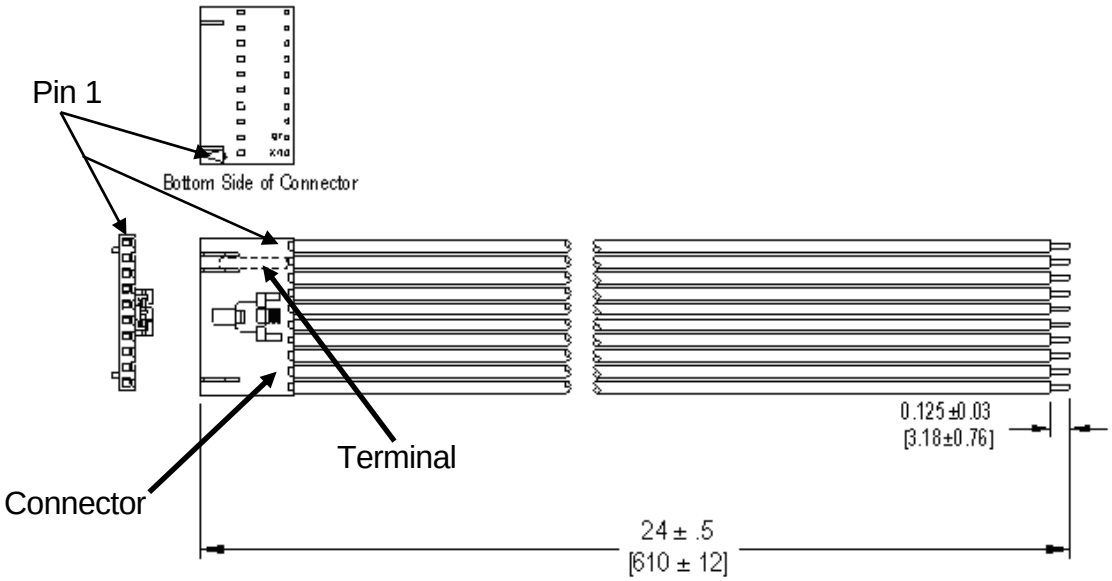
Description	Manufacturer	Manufacturer Part #
Connector	Molex	39-01-2020
Terminal	Molex	39-00-0038 (chain)
	Molex	39-00-0039 (loose)

NOTICE

Minimum Gauge Size is recommended to be 22 AWG or greater.



Pin No.	Description	Input/ Output	Notes
1	Tachometer	Output	Speed Output – 15 Pulses/Revolution (PPR) for Dynamo and 9 PPR for HST23 at TTL Level (0 to 5 Vdc) and 50% Duty Cycle
2	Speed / Torque	Input	Only used for Analog Control Method
3	PWM	Input/ Output	Input - PWM Control Method ● 0% duty cycle minimum command ● 100% duty cycle maximum command ● Used with Direction Input pin (Pin 7) Output - Analog Control Method ● Outputs a PWM signal that monitors the ValuDrive® DC input current.
4	Encoder Channel B	Output	Speed and Direction Output – PPR based on customer preference at TTL level; No connection if encoder not present
5	Encoder Channel A	Output	Speed and Direction Output – PPR based on customer preference at TTL level; No connection if encoder not present
6	Direction	Output	Direction Output – 5 Vdc output = clockwise lead end 0 Vdc output = counter-clockwise lead end Can be used in conjunction with Tachometer output (Pin 1) to determine speed and direction
7	Direction / PWM & Direction	Input	Direction - ● Clockwise Lead End = High level (5 Vdc) ● Counter- Clockwise Lead End = Low level (GND) Used in conjunction with PWM (Pin 3) and Speed/Torque (Pin 2) PWM & Direction - ● 0% duty cycle maximum command in the counterclockwise direction lead end ● 50% duty cycle minimum command ● 100% duty cycle maximum command in the clockwise direction lead end
8	Enable	Input	Low level signal (0 Vdc) enables drive
9	GND	--	Return path for + 5 Vdc (Pin 10)
10	+5 Vdc	Input/ Output	Input - User supplied 5 Vdc Output - Optional Integral 5 Vdc supply



Pin #	Color
1	Orange
2	Gray
3	Yellow
4	Green
5	Brown
6	Violet
7	Blue
8	White
9	Black
10	Red

Description	Manufacturer	Manufacturer Part #
Connector	Molex	50-57-9410
Terminal	Molex	16-02-0087 (chain)
	Molex	16-02-0103 (loose)

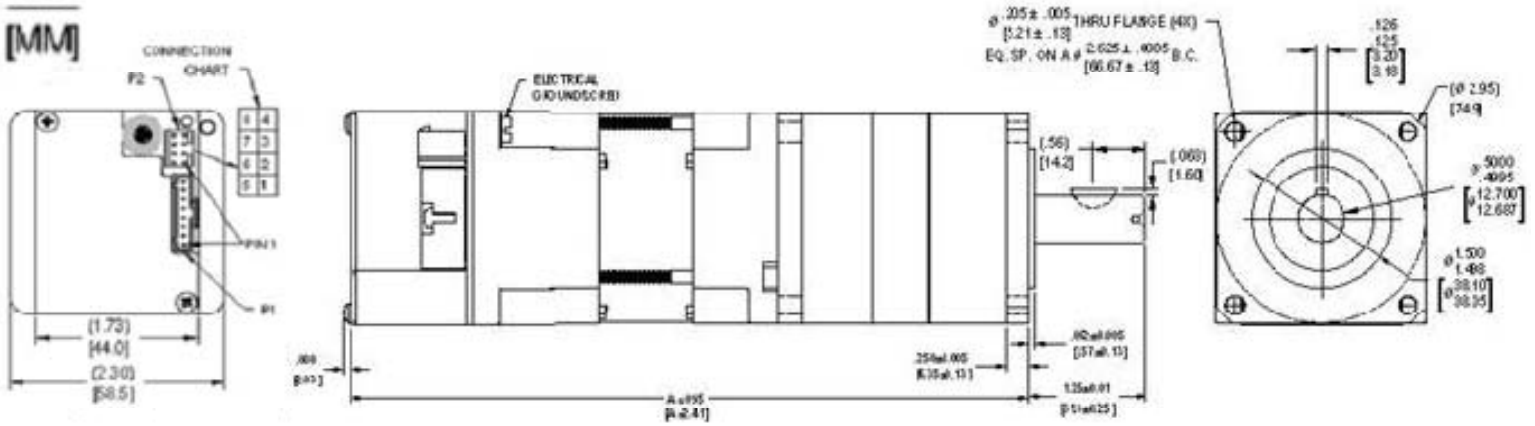
NOTICE

Minimum Gauge Size is recommended to be 22 AWG or greater.

EXTERNAL CONTROL DRAWINGS

NEMA 23 PLANETARY GEAR MOUNTING

IN
[MM]



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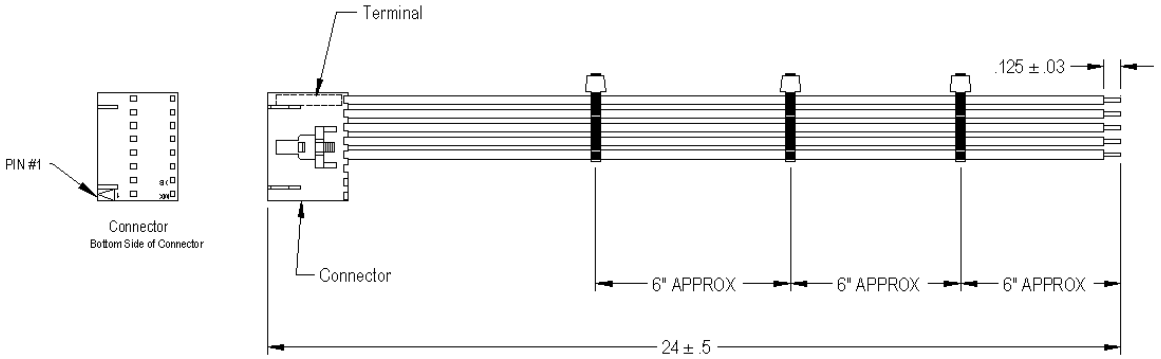
1*	8.09 [205.5]

Model	Overall Length (A) in [mm]
2	8.27 [210.1]
2*	9.09 [230.9]

* Gear Reductions 16:1 and higher

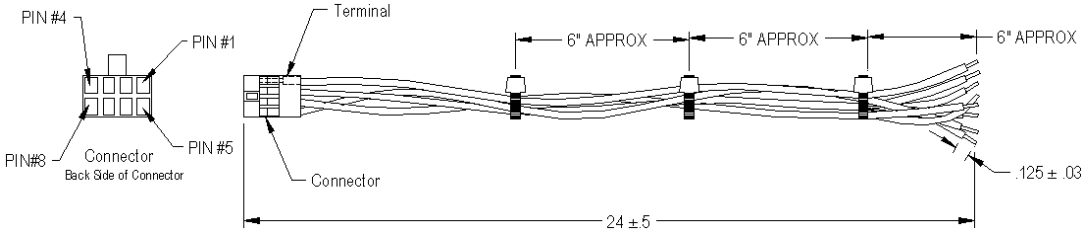
HALL CONNECTIONS (P1)				MOTOR LEAD CONNECTIONS	
PIN #	DESCRIPTION	PIN #	DESCRIPTION	COLOR	DESCRIPTION
1	Vs	5	HALL C	BLUE	PHASE A
2	Vs (return)	6	BLANK	RED	PHASE B
3	HALL B	7	BLANK	BLACK	PHASE C
4	HALL A	8	BLANK		
ENCODER CONNECTIONS (P2)					
1	+5Vs	4	N/C	7	/B
2	A	5	+5Vs (return)	8	N/C
3	B	6	/A		



Pin #	Color
1	Red
2	Black
3	Brown
4	White
5	Green

22 AWG

Description	Manufacturer	Manufacturer Part #
Connector	Molex	50-57-9408
Terminal		16-02-0087 (chain)
		16-02-0103 (loose)
22 AWG Wire, Red	Belden	32822 0025000
22 AWG Wire, Black	Belden	32822 0105000
22 AWG Wire, Brown	Belden	32822 0015000
22 AWG Wire, White	Belden	32822 0095000
22 AWG Wire, Green	Belden	32822 0055000
Cable Tie		



Pin #	Color
1	Red
2	White
3	Blue
4	Gray
5	Black
6	Orange
7	Brown
8	Green

22 AWG

Description	Manufacturer	Manufacturer Part #
Connector	FCI	65846-016
Terminal	FCI	48051-000 (chain)
		48236-000 (loose)
22 AWG Wire, Red	Belden	32822 0025000
22 AWG Wire, White	Belden	32822 0095000
22 AWG Wire, Blue	Belden	32822 0135000
22 AWG Wire, Gray	Belden	32822 0085000
22 AWG Wire, Black	Belden	32822 0105000
22 AWG Wire, Orange	Belden	32822 0035000
22 AWG Wire, Brown	Belden	32822 0015000
22 AWG Wire, Green	Belden	32822 0055000
Cable Tie		