MOUNTING AND INITIAL STARTUP

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Safety Information

Danger!

Hazardous Voltage! Before making any connection to the motor, disconnect all power to the motor.

Warning: Any electrical or mechanical modification to this equipment without prior written consent of AutomationDirect.com, Inc. will void all warranties, may result in a safety hazard, and may void the $_{c}$CSA$_{US}$ listing.

Warning: To avoid physical injury, keep your hands and clothing away from all moving parts.

Wiring Notes: PLEASE READ PRIOR TO INSTALLATION.

1) *During installation, follow all local electrical, construction, and safety codes for the country in which the motor is to be installed.*
2) *Make sure the appropriate protective devices (circuit breaker or fuses) are connected between the power source and motor controller.*
3) *Make sure that the leads are connected correctly and the motor is properly grounded. (Ground resistance should not exceed 0.1Ω.)*
4) *Use ground leads that comply with AWG/MCM standards and keep them as short as possible.*
5) *Make sure that the power source is capable of supplying the correct voltage and required current to the motor.*
6) *Do not attach or remove wiring when power is applied to the motor.*

Applicable Codes

Small-Frame Motors

All IronHorse small-frame PMDC motors are UL recognized (E365956) and CSA approved. Therefore they comply with the requirements of the National Electrical Code (NEC) and the Canadian Electrical Code (CEC).

Installations intended to meet the UL or CSA requirements must follow the instructions provided in the "Wiring Notes" as a minimum standard. Follow all local codes that exceed UL or CSA requirements. Refer to the technical data on the motor nameplate for electrical and performance data.

IronHorse small-frame PMDC motors are RoHS compliant.

56C-Frame motors

All IronHorse 56C-frame PMDC motors are $_{c}$CSA$_{us}$ listed, and therefore comply with the requirements of the National Electrical Code (NEC) and the Canadian Electrical Code (CEC).

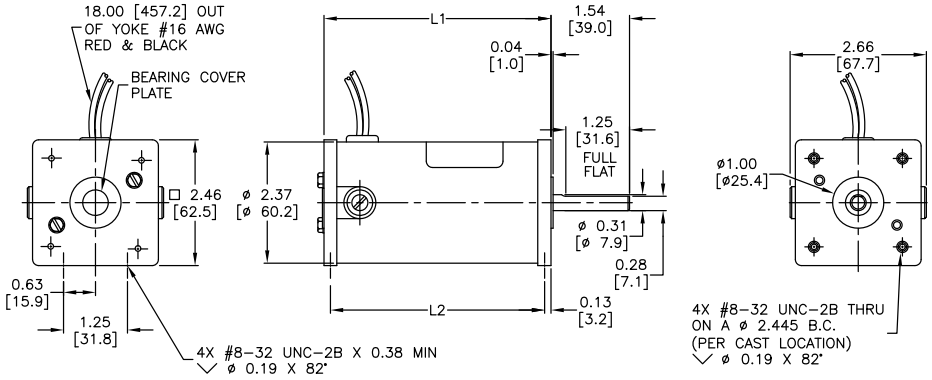
Installations intended to meet the $_{c}$CSA$_{us}$ requirements must follow the instructions provided in the "Wiring Notes" as a minimum standard. Follow all local codes that exceed $_{c}$CSA$_{us}$ requirements. Refer to the technical data on the motor nameplate for electrical and performance data.

IronHorse 56C-frame PMDC motors are CE compliant.

MOTOR DIMENSIONS

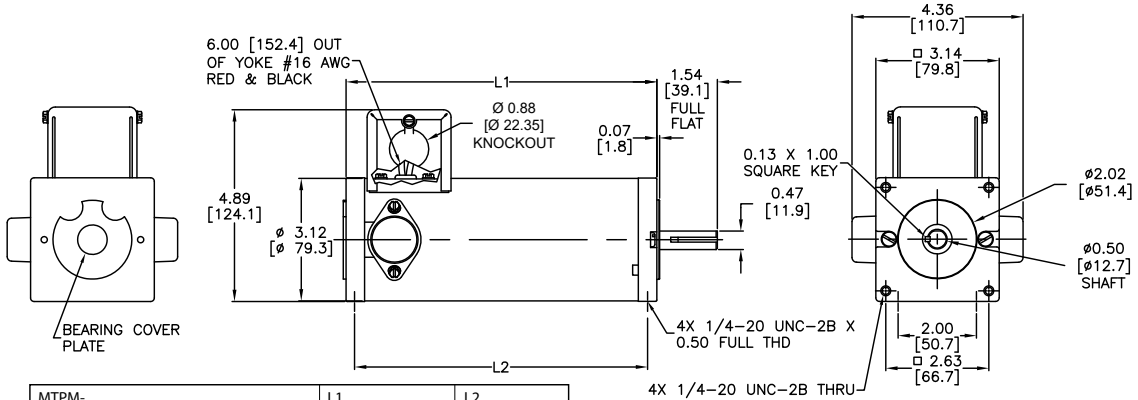
(DIMENSIONS = in [mm])

SMALL-FRAME TENV DC MOTORS WITH 0.3125-INCH SHAFT DIAMETER – DIMENSIONS



MTPM-	L1	L2
P03-1L18, P10-1JK34	4.44 [112.8]	4.19 [106.4]
P04-1L17, P13-1JK42	4.94 [125.5]	4.69 [119.1]

SMALL-FRAME TENV DC MOTORS WITH 0.50-INCH SHAFT DIAMETER – DIMENSIONS

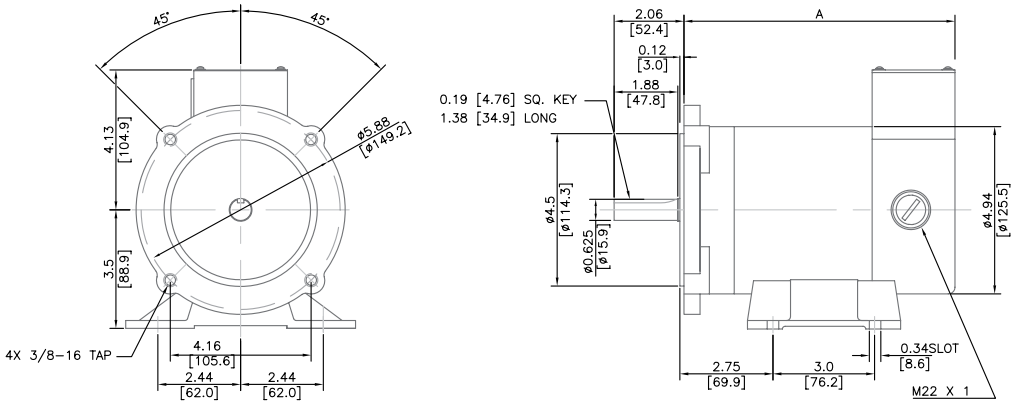


MTPM-	L1	L2
P05-1L19, P07-1M24, P17-JK43	4.92 [125.0]	4.56 [115.8]
P13-1L19, P13-1M19, P25-1JK40	6.92 [175.8]	6.46 [164.1]
P14-1L19, P14-1M18, P25-1JK44	7.92 [201.2]	7.46 [189.5]

Motor Dimensions (continued)

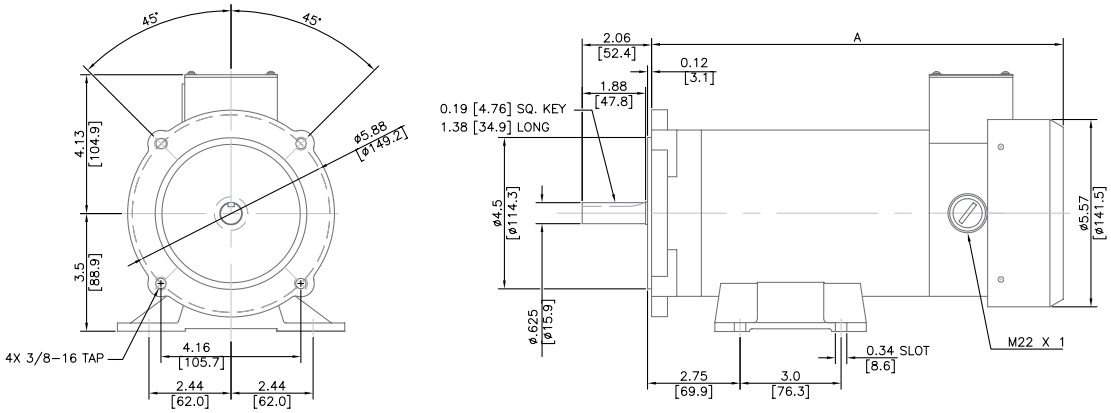
(Dimensions = in [mm])

56C-Frame TENV DC Motor – 0.33 to 0.5 HP – Dimensions



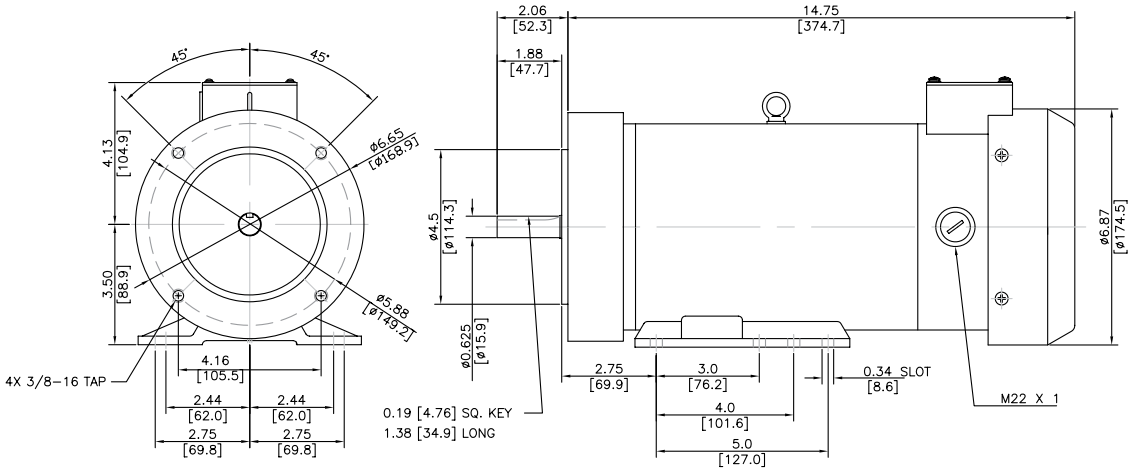
A = 8.0" [203.2] – 0.33 HP, 90VDC, 1800RPM
A = 8.0" [203.2] – 0.33 HP, 180VDC, 1800RPM
A = 8.88" [225.5] – 0.50 HP, 90VDC, 1800RPM
A = 8.88" [225.5] – 0.50 HP, 180VDC, 1800RPM

56C-Frame TEFC DC Motor – 0.75 to 1.5 HP – Dimensions



A = 11.45" [290.8] – .75 HP, 90VDC, 1800RPM
A = 11.45" [290.8] – .75 HP, 180VDC, 1800RPM
A = 12.24" [311.0] – 1 HP, 90VDC, 1800RPM
A = 12.24" [311.0] – 1 HP, 180VDC, 1800RPM
A = 14.39" [365.5] – 1.5 HP, 90VDC, 1800RPM
A = 14.39" [365.5] – 1.5 HP, 180VDC, 1800RPM

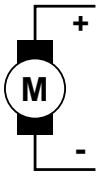
56C-Frame TEFC DC Motor – 2HP – Dimensions

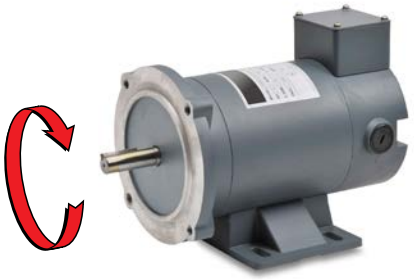


Terminal Diagram and Wiring

DC motors are very easy to wire. There are only two terminals; one for the positive (red) lead and one for the negative (black) lead.

If wired correctly, the motor will turn clockwise when you are facing the motor shaft. If the motor turns counterclockwise, reverse the positive and negative leads.





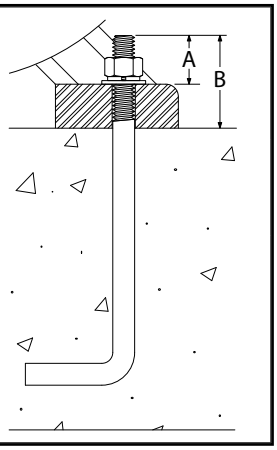
NOTE: These motors do not have connectors for installing encoders or tachometers.

Motor Mounting

IronHorse motors should be properly mounted to prevent premature motor and/or bearing failure. There are no limitations on mounting orientation; that is, the motor can be installed vertically, horizontally, upside down, or at any angle. When necessary, use motor shims to level the motor at all mounting bolt holes. Use proper diameter bolts of the highest grade material available for the application. Use the chart below to select the correct size bolt for each frame size.

A mounted motor must operate vibration free. Each motor installation should be checked for potential vibration situations. Base shims should also be used when necessary for level mounting.

Motor Mounting Bolt Sizes			
Frame Size	***Bolt Diameter***	***Minimum Usable Thread Length (A)***	***Minimum Exposed Anchor Length (B)***
Small Frame	Face mounting only; no mounting feet		
56	5/16 in	0.45 in	0.88 in



STABLE Slide Bases

AutomationDirect offers STABLE slide bases for simple mounting of NEMA standard frame motors. STABLE slide bases are manufactured from heavy-duty steel and allow motor position adjustment when mounting any NEMA framed motor. See Chapter 4 (Accessories) for complete details.

Proper Installation Conditions

Small-Frame motors

IronHorse small-frame motors should be properly mounted to prevent premature motor and/or bearing failure. There are no limitations on mounting orientation; that is, the motor can be installed vertically, horizontally, upside down, or at any angle. Use proper diameter bolts of the highest grade material available for the application, as shown on the dimension diagrams.

A mounted motor must operate vibration free. Each motor installation should be checked for potential vibration situations.

56C-Frame Motors

Care should be taken to make sure that an IronHorse 56C-frame motor is mounted at least thirty inches from a wall or structure that would prevent proper ventilation of the motor. The installation area should be free of dust and smoke particles. Any air contaminate could inhibit proper operation of the motor fan.

If an IronHorse motor is to be installed in a high altitude or in a low temperature location, use the Altitude / Ambient Temperature Derating chart below for proper motor sizing.

Altitude / Ambient Temperature Derating Chart

		Altitude – Meters (Feet) Above Sea Level						
		1000 (3281)	1500 (4921)	2000 (6562)	2500 (8202)	3000 (9842)	3500 (11,483)	4000 (13,123)
Temperature – °C (°F)	10 (50)							1.50
	15 (59)						1.05	0.99
	20 (68)					1.05	0.99	0.93
	25 (77)				1.05	0.98	0.93	0.88
	30 (86)			1.05	0.97	0.92	0.87	0.82
	40 (104)	1.00	0.94	0.89	0.85	0.80	0.76	0.72
	50 (122)	0.85	0.80	0.76	0.72	0.68	0.65	0.62
	60 (140)	0.71	0.67	0.64	0.60	0.57	0.55	0.52

Example: 1hp @ 60 °C and 2000 meters
1 / 0.64 = 1.56 hp
The motor should be a 2hp motor.

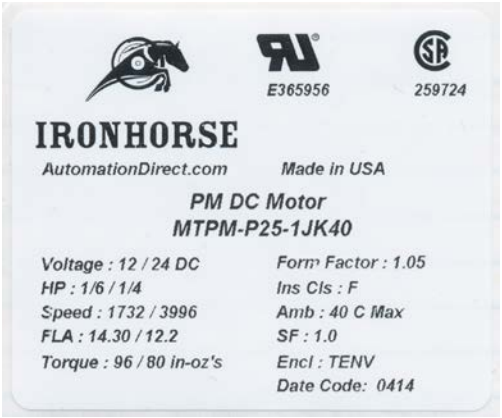
Coupling Alignment

Correct coupling alignment is very important to the life of the motor. Coupling misalignment is the major cause of motor bearing failure. In belt driven applications, pulleys should be installed correctly. Belt tension, alignment and wear should be checked at installation and at regular maintenance intervals. Install motor couplings per the manufacturers instructions. Whenever possible, direct couple or flange mount IronHorse motors in their application. Doing so can greatly extend the bearing life.

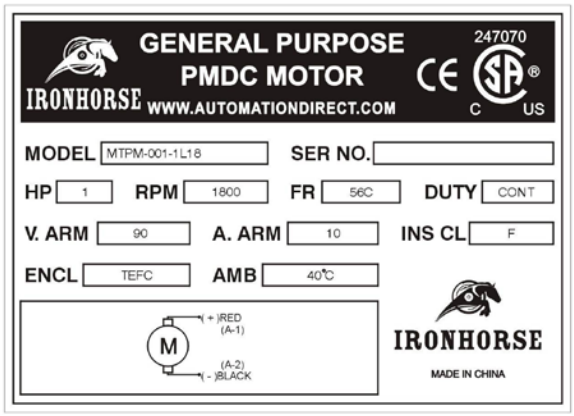
Motor Nameplate and Starter Information

Typical IronHorse Motor Nameplate

Small-Frame Motor Nameplate



56C-Frame Motor Nameplate



Motor Control Information

Starting System Information					
Frame Size	***Number of Internal Leads***	***Internal Lead Size***	***Internal Lead Length***	***Voltage***	***DC Motor Type***
Small-Frame	2	16 AWG	6 in (with junction box) 18 (without junction box)	12–24/90/180 VDC	Permanent Magnet
56C (1Ø)	2	16 AWG	6 in	90/180 VDC	

Inspection Before Startup

1) *Turn the shaft by hand and make sure the shaft turns freely. Listen for any unusual noises and feel for any interruption in the shaft as it turns.*
2) *Perform a final check on the installation of all parts in the assembly. Check the motor mounting bolts, coupling, belt drive, C-face mount, alignment, etc.*
3) *Verify all electrical connections for the motor and drive. Make sure all terminal screws are tightened properly.*
4) *Make sure that all electrical components used in the installation are rated for the locked rotor amperage.*
5) *Make sure the motor is properly grounded. Use the grounding lug provided in the motor terminal box.*

Initial Startup Inspection

1) *At initial startup monitor the start-up voltage and the running voltage of the motor. The full load voltage should never exceed the line voltage on the motor nameplate multiplied by the service factor of the motor.*
   Example: 180 VDC x 1.00 = 180 VDC.
2) *Check the full load running amperage of the motor. The full load running amperage should not be more than the amount indicated on the motor nameplate*
3) *Listen for any unusual noises at motor start-up and in the first hour of operation. Listen for any unusual bearing noise in the drive end and opposite drive end of the motor. Abnormal bearing noise can be an indication of a defective bearing. Ironhorse PMDC motors have sealed bearings.*

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