

# AutomationDirect AC Motors Selection Overview

## General purpose or inverter-duty motor?

### How to choose a general purpose motor vs. an inverter-duty motor

General purpose motors have been around for many years. They are the workhorse of almost every industry. An inverter-duty motor is a much newer concept that was necessary as general purpose motors began to be driven by VFDs (inverters or AC drives). An inverter duty motor can withstand the higher voltage spikes produced by all VFDs (amplified at longer cable lengths) and can run at very slow speeds without overheating. This performance comes at a cost: inverter-duty motors can be much more expensive than general purpose motors. Guidelines for choosing an IronHorse general purpose motor vs. an inverter-duty motor are given below. If your application falls within the guidelines below, there is no need to apply an inverter-duty motor.

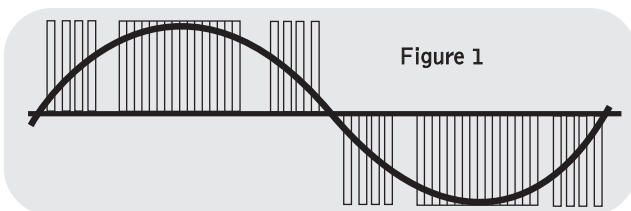
NOTE: Marathon inverter-duty motors have limitations as well. Please see the Marathon section for more details.

**Background:** For many years, AC motors were driven by across-the-line contactors and starters. The electricity sent to the motor was a very clean sine wave at 60Hz. Noise and voltage peaks were relatively small. **However, there were drawbacks:** they only ran electrically at one speed (speed reduction was usually handled by gearboxes or some other, usually inefficient, mechanical means) and they had an inrush of electrical current (when the motor was first turned on) that was usually 5 to 6 times the normal current that the motor would consume. The speed reduction apparatus was expensive and bulky, and the inrush would wreak havoc with power systems and loading (imagine an air conditioning system in an old house - when the compressor would kick on, the lights would dim; now imagine the same circumstances with a motor the size of a small car).

**Note:** The following discussion applies only to 3-phase motors.

### Enter the VFDs (variable frequency drives):

Drives were introduced to allow the speed of these motors to be changed while running and to lessen the inrush current when the drive first starts up. To do this, the drive takes the incoming 60Hz AC power and rectifies it to a DC voltage (every drive has a DC bus that is around  $1.414 \times \text{incoming AC Line Voltage}$ ).

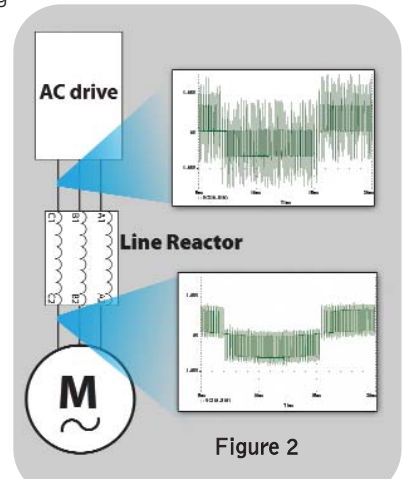


This DC voltage is then “chopped” by power transistors at very high frequencies to simulate a sine wave that is sent to the motor [see Figure 1]. By converting the incoming power to DC and then reconvert it to AC, the drive can vary its output voltage and output frequency, thus varying the speed of a motor. Everything sounds great, right? We get to control the frequency and voltage going out to the motor, thus controlling its speed.

**Some things to watch out for:** A VFD-driven general purpose motor can overheat if it is run too slowly. (Motors can get hot if they’re run slower than their rated speed.) Since most general purpose motors cool themselves with shaft-mounted fans, if the motor overheats, bearing and insulation life will be reduced. Therefore there are minimum speed requirements for all motors.

The voltage “chopping” that occurs in the drive actually sends high-voltage spikes (at the DC bus level) down the wire to the motor. If the system contains long

cabling, there are actually instances where a reflected wave occurs at the motor. The reflected wave can effectively double the voltage on the wire. This can lead to premature failure of the motor insulation. Long cable lengths drive increase the harmful effects of the reflected wave, as do high chopping frequencies (listed in drive manuals as carrier frequencies). Line reactors, 1:1 transformers placed at the



output of the drive, can help reduce the voltage spikes going from the drive to the motor. Line reactors are used in many instances when the motor is located far from the drive [see Figure 2].

In summary, general purpose motors can be run with drives in many applications; however inverter-duty motors are designed to handle much lower speeds without overheating and they are capable of withstanding higher voltage spikes without their insulation failing. With the increased performance comes an increase in cost. This additional cost can be worth it if you need greater performance.

The considerations for applying IronHorse motors are given below.

Heat considerations		
	IronHorse speed ratio	For an 1800 RPM motor, minimum IronHorse speed is:
Variable Torque applications (fans, centrifugal pumps, etc.)	5:1	1800/5 = 360RPM
Constant Torque Applications (conveyors, extruders, etc.)	2:1	1800/2 = 900RPM
Voltage Spike considerations		
	Max cable distance from drive to IronHorse motor	Max cable distance with a 3% line reactor between drive and IronHorse motor
For use with 230V and 460V VFDs*	125'	250'

\* Up to 6kHz carrier frequency

# AC Motor Selection – Three-phase Motors

(Single-phase motors are shown on page 15-13)

3-Phase Characteristic	IronHorse™ 56C Frame 3-Phase	IronHorse™ T & TC Frames	Marathon microMAX™	Marathon Black Max®	Marathon Blue Max®	Marathon NEMA Premium® XRI®	Marathon Blue Chip XRI®
<b>Electrical Characteristics</b>							
<b>Horsepower range</b>	1/3 - 2	1 - 300 (T); 1 - 100 (TC)	1/4 - 10	1/4 - 30	40 - 100	1 - 10	15 - 100
<b>Base speed (# Poles)</b>	1800 (4), 3600 (2)	1200(6), 1800 (4), 3600(2)	1800 (4)	1800 (4) and 1200 (6)	1800 (4)	1200(6),1800(4),3600(2)	1800 (4)
<b>Standard Voltage</b>	208-230/460	208-230/460 (250 & 300 hp 460V only)	230/460 (1/4 hp is 230V only)	230/460 and 575	230/460	208-230/460	230/460 and 575
<b>Insulation Class</b>	F	F	H	F	H	F	F
<b>Insulation System</b>	dip & bake	double dip & bake	CR <sup>200</sup> magnet wire	MAX GUARD®		CR <sup>200</sup> magnet wire	
<b>Service Factor</b>	1.15 (line) 1.0 (drive)	1.15 (line) 1.0 (drive)	1.0	1.0	1.0	1.15 (line) 1.0 (drive)	1.15
<b>Phase/Base Frequency</b>	3/60						
<b>Design Code (NEMA)</b>	B	A: 10-50 hp 4&6 pole B: all other sizes	A and B for 1/4 - 2 hp	A	A	B	B
<b>Duty Cycle</b>	Continuous						
<b>Thermal protection</b>	None			Class F thermostats		None	
<b>Mechanical Characteristics</b>							
<b>Frame size (mounting)</b>	56C	143T/TC - 405TC/449T	56C - 215TC	56C - 286TC	324T(C)-405T(C)	56C - 215TC	254T - 405T
<b>Enclosure</b>	TEFC	TEFC	TENV and TEFC	TENV	TEFC and TEBC	TEFC	TEFC
<b>Frame material</b>	Rolled Steel frame; Aluminum end bell	Cast Iron	Rolled Steel	Rolled Steel w Al face; Cast Iron	Cast Iron	Rolled Steel	Cast Iron
<b>End bracket material</b>	Aluminum	Cast Iron	Aluminum	Aluminum, Cast Iron	Cast Iron	Aluminum	Cast Iron
<b>Conduit box material</b>	Steel	Cast Iron	Steel	Steel	Cast Iron	Steel	Steel (<326T) Cast Iron (>324T)
<b>Fan guard material</b>	Steel	Steel	Polypropylene	None (all ratings TENV)	Cast Iron	Plastic	Polyprop. (<286T) Cast Iron (>324T)
<b>Fan material</b>	Plastic	Plastic (143T/TC - 445/7T) Aluminum (449T)	Polypropylene	None (all ratings TENV)	Polypropylene	Plastic	Polypropylene
<b>Lead termination</b>	Conduit box	Conduit box	Conduit box except Terminal block - 1/4 hp	Conduit box	Conduit box	Conduit box	Conduit box
<b>Standard mounting</b>	C-Face with Removable Rigid Base	Rigid Base (C-Flange kit available) C-Face with Rigid Base (1-100 hp)	C-Face with Rigid Base & C-Face Round Body	C-Face with Rigid Base	C-Face with Rigid Base	C-Face with Rigid Base	Rigid Base
<b>Drive end shaft slinger</b>	Yes	Yes	No	No	Yes	Yes	Yes
<b>Paint</b>	Black	Epoxy primer / Synthetic alkyd enamel	Black powder-coat	Black enamel	Blue enamel	Blue enamel	epoxy paint
<b>Bearings</b>	Ball	1-75 hp: Ball 100-300 hp: Roller	Ball (C3 fit)	Ball (C3 fit)	Ball (C3 fit)	Ball	Ball (C3 fit)
<b>Grease</b>	Exxon Polyrex EM						
<b>Standard conduit box assembly position</b>	F1	F1 some sizes reversible to F2	F3	F1, reversible to F2	F1, reversible to F2	F3	F1
<b>Performance Characteristics</b>							
<b>Constant Torque speed range</b>	2:1	2:1	20:1 (TEFC) 1000:1 (TENV)	1000:1 (TENV)	2000:1 (all enclosures)	10:1	20:1
<b>Variable Torque speed range</b>	5:1	5:1	-	-	-	10:1	-
<b>Constant Horsepower speed range</b>	1.5:1	1.5:1	2:1	2:1 (90-120Hz intermit- tent @50% duty cycle)	2:1	2:1	2:1
<b>Temperature rise</b>	B	B	B	F	F (TEFC) and B (TEBC)	F	B
<b>Encoder provisions</b>	No	No	No	Yes	Yes	No	No
<b>Other Characteristics</b>							
<b>Agency listings</b>	cCSA <sub>US</sub>	CE, cCSA <sub>US</sub> , EPACT	UL Recognized and CSA Certified				
<b>Warranty*</b>	2 years			3 years (through Marathon Electric)			

\*See Terms and Conditions for motor warranty explanation.

1) For warranty on IronHorse motors below 50 hp, warranty service can be arranged through AutomationDirect.

2) For warranty on IronHorse motors 50 hp and above, motors must be inspected by a local EASA motor repair or service center; see AutomationDirect Terms & Conditions.

3) Marathon warranty service can be arranged through Marathon Electric service centers. See list of service centers on our web site at [www.automationdirect.com](http://www.automationdirect.com).

# IronHorse Cast Iron AC Motors

T Frame TEFC Motors – Three-phase Industrial Duty – 1 to 300 hp

TC Frame (C-face) TEFC Motors – Three-phase Industrial Duty – 1 to 100 hp



*Three-phase  
Cast Iron T-Frame*



*Three-phase  
Cast Iron TC-Frame*

## Features

- Totally Enclosed Fan Cooled (TEFC) enclosure
- NEMA TC-frame (C-face) and T-frame motors
- C-flange kits available for T-frame motors
- Cast iron frame with ribbed design for maximum cooling
- Solid full frame length cast iron mounting feet
- Steel fan cover
- Cast iron junction box with rubber gasket and rubber dust cover
- NSK/SKF brand premium quality ball or roller bearings
- Maintenance free bearings (10 hp and below)
- V-ring shaft seals on drive end and on opposite drive end
- Electrically reversible
- Class F winding insulation
- Service Factor: 1.15 (1.0 with AC drive)
- High efficiency  $\eta_{CSA_{US}}$  certified, ISO9001, CE, EPACK certified
- Inverter ratings: 5:1 (variable torque); 2:1 (constant torque)
- Two year warranty

## Applications

- Fans
- Conveyors
- Pumps
- Material Handling
- Metal Processing
- Textile Processing
- Test Stands

# IronHorse Cast Iron AC Motors

T Frame TEFC Motors – Three-phase Industrial Duty – 1 to 300 hp

TC Frame (C-face) TEFC Motors – Three-phase Industrial Duty – 1 to 100 hp

Motor Specifications – T & TC <sup>(1)</sup> Frame Three-phase Motors – 1200, 1800, 3600 rpm												
Part Number	Price	HP	Base RPM	Phase	Voltage	Housing	NEMA Frame	Mounting <sup>(2)</sup>	Holes / Foot	Service Factor	F.L. Amps @230V/460V	Approx Shipping Weight (lb)
MTC-001-3BD12	<--->	1	1200	3	208-230/460	TEFC cast iron	145T	F1(F2)	4	1.15	3.2 / 1.6	65
MTC-001-3BD18	<--->		1800				143T	F1(F2)	2		3.0 / 1.5	55
MTC-001-3BD18CK <sup>(1)</sup>	<--->		143TC				F1(F2)	2	3.0 / 1.5		61	
MTC-1P5-3BD12 <sup>(3)</sup>	<--->	1.5	1200				182T	F1(F2)	2		4.8 / 2.4	100 <sup>(3)</sup>
MTC-1P5-3BD18	<--->		1800				145T	F1(F2)	4		4.2 / 2.1	55
MTC-1P5-3BD18CK <sup>(1)</sup>	<--->		145TC				F1(F2)	4	4.2 / 2.1		67	
MTC-1P5-3BD36	<--->	3600	143T				F1(F2)	2	3.8 / 1.9		50	
MTC-002-3BD12 <sup>(3)</sup>	<--->	2	1200				184T	F1(F2)	4		6.1 / 3.1	105 <sup>(3)</sup>
MTC-002-3BD18	<--->		1800				145T	F1(F2)	4		5.4 / 2.7	60
MTC-002-3BD18CK <sup>(1)</sup>	<--->		145TC				F1(F2)	4	5.4 / 2.7		69	
MTC-002-3BD36	<--->	3600	145T				F1(F2)	4	5.0 / 2.5		60	
MTC-003-3BD12 <sup>(3)</sup>	<--->	3	1200				213T	F1(F2)	2		8.4 / 4.2	155 <sup>(3)</sup>
MTC-003-3BD18	<--->		1800				182T	F1(F2)	2		7.72 / 3.86	90
MTC-003-3BD18CK <sup>(1)(3)</sup>	<--->		182TC				F1(F2)	2	7.72 / 3.86		112 <sup>(3)</sup>	
MTC-003-3BD36 <sup>(3)</sup>	<--->	3600	182T				F1(F2)	2	7.2 / 3.6		100 <sup>(3)</sup>	
MTC-005-3BD12 <sup>(3)</sup>	<--->	5	1200				215T	F1(F2)	4		13.6 / 6.8	175 <sup>(3)</sup>
MTC-005-3BD18 <sup>(3)</sup>	<--->		1800				184T	F1(F2)	4		11.8 / 5.9	110 <sup>(3)</sup>
MTC-005-3BD18CK <sup>(1)(3)</sup>	<--->		184TC				F1(F2)	4	11.8 / 5.9		125 <sup>(3)</sup>	
MTC-005-3BD36 <sup>(3)</sup>	<--->	3600	184T				F1(F2)	4	11.3 / 5.7		110 <sup>(3)</sup>	
MTC-7P5-3BD12 <sup>(3)</sup>	<--->	7.5	1200				254T	F1(F2)	2		21.2 / 10.6	300 <sup>(3)</sup>
MTC-7P5-3BD18 <sup>(3)</sup>	<--->		1800				213T	F1(F2)	2		18.6 / 9.3	150 <sup>(3)</sup>
MTC-7P5-3BD18CK <sup>(1)(3)</sup>	<--->		213TC				F1(F2)	2	18.6 / 9.3		170 <sup>(3)</sup>	
MTC-7P5-3BD36 <sup>(3)</sup>	<--->	3600	213T				F1(F2)	2	16.8 / 8.4		148 <sup>(3)</sup>	
MTC-010-3BD12 <sup>(3)</sup>	<--->	10	1200				256T	F1(F2)	4		28.0 / 14.0	340 <sup>(3)</sup>
MTC-010-3BD18 <sup>(3)</sup>	<--->		1800				215T	F1(F2)	4		24.8 / 12.4	179 <sup>(3)</sup>
MTC-010-3BD18CK <sup>(1)(3)</sup>	<--->		215TC				F1(F2)	4	24.8 / 12.4		198 <sup>(3)</sup>	
MTC-010-3BD36 <sup>(3)</sup>	<--->	3600	215T				F1(F2)	4	22.4 / 11.2		181 <sup>(3)</sup>	
MTC-015-3BD18 <sup>(3)</sup>	<--->	15	1800				254T	F1(F2)	2		35.4 / 17.7	290 <sup>(3)</sup>
MTC-015-3BD18CK <sup>(1)(3)</sup>	<--->						254TC	F1(F2)	2		35.4 / 17.7	310 <sup>(3)</sup>
MTC-020-3BD18 <sup>(3)</sup>	<--->	20	1800				256T	F1(F2)	4		47.6 / 23.8	326 <sup>(3)</sup>
MTC-020-3BD18CK <sup>(1)(3)</sup>	<--->			256TC	F1(F2)	4	47.6 / 23.8	360 <sup>(3)</sup>				
MTC-025-3BD18 <sup>(3)</sup>	<--->	25	1800	284T	F1	2	56.4 / 28.2	400 <sup>(3)</sup>				
MTC-025-3BD18CK <sup>(1)(3)</sup>	<--->			284TC	F1	2	56.4 / 28.2	440 <sup>(3)</sup>				

1) TC-frame motors are T-frame motors with applicable C-face accessory kits installed.

2) F1(F2) indicates F1 conduit box mounting location, field convertible to F2 (as shown on dimensional diagram).

Notes 3 & 4: Please review the AutomationDirect Terms & Conditions for warranty and service on this product.

3) For motors weighing over 100 lbs: A) LTL shipment required. B) Order before 5:00 p.m. EST for same day shipment. C) You must have a receiving loading dock. D) Not available in Hawaii or Puerto Rico.

4) For warranty on motors 50 hp and above, motors must be inspected by an EASA motor repair or service center. See AutomationDirect Terms & Conditions for details.

\*\*\*\*\* TABLE CONTINUED NEXT PAGE FOR 30-300 HP MOTORS \*\*\*\*\*

# IronHorse Cast Iron AC Motors

T Frame TEFC Motors – Three-phase Industrial Duty – 1 to 300 hp

TC Frame (C-face) TEFC Motors – Three-phase Industrial Duty – 1 to 100 hp

\*\*\*\* TABLE CONTINUED FROM PREVIOUS PAGE FOR 1–25 HP MOTORS \*\*\*\*

Motor Specifications – T & TC <sup>(1)</sup> Frame Three-phase Motors – 1800 rpm												
Part Number	Price	HP	Base RPM	Phase	Voltage	Housing	NEMA Frame	Mounting <sup>(2)</sup>	Holes / Foot	Service Factor	F.L. Amps @230V/460V	Approx Shipping Weight (lb)
<b>MTC-030-3BD18</b> <sup>(3)</sup>	<--->	30	1800	3	208-230/460	TEFC cast iron	286T	F1	4	1.15	67.2 / 33.6	451 <sup>(3)</sup>
<b>MTC-030-3BD18CK</b> <sup>(1)(3)</sup>	<--->						286TC					470 <sup>(3)</sup>
<b>MTC-040-3BD18</b> <sup>(3)</sup>	<--->	40					324T	F1	2		93.0 / 46.5	589 <sup>(3)</sup>
<b>MTC-040-3BD18CK</b> <sup>(1)(3)</sup>	<--->						324TC					608 <sup>(3)</sup>
<b>MTC-050-3BD18</b> <sup>(3)(4)</sup>	<--->	50 <sup>(4)</sup>					326T	F1	4		114.6 / 57.3	640 <sup>(3)</sup>
<b>MTC-050-3BD18CK</b> <sup>(1)(3)(4)</sup>	<--->						326TC					652 <sup>(3)</sup>
<b>MTC-060-3BD18</b> <sup>(3)(4)</sup>	<--->	60 <sup>(4)</sup>					364T	F1	2		139.4 / 69.7	760 <sup>(3)</sup>
<b>MTC-060-3BD18CK</b> <sup>(1)(3)(4)</sup>	<--->						364TC					777 <sup>(3)</sup>
<b>MTC-075-3BD18</b> <sup>(3)(4)</sup>	<--->	75 <sup>(4)</sup>					365T	F1	4		172.8 / 86.4	803 <sup>(3)</sup>
<b>MTC-075-3BD18CK</b> <sup>(1)(3)(4)</sup>	<--->						365TC					837 <sup>(3)</sup>
<b>MTC-100-3BD18</b> <sup>(3)(4)</sup>	<--->	100 <sup>(4)</sup>					405T	F1	4		230 / 115	1300 <sup>(3)</sup>
<b>MTC-100-3BD18CK</b> <sup>(1)(3)(4)</sup>	<--->						405TC					1335 <sup>(3)</sup>
<b>MTC-125-3BD18</b> <sup>(3)(4)</sup>	<--->	125 <sup>(4)</sup>					444T	F1(F2)	2		274 / 137	1433 <sup>(3)</sup>
<b>MTC-150-3BD18</b> <sup>(3)(4)</sup>	<--->	150 <sup>(4)</sup>					445T	F1(F2)	4		326 / 163	1575 <sup>(3)</sup>
<b>MTC-200-3BD18</b> <sup>(3)(4)</sup>	<--->	200 <sup>(4)</sup>			445/7T		F1(F2)	4	446 / 223		1858 <sup>(3)</sup>	
<b>MTC-250-3D18</b> <sup>(3)(4)</sup>	<--->	250 <sup>(4)</sup>			460		449T	F1	2		- / 282	2508 <sup>(3)</sup>
<b>MTC-300-3D18</b> <sup>(3)(4)</sup>	<--->	300 <sup>(4)</sup>					449T				- / 334	2728 <sup>(3)</sup>

1) TC-frame motors are T-frame motors with applicable C-face accessory kits installed.

2) F1(F2) indicates F1 conduit box mounting location, field convertible to F2 (as shown on dimensional diagram).

Notes 3 & 4: Please review the AutomationDirect Terms & Conditions for warranty and service on this product.

3) For motors weighing over 100 lbs: A) LTL shipment required. B) Order before 5:00 p.m. EST for same day shipment. C) You must have a receiving loading dock.

D) Not available in Hawaii or Puerto Rico

4) For warranty on motors 50 hp and above, motors must be inspected by an EASA motor repair or service center. See AutomationDirect Terms & Conditions for details.

# IronHorse Cast Iron AC Motors

T Frame TEFC Motors – Three-phase Industrial Duty – 1 to 300 hp

TC Frame (C-face) TEFC Motors – Three-phase Industrial Duty – 1 to 100 hp

Performance Data – T & TC <sup>(1)</sup> Frame Three-phase Motors (460 Volt except as indicated) – 1200, 1800, 3600 rpm																	
Part Number	HP	NEMA Design	FL RPM	Minimum Speed (rpm)			Current @ 230V/460V (Amps)			Torque (lb-ft)			Maximum Speed (rpm)		FL Efficiency (%)	F.L. Power Factor	Rotor Inertia (lb-ft <sup>2</sup> )
				CT	VT	No Load	Full Load	Locked Rotor	Full Load	Locked Rotor	Break-down	CHP(2)	Safe				
<b>MTC-001-3BD12</b>	1		1150	600	240	3.2 / 1.6	3.2 / 1.6	25.0 / 12.5	4.59	11.47	14.69	1800	3600	81.1	0.72	0.009	
<b>MTC-001-3BD18(CK)</b>			1760	900	360	2.2 / 1.1	3.0 / 1.5	30.0 / 15.0	3.00	7.50	10.50	2700	5400	82.5	0.71	0.068	
<b>MTC-1P5-3BD12</b>			1170	600	240	3.5 / 1.8	4.8 / 2.4	40.0 / 20.0	6.60	18.5	24.4	1800	3600	85.5	0.65	0.068	
<b>MTC-1P5-3BD18(CK)</b>	1.5		1755	900	360	2.6 / 1.3	4.2 / 2.1	40.0 / 20.0	4.59	11.0	14.68	2700	5400	84.0	0.74	0.083	
<b>MTC-1P5-3BD36</b>			3480	1800	720	1.4 / 0.7	3.8 / 1.9	40.0 / 20.0	2.23	4.01	5.58	5400	5400	82.5	0.86	0.009	
<b>MTC-002-3BD12</b>	2		1170	600	240	4.0 / 2.0	6.1 / 3.1	50.0 / 25.0	9.02	24.4	30.7	1800	3600	86.5	0.70	0.100	
<b>MTC-002-3BD18(CK)</b>			1750	900	360	3.0 / 1.5	5.4 / 2.7	50.0 / 25.0	6.05	13.9	17.55	2700	5400	84.0	0.77	0.09	
<b>MTC-002-3BD36</b>			3480	1800	720	1.5 / 0.8	5.0 / 2.5	50.0 / 25.0	3.03	6.06	8.18	5400	5400	84.0	0.87	0.010	
<b>MTC-003-3BD12</b>	3	B	1180	600	240	4.7 / 2.4	8.4 / 4.2	64.0 / 32.0	13.4	22.8	37.5	1800	3600	87.5	0.72	0.207	
<b>MTC-003-3BD18(CK)</b>			1750	900	360	4.4 / 2.2	7.72 / 3.86	64.0 / 32.0	9.07	25.4	29.93	2700	5400	87.5	0.81	0.22	
<b>MTC-003-3BD36</b>			3520	1800	720	2.8 / 1.4	7.2 / 3.6	64.0 / 32.0	4.50	10.4	16.2	5400	5400	85.5	0.86	0.034	
<b>MTC-005-3BD12</b>	5		1180	600	240	7.3 / 3.7	13.6 / 6.8	92.0 / 46.0	22.2	37.7	53.3	1800	3600	87.5	0.72	0.258	
<b>MTC-005-3BD18(CK)</b>			1750	900	360	5.1 / 2.6	11.8 / 5.9	92.0 / 46.0	15.1	40.8	46.8	2700	5400	87.5	0.83	0.285	
<b>MTC-005-3BD36</b>			3510	1800	720	4.0 / 2.0	11.3 / 5.7	92.0 / 46.0	7.46	15.7	26.5	5400	5400	87.5	0.88	0.040	
<b>MTC-7P5-3BD12</b>	7.5		1180	600	240	12.6 / 6.3	21.2 / 10.6	127 / 63.5	32.9	75.7	98.7	1800	3600	89.5	0.71	0.480	
<b>MTC-7P5-3BD18(CK)</b>			1760	900	360	9.2 / 4.6	18.6 / 9.3	127 / 63.5	22.0	44.0	72.6	2700	5400	89.5	0.81	0.602	
<b>MTC-7P5-3BD36</b>			3520	1800	720	5.0 / 2.5	16.8 / 8.4	127 / 63.5	11.0	22.0	36.3	5400	5400	88.5	0.89	0.258	
<b>MTC-010-3BD12</b>	10	A	1180	600	240	7.6 / 3.8	28.0 / 14.0	168 / 84.0	44.8	98.6	139	1800	3600	89.5	0.74	2.487	
<b>MTC-010-3BD18(CK)</b>			1760	900	360	13.0 / 6.5	24.8 / 12.4	200 / 100	29.8	59.6	92.4	2700	4200	89.5	0.83	0.742	
<b>MTC-010-3BD36</b>		B	3530	1800	720	5.7 / 2.8	22.4 / 11.2	162 / 81.0	15.0	33.0	49.5	5400	5400	89.5	0.89	0.109	
<b>MTC-015-3BD18(CK)</b>	15		1770			15.6 / 7.8	35.4 / 17.7	280 / 140	44.5	89.0	124.6			91.0	0.83	1.71	
<b>MTC-020-3BD18(CK)</b>	20		1770			19.0 / 9.5	47.6 / 23.8	400 / 200	59.7	119	155.2			91.0	0.84	2.18	
<b>MTC-025-3BD18(CK)</b>	25		1775			24.0 / 12.0	56.4 / 28.2	440 / 220	73.9	152	206.9			92.4	0.87	3.3	
<b>MTC-030-3BD18(CK)</b>	30		1775			27.0 / 13.5	67.2 / 33.6	520 / 260	88.7	177	257.2			92.4	0.86	3.76	
<b>MTC-040-3BD18(CK)</b>	40		1775			35.0 / 17.5	93.0 / 46.5	720 / 360	118	248	354.9			93.0	0.86	5.84	
<b>MTC-050-3BD18(CK)</b>	50		1775			38.6 / 19.3	114.6 / 57.3	880 / 440	148	311	444			93.0	0.86	6.34	
<b>MTC-060-3BD18(CK)</b>	60		1785		900	39.8 / 19.9	139.4 / 69.7	870 / 435	178	320	481	2700	4200	93.6	0.85	11.4	
<b>MTC-075-3BD18(CK)</b>	75		1785		360	55.2 / 27.6	172.8 / 86.4	1086 / 543	221	398	530			94.1	0.84	12.7	
<b>MTC-100-3BD18(CK)</b>	100		1785			66.0 / 33.0	230 / 115	1450 / 725	296	592	858			94.5	0.87	28.5	
<b>MTC-125-3BD18</b>	125		1785			70.0 / 35.0	274 / 137	1815 / 908	355	604	888			94.5	0.86	38.9	
<b>MTC-150-3BD18</b>	150		1785			92.2 / 46.1	326 / 163	2170 / 1085	433	779	1083			95.0	0.87	47.2	
<b>MTC-200-3BD18</b>	200		1785			113.6 / 56.8	446 / 223	2900 / 1450	590	1180	1652			95.0	0.87	62.3	
<b>MTC-250-3D18</b>	250		1790			- / 85.6	- / 282	- / 1980	728	1660	2402			95.9	0.87	86.000	
<b>MTC-300-3D18</b>	300		1790			- / 96.6	- / 334	- / 2351	864	1953	2817			95.7	0.88	105.000	

1) TC-frame motors (MTC-xxx-xxxxCK) are T-frame motors with applicable C-face accessory kits installed.

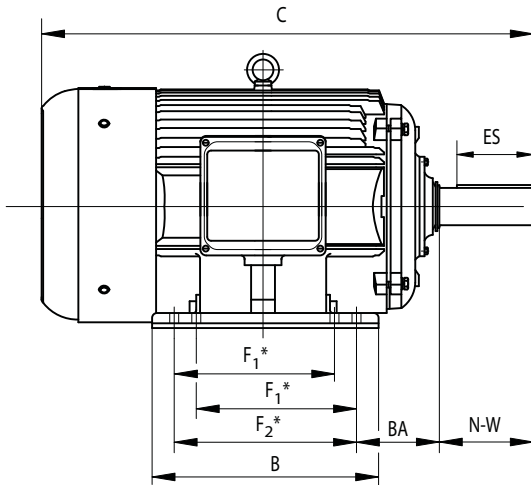
2) Maximum Constant HP RPM is for direct coupled loads.

# IronHorse Cast Iron AC Motors

## T & TC Frame TEFC Motors – Three-phase Industrial Duty – Dimensions

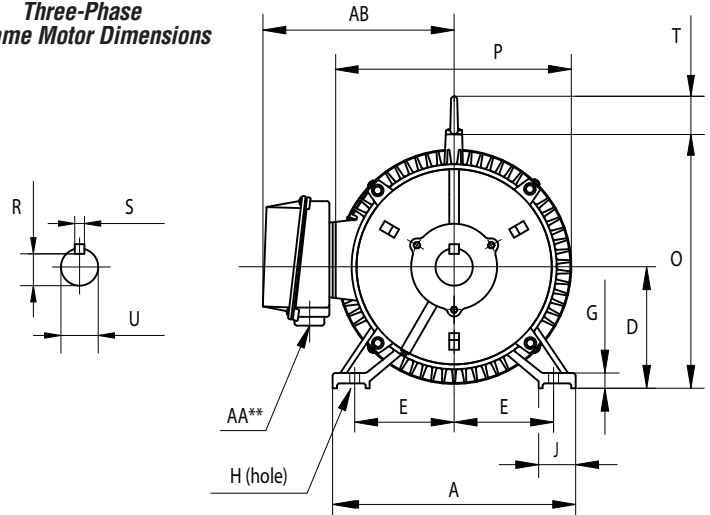


**NOTE:** C-FACE DIMENSIONS FOR TC FRAME MOTORS (MTC-xxx-xxxxCK) ARE SHOWN ON THE ACCESSORIES PAGE WITH C-FLANGE ACCESSORY KIT DIMENSIONS. TC-FRAME MOTORS ARE T-FRAME MOTORS WITH C-FLANGE ACCESSORY KITS INSTALLED.



\* Various frame sizes have 2 or 4 mounting holes per mounting foot (one mounting foot per side).

**Three-Phase T Frame Motor Dimensions**



\*\* F1 mounting shown.  
\*\* Some frame sizes are F1/F2 convertible.

**Dimensions [inches, except as noted] – Three-phase T Frame Motors – 1200, 1800, 3600 rpm**

Part Number	HP	NEMA Frame	A	AA**	AB	B	BA	C	D	E	ES	F <sub>1</sub> *	F <sub>2</sub> *	G	H	J	N-W	O	P	R	S	T	U													
MTC-001-3BD12	1	145T	7	3/4" NPT	6.89	6	2.25	13.58	3.5	2.75	1.41	4	5	0.512	0.34	1.45	2.25	7.08	7.16	0.771	0.188	0.88	0.875													
MTC-001-3BD18		143T				5		12.57				n/a	4																							
MTC-1P5-3BD12	1-1/2	182T	9	1" NPT	7.45	6.5	2.75	15.11	4.5	3.75	1.78	n/a	4.5	0.59	0.41	1.97	2.75	8.97	8.82	0.986	0.25	1.42	1.125													
MTC-1P5-3BD18		145T				6		13.58				4	5																							
MTC-1P5-3BD36		143T				5		12.57				n/a	4																							
MTC-002-3BD12	2	184T	9	1" NPT	7.45	7.5	2.75	16.11	4.5	3.75	1.78	4.5	5.5	0.59	0.41	1.97	2.75	8.97	8.82	0.986	0.25	1.42	1.125													
MTC-002-3BD18		145T				6		13.58				4	5											n/a												
MTC-002-3BD36		143T				5		12.57				n/a	4											0.88												
MTC-003-3BD12	3	213T	10.5	1" NPT	8.63	7.5	3.5	18.89	5.25	4.25	2.41	n/a	5.5	0.709	0.41	2.36	3.38	10.53	10.4	1.201	0.312	1.73	1.375													
MTC-003-3BD18		182T				6.5		15.11				4.5	3.75											1.78	n/a	4.5	0.59	0.41	1.97	2.75	8.97	8.82	0.986	0.25	1.42	1.125
MTC-003-3BD36		184T				7.5		16.11				4.5	3.75											1.78	4.5	5.5	0.59	0.41	1.97	2.75	8.97	8.82	0.986	0.25	1.42	1.125
MTC-005-3BD12	5	215T	10.5	1" NPT	8.63	9	3.5	20.49	5.25	4.25	2.41	5.5	7	0.709	0.41	2.36	3.38	10.53	10.4	1.201	0.312	1.73	1.375													
MTC-005-3BD18		184T				7.5		16.11				4.5	3.75											1.78	4.5	5.5	0.59	0.41	1.97	2.75	8.97	8.82	0.986	0.25	1.42	1.125
MTC-005-3BD36		215T				9		20.49				5.25	4.25											2.41	5.5	7	0.709	0.41	2.36	3.38	10.53	10.4	1.201	0.312	1.73	1.375
MTC-7P5-3BD12	7-1/2	254T	12.5	1.5" NPT	11.2	10.8	4.25	23.29	6.25	5	2.91	n/a	8.25	0.787	0.53	2.76	4	12.89	12.6	1.416	0.375	2.05	1.625													
MTC-7P5-3BD18		213T				7.5		18.89				5.25	4.25											2.41	n/a	5.5	0.709	0.41	2.36	3.38	10.53	10.4	1.201	0.312	1.73	1.375
MTC-7P5-3BD36		254T				10.8		23.29				6.25	5											2.91	8.25	10	0.787	0.53	2.76	4	12.89	12.6	1.416	0.375	2.05	1.625
MTC-010-3BD12	10	256T	12.5	1.5" NPT	11.2	12.5	4.25	25.06	6.25	5	2.91	8.25	10	0.787	0.53	2.76	4	12.89	12.6	1.416	0.375	2.05	1.625													
MTC-010-3BD18		215T				9		20.49				5.25	4.25											2.41	5.5	7	0.709	0.41	2.36	3.38	10.53	10.4	1.201	0.312	1.73	1.375
MTC-010-3BD36		256T				12.5		25.06				6.25	5											2.91	8.25	10	0.787	0.53	2.76	4	12.89	12.6	1.416	0.375	2.05	1.625

\* Various frame sizes have 2 or 4 mounting holes per mounting foot.

\*\* AA dimension is conduit fitting size.

F1 mounting shown; some frame sizes are F1/F2 convertible; refer to T Frame "Motor Specifications" table.  
(F2 mounting = conduit entrance on right side facing shaft.)

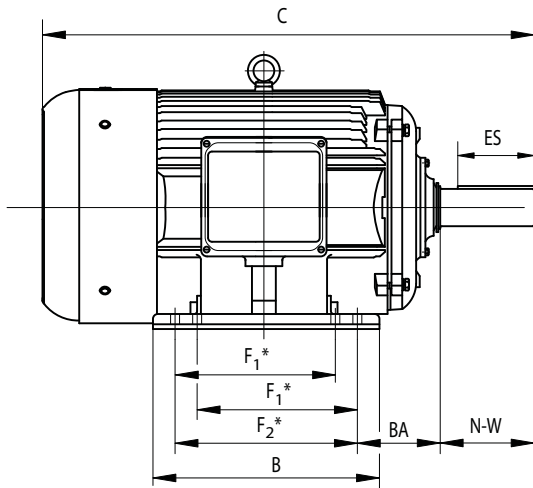
\*\*\*\*\* TABLE CONTINUED NEXT PAGE FOR 15-300 HP MOTORS \*\*\*\*\*

# IronHorse Cast Iron AC Motors

## T & TC Frame TEFC Motors – Three-phase Industrial Duty – Dimensions

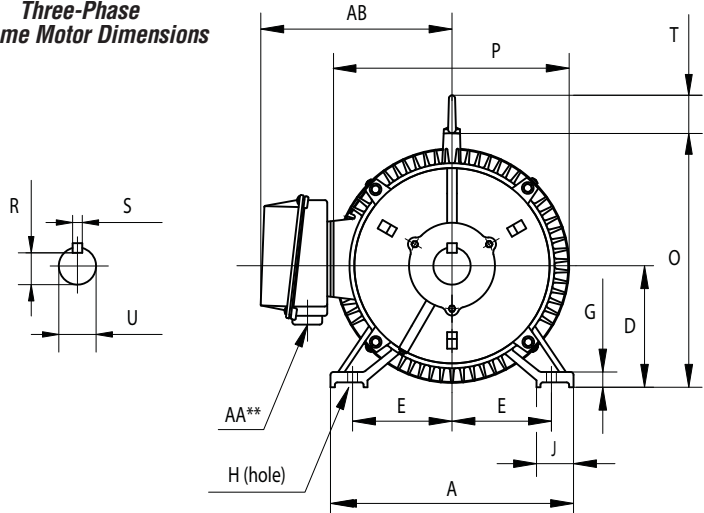


**NOTE:** C-FACE DIMENSIONS FOR TC FRAME MOTORS (MTC-XXX-XXXXCK) ARE SHOWN ON THE ACCESSORIES PAGE WITH C-FLANGE ACCESSORY KIT DIMENSIONS. TC-FRAME MOTORS ARE T-FRAME MOTORS WITH C-FLANGE ACCESSORY KITS INSTALLED.



\* Various frame sizes have 2 or 4 mounting holes per mounting foot (one mounting foot per side).

### Three-Phase T Frame Motor Dimensions



\*\* F1 mounting shown.  
\*\* Some frame sizes are F1/F2 convertible.

\*\*\*\*\* TABLE CONTINUED FROM PREVIOUS PAGE FOR 1-10 HP MOTORS \*\*\*\*\*

### Dimensions [inches, except as noted] – Three-phase T Frame Motors – 1800 RPM

Part Number	HP	NEMA Frame	A	AA**	AB	B	BA	C	D	E	ES	F1*	F2*	G	H	J	N-W	O	P	R	S	T	U
MTC-015-3BD18	15	254T	12.5	1.5" NPT	11.2	10.8	4.25	23.29	6.25	5	2.91	n/a	8.25	0.787	0.53	2.76	4	12.89	12.6	1.416	0.375	2.05	1.625
MTC-020-3BD18	20	256T				12.5		25.06				8.25	10										
MTC-025-3BD18	25	284T	14	1.5" NPT	12	12.5	4.75	26.64	7	5.5	3.28	n/a	9.5	0.866	0.53	2.76	4.62	14.28	14.17	1.591	0.5	2.05	1.875
MTC-030-3BD18	30	286T				14		28.18				9.5	11										
MTC-040-3BD18	40	324T	16	2" NPT	13.4	14	5.25	29.95	8	6.25	3.91	n/a	10.5	0.984	0.66	2.76	5.25	15.91	15.75	1.845	0.5	2.44	2.125
MTC-050-3BD18	50	326T				15.5		31.24				10.5	12										
MTC-060-3BD18	60	364T	18	3" NPT	15.7	15.2	5.88	32.68	9	7	4.28	n/a	11.25	1.102	0.66	2.95	5.88	18.13	17.7	2.021	0.625	2.44	2.375
MTC-075-3BD18	75	365T				16.2		34.11				11.25	12.25										
MTC-100-3BD18	100	405T	20	3" NPT	18.31	17.8	6.62	38.35	10	8	5.65	12.25	13.75	1.18	0.81	3.15	7.25	21.02	21.42	2.45	0.75	2.83	2.875
MTC-125-3BD18	125	444T				18.5		42.52				n/a	14.5										
MTC-150-3BD18	150	445T	22	2x3"NPT	19.41	20.5	7.5	44.5	11	9	6.91	14.5	16.5	1.38	0.81	3.35	8.5	22.97	23.43	2.88	0.875	3.46	3.375
MTC-200-3BD18	200	445/7T				24		48.03				16.5	20										
MTC-250-3D18	250	449T	22	2x3"NPT	19.07	31	7.5	55.51	11	9	7.01	n/a	25	1.575	0.81	3.35	8.5	23	24	2.88	0.875	4.25	3.375
MTC-300-3D18	300																						

\* Various frame sizes have 2 or 4 mounting holes per mounting foot.  
\*\* AA dimension is conduit fitting size.  
F1 mounting shown; some frame sizes are F1/F2 convertible; refer to T Frame "Motor Specifications" table.  
(F2 mounting = conduit entrance on right side facing shaft.)



# IronHorse AC Motor Accessories

## T Frame TEFC Motors – Three-phase Industrial Duty – 1 to 300 hp – C-Flange Kits

We stock 1800 rpm NEMA cast iron T-frame motors from 1–300hp, and TC-frame motors from 1–100hp.

We also offer IronHorse cast iron C-flange kits which can be used for C-face mounting of our IronHorse cast iron T-frame motors. The kits are field installable and include the C-faces and bolts.

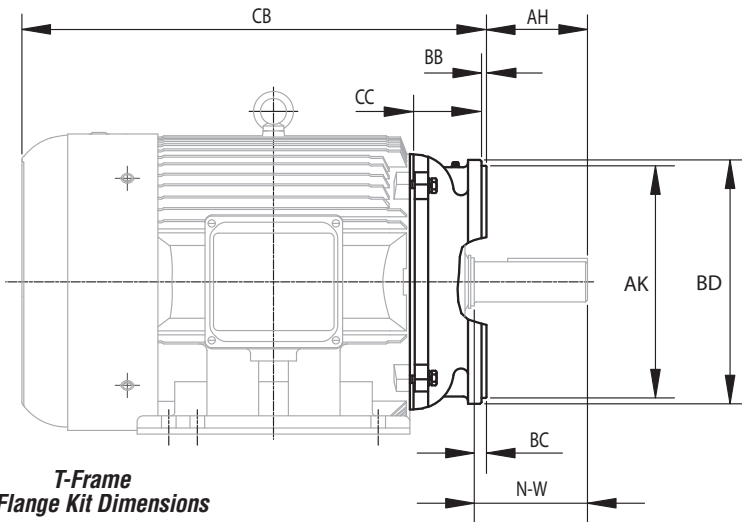


Three-phase T-frame Motor C-flange Kits					
Part Number	Price	Fits Frame	Fits Motor Number	Motor HP	Shipping Weight (lb)
<b>MTA-CFACE-140TC</b>	<-->	143T & 145T	MTC-001-3BD12	1	6.0
			MTC-001-3BD18	1	
			MTC-1P5-3BD18	1-1/2	
			MTC-1P5-3BD36	1-1/2	
			MTC-002-3BD18	2	
			MTC-002-3BD36	2	
<b>MTA-CFACE-180TC</b>	<-->	182T & 184T	MTC-1P5-3BD12	1-1/2	12
			MTC-002-3BD12	2	
			MTC-003-3BD18	3	
			MTC-003-3BD36	3	
			MTC-003-3BD36	5	
			MTC-005-3BD36	5	
<b>MTA-CFACE-210TC</b>	<-->	213T & 215T	MTC-003-3BD12	3	12
			MTC-005-3BD12	5	
			MTC-7P5-3BD18	7-1/2	
			MTC-7P5-3BD36	7-1/2	
			MTC-010-3BD18	10	
			MTC-010-3BD36	10	
<b>MTA-CFACE-250TC</b>	<-->	254T & 256T	MTC-7P5-3BD12	7-1/2	32
			MTC-010-3BD12	10	
			MTC-015-3BD18	15	
			MTC-020-3BD18	20	
<b>MTA-CFACE-280TC</b>	<-->	284T & 286T	MTC-025-3BD18	25	38
			MTC-030-3BD18	30	
<b>MTA-CFACE-320TC</b>	<-->	324T & 326T	MTC-040-3BD18	40	60
			MTC-050-3BD18	50	
<b>MTA-CFACE-360TC</b>	<-->	364T & 365T	MTC-060-3BD18	60	62
			MTC-075-3BD18	75	
<b>MTA-CFACE-400TC<sup>(1)</sup></b>	<-->	405T	MTC-100-3BD18	100	144 <sup>(1)</sup>
<b>MTA-CFACE-444TC<sup>(1)</sup></b>	<-->	444T & 445T	MTC-125-3BD18	125	156 <sup>(1)</sup>
			MTC-150-3BD18	150	
<b>MTA-CFACE-447TC<sup>(1)</sup></b>	<-->	445/7T	MTC-200-3BD18	200	154 <sup>(1)</sup>
<b>MTA-CFACE-449TC<sup>(1)</sup></b>	<-->	449T	MTC-250-3D18	250	168 <sup>(1)</sup>
			MTC-300-3D18	300	

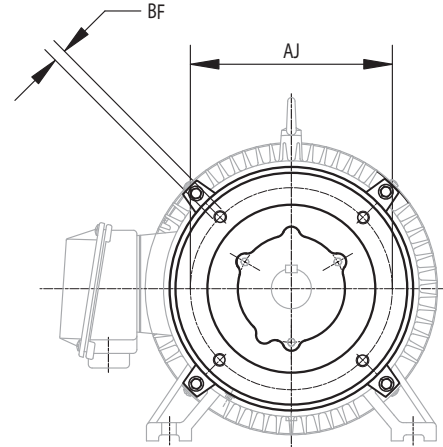
1) For components weighing over 100 lbs: A) LTL shipment required. B) Order before 5:00 p.m. EST for same day shipment. C) You must have a receiving loading dock. D) Not available in Hawaii or Puerto Rico.

# IronHorse AC Motor Accessories

## T Frame TEFC Motors – Three-phase Industrial Duty – 1 to 300 hp – C-Flange Kit and TC-Frame Motor Dimensions



**T-Frame  
C-Flange Kit Dimensions**



**NOTE:**

MOTOR HOUSING DIMENSIONS FOR TC FRAME MOTORS (MTC-xxx-xxxxCK) ARE SHOWN ON THE PREVIOUS PAGE WITH T-FRAME MOTOR DIMENSIONS. TC-FRAME MOTORS ARE T-FRAME MOTORS WITH C-FLANGE ACCESSORY KITS INSTALLED.



Dimensions [inches] - T-Frame Motor C-Flange Kits											
Part Number	Frame Type	AH <sup>(2)</sup>	AJ	AK	BB	BC <sup>(2)</sup>	BD	BF	CB <sup>(2)</sup>	CC	N-W <sup>(2)</sup>
<b>MTA-CFACE-140TC<sup>(1)</sup></b>	143T / 145T	1.96	5.875 <sup>(1)</sup>	4.5 <sup>(1)</sup>	0.16	0.12	6.5	3/8-16	10.61 / 11.62	1.43	2.25
<b>MTA-CFACE-180TC</b>	182T / 184T	2.62	7.25	8.5	0.25	0.12	9	1/2-13	12.49 / 13.49	1.17	2.75
<b>MTA-CFACE-210TC</b>	213T / 215T	3.12	7.25	8.5	0.25	0.25	9	1/2-13	15.77 / 17.37	1.45	3.38
<b>MTA-CFACE-250TC</b>	254T / 256T	3.75	7.25	8.5	0.25	0.25	10	1/2-13	19.54 / 21.31	2.89	4
<b>MTA-CFACE-280TC</b>	284T / 286T	4.38	9	10.5	0.25	0.25	11.25	1/2-13	22.26 / 23.80	3.26	4.62
<b>MTA-CFACE-320TC</b>	324T / 326T	5	11	12.5	0.25	0.25	14	5/8-11	24.95 / 26.24	3.67	5.25
<b>MTA-CFACE-360TC</b>	364T / 365T	5.62	11	12.5	0.25	0.25	14	5/8-11	27.06 / 28.49	4.06	5.88
<b>MTA-CFACE-400TC</b>	405T	7	11	12.5	0.25	0.25	15.5	5/8-11	31.35	4.33	7.25
<b>MTA-CFACE-444TC</b>	444T / 445T	8.25	14	16	0.25	0.25	18	5/8-11	34.27 / 36.25	4.11	8.5
<b>MTA-CFACE-447TC</b>	445/7T	8.25	14	16	0.25	0.25	18	5/8-11	39.78	4.11	8.5
<b>MTA-CFACE-449TC</b>	449T	8.248	14	16	0.26	0.26	17.72	5/8-11	47.26	4.35	8.5

(1) Mounting bolt holes for MTA-CFACE-140TC are located outside of the highest C-face flange surface (dimension AJ > AK).  
(2) Motor dependent dimensions apply only to IronHorse MTC-xxx-xxxx(CK) motors.