microMAX™ AC Inverter-Duty Motors

1000:1 Constant Torque (TENV), 20:1 Constant Torque (TEFC)

Features

- Constant torque operation from 0 to base speed (TENV ratings)
- Constant torque operation from 1/20 speed to base speed (TEFC ratings)
- Constant horsepower to twice base speed (RPM)
- Class H insulation with CR200 (corona-resistant) magnet wire
- Continuous duty at 40°C ambient
- C-Face with rigid base, except C-Face with removable rigid base as noted
- Service Factor: 1.0
- Utilizes double shielded ball bearings
- Exxon Polyrex® EM bearing grease
- Eliminates brush and commutator maintenance
- Electrically reversible
- UL Recognized, CSA Certified, and CE Mark
- Three year warranty (through Marathon Electric)

Applications

- Replaces 90 volt and 180 volt PMDC motors (when used with AC variable frequency drives)
- Typical uses include: machine tools, conveyors, packaging machines, batching machines, printing equipment, pumps and fans.

Motor Shipping Schedule *		
*Same or one day **	*Up to 7 days*	*Up to 10 days*

Color indicates shipping lead time in business days. Check stock status online.
** Certain heavy and oversized items can be shipped only via LTL. Check our website for current shipping method constraints by part number.*

Prices & Specifications

Motor Specifications – microMAX

Part Number *	Price	HP	Base RPM	Volts	Encl.	NEMA Frame	Model No.	F.L. Amps	Weight (lb) *	Footnotes
Y500		1/4	1800	230	TENV	56C	56H17T2011	1.0	17	Q
Y502		1/3					56H17T2013A	1.2	17	Q
Y360		1/2		230/460			56H17T2017	1.8 / 0.9	25	–
Y362		3/4			TEFC		56H17F2017A	2.8 / 1.4	25	–
Y364		1					56H17F2021	3.2 / 1.6	28	–
Y366		1-1/2			TENV	145TC	145THTR5329AA	4.8 / 2.4	45	6
Y368		2			TEFC		145THFR5329	5.8 / 2.9	45	6
Y1999 †		3				182TC	182THFW7729AA	8.4 / 4.2	64	6
Y1372 †		5				184TC	184THFW7726AA	13.0 / 6.5	92	6
Y994	9.00	7-1/2				213TC	213THFW7726	21.4 / 10.7	125	6
Y996	0.00	10				215TC	215THFW7726	27.6 / 13.8	135	6

** Refer to the Motor Shipping Schedule table for shipping information. Certain heavy and oversized items can be shipped only via LTL. Check our web site for current shipping method constraints by part number.*

† Detailed information on the previous versions of these motors (Y999 & Y372

Footnotes: Q = "Quick Connect" terminal board (1/4-in female spade lug) 6 = Bolt-on, removable base for footless mounting option

Note: Please review the AutomationDirect Terms & Conditions for warranty and service on this product. Warranty service can be arranged through numerous Marathon Electric service centers. See list of service centers on our Web site at _____.

microMAX™ AC Inverter-Duty Motors

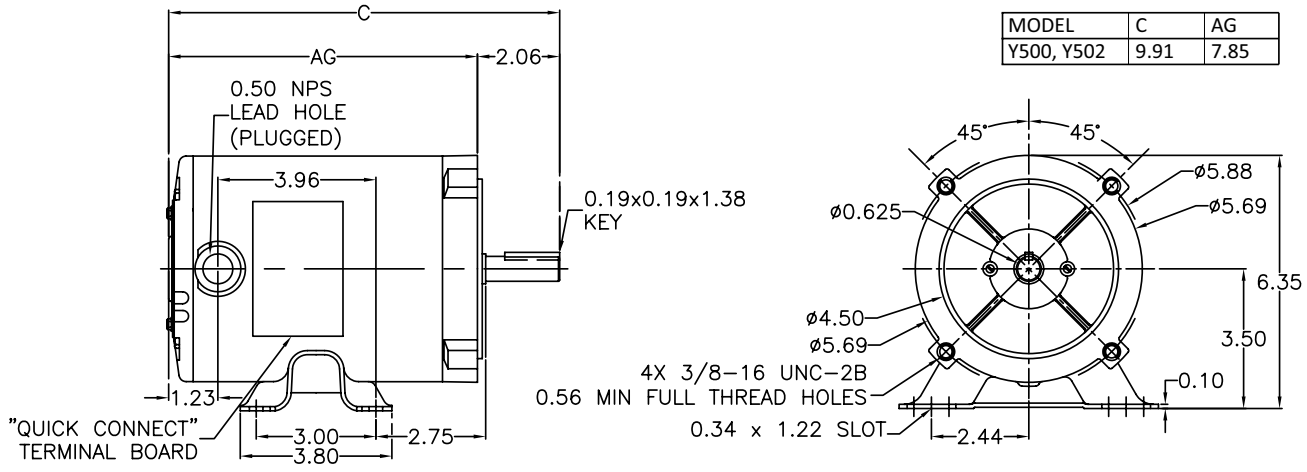
Performance Data

Performance Data (460 Volt except as indicated) – microMAX													
Part Number	*HP*	*NEMA Design*	*F.L. RPM*	*Min. RPM*	*F.L. AMPS @460V*	*N.L. AMPS @460V*	*F.L. Torque (lb·ft)*	*B.D. Torque (lb·ft)*	*Max. CHP RPM**	*Max. Safe RPM*	*F.L. Effic.*	*F.L. Power Factor*	*Rotor Inertia ($lb·ft^2$)*
Y500	1/4 (230V)	B	1725	1.8	1.0 (230V)	0.7 (230V)	0.75	3.7	3520	5400	72.0	65.0	0.040
Y502	1/3 (230V)	A	1725	0	1.2 (230V)	0.9 (230V)	1.0	4.5	3450	5400	74.0	67.0	0.045
Y360	1/2	B	1725	1.8	0.9	0.5	1.5	6.8	3520	5400	80.0	72.0	0.075
Y362	3/4	A	1725	90	1.4	1.0	2.3	9.5	3520	4000	75.5	70.5	0.055
Y364	1	B	1725	90	1.6	0.9	3.0	12.0	3520	4000	78.5	77.5	0.090
Y366	1-1/2	A	1755	0	2.4	1.6	4.5	29.0	3500	5400	85.5	69.0	0.140
Y368	2	B	1740	90	2.9	1.6	6.0	29.0	3530	4000	82.5	77.0	0.140
Y1999	3	A	1765	90	4.2	2.2	8.9	33.8	3530	4000	87.5	76.4	0.38
Y1372	5		1760	90	6.5	2.8	15	48.6	3520	4000	87.5	81.6	0.357
Y994	7-1/2		1770	90	10.7	6.2	22.3	80.0	3565	4000	89.5	72.5	0.75
Y996	10	B	1770	90	13.8	7.8	30.0	110	3570	4000	91.0	74.0	1.00

* Maximum Constant HP RPM is for direct-coupled loads.

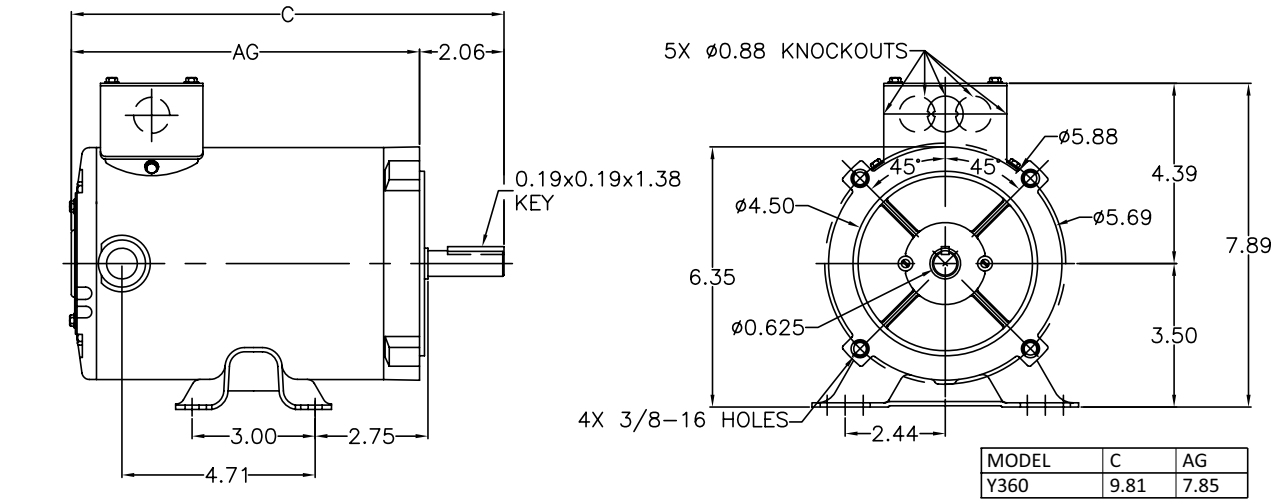
Dimensions (units = inches)

Figure 1 – Y500, Y502



MODEL	C	AG
Y500, Y502	9.91	7.85

Figure 2 – Y360

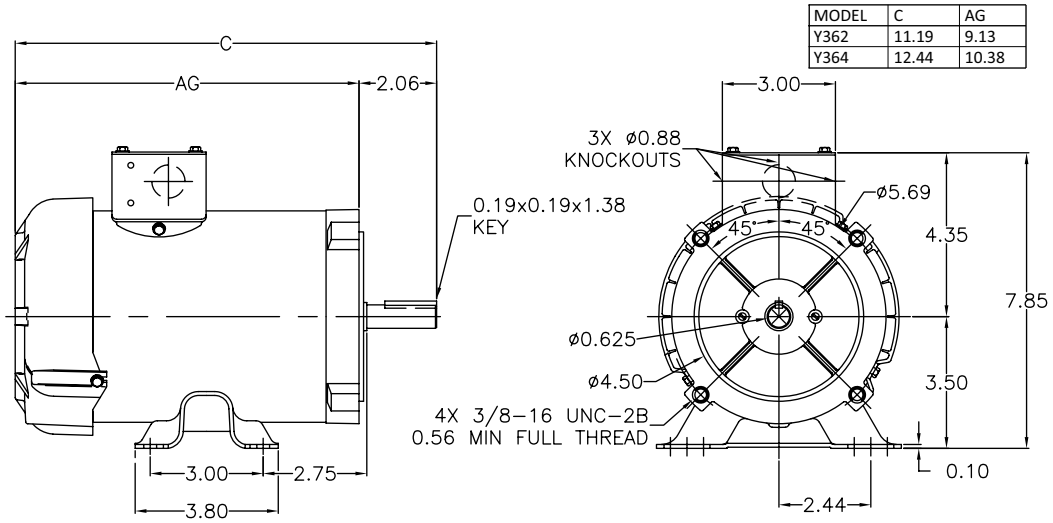


MODEL	C	AG
Y360	9.81	7.85

microMAX™ AC Inverter-Duty Motors

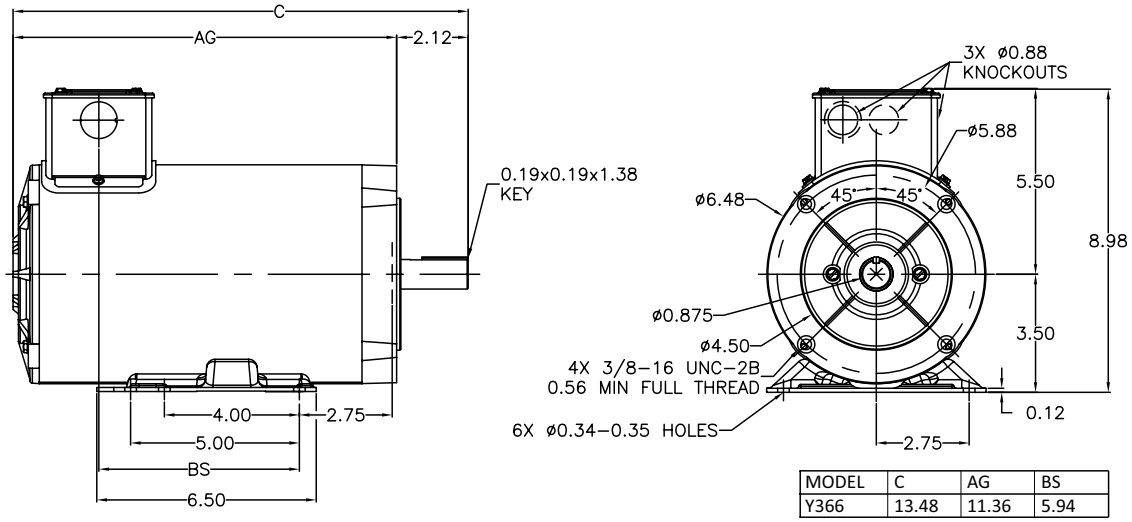
Dimensions (units = inches)

Figure 3 – Y362, Y364



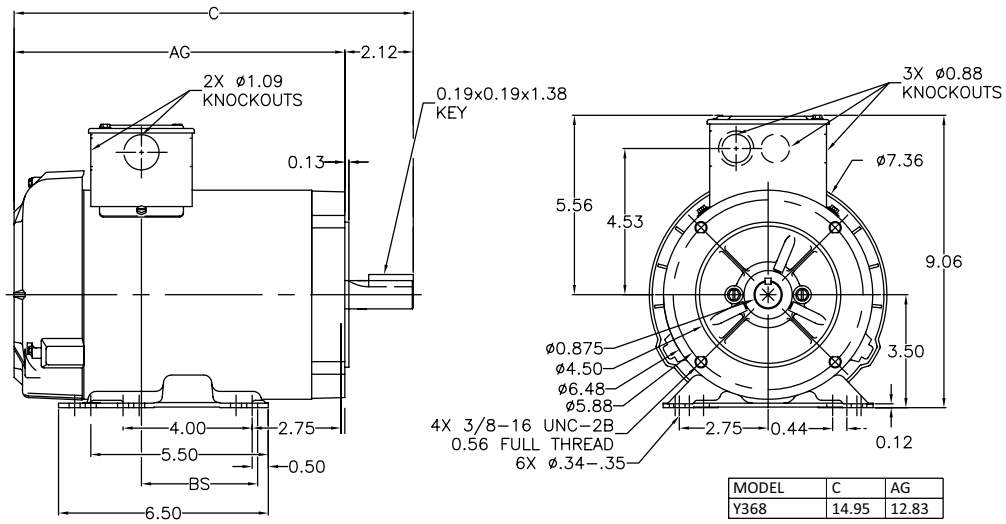
MODEL	C	AG
Y362	11.19	9.13
Y364	12.44	10.38

Figure 4 – Y366



MODEL	C	AG	BS
Y366	13.48	11.36	5.94

Figure 5 – Y368

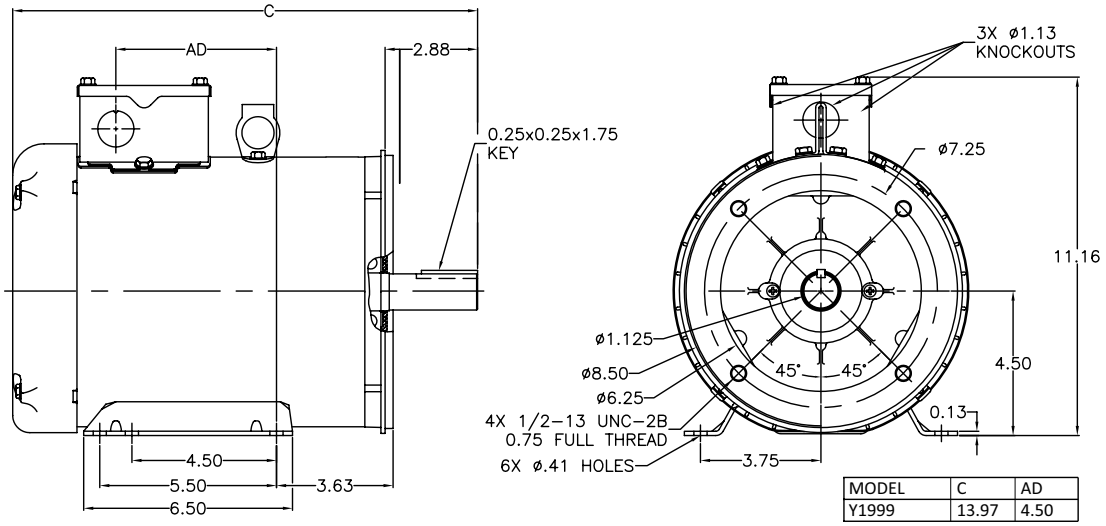


MODEL	C	AG
Y368	14.95	12.83

microMAX™ AC Inverter-Duty Motors

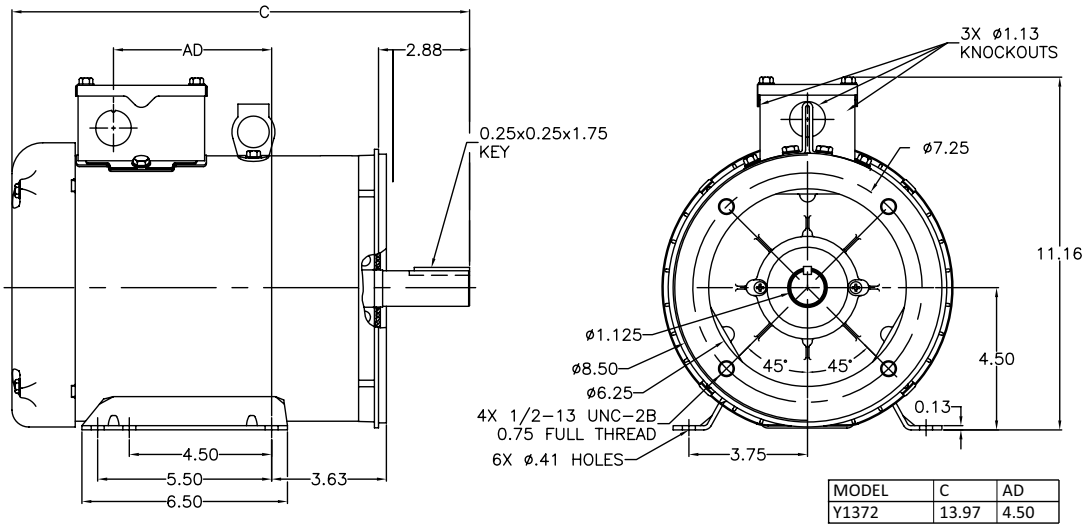
Dimensions (units = inches)

Figure 6 – Y1999



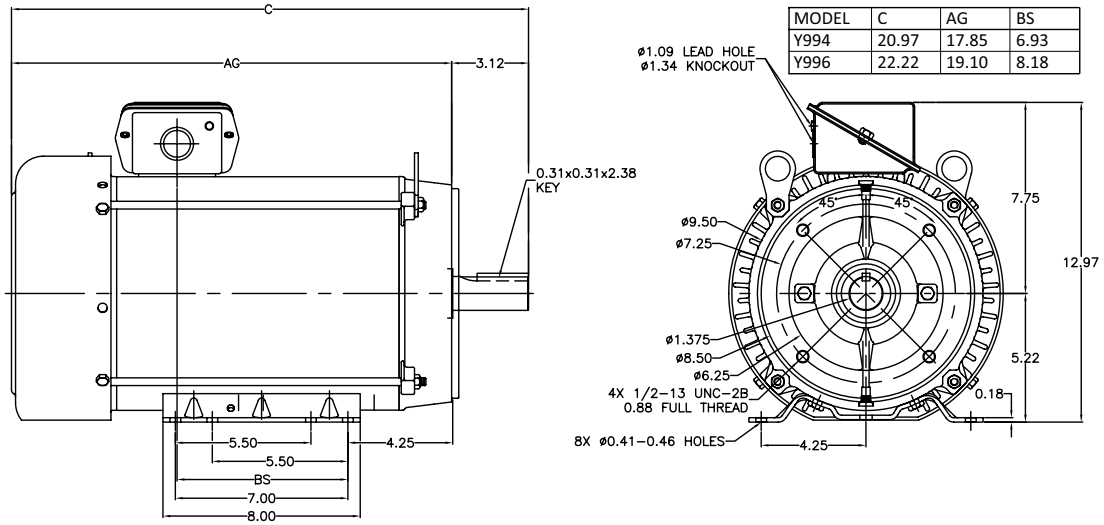
MODEL	C	AD
Y1999	13.97	4.50

Figure 7 – Y1372



MODEL	C	AD
Y1372	13.97	4.50

Figure 8 – Y996, Y994



MODEL	C	AG	BS
Y994	20.97	17.85	6.93
Y996	22.22	19.10	8.18

STABLE™ Motor Slide Bases

Mounting Slide Bases for 56 to 449T NEMA Motors Features

- Allows adjustment of motor mounting position
- Slide direction is perpendicular to motor shaft
- Double adjusting screws for frames 182T–449T
- Manufactured to precise dimensional standards
- Dimensionally interchangeable with existing major makes
- Heavy-duty steel construction
- Painted with oven-baked primer for better adhesion of customer's paint
- All "D" bolts (motor mounting bolts) are fixed to the exact motor foot pattern
- All "D" bolts are welded into position to prevent spinning and dropping from slots
- • Nuts and washers are provided for securing the motor to the slide base

STABLE Motor Slide Bases for 3-Phase Motors

Part Number	Price	Fits Frame Type	Product Wt. (lb)	Fits Motor						
					Marathon					
				IronHorse	micro -MAX ---- Max+	Black Max 230/460V ---- Black Max 575V	Blue Max	XRI GP & NEMA Premium	Powerwash SXT & Jet Pump	Blue Chip XRI 230/ 460V ---- Blue Chip XRI 575V
MTA-BASE-W56 *		56*	2.8	MTPM-P3x-1x18 MTPM-P5x-1x18 MTPM-P7x-1x18 MTPM-0xx-1x18 MTPM-1xx-1x18 MTR(2)(P)-xxx-xxxxx*	Y500 Y502 Y360 Y362 Y364 Y280 Y281 Y282	Y592(-A772) Y534(-A772) Y535(-A772) Y555(-A772) Y556(-A772)	–	E2000 D390 G580 D391 G581 K705 D392 G582 K707 D393A K708A G583A K709A D394A K721A G584A D395A G585A K724A D396A K725A	N410 J066A	–
MTA-BASE-W143T		143T/TC	4.6	MTCP2-001-3BD18(C) MTCP2-1P5-3BD36	–	Y536(-A772)	–	E2001A E2003		–
MTA-BASE-W145T		145T/TC	5.1	MTCP2-001-3BD12 MTCP2-1P5-3BD18(C) MTCP2-002-3BD18(C) MTCP2-002-3BD36	Y366 Y368 Y284 Y285	Y537(-A772) Y538(-A772) Y551(-A772) Y557(-A772)	–	E2002 E2004A E2007A		–
MTA-BASE-W182T		182T/TC	9.2	MTCP2-1P5-3BD12 MTCP2-003-3BD18(C) MTCP2-003-3BD36 MTF-002-1C18-182	Y1999 Y286A	Y541A(-A772) Y558A(-A772)	–	E2009 E2010	C383B	–

** IronHorse MTR2 56HC motors have double-punched bases to fit on slide base MTA-BASE-W56.*
*** Motors MTC-250-3D18 and MTC-300-3D18 are obsolete, and no longer available.*

table continued on next page

STABLE™ Motor Slide Bases

table continued from previous page

STABLE Motor Slide Bases for 3-Phase Motors

Part Number	Price	Fits Frame Type	Product Wt. (lb)	Fits Motor						
					Marathon					
				IronHorse	micro -MAX ---- Max+	Black Max 230/460V ---- Black Max 575V	Blue Max	XRI GP & NEMA Premium	Powerwash SXT & Jet Pump	Blue Chip XRI 230/ 460V ---- Blue Chip XRI 575V
MTA-BASE-W184T		184T/TC	10	MTCP2-002-3BD12 MTCP2-005-3BD18(C) MTCP2-005-3BD36 MTF-00x-1C18	Y1372 Y287A	Y540(-A772) Y543A(-A772) Y559A(-A772)	–	E2012 E2013	C387B	–
MTA-BASE-W213T		213T/TC	13	MTCP2-003-3BD12 MTCP2-7P5-3BD18(C) MTCP2-7P5-3BD36	Y994	Y542(-A772) Y545(-A772) Y560(-A772)	–	E2011 E2016A	C389B C390B C391B E2011A E2016B	–
MTA-BASE-W215T		215T/TC	15	MTCP2-005-3BD12 MTCP2-010-3BD18(C) MTCP2-010-3BD36	Y996	Y544(-A772) Y547(-A772) Y561(-A772	–	E2018	C392B E2014A E2018A	–
MTA-BASE-W254T		254T/TC	18	MTCP2-7P5-3BD12 MTCP2-015-3BD18(C) MTCP2-015-3BD36	–	Y546(-A772) Y549(-A772) Y562(-A772)	–	–	–	
MTA-BASE-W256T		256T/TC	19	MTCP2-010-3BD12 MTCP2-020-3BD18(C) MTCP2-20-3BD36	–	Y548(-A772) Y552(-A772) Y563(-A772)	–	–	–	
MTA-BASE-W284T		284T/TC	20	MTCP2-015-3BD12 MTCP2-025-3BD18(C)	–	Y553(-A772)	–	–	–	E207
MTA-BASE-W286T		286T/TC	21	MTCP2-20-3BD12 MTCP2-030-3BD18(C)	–	Y393(-A772)	–	–	–	-
MTA-BASE-W324T		324T/TC	30	MTCP2-040-3BD18(C)	–	–	Y571(-A774) Y513(-A775)	–	–	E209
MTA-BASE-W326T		326T/TC	31	MTCP2-050-3BD18(C)	–	–	Y572(-A774) Y514(-A775)	–	–	
MTA-BASE-W364T		364T/TC	43	MTCP2-060-3BD18(C)	–	–	Y573(-A774) Y515(-A775)	–	–	-
MTA-BASE-W365T		365T/TC	43	MTCP2-075-3BD18(C)	–	–	Y574(-A774) Y516(-A775)	–	–	E212
MTA-BASE-W404T		404T/TC	58	–	–	–	–	–	–	–
MTA-BASE-W405T		405T/TC	60	MTCP2-100-3BD18(C)	–	–	Y575(-A774) Y517(-A775)	–	–	-
MTA-BASE-W444T		444T	63	MTCP2-125-3BD18	–	–	–	–	–	–
MTA-BASE-W445T		445T	65	MTCP2-150-3BD18	–	–	–	–	–	–
MTA-BASE-W447T		447T	89	MTCP2-200-3BD18	–	–	–	–	–	–
MTA-BASE-W449T		449T	94	MTCP2-250-3D18 MTCP2-300-3D18	–	–	–	–	–	–

** IronHorse MTR2 56HC motors have double-punched bases to fit on slide base MTA-BASE-W56.*

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 (sqrt of 2) * 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 reconverting 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.

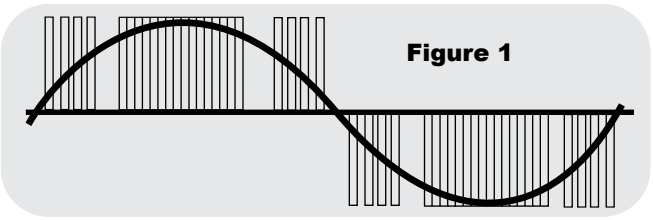


Figure 1

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 between the motor and 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].

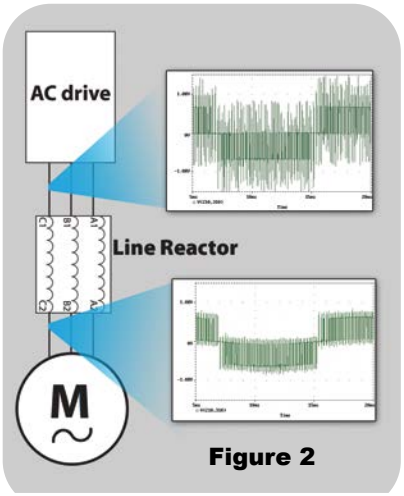


Figure 2

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 (EPAct motors) 10:1 (PE motors)	1800/5 = 360RPM 1800/5 = 180RPM
Constant Torque Applications (conveyors, extruders, etc.)	2:1 (EPAct motors) 4:1 (PE motors)	1800/2 = 900RPM 1800/4 = 450RPM

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 ft	250 ft

** Up to 6kHz carrier frequency*