# IronHorse® AC Motor Accessories – 1-Phase

## 56C/56HC Frame TEFC Motors – Single-Phase – 0.33 to 2 hp – Motor Accessories

***Start Capacitors***
Single-phase motors use capacitors to provide starting torque when power is first applied to the motor. AutomationDirect offers *spare/ replacement* starting capacitors for our single-phase IronHorse motors.

### Run Capacitors

In addition to the start capacitors and centrifugal switches, IronHorse 1-1/2 and 2 hp single-phase motors also have run capacitors which allow the motors to develop higher running torque, greater efficiency, and improved power factor. We offer *spare/replacement* run capacitors for single-phase IronHorse motors.

***Centrifugal Switches***
The start capacitors are no longer needed once the motors begin turning, so they are then taken out of the circuit by a centrifugal switch. We also offer *spare/replacement* switches for our motors.

***Stationary Switches***
MTR2 series motors have a separate stationary switch that works with the centrifugal switch; both switches are required.

(MTR series motors have only the one centrifugal switch.)

***Junction Box***
***MTAR-JBOX-56***

***Junction Box***
***MTA2-JBOX-56***


***Start Capacitor***
***MTA-CAP-02***


***Run Capacitor***
***MTA-CAP-07***

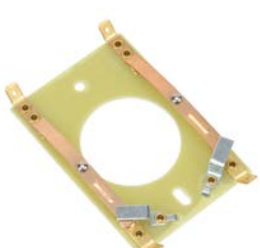
***Fan***
***MTAR-FAN-56***

***Fan***
***MTA2-FAN-56***

***Centrifugal Switch*** ***MTA-CSW-01***

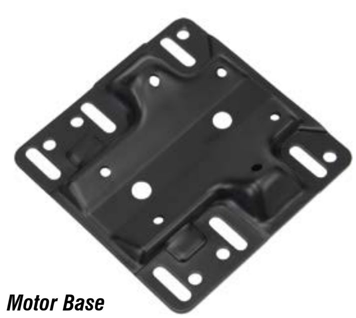
***Fan Shroud***
***MTAR-SHROUD-56***

***Fan Shroud***
***MTA2-SHROUD-56***



***Stationary Switch***
***MTA-CSW-04***

***Motor Base***
***MTAR-BASE-56***



***Motor Base***
***MTA2-BASE-56***

# IronHorse® AC Motor Accessories – 1-Phase

## 56C/56HC Frame TEFC Motors – Single-Phase – 0.33 to 2 hp – Motor Accessories

**MTR Series Single-Phase Motor Spare/Replacement Parts (NOT for MTR2 Motors)***

| Part Number | Price | Accessory Type | Capacitance (µF) | Rated Voltage | Dimension Height x Ø (in [mm]) | Applicable MTR Motor Number | MTR Motor HP : RPM |
|---|---|---|---|---|---|---|---|
| MTA-CAP-01 | | start capacitor | 200 | 165 | 3.15 x 1.65 [80.0 x 41.9] | MTR-P33-1AB18 | 1/3 : 1800 |
| MTA-CAP-02 | | start capacitor | 250 | | | MTR-P50-1AB18<br>MTR-P75-1AB18 | 1/2 : 1800<br>3/4 : 1800 |
| MTA-CAP-03 | | start capacitor | 300 | | | MTR-001-1AB18 | 1 : 1800 |
| MTA-CAP-08 | | start capacitor | 400 | | | MTR-1P5-1AB36 | 1-1/2 : 3600 |
| MTA-CAP-09 | | run capacitor | 35 | | 4.0 x 1.8 [101 x 45] | MTR-1P5-1AB36 | 1-1/2 : 3600 |
| MTA-CSW-01 | | centrifugal switch | n/a | 250 | n/a | MTR-xxx-1AB18 | all 1800 rpm |
| MTA-CSW-02 | | | | | | MTR-1P5-1AB36 | all 3600 rpm |
| MTAR-BASE-56 | | motor base | | n/a | | MTR-xxx-1ABxx | all |
| MTAR-FAN-56 | | fan | | | | | |
| MTAR-JBOX-56 | | junction box | | | | | |
| MTAR-SHROUD-56 | | fan shroud | | | | | |

*These accessories are spare/replacement components only for MTR series IronHorse motors. Accessories for MTR series motors are not compatible with MTR2 series motors.*

**MTR2 Series Single-Phase Motor Spare/Replacement Parts (NOT for MTR Motors)***

| Part Number | Price | Accessory Type | Capacitance (µF) | Rated Voltage | Dimension Height x Ø (in [mm]) | Applicable MTR2 Motor Number | MTR2 Motor HP : RPM |
|---|---|---|---|---|---|---|---|
| MTA-CAP-10 | | start capacitor | 200 | 165 | 2.80 x 1.46 [71.1 x 37.1] | MTR2-P33-1AB36 | 1/3 : 3600 |
| MTA-CAP-11 | | start capacitor | 300 | | 3.39 x 1.85 [86.1 x 47.0] | MTR2-P33-1AB18<br>MTR2-P50-1AB36 | 1/3: 1800<br>1/2 : 3600 |
| MTA-CAP-12 | | start capacitor | 400 | | | MTR2-P50-1AB18<br>MTR2-P75-1AB36 | 1/2: 1800<br>3/4 : 3600 |
| MTA-CAP-13 | | start capacitor | 500 | | | MTR2-P75-1AB18<br>MTR2-001-1AB18<br>MTR2-001-1AB36 | 3/4: 1800<br>1: 1800<br>1 : 3600 |
| MTA-CAP-14 | | run capacitor | 40 | 250 | 3.38 x 1.81 [85.9 x 46.0] | MTR2-1P5-1ABxx<br>MTR2-002-1ABxx | 1-1/2 : 1800<br>1-1/2 : 3600<br>2 : 1800<br>2 : 3600 |
| MTA-CAP-15 | | start capacitor | 800 | 165 | 4.41 x 1.85 [112.0 x 47.0] | | |
| MTA-CAP-22 | | start capacitor | 900 | 165 | 4.375 x 1.8125 [111.1 x 46.0] | MTR2-1P5-1AB18 | 1-1/2; 1800 |
| MTA-CSW-03 | | centrifugal switch | n/a | 125 | n/a | MTR2-xxx-1AB36 | all 3600 rpm |
| MTA-CSW-04 | | stationary switch | | | | MTR2-xxx-1ABxx | all |
| MTA-CSW-08 | | centrifugal switch | | | | MTR2-xxx-1AB18 | all 1800 rpm |
| MTA2-BASE-56 | | motor base | | n/a | | MTR2-xxx-1ABxx | all |
| MTA2-FAN-56 | | fan | | | | | |
| MTA2-JBOX-56 | | junction box | | | | | |
| MTA2-SHROUD-56 | | fan shroud | | | | | |

*These accessories are spare/replacement components only for MTR2 series IronHorse motors. Accessories for MTR2 series motors are not compatible with MTR series motors.*

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

# 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.

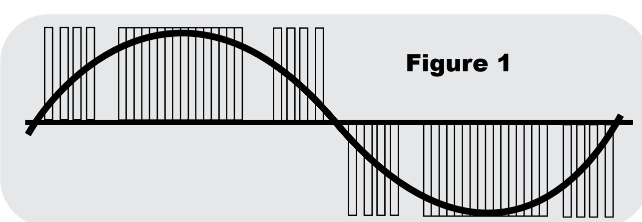


**Figure 1**

**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].

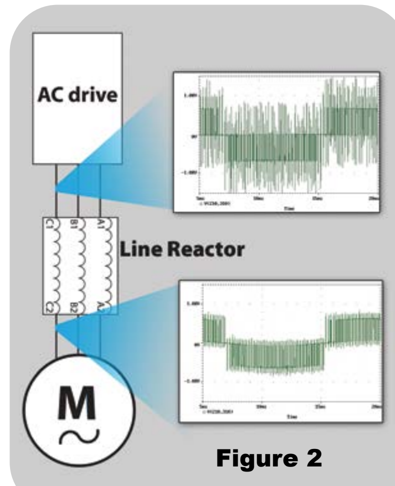



**Figure 2**

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