

# EasyStart 366

## Commercial (board-only) Model

ASY-366-X05 (36000 BTU, 3 ton)

ASY-366-X06 (72000 BTU, 6 ton)

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## Introduction

EasyStart™ is a one-of-a-kind soft starter for single-phase motors operating at 115VAC or 230VAC, 50Hz or 60Hz, custom developed by Micro-Air. It uses a highly-sophisticated, microprocessor-controlled system that employs a 4-part start ramp that is precisely sequenced using real-time closed-loop control. EasyStart even optimizes itself as it "learns" your compressor motor during the first few startups. This advanced system enables EasyStart to deliver up to **65-75%** start current reduction.

EasyStart also has numerous specialized fault checks not found in any other soft starter that provide further protection for your compressor motor. The many features EasyStart incorporates make it the perfect solution to allow an air conditioner or refrigeration compressor to operate on a generator, inverter, or limited utility power when it would otherwise not have functioned. It can also be applied to air compressor, pump motors and other single phase motors.

## Common questions about EasyStart™ 366

### Why is it better than a “Hard Start” kit?

EasyStart is not a “hard start kit” or a start capacitor alone. A hard start adds current to the start winding during the start process. The current reduction you see is because of the phase difference between voltage and current during the start. These devices can deliver at best a 10-20% reduction to a compressor's normal startup locked-rotor amperage (LRA). In some instances no reduction may be seen by adding a hard start kit!

EasyStart is totally different from a hard start. It controls the power applied to the compressor during the start and slightly lengthens the start process resulting in significantly less peak current draw. Some customers have reported a 75% reduction in start current!

### What applications should use the low cost 366 starter?

This EasyStart model is designed mainly for air conditioning, refrigeration, water maker, and similar manufacturers that incorporate compressors or multi horsepower motors into their appliance products. Customers who understand what is required to install this product may also elect to purchase this product. The start capacitor, wiring, and enclosure are not included (board-only), providing a substantial cost savings. This product must be mounted inside an appropriate enclosure that prevents damage from moisture intrusion. An appropriately sized start capacitor and appropriately sized wiring must also be supplied by the installer.

### How is the 366 different from the 364 or 368 starters?

The 366 starter uses the same software and algorithms as the other starters. 366 starters do not have wiring harnesses, start capacitors or enclosures. ***It is designed to be installed by manufacturers who understand the requirements of enclosing, mounting and wiring and not for individual use. Engineering assistance can be provided for volume orders. Installation assistance is not provided.***

The 364 and 368 starters are designed to be fitted to existing motors and compressors. They are available in water proof IP66 rated enclosures and have wiring harnesses that simplify connections. Installation assistance is available for 364 and 368 models.

### What kind of enclosure is required for the 366?

The 366 is designed to be installed in an area where it will not encounter moisture. Recommended installations include inside mounted electrical boxes or mounting inside a minimum of IP53 or NEMA 3 enclosures when used outside. Higher rated enclosures such as NEMA 4X or IP66 are strongly suggested for systems where high humidity or direct moisture contact can occur.

### Which model 366 do I need?

The EasyStart 366 is available in two models. The X06 model is capable of supporting up to a 72000 BTU (6 ton) compressor. The X05 model is capable of supporting up to a 36000 BTU (3 ton) compressor.

Model Number:	Use with AC compressors up to:	Motors up to:
ASY-366-X05	3 Ton (36 KBTU)	25 RLA
ASY-366-X06	6 Ton (72 KBTU)	35 RLA

### What size capacitor should I use?

Compressor Capacity (BTU)	Start Capacitor Size
up to 12K	72-86 MFD
13 to 23K	88-106 MFD
24 to 36K	108-130 MFD
37 to 48K	189-227 MFD
49 to 72K	270-324 MFD

#### Voltage Ratings:

115VAC applications can use 250V rating.

230VAC applications should use 330V rating.

**Note:** Micro-Air does stock certain sizes of start capacitors. Please contact us for more information.

# Installation

## Identifying the board

The 36000 BTU (3 ton) rated X05 board uses Faston™ style spade terminals for L2 and Run connections on the board. The 72000 BTU (6 ton) rated X06 board uses wire insert spring terminals for the L2 and Run connections on the board.

## Installing the EasyStart 366 board

The EasyStart 366 board comes with four mounting stand offs to mount in each of the four corners of the board. Drill four 0.144 in (3.66mm) holes in your enclosure using the template at the end of this manual.

*Note: Some printers do not print to scale very well. Verify the dimensions on the printed template with the board before drilling.*

Install the mounting stand-offs by pressing the threaded end of the standoff through the drilled panel hole and installing the nut with integrated lock washer. Install the board by placing the board on the stand-offs and installing four 6-32 machine screws with lock washers. Machine screws and nuts should be tightened to approximately 9 inch-pounds.



## Wiring the board

Typical wiring is shown in diagrams 1 and 2 in this manual. Diagram 1 shows the standard wiring for a compressor only. Diagram 2 shows the wiring for a system with a split capacitor commonly found in HVAC systems with integrated fans.

Additional information may be required for certain motor types such as motors with multiple or split windings and motors with a centrifugal clutch. See the FAQ section for more details.

## Starting the system for the first time

When a compressor is first connected, EasyStart will learn for the first five starts of the compressor. After the learning process is complete, EasyStart chooses the best starting characteristic for the compressor. We strongly recommend the use of stable AC power such as utility power for the first five starts. After the first five starts, the system can be used on less stable power sources like inverter or generator power.

# Troubleshooting

## Faults

Three LED lights are provided to help diagnose detected faults. The actual LED indications for the following faults are shown in table in the wiring diagrams contained in this document. Restart attempts when available will occur after three minutes and forty seconds.

Power Interrupted: A temporary power loss was detected and EasyStart shut down the compressor. If power is restored before EasyStart completely loses power, EasyStart will attempt a restart.

Compressor Stall: An improper operating condition exists that is consistent with a stalled compressor. This condition is triggered by an improper signal on the start winding of the compressor. This can be caused by a broken start winding wire connection, a failed start capacitor, as well as a locked compressor rotor. Be sure your thermostat allows sufficient time for pressure equalization before restarts.

No Start Winding Voltage: No signal was detected on the start winding. Verify the wiring to the winding is correct.

Compressor Over Current: Compressor running current is limited to a maximum of 25 RLA for the 3-ton X05 model and 35 RLA for the 6-ton X06 model. EasyStart will shut down and indicate this fault if current exceeds this value.

Open Compressor Overload: An improper operating condition exists that is consistent with an overload protector opening during operation. Any condition that causes the connection to the compressor to be broken can cause this fault.

## Jumper Settings

Two options can be selected using the provided board mounted header and shorting jumper. Power must be removed from EasyStart when changing jumper settings.

### Fixed Start

When the shorting jumper is placed on pins 1 and 3 in the “Fixed Start” position, EasyStart will use a factory defined short ramp on every start. This is used for diagnosing certain types of system problems and should only be used with manufacturer support.

### Relearn

If a compressor is replaced with a different size, manufacturer or type of compressor, relearning may be required. Place the shorting jumper on pins 4 and 6. Start a cycle with the compressor control device and terminate the cycle. Remove the jumper from the relearn position and return it to the normal position. The learning process will occur thereafter as described in [starting the system for the first time](#).

## **Start winding fuse**

A board mounted replaceable 5x20mm slow blow fuse is installed in the start winding circuit. This fuse may fail if the starter is connected to a compressor that is oversized or if the board is miswired. Boards with (-X05) extension have a 16 Amp, 250 VAC rated fuse. Boards with (-X06) extension have a 20 Amp, 250 VAC rated fuse.

## **FAQ**

### **Can I install the 366 on my RV, home AC, refrigerator etc.?**

Although it is possible, we recommend ASY-364 or ASY-368 because they are ready to install on existing systems. 366 boards can be used however you will need to address electrical safety concerns, moisture intrusion and wiring for your installation. This support is not provided by Micro-Air as this product is intended for commercial use only.

### **Can I use 366 for my electric motor (well pump, air compressor, wash down motor etc.)?**

Yes. You must be able to access the windings on the motor and have the wiring diagram for the motor. We have successfully installed EasyStart in many different applications although some are more challenging than others. Microair can assist volume customers in installing EasyStart into these more complicated installations. Please try to have a wiring diagram for your motor, start and run capacitor sizes, RLA, LRA, voltage, manufacturer, and model number for your motor when contacting Microair.

### **How do I contact Micro-Air?**

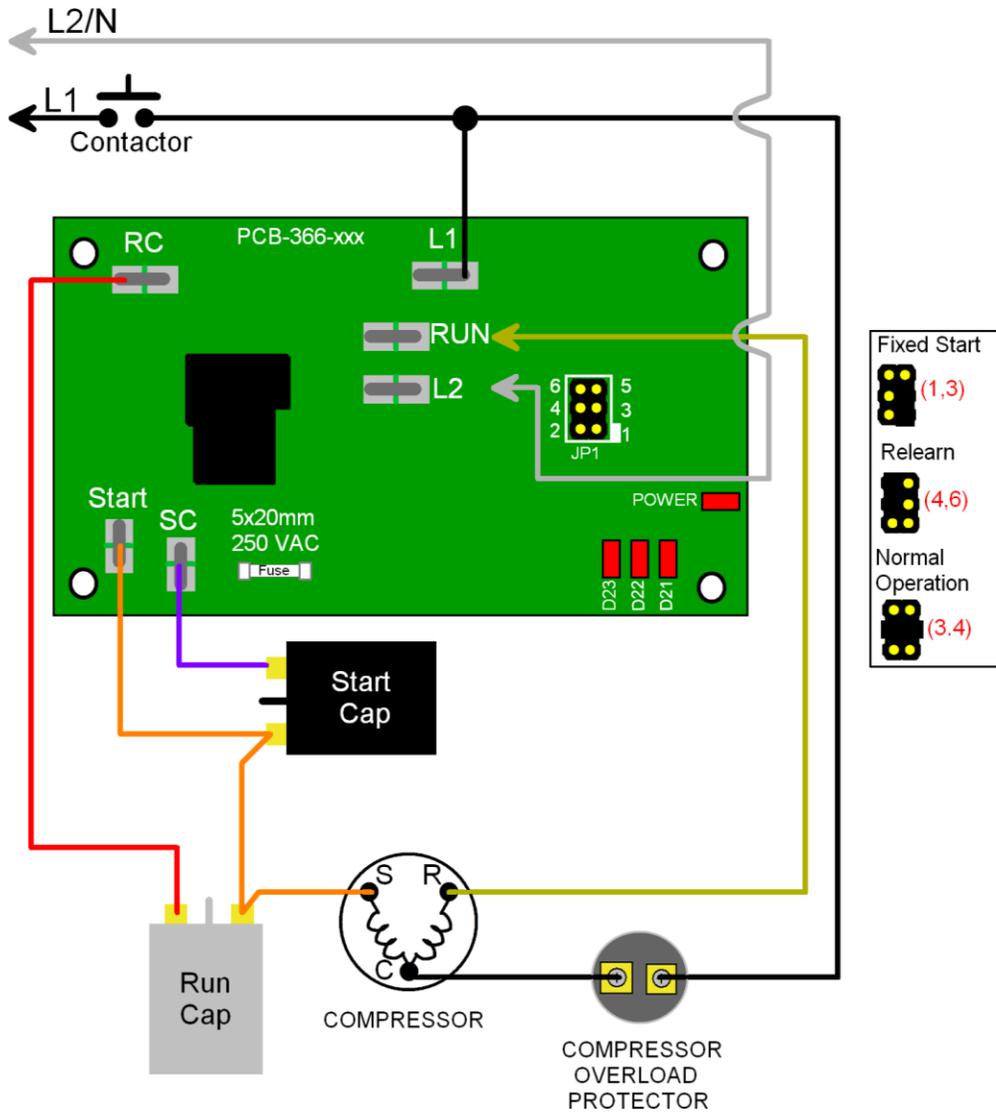
[Help@Microair.net](mailto:Help@Microair.net)

### **My motor or compressor size is not listed. What start capacitor do I use?**

Many times the manufacturers recommended start capacitor will work when connected to EasyStart. We have found some split winding motors need significantly less capacitance when used at 230 VAC. Contact Micro-Air if you need assistance selecting a value.

# Wiring

Diagram 1: ASY-366 Standard Wiring

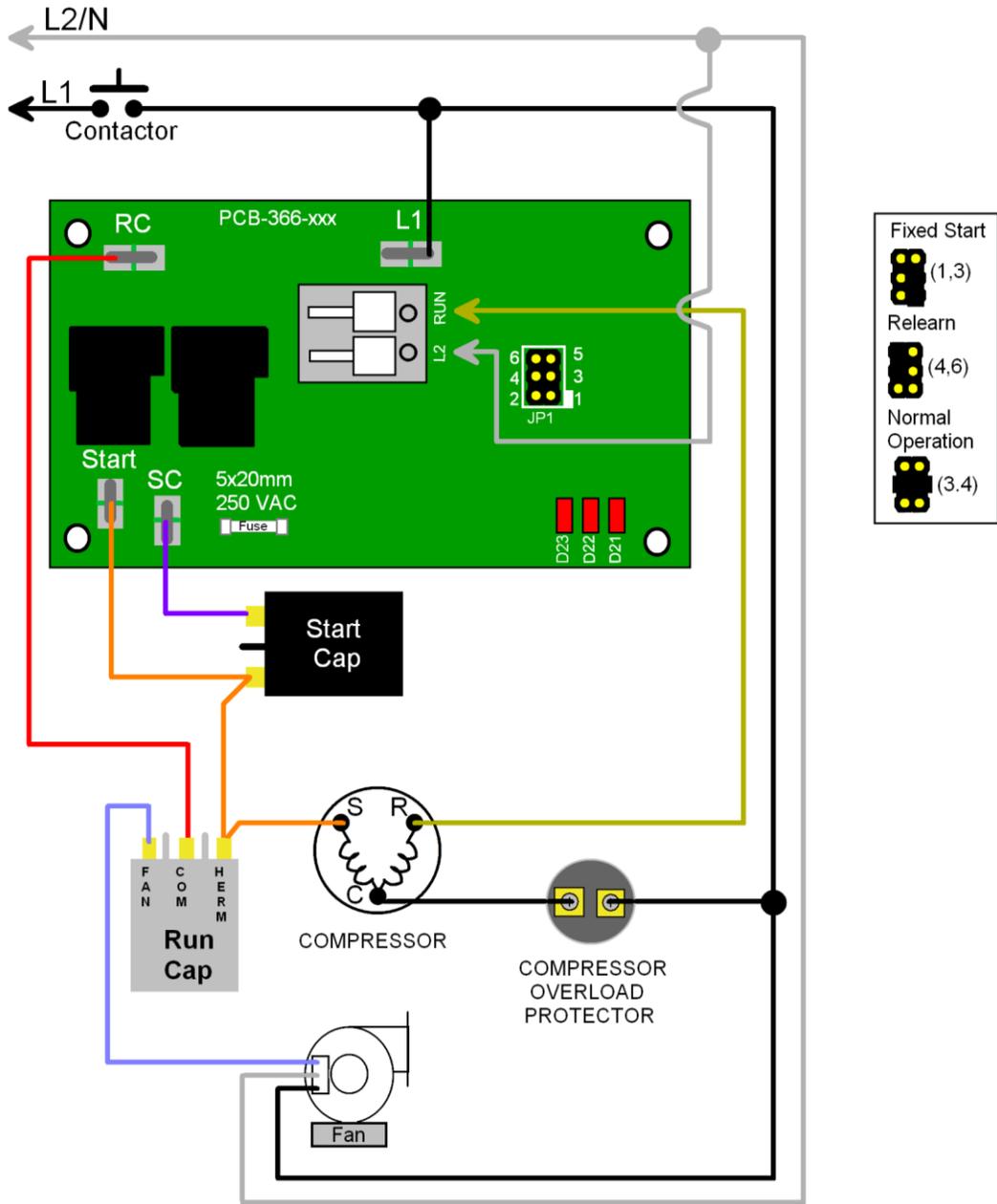


D23	D22	D21	Indication
Red	Red	Grey	Power Interrupted
Red	Grey	Red	Compressor Stall
Red	Red	Red	No Start Winding Voltage
Grey	Red	Grey	Compressor Over Current
Grey	Grey	Red	Open Compressor Overload
Grey	Grey	Grey	Normal Operation

Phase: Single Phase  
 Voltage: 100 - 240 VAC  
 Frequency: 50 - 60 Hz

Micro Air Corp.	
Easy Start LC Unit Wiring	
ASY-366-X05	
Drawn By: Roger Krinic	
October 6, 2016	Rev 2.05

**Diagram 2: ASY-366 with Split Cap Fan**



D23	D22	D21	Indication
Red	Red	Grey	Power Interrupted
Red	Grey	Red	Compressor Stall
Red	Red	Red	No Start Winding Voltage
Grey	Red	Grey	Compressor Over Current
Grey	Grey	Red	Open Compressor Overload
Grey	Grey	Grey	Normal Operation

**Phase:** Single Phase  
**Voltage:** 100 - 240 VAC  
**Frequency:** 50 - 60 Hz

Micro Air Corp.	
Easy Start Board Only Wiring	
ASY-366	
Drawn By: Roger Krinic	
October 6, 2016	Rev 3.05

## Specifications

Line voltage	100 to 250VAC
Frequency	50 or 60 Hz
Maximum motor RLA	35 Amps (-X06) 25 Amps (-X05)
Maximum start winding current (fuse protected)	20 Amps (-X06) 16 Amps (-X05)
Minimum operating temperature	0°F (-17.8°C)
Maximum operating temperature	150°F (65.5°C)
Maximum RH conditions (Board and display)	95 % Non-condensing
Board height (X05)	1.375" (3.5cm)
(X06)	2.20" (5.6cm)

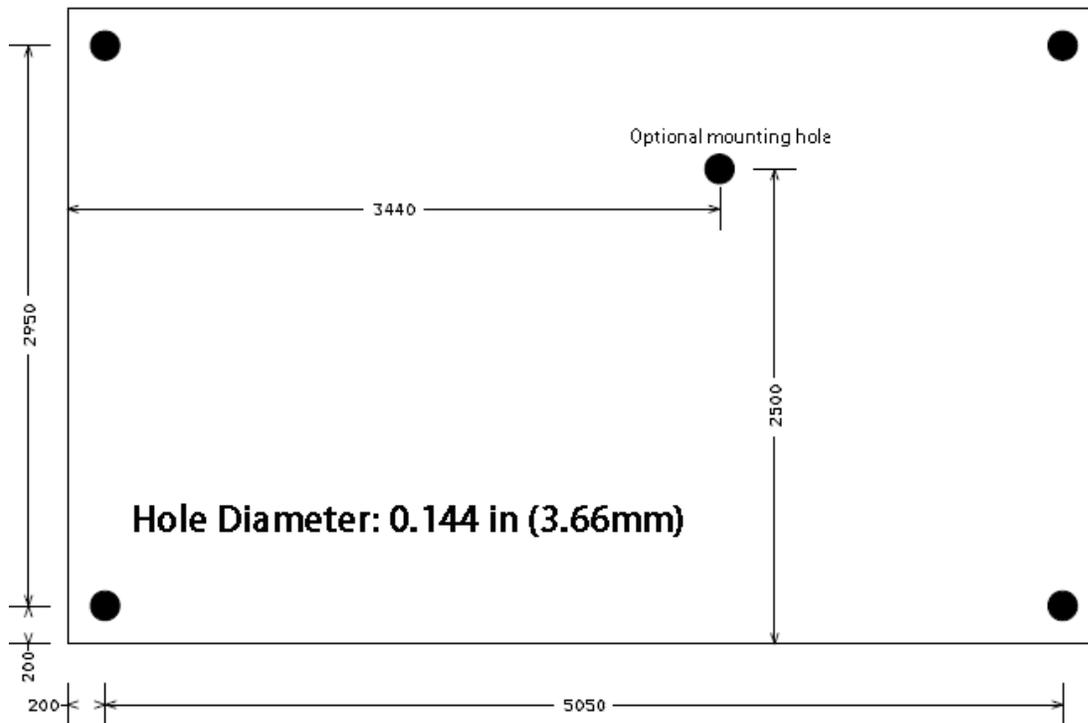
## Warranty

Micro-Air warrants new products sold by us to be free from manufacturing defects for a period of two (2) years commencing with delivery of the product to the original customer. Our obligation under this warranty is expressly limited at our option, to the replacement or the repair at *Micro-Air* or at a service facility designated by us, of such parts, as inspection shall disclose to have been defective. This warranty does not apply to defects caused by damage or unreasonable use, including failure to provide reasonable and necessary maintenance, while in the possession of the consumer.

*Micro-Air* shall not be liable for consequential damages of any kind, including, but not limited to, consequential labor costs or transportation charges in connection with the replacement or repair of the defective parts.

# Mounting template

## ASY-366 MOUNTING DIMENSIONS



Above hole dimensions are in inches and are provided as a guide for drilling. All other dimensions are in thousandths of an inch.

***Note: Some printers do not print to scale very well. Verify the dimensions on the printed template with the board before drilling.***

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