

**INTRODUCING THE WORLD MOTOR**

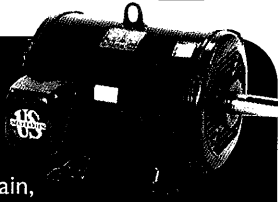
U.S. Electrical Motors is proud to announce the introduction of the World Motor into the integral horsepower motor market. The World Motor is more than just another energy efficient motor – this product incorporates World Class design ... World Class features ... and World Class testing.

Our World Motor, introduced in 1997, lends itself to international requirements and is available in open dripproof, totally enclosed fan cooled and hostile duty cast iron designs.



**Open Dripproof**

Open motors, types FR and FD, are constructed to minimize the entrance of rain, snow and airborne particles. Our enclosures exceed NEMA requirements because U.S. Motors has built in the extra protection needed for rugged outdoor applications. The ventilation system is designed to provide optimum cooling for both windings and bearings. Motor type FD is steel frame from 56 through 320 T. Type FR is constructed of cast iron and is available from 360 through 449T frame.



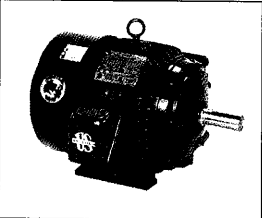
**Unimount® Totally Enclosed Fan Cooled**

Designed to feed a wide range of solids and powders in gravity, pressure or vacuum applications. The exclusive Tapered Rotor Design allows rotor clearance to be field adjusted without rotor removal. This can be used to compensate for temperature, wear or product variations. The Tapered Rotor Design also simplifies tear-down and reassembly. The "V" neck inlet reduces product shearing. Cast bodies, precision machining, adjustable packing glands and permanently sealed outboard bearings assure high reliability and long operating life.



**Hostile Duty**

Totally Enclosed Hostile Duty machines, type FCT, are available for more demanding environments. The rugged cast iron frame and end bells provide greater durability (140 frame is rolled steel). The Corro-Duty® paint withstands a 250 hour salt spray for added protection. Cast iron conduit box and fan guard kits are available to upgrade to full Corro-Duty® for corrosive atmospheres. The Hostile Duty is available from 1 through 200 horsepower in frames 140 through 447T.



**New Energy Laws**

As global concern for energy conservation increases, more countries acknowledge and appreciate the need for motors with higher efficiency levels. The U.S., Canada and Mexico have all passed legislation stipulating that integral horsepower motors meet efficiencies shown in NEMAMG1, 12-10. In the U.S., the Energy Policy Act of 1992 (EPACT '92) becomes effective October 24, 1997 and impacts the following types of squirrel cage induction motors:

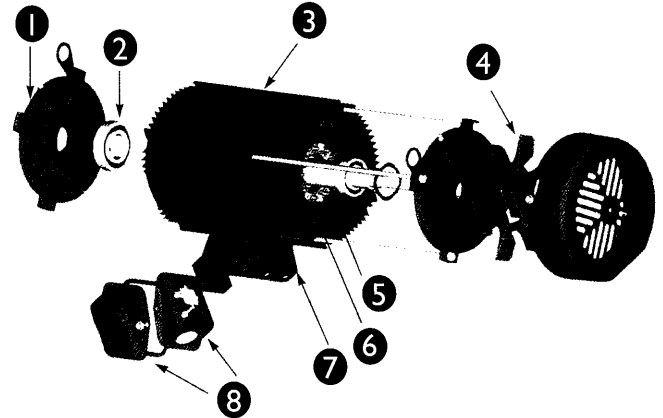
- |                     |                         |
|---------------------|-------------------------|
| • General Purpose   | • Foot Mounted          |
| • Open and Enclosed | • Design A or B         |
| • NEMA T-Frame      | • 230/460               |
| • Single Speed      | • 60 Hertz, Three Phase |

Other types of motors not immediately covered by the legislation, such as labeled hazardous location motors, have an additional two year window to come into compliance. Definite and special purpose motors are not currently included in the legislation.

The World Motor was designed with these efficiency requirements in mind.

## A Closer Look at the World Motor

1. C-Face and D-Flange kits available
2. Double shielded vacuum degassed bearings on most ratings
3. Corro-Duty® type paint withstands 250 hour salt spray test
4. Non-sparking polypropylene fans on all TEFC ratings
5. Low loss lamination steel and increased active material for energy efficiency
6. 250 frames and larger ratings suitable for Wye-Delta starting
7. Removable base on all Unimount® TEFC ratings
8. Terminal block and cable gland kits available



### Product Features

	Open Dripproof	Open Dripproof	TEFC Unimount	TEFC Hostile Duty
Type	"FD"	"FR"	"FUT"	"FCT"
<b>Frame Material</b>	Steel	Cast Iron	Aluminum (56-140 Rolled Steel)	Cast Iron (140 Rolled Steel)
<b>End Shield Material</b>	140-250 Aluminum 280-320 Cast Iron	Cast Iron	Aluminum	Cast Iron
<b>Paint</b>	Corro-Duty (250 hour salt spray)	Corro-Duty (250 hour salt spray)	Corro-Duty (250 hour salt spray)	Corro-Duty (250 hour salt spray)
<b>Horsepower Range</b>	1/3 thru 60 HP	30 thru 400 HP	1 thru 30 HP	1 thru 200 HP
<b>Frame Sizes</b>	56 thru 320 T Frame	360 thru 449T Frame	56 thru 286T Frame	140 thru 447T Frame
<b>CE Mark on Nameplate</b>	Yes	Yes	Yes	Yes
<b>Phase</b>	Three phase	Three phase	Three phase	Three phase
<b>Speeds</b>	<b>60 Hz</b> 3600-900 rpm <b>50 Hz</b> 3000-750 rpm	<b>60 Hz</b> 3600-900 rpm <b>50 Hz</b> 3000-750 rpm	<b>60 Hz</b> 3600-900 rpm <b>50 Hz</b> 3000-750 rpm	<b>60 Hz</b> 3600-900 rpm <b>50 Hz</b> 3000-750 rpm
<b>Voltage</b>	<b>60 Hz</b> 200, 208-230/460, 460, 575 volt <b>50 Hz</b> 190/380, 380 volt	<b>60 Hz</b> 200, 230/460, 460, 575 volt <b>50 Hz</b> 190/380, 380 volt	<b>60 Hz</b> 200, 208/460, 460, 575 volt <b>50 Hz</b> 190/380, 380 volt	<b>60 Hz</b> 200, 208/460, 460, 575 volt <b>50 Hz</b> 190/380, 380 volt
<b>Hertz</b>	50/60 hertz on 230/460 volt & 460 volt only, 60 Hz on 200 & 575 volt	50/60 hertz on 230/460 volt & 460 volt only, 60 Hz on 200 & 575 volt	50/60 hertz on 230/460 volt & 460 volt only, 60 Hz on 200 & 575 volt	50/60 hertz on 230/460 volt & 460 volt only, 60 Hz on 200 & 575 volt
<b>Service Factor</b>	1.15 on 60 Hz 1.0 on 50 Hz	1.15 on 60 Hz 1.0 on 50 Hz	1.25 on 60 Hz 1.0 on 50 Hz	1.25 on 60 Hz 1.0 on 50 Hz
<b>Starting Method</b>	Across-the-Line Wye-Delta Part Winding start	360-449T 360-449T 360-449T	56-280T 250-280T 56-280T	56-447T 250-447T 56-447T
<b>Bearing type</b>	Sealed on 56-140T Double shielded 180-320T	Double shielded 360T Open 400-440T	Shielded on 56-140T Double shielded 180-280T	Double shielded 140-360T Open 400-440T
<b>Regreasing Provisions</b>	Yes 180 Frame and larger	Yes	Shaft End	250 Frame and larger

## Electrical Components

### Full Line Control From Square D



**Square D** is a worldwide supplier of products, systems and services for the distribution, application and control of electrical energy. We've been serving industrial and construction markets, as well as public utilities, individual consumers and government agencies for over 85 years.

We offer unsurpassed quality and innovative design, the largest distribution and delivery network in the industry, and a committed staff of trained sales representatives and service technicians willing to stand behind every product we sell.

**Our full line of control products includes:**

- Push Buttons, Selector Switches and Pilot Lights
- Foot Switches
- Relays, Timers and Terminal Blocks
- Limit Switches and Pressure Switches
- Solid State Sensors
- Definite Purpose Contractors and Starters
- Manual Starters and Switches
- Combination Starters
- IEC Contractors and Overload Relays
- Control Transformers
- Lighting Contractors
- AC Drives
- Medium Voltage Control
- Crane Control

## Control Stations & Enclosures

**Standard Duty Control Stations.** Square D offers a complete line of standard duty control stations that are designed for use with magnetic starters to govern the starting, stopping or reversing of all types of electric motors. Surface and flush mounting general duty types and watertight and hazardous location versions are available.

**Security Control Stations.** Available in cast aluminum for surface mounting or stainless steel for flush mounting. Square D's security control stations are recommended for a variety of applications including control of overhead doors and gates in stores, shopping centers, warehouses, parking garages and commercial buildings.

**Control Stations and Enclosures.** Square D offers a complete line of assembled control stations that are designed to meet virtually any application needed. Factory assembled standard

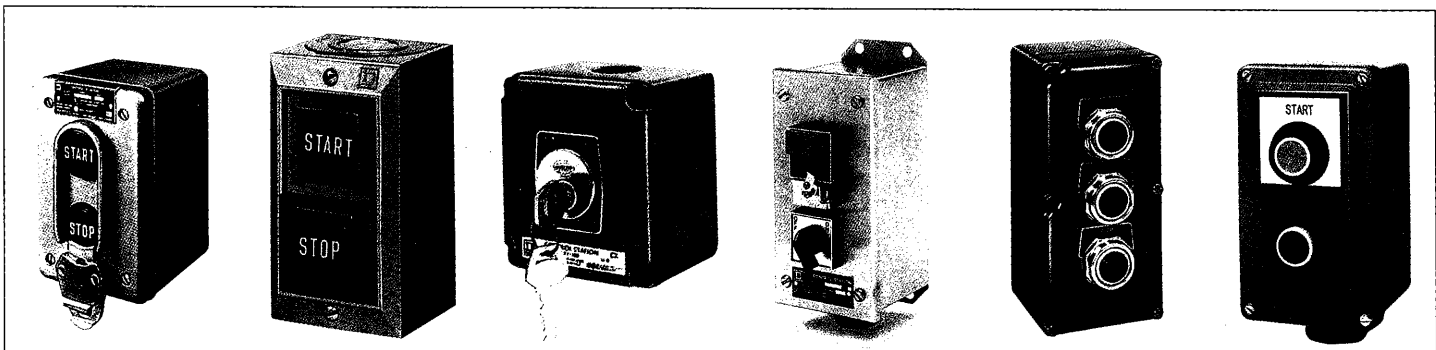
stations are available or order enclosures and operators and assemble to your specifications.

Custom stations with up to 30 units will be delivered in three days or less from our factory with no additional charge for assembly.

**Die-Cast Aluminum Enclosures.** Square D's type KY die-cast aluminum enclosures are rated for both NEMA and UL Types 1, 3, 4, and 13 oiltight, watertight and dusttight applications.

**Stainless steel Enclosures.** Type KYSS stainless steel enclosures are rated for both NEMA and UL Types 1, 3, 4, 4X and 13 oiltight, watertight, dusttight and corrosion resistant applications.

**Fiberglass Enclosures.** Square D's Type SKY fiberglass enclosures are rated for both NEMA and UL Types 1, 3, 4, 4X and 13 oiltight, watertight, dusttight and corrosion resistant applications.



# Circuit Breakers

## A Simple Case For Protection, Transformation And Termination

Our full line of operating mechanisms and door closing mechanisms are designed to be rugged, yet easy to install, easy to operate, and easily convertible from right hand to left hand flange mounting.

A wide variety of flange mounted, variable depth disconnect switches, fusible or non-fusible, with visible blades and accessories simplify all 30 through 400 ampere applications.

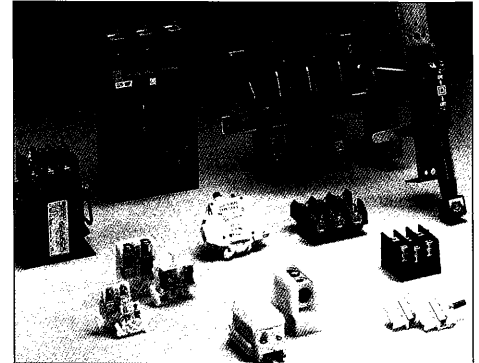
In addition, both flange and door mounted operating mechanisms (15 through 1000 amperes) are available for use with Square D circuit breakers as main or branch circuit disconnect devices in control enclosures. They feature NEMA 1, 3, 3R, and 12 handle assemblies, mechanical door interlocks,

and padlock provisions which allow the handle to be padlocked in the "off" position.

Also, a complete line of UL listed, CSA certified and IEC rated thermal-magnetic molded case circuit breakers are available in one, two, and three pole, and in 100 through 2500 ampere frames with standard interrupting 240Vac/250Vdc through high interrupting 600Vac ratings.

Ground fault modules, as well as OEM unit mounting bases are available, and can be ordered from the factory with or without auxiliary switches, alarm switches and cylinder blocks.

Our Type K control transformers have set new industry standards for design



innovation and top performance. They are available in a wide range of voltages, in sizes up to 5000 VA. And for your unique requirements, we will design, manufacture and ship a special transformer in as little as three weeks or less.

## The Most Complete Line Of Switches In The Industry

	<b>Amp Range</b>	<b>Vac Max</b>	<b>Vdc Max</b>	<b>Fusible</b>	<b>Enclosure Type</b>
General Duty	30-600	250 Vac	—	Fusible and Not-Fusible	Type I, 3R
Heavy Duty	30-1200	600 Vac	600 Vdc	Fusible and Not-Fusible	Type I, 3R, 4, 4X, 5, 12
4 Pole Heavy Duty	30-600	600 Vac	600 Vdc	Fusible and Not-Fusible	Type I, 3R, Stainless Steel, 12
6 Pole Heavy Duty	30-200	600 Vac	—	Fusible and Not-Fusible	Type I, 3R, Stainless Steel, 12
Double Throw	30-600	600 Vac	250 Vdc	Not-Fusible	Type I, 3R, Stainless Steel, 12
Interlock Rec. Switches*	30-100	600 Vac	250 Vdc	Fusible and Not-Fusible	Type I, 3R, 4, 4X, 5, 12
Hazardous Location Switches	30-100	600 Vac	250 Vdc	Not-Fusible	Used in Class I, Groups C and D, Type 7, and Class II, Groups E, F, and G, Type 9 or Class III, Type 9 as defined in NEC article 500

\* Appleton POWERTITE, Cross-Hinds ARKTITE, and HUBBELLOCK receptacles

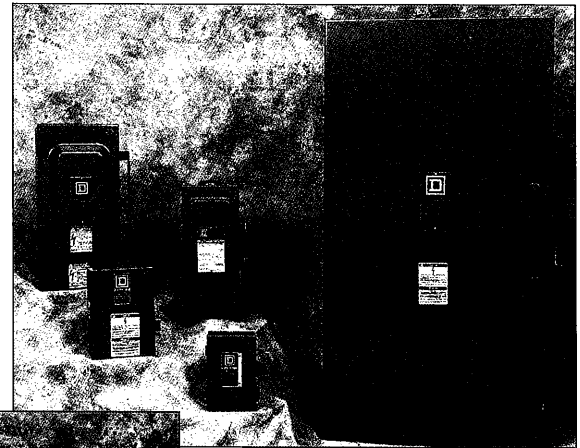
Type I (indoor), Type 3R (outdoor), Type 4, 4X, 5 (water and dust-tight, corrosion resistant) (cast aluminum, stainless steel, Glass Polyester or KRYDON), Type 12 (JIC-Mill and Foundry type).

Switches are UL Listed (UL98 Enclosed Switches) and meet or exceed the NEMA KSI standard.

# Safety Switches

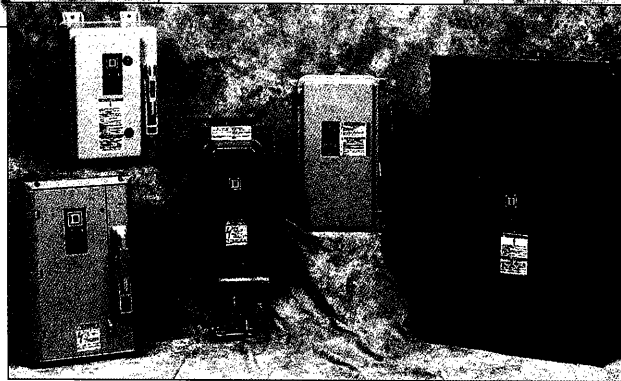
**For Over 90 Years, Safety Switches Have Been Our Business**

We've built that business by listening to our customers, following through on their requests, and delivering high quality products that meet their needs. Maybe that's why Square D is consistently ranked #1 in surveys for brand preference and is the overall market-share leader for the past twenty years. The explanation for this success is really very simple. In safety switches, we do as much as we can for our customers—then we do more.



## Heavy Duty Safety Switches →

Designed for applications where safety, maximum performance and continuity of service is required. They are suitable for use in service entrance applications when installed in accordance with applicable codes.



## ↑ General Duty Safety Switches

Designed for residential and light commercial applications where duty is not severe and economy is a prime consideration. They are suitable for use in service entrance applications when installed in accordance with applicable codes.

# Type S Starters

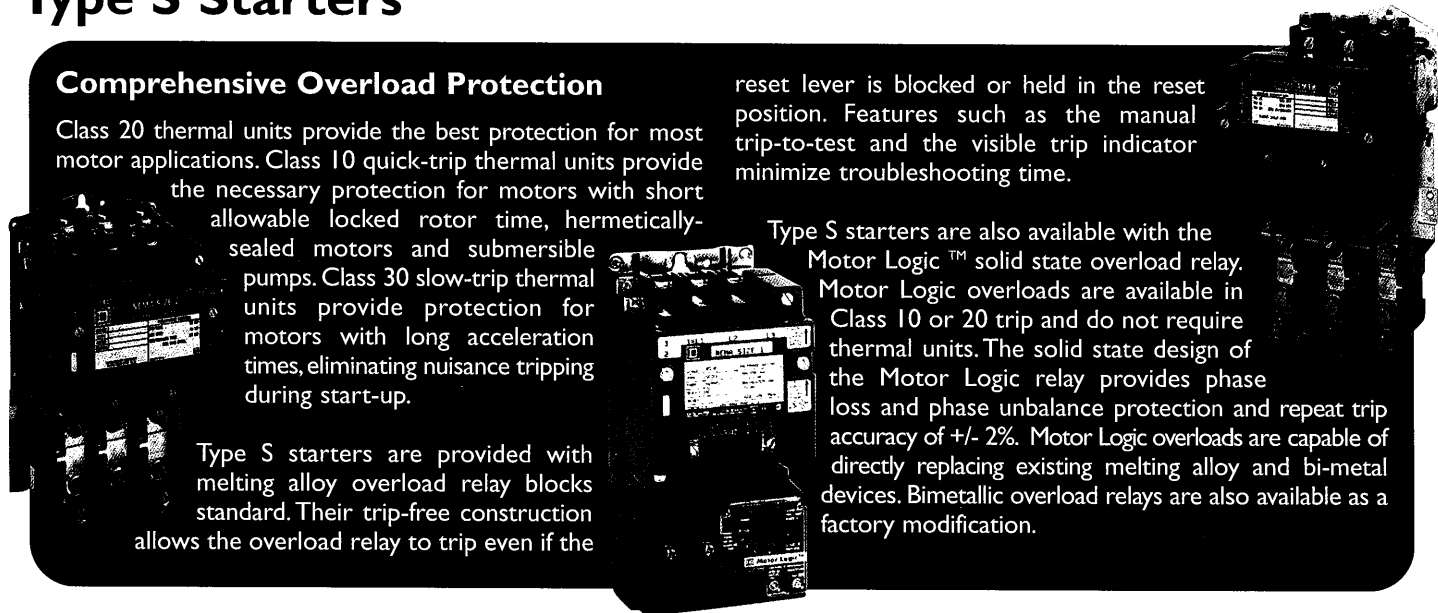
## Comprehensive Overload Protection

Class 20 thermal units provide the best protection for most motor applications. Class 10 quick-trip thermal units provide the necessary protection for motors with short allowable locked rotor time, hermetically-sealed motors and submersible pumps. Class 30 slow-trip thermal units provide protection for motors with long acceleration times, eliminating nuisance tripping during start-up.

Type S starters are provided with melting alloy overload relay blocks standard. Their trip-free construction allows the overload relay to trip even if the

reset lever is blocked or held in the reset position. Features such as the manual trip-to-test and the visible trip indicator minimize troubleshooting time.

Type S starters are also available with the Motor Logic™ solid state overload relay. Motor Logic overloads are available in Class 10 or 20 trip and do not require thermal units. The solid state design of the Motor Logic relay provides phase loss and phase unbalance protection and repeat trip accuracy of +/- 2%. Motor Logic overloads are capable of directly replacing existing melting alloy and bi-metal devices. Bimetallic overload relays are also available as a factory modification.



## Combination Starters

Soon after introducing the basic Type S starter in 1965, Square D presented another leader to the electrical industry: Type S Combination Starter. This device merged the requirements of motor overload and short circuit protection into one single, convenient package.

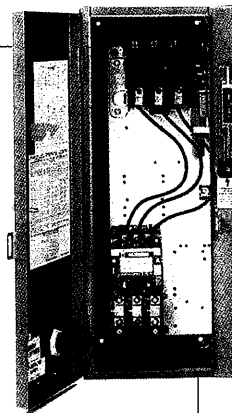
With the Type S starter as a foundation, most any motor control assembly can be constructed. Square D's disconnect switch starters and circuit breaker combination starters provide standard NEMA features that exceed most code, safety and quality requirements.

### Standard Features

**Handle Mechanism:** Includes a color-coded knob for quick and easy ON/OFF; a mechanical interlock which inhibits opening of the door when the starter is energized OR inhibits energizing the starter when the door is open; and a lockout provision for additional safety when a padlock is used.

**Door Closing Mechanism:** Supplied on NEMA 12 devices. Ensures door and enclosure integrity with an additional provision for padlocking.

**Solid Ground Bar:** Included in all enclosed starters to meet the most stringent control and conduit grounding requirements.

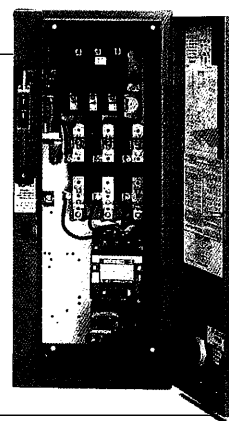


## Disconnect Switch Starters

Switch-type combination starters are available with fusible or non-fusible disconnect switches. The switch itself is constructed of a molded, insulated material that delivers arcquenching performance similar to that of high voltage switch gear. Visible blade construction confirms safety and proper performance at a glance. Many industries have standardized on the feature.

Non-fusible assemblies can be field converted to fusible designs easily and quickly. Factory-built fusible units will accept the industry standard Class H, K or J fuses. Class R fuse clip kits can be factory or field installed to meet rejection fuse requirements.

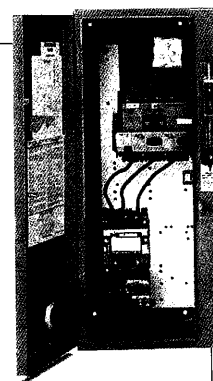
The various units have specific UL listed short circuit withstand ratings that range from 5,000 to 100,000 amperes. Specific ratings are influenced by many components, including the size of the disconnect switch and the type of fuses used with the switch.



## Circuit Breaker Starters

For applications requiring a breaker-type combination starter, Square D provides both a thermal magnetic circuit breaker and a motor circuit protector.

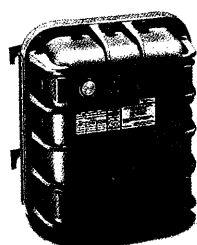
The most widely used overcurrent protection devices are thermal-magnetic circuit breakers, which use bimetals and electromagnets to provide both thermal and magnetic over-current protection. MAG-GARD® motor circuit protectors are similar in construction, but provide only short-circuit protection. When MAG-GARD devices are used with motor starters, the adjustable instantaneous trip provides maximum motor protection based on specific amperage and application. Type S combination starters using thermal magnetic breakers carry a UL listed short circuit withstand rating from 5,000 to 30,000 amperes. If a MAG-GARD Type GJL breaker is used, the withstand rating increases to 100,000 amperes. Specific ratings and listings may vary depending on the specific combination of components used in the assembly.



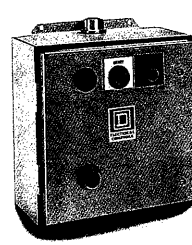
## Versatile Enclosure



**NEMA Type 1**



**NEMA Type 7 & 9**



**NEMA Type 4 & 4X**



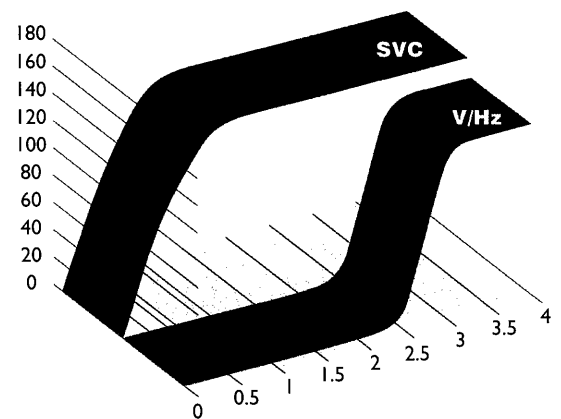
**NEMA Type 12**

## The Complete ALTIVAR Family: Choose the Appropriate Level of Performance

Customize SQUARE D Drives and Soft Starts to Your Specific Application

ALTIVAR drives and ALTISTART soft starts allow easy access to data so you can respond on the spot.

Sensorless vector control technology in ALTIVAR drives provide motor performance improvements you can chart.



**ALTIVAR®** and **ALTISTART®** products are especially proficient at delivering energy savings and increased productivity in fan, pump, compressor and industrial process applications. Customizing them to meet the requirements of these applications is quick and easy as well.

### HVAC Fans

“Better” HVAC means more efficiently delivered heated or cooled air. Fan systems built around conventional single speed or two-speed starters are prone to electrical in-rush and high motor torque at start-up which can result in mechanical wear and tear and adversely affect system performance. SQUARE D drives and soft starts solve these problems by providing more complete system control.

The best way to achieve more energy efficient HVAC is with air handling systems which vary the air volume by adjusting fan motor speed. Our ALTIVAR products were developed to drive variable air volume (VAV) systems. Using ALTIVAR drives rather than electromechanical controls, you can cut energy costs by reducing fan motor RPM's and expensive starts and stops. You can minimize the size of air handling systems and shift to smaller,

high-efficiency motors. And you can do it all with one of the lowest installed costs of any energy saving investment.

SQUARE D makes the transition easy, too. Factory-configured, enclosed ALTIVAR drive “packages” are available with the NEC-required disconnects. Operators and pilot lights may be added if you choose.

For high inertia fans and centrifuges, which may require long starting times, the patented torque control system of the ALTISTART 46 unit is ideal. ALTISTART 46 allows you to adjust current limit and overload protection and define a maximum start time. This minimizes starting current requirements, reduces wear on mechanical couplings and protects against stalling.

### Pumps

Pump systems are generally designed to use a full-speed, non-reversing motor to drive a water mover. The output of these systems is controlled by mechanically constricting the flow with throttling valves.

Constricting water reduces the flow but not the load on the motor and the power required to run the motor. Therefore, flow constriction is not very efficient. Running a system this way is like driving a car with the accelerator pressed to the floor while controlling speed with the brake.

An adjustable frequency drive, on the other hand, allows precise control of motor output. In the case of pumps which must handle varying flow levels, which is true of most pumps, variable

torque products such as ALTIVAR drives can deliver a significant reduction in the power required to handle the loads.

Compared to electromechanical controls of traditional soft starts, the ALTISTART 46 unit offers much improved performance for the controlled acceleration and deceleration of pumps. Because the ALTISTART 46 unit bases ramping on the motor torque rather than on current or voltage, you get optimal starting and stopping control regardless of flow rate. Water hammer and pipe damage is reduced, as well as motor wear. Plus, the ALTISTART 46 unit provides overload and underload protection and allows for remote management, control and monitoring of the motor and starter.

# Altistart 46 Soft Start

## A New Generation of Soft Starts

The ALTISTART® 46 Soft Start introduces the principal of Torque Control System (TCS™) ramping. By controlling motor torque, the ATS 46 soft start is ideal for a wider variety of application than traditional soft starts which simply provide a voltage ramp or current limit. Setting the new industry standard in soft start control, TCS can provide a linear speed ramp without external feedback and helps prevent water hammer independent of the load condition.

**Ease of Selection**

The ATS 46 soft start is available in 21 power ratings from 17 to 1200 amps and each model is rated for use at any voltage between 200 and 500 VAC at 50 or 60 Hz. Given the improved performance TCS ramping offers and the variety of model sizes, product selection is a simple consideration of motor horsepower and duty cycle requirements.

### Ease of Installation

The ATS 46 soft start is preset for quick and easy start-up without adjustment for the majority of installations.

### Ease of Configuration

If modification of the factory presets is required, the settings can easily be adjusted using a digital keypad or optional PLC or PC connections.

### Ease of Operation

For worry free operation, the motor, starter and fault status communication occurs through a user-friendly dialog.

### Starting and Stopping

The Altistart 46 provides a choice of starting methods:

- TCS soft start, adjustable from 1 to 60 seconds
- Custom TCS Ramp, initial starting torque and torque limit may be adjusted for customized starting performance
- Current limit, adjustable from 150 to 500% of the device rating
- TCS with "boost," adjustable from 50 to 100% of mains voltage



#### Section Guide

ALTISTART  
ATS 46

Enclosed  
ALTISTART  
Class 8636/38/39

Modular  
Soft Start  
LH4N

#### SOLID STATE

<b>Enclosures</b>			
Open	X		X
TYPE I		X	
TYPE I2		X	
TYPE 3R/4			
<b>Combination Devices</b>			
Fusible Disc		X	
Circuit Breaker		X	
<b>Max Motor Voltage</b>			
480 Vac	X	X	X
575 Vac			X (LH4N2)
<b>Maximum Horsepower</b>			
At 480 Vac	900	500	60
<b>Starting Method</b>			
TCS (Torque Control System)	X	X	
Voltage Ramp	X	X	X
Current Limit	X	X	
<b>Starting Current</b>			
% Starter Rated Current	200-500%	200-500%	200-500%
<b>Starting Torque</b>			
% Rated Torque	10-100%	10-100%	10-70%
<b>Starting Time</b>			
Acc Ramp Time	1-60 sec.	1-60 sec.	0.5-5 sec.
Factory Settings	10	10	
<b>Methods of Stopping</b>			
Decel Ramp	X	X	X (LH4N2)
Braking	X	X	
Free Wheel	X	X	X
<b>Communication Options</b>			
MODBUS	X	X	
Unitelway	X	X	
Analog Output	X	X	
<b>CE Mark</b>	X		X



## Altistart 46 Soft Start *(continued)*

The ALTISTART 46 also provides a choice of stopping methods which may be used even if a shorting contactor is used to bypass the soft start while running:

- Freewheel or coast to stop
- TCS soft stop, adjustable from 1 to 60 sec.
- InTele™ Braking does not require external components for a faster than freewheel stop.

### Protective Features

A microprocessor continuously monitors motor and starter status, providing state-of-the-art protection, even when a shorting contactor is used to bypass the soft start when the motor is up to speed. Protective features include: choice of Class 10, 20 or 30 motor overload protection with pre-alarm, phase loss and selectable underload detection, stall, jam and phase reversal protection.

### Monitoring and Indication

A digital keypad and flexible I/O are standard for customized system integration. Comprehensive diagnostics are provided for easy troubleshooting and maintenance as well as real time indication of motor and starter status.

### Enclosed Soft Start Controller Options

Altistart controllers are also available as packaged solutions for immediate installation. Enclosed controllers are factory tested and provide SCR fault isolation for optimal protection on the motor and operating personnel. A door-mounted keypad is standard for convenient setup and monitoring. Enclosed options include:

- Non-combination controllers in NEMA Type 1 or 12 enclosure through 400 HP
- Combination controllers with a circuit breaker or fusible disconnect in NEMA Type 12 enclosure through 500 HP
- Combination controllers in motor control centers feature full voltage bypasses standard through 500 HP
- Optional shorting and isolation contractors, reversing service, control operators, pilot lights and meters.

Contact Thompson-Hill for further information.

### Selection Guide

Catalog Number	Rated Amps	Horsepower			Dimensions			Weight Lbs
		208V	230V	460V	Height	Width	Depth	
ATS46D17N	17	3	5	10	13	7	6	9
ATS46D22N	22	5	7.5	15	13	7	6	9
ATS46D32N	32	7.5	10	20	15	7	6	10
ATS46D38N	38	10	—	25	15	7	6	10
ATS46D47N	47	—	15	30	13	9	7	15
ATS46D62N	62	15	20	40	13	9	7	15
ATS46D75N	75	20	25	50	13	9	10	24
ATS46D88N	88	25	30	60	13	9	10	24
ATS46C11N	110	30	40	75	15	9	10	26
ATS46C14N	145	40	50	100	17	9	10	35
ATS46C17N	176	50	60	125	27	14	11	97
ATS46C21N	210	60	75	150	27	14	11	97
ATS46C25N	257	75	100	200	27	14	11	97
ATS46C32N	320	100	125	250	27	14	11	97
ATS46C41N	410	125	150	300	37	16	14	123
ATS46C48N	480	150	—	350	37	16	14	137
ATS46C59N	590	—	200	400	37	16	14	137
ATS46C66N	660	200	250	500	37	16	14	137
ATS46C79N	790	250	300	600	40	30	14	247
ATS46M10N	1000	350	400	800	40	30	14	273
ATS46M12N	1200	400	450	900	40	30	14	273

### Specifications

Three phase supply voltage.....	280V -10% to 240V +10% 380V -15% to 415V +10% 440V -10% to 500V +10%
Frequency .....	50/60 Hz, self adjusting, +/- 5% during start, + 5% -15% while running
Rated current .....	17 to 1200 A in 21 ratings
Motor power .....	2 to 1000 hp
Ambient air temperature.....	Operation: 0°C to +40°C without derating (between +40°C and +60° C, derate the ATS46 by 1.2% for each degree C) Storage: -25°C to 70°C
Max. relative humidity.....	93% without condensation or dripping water
Max. ambient pollution .....	Degree 3, conforming to IEC 664
Max. operating altitude.....	1000m without derating (above this, derate the ATS46 current by 0.5% for each additional 100m)
Operating position .....	Max. vertical inclination +/- 15 degrees with respect to the normal mounting position
Degree of protection .....	IP20: ATS46D17n to C14N models IP00: ATS46C17N to M12N models
Shock resistance.....	Conforms to IEC 68-2-27
Vibration resistance.....	Conforms to IEC 68-2-6
Resistance to electrostatic discharges....	Conforms to IEC 1000-4-2, level 3
Immunity to radio-electric interference.	Conforms to IEC 1000-4-3, level 3
Immunity to rapid electrical transients ..	Conforms to IEC 1000-4-4, level 4
Conformity to standards .....	UL Listed, CSA approved, carries CE Marking, conforms to IEC-947-4-2.

## Altivar 66 AC Drives

### Basic Drive

The ALTIVAR 66 drive is designed for use with standard three-phase asynchronous motors with a power range of 1 to 350 hp (constant torque) or 400 hp (variable torque), 2.2 to 220 kw (constant torque) or 250 kw (variable torque). With its modular design and extensive range of options and accessories, the ALTIVAR 66 drive can be used in all types of industrial environments, commercial construction, and OEM applications.

The ALTIVAR 66 drive benefits from a new concept, PRO System (Performance Regulation Optimization), providing a solution for demanding drive applications.



### Features include:

- New motor flux control algorithms
- Automatic adaptation of motor parameters
- Sensorless flux vector control without encoder
- Transient overtorque necessary for starting

### Factory Setting

The ALTIVAR 66 drive is factory preset for use in most common applications.

- Maximum available torque at low speeds without adjustment
- Automatic adjustment of acceleration and deceleration ramp times when torque capabilities are exceeded

The drive can be configured for either constant or variable torque applications.

### Drive Operator Interface

A keypad display is mounted on front of the drive. It allows:

- Choice of six languages
- Drive identification, parameter and fault display
- Recall of adjustments and drive configuration
- Display of running values such as output frequency or a fault
- Local control of the drive

The LCD graphic screen displays graphs and has reverse video for enhancing text or numerical values on the screen. An access locking switch on back of the keypad and a software key allow partial or total access to parameters. Adjustments can be saved on a PCMCIA card (Personal Computer Memory Card International Association) and subsequently downloaded into other ALTIVAR 66 drives. Three LEDs on front of the drive indicate status:

- Red LED illuminated: Drive fault
- Yellow LED illuminated: Current limit: flashing: Prealarm
- Green LED illuminated: Drive powered

### Reduction of Motor Noise

For use with constant or variable torque, a high switching frequency (2 kHz, 4 kHz, or 10 kHz) is available.

The switching frequency is randomly modulated to reduce audible motor noise while limiting losses in the drive.

### Sensorless Flux Vector Control

The ALTIVAR 66 basic drive incorporates flux vector control without encoder feedback, giving rated motor torque at 0.5 Hz without adjustment.

This sensorless flux vector control provides:

- Exceptional torque performance with a standard motor
- Rapid dynamic response with digital speed regulation
- Optimal performance for extruders, specialty machines, and material handling applications
- Economic solution for high torque and low speed

### Protection

The drive automatically protects itself against short circuits:

- Between output phases
- Between output phases and ground
- On the outputs of internal supplies
- On the logic and analog outputs

The drive provides UL rated electronic motor thermal protection.

The drive also provides:

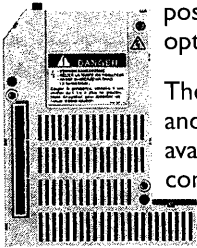
- Thermal protection against excessive overheating
- Protection against input line supply undervoltage and overvoltage
- Protection against input and output phase loss

# Altivar 66 AC Drive *(continued)*

## Options

### I/O Extension Modules

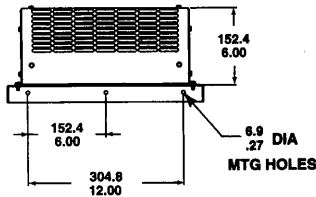
When the ALTIVAR 66 drive is first powered up, it is ready for use in its standard configuration for most applications. It is possible to add other functions by using an optional Input/Output Extension Module.



The I/O Extension Module adds additional logic and analog inputs and outputs. Two versions are available, for 24 VDC control and for 115 VAC control, allowing the drive to be adapted to your configurations.

## Accessories

### Dynamic Braking



A braking transistor is integrated into the ALTIVAR 66 drive.

The addition of an external resistor permits dissipation of excess braking energy, allowing the drive to function in quadrants 2 and 4 of the speed/ torque curve.

### PC Connection

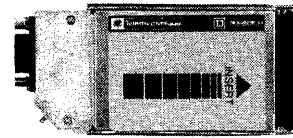
The PC Connection option allows the drive to be connected to a personal computer via RS 232C.

The software provides the following advantages:

- Prepare a drive configuration without connecting the drive to the computer.
- Save configurations and adjustments on a floppy or hard disk.
- Download configuration and adjustments into the drive.
- Provide a printout of drive configuration for future reference.

## Communication

Designed to be integrated into modern automated architectures, the ALTIVAR 66 drive can be connected to several different multidrop communication buses.

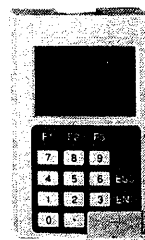


Communication is possible with the most common industrial protocols:

- UNI-TELEWAY
- MODBUS RTU/ASCII
- MODBUS Plus

Other interfaces are available through third party offerings.

## Keypad Door Mounting Kit

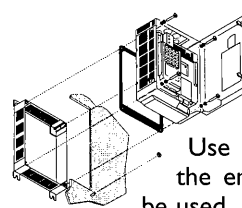


The keypad display can be remotely mounted with the use of a Keypad Door Mounting Kit.

The Keypad Door Mounting Kit allows the keypad to be mounted in the enclosure door. It allows you to view the display and access the keypad. The kit also allows three LEDs to be mounted in the enclosure door:

- Red LED illuminated: Drive fault
- Yellow LED illuminated: Current limit; flashing: Prealarm
- Green LED illuminated: Drive powered

## Recess Mounting Kits



The heat sink on the drive can be mounted through the enclosure wall.

The Recess Mounting Kit can be used with Type 1 or Type 12 enclosures.

Use of these kits reduces heat dissipated in the enclosure, allowing a smaller enclosure to be used.