



Prism

*ADJUSTABLE FREQUENCY AC DRIVE
CONTROLLER
1/4 through 5 HP*

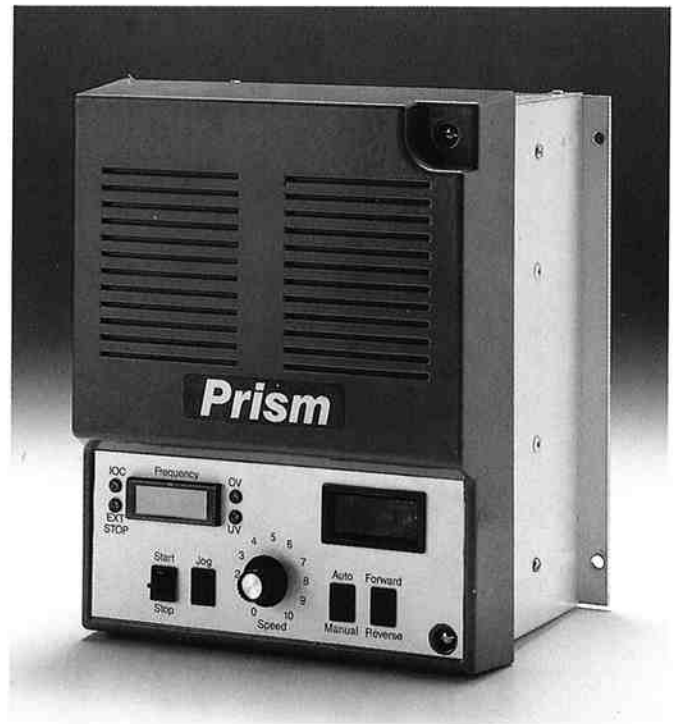


- Compact Size
- Accepts Single Phase or Three Phase Input Power
- Pre-Engineered Option Kits
- UL Listed, CSA Approved

General Description

The Prism is a high performance, general purpose, transistorized Adjustable Frequency AC Drive controller that operates directly from 50/60Hz plant power. The Prism produces an adjustable frequency, adjustable voltage, three phase output using state of the art PWM technology. Conventional fixed speed squirrel cage induction, synchronous or permanent magnet AC motors can be used with the Prism to produce an adjustable speed AC drive.

Because the Prism is equipped with an electronic inverse time overload and fast acting, current limiting fuses, it functions as a fused (high interrupting capacity) AC motor starter. No external overload protection is needed to meet National Electrical Code requirements on single motor applications.



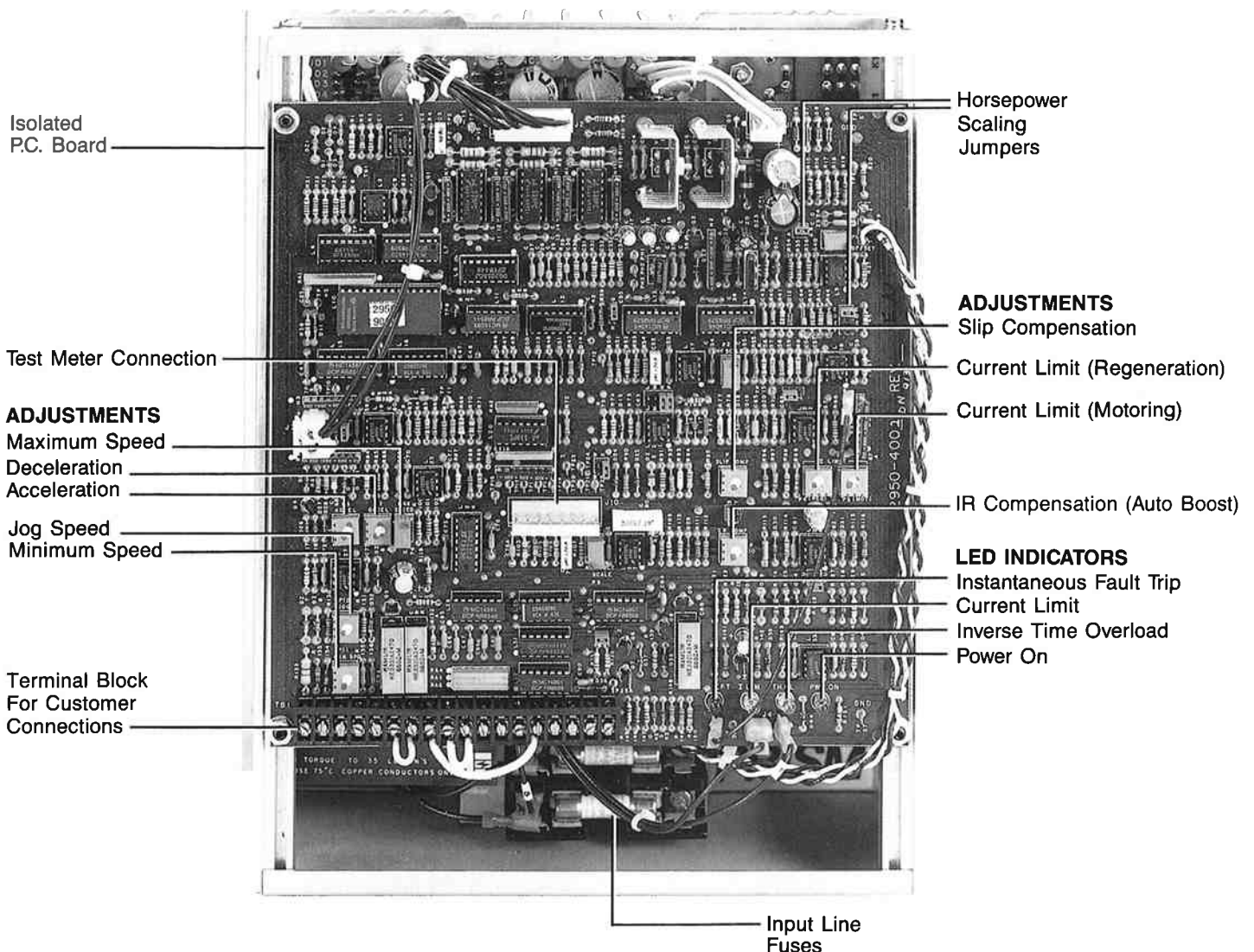
Standard Features

- **Motor Control Center Compatible** — With dimensions of 12" x 10³/₄" x 7" the Prism easily fits into a standard motor control center.
- **Compatible with primary or secondary side AC contactor/ starter** — In HVAC retrofits, the Prism can be directly installed and work in conjunction with both existing primary and secondary AC contactors/starters.
- **Two Separately Terminated References** — Either 0 to -10VDC or 4 - 20Ma can be used as a speed reference to give speed reference flexibility.
- **Jog at an Adjustable Preset Speed** — This function gives the ability to inch or creep at an adjustable speed.
- **Solid State Reversing** — The Prism has on board reversing circuitry that only needs an external switch to activate it.
- **Separately Adjustable Linear Accel/Decel** — Motor transition rates can be adjusted from 2-30 seconds.
- **Maximum Frequency up to 120Hz** — In order to accommodate differing maximum speeds and motors, the Prism can be programmed for either 60 Hz, 90 Hz or 120 Hz maximum output frequency.
- **High Input Voltage Ratings**—Keeping in mind that real world plant lines are not always at nominal voltage, the Prism is rated higher than most drives at 208/240VAC, 380VAC and 415/480VAC ±10%.
- **Single Phase or Three Phase Input** — The Prism can accept either single phase or three phase power. Some models require derating with single phase input. (See ratings chart.)
- **Approvals** — UL Listed, CSA Approved
- **Two Stopping Modes** — Either a controlled ramp stop or a coast to rest stop can be chosen, depending on drive application.
- **Torque Limit** — In order to provide maximum control, torque limit potentiometers are provided for both motoring and regeneration which have a range of 50 to 150% of rated torque.
- **Analog output signal proportional to frequency** — An analog output of 0-6VDC for 60Hz or 0-12VDC for 120Hz is available at the customer terminal strip. With this signal an external speed meter can be used or the signal can be used by a process controller for frequency monitoring.
- **Dual Frequency Operation** — Because of the Prism's unique design, it can accept either 50 or 60Hz input power without any internal modifications.
- **Frequency Regulation** — The precision of the Prism AC Drive Controller is exemplified in its frequency regulation which is .5% of maximum selected frequency.
- **Diagnostic LEDs** — Four bright LEDs indicate AC Power on, fault trip, in torque limit, inverse time overload trip and can be seen at a glance.
- **High Starting Torque** — Emerson boldly claims that the Prism drive can start any motor and load combination as long as the motor with load can be started across the line.
- **Auto Boost (IR Compensation)** — Emerson provides this exclusive function which automatically adjusts the volts/hertz ratio proportional to current demand. This keeps motors from stalling out, no matter what point they are at in the speed range.
- **Isolated Control Circuitry** — The top board is differentially isolated from the incoming line so that drive commons may be tied together or to earth ground.

Protective Features

- **AC Line Fuses** — provides the utmost in fuse coordination and protection of power transistors and the motor.
- **Instantaneous Overcurrent Protection** — if a transient load causes over 300% rated current to be drawn, the drive will safely shut-down preventing motor damage.
- **Inverse Time Overload Protection** — allows the Prism to act as a fused (high interrupting capacity) AC motor starter. No external overloads need to be supplied by the customer, to meet National Electrical Code requirements on single motor applications.
- **Undervoltage Protection** — the drive safely shuts down if the DC Bus Voltage drops below a predetermined value, protecting the drive and motor.
- **DC Bus Overvoltage Limit** — this keeps the bus from rising too high, protecting the motor and the drive itself.
- **Charged Bus Indicator** — easily visible neon light warns maintenance personnel that the DC Bus is charged.
- **Starting into a Running Motor Protection** — the Prism is equipped with circuitry to protect it from failing if it is started into a running motor.
- **Phase to Phase Short Circuit Protection** — If any of the output phases of the Prism controller short together (a motor stator failure), the drive will safely shut down until the short is cleared.
- **Phase to Ground Short Circuit Protection** — If an output phase shorts to ground (even if it shorts to the incoming power line), the Prism AC Controller will safely shut-down, protecting itself until the short is cleared.

Component Identification



Optional Features

Pre-Engineered Modification Kits

The Prism may be purchased alone or with a selected group of pre-engineered modification kits. The modifications may be factory installed or shipped loose for field installation. When furnished loose, each kit is individually packaged and identified and includes all mounting hardware, wire, terminals, cable ties, labels, and instructions. Most of the modifications can fit underneath the top cover of the Nema 1 enclosure kit. The following is a partial list of the Prism modification kits available:

Nema 1 Enclosure Kit with Operators P/N 2950-9051

Nema 1 Enclosure Kit without Operators P/N 2950-9052

Both kits provide Nema Class 1 protection for the Prism Unit. The Nema 1 Enclosure Kits provide space to mount one of the following: Isolated Process Signal Follower, 3-15 PSI Follower and the BCD Reference Follower.

The Nema 1 Enclosure Kit with operators includes a premounted speed potentiometer, Start/Stop rocker switch and a viewport window to observe the diagnostic LED's. The kit also includes a loose Run/Jog selector switch, Forward/Reverse selector switch, and an Auto/Manual selector switch all available for enclosure mounting.

The following options also mount on this enclosure; Ten Turn Speed Potentiometer and the Digital Frequency Meter with First Fault Diagnostics.

The Nema 1 Enclosure Kit without operators allows for wall mounting with operators located remotely. A viewport window is provided to observe the diagnostic LEDs. The optional Digital Frequency Meter with First Fault Diagnostics can also be mounted on this kit.

Nema 12 Enclosure Kit without Operators P/N 2950-9053

Nema 12 Operators Kit P/N 2950-9054

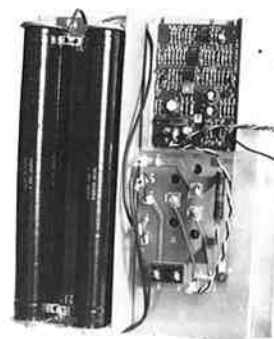
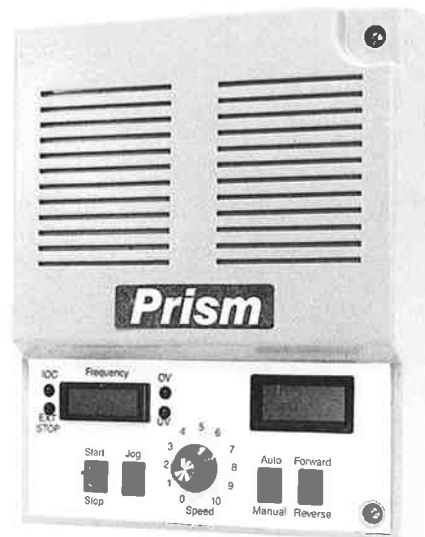
In more rigorous industrial environments, the Nema 12 Enclosure Kit provides the utmost in protection to the Prism Drive. Because of the Nema 12 Enclosure Kit's unique design, it can accommodate all Prism models regardless of horsepower. Inside the enclosure is space to mount the following options: Isolated Process Follower, 3-15 PSI Follower and BCD Reference Follower.

A molded operators tray, with a "Power On" LED, is mounted on the enclosure door. The Nema 12 operators kit includes Start, Stop pushbuttons, Run/Jog, Forward/Reverse and Auto/Manual selector switches and a speed potentiometer, which can be added to the molded operators tray.

Braking Kit P/N 2950-9058

This braking kit can be used to decelerate the motor more rapidly than its usual stopping rate by switching an energy absorption resistor onto the DC Bus. The resistor will absorb 100% rated power on a non-continuous basis, and also absorbs 20% rated power automatically, on a continuous basis, whenever the bus voltage exceeds the braking kits adjustable threshold level. The braking kit is programmable for 230VAC or 460VAC motors. One braking kit covers the entire Prism horsepower range and comes in a Nema 1 enclosure as standard.

If 100% rated power must be absorbed continuously during drive regeneration, consult factory.



Optional Features

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The following options also mount on this enclosure; Ten Turn Speed Potentiometer and the Digital Frequency Meter with First Fault Diagnostics.

The Nema 1 Enclosure Kit without operators allows for wall mounting with operators located remotely. A viewport window is provided to observe the diagnostic LEDs. The optional Digital Frequency Meter with First Fault Diagnostics can also be mounted on this kit.

Nema 12 Enclosure Kit without Operators P/N 2950-9053

Nema 12 Operators Kit P/N 2950-9054

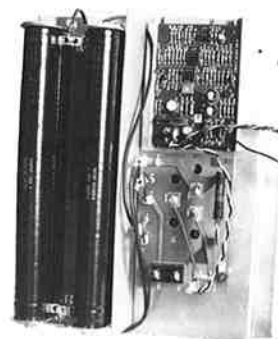
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If 100% rated power must be absorbed continuously during drive regeneration, consult factory.



Specifications:

Performance Specifications:

- Output Voltage: 208/230VAC, 380VAC or 415/460VAC, 3 phase
- Nominal Output Frequency: 60Hz, 90Hz, 120Hz (Jumper Selectable)
- Controlled Speed Range: 20 to 1
- Frequency Regulation: .5% of maximum frequency
- Overload Rating: 150% for 60 seconds
- Service Factor: 1.0
- Breakaway Torque: Locked Rotor or greater
- Efficiency: 95% or greater
- Maximum AC Motor Size: 2 times rated drive HP

Adjustments:

- Maximum Speed: 50 to 110% of rated frequency.
- Minimum Speed: 0 to 50% of rated frequency.
- Jog Speed: 0 to 50% of rated frequency.
- Autoboot: 0 to 5% of rated voltage. (Jumper selectable from 5 to 10% rated voltage).
- Torque Limit (Motoring): 50 to 150% of rated current.
- Torque Limit (Regen): 50 to 150% of rated current.
- Accel/Decel Time: Separately adjustable from 2 to 30 seconds.
- Slip Compensation: 0 to 10%.

Service Conditions:

- Rated Input Voltages: 208/240, 380VAC or 415/480 Volts (+ 10%, - 10%) A.C. three phase or single phase.
- Frequency: 50/60 Hz, + 5%, - 5%
- Ambient Temperatures: 0 to 55°C (chassis)
0 to 40°C (enclosed)
- 30° to 65°C (storage)
- Altitude: Sea level to 3,300 feet
- Humidity: Non-condensing to 95%
- Max Short Circuit Current: 100,000 Amps (symmetrical)

Diagnostics

- Indicators (LEDs): AC Power On
Fault Trip
In Current Limit
Inverse Time Overload
Charged Bus
- Indicator (Neon):

Input Signal Requirements:

- 0 to - 10VDC or 4-20Ma

Speed Potentiometer:

- 2,000 Ohms, 2 Watt or 5,000 Ohms, 2 Watt

Ratings

Chassis Part Number	Input		Typical HP Range†	Max Output KVA*	Max Output KW*	Max Continuous Output Amps	Overload Output Amps 60 sec	Max Output Volts
	Volts**	Amps						
2950-8000	208/240 1ø	12.47	1/4 to 2	3.03	2.07	7.60	11.40	208/230
	208/240 3ø	7.20	1/4 to 2					
2950-8001	208/240 1ø	28.95	3	4.21	2.90	10.56	15.84	208/230
	208/240 3ø	16.70	3 to 5	7.01	4.84	17.60	26.40	
2950-8002	415/480 1ø	9.01	1/4 to 2	2.97	1.98	3.73	5.60	415/460
	415/480 3ø	5.20	1/4 to 3	4.46	2.97	5.60	8.40	
2950-8003	415/480 3ø	8.40	5	7.01	4.84	8.80	13.29	415/460
2950-8004	380 3ø	5.20	2 1/2	3.70	2.50	5.60	8.40	380
2950-8005	380 3ø	8.40	4 1/4	5.82	4.02	8.80	13.29	380

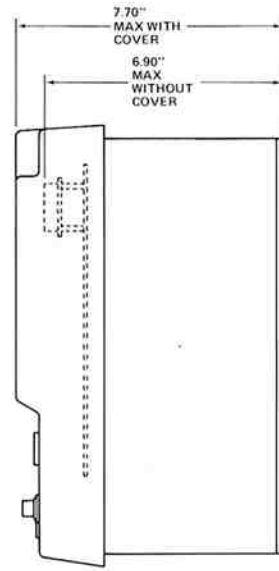
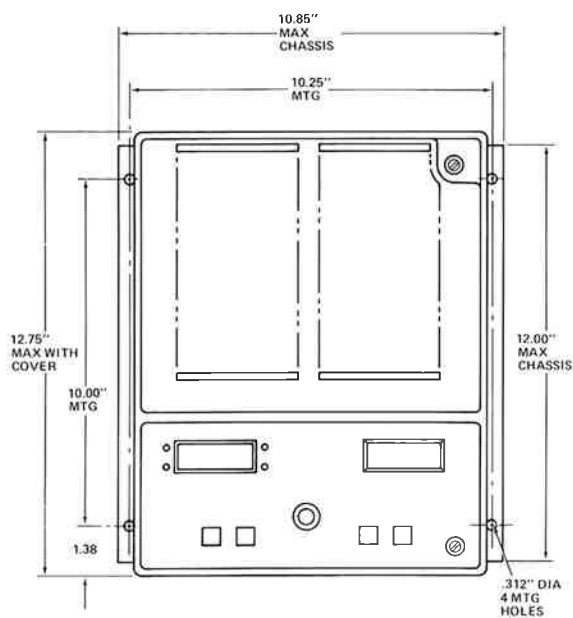
* Note: KVA and KW ratings shown above are for 240 and 480 VAC ratings only. KVA and KW ratings for 208 or 415 VAC units are proportionally less.

** Note: Never attempt to operate a Prism unit on any input voltage other than its label rating. Doing this can cause equipment damage.

† Note: Typical horsepower ratings for 208 or 415 VAC input power will be proportionally less than the ratings for 240/480 volt units. With high efficiency motors, the listed HP ratings can usually be maintained. Check motor nameplate for ampere rating when using the Prism control with 208 or 415 VAC input.

Dimensions

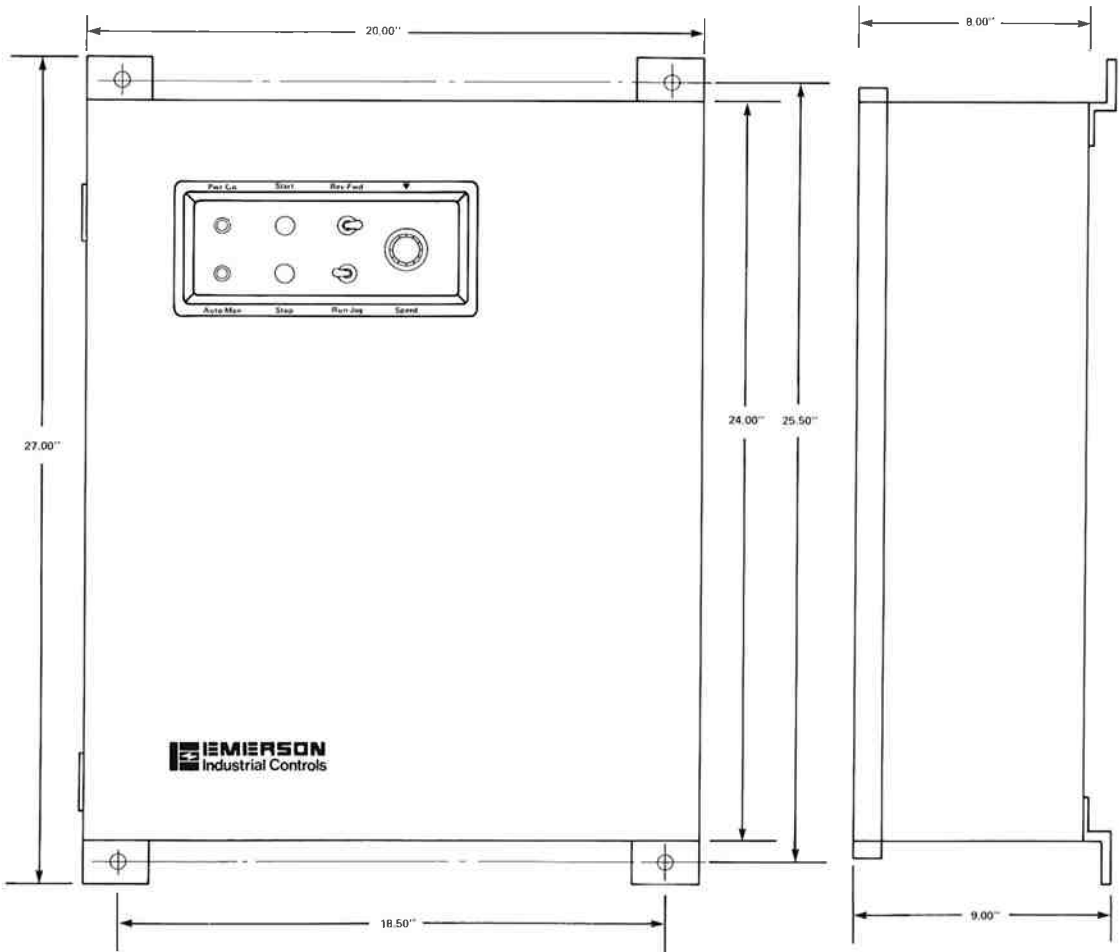
Chassis Unit and NEMA 1 Enclosure



WEIGHT (lbs.)

Chassis	Enclosed
18	19

NEMA 12 Enclosure



WEIGHT (lbs.)

Enclosure
41

The Emerson Story

Emerson Electric Company is one of the world's largest and most diversified manufacturers of electrical and electronic equipment, with five billion dollars of sales. Emerson's world-wide manufacturing facilities provide products and systems for commercial, industrial and consumer use. Over the last 25 years Emerson has grown profitably at a rate in excess of 15% per year.

Emerson's Industrial Controls Division (EIC) has been the leading developer and manufacturer of solid-state inverters for over 20 years. They manufacture AC Adjustable Frequency Drives in Santa Ana, California, Grand Island, New York, and Swindon, England. DC Controls are manufactured in Grand Island, New York and DC Motors are manufactured at a facility in Chicago, Illinois. These DC product lines have been among the leaders in the DC field since 1968.

With the consolidation of the WER DC drive product line with the Industrial Controls AC product line, Emerson now is able to present a unique and complete capability to serve the total adjustable speed drive market.

In addition, Emerson maintains the most specialized network of field service engineers in the world. They are truly dedicated to solid-state power conversion products. Emerson service engineers are located in every region of the USA, Canada, and Europe. Emerson factory trained engineers are also available throughout most other countries in the world.

Emerson field service engineers provide complete startup capability for all drive systems, and are able to respond to warranty situations in a timely, responsive manner. In addition, Emerson is able to provide training for its customers either on site or through



regularly scheduled factory schools featuring theory of operation, as well as "hands on" equipment training.

Emerson Industrial Controls Division is truly dedicated to maintaining its position as the adjustable speed drive specialist.

In addition to the world's best trained and most experienced network of application-oriented salesmen, service engineers, and qualified stocking distributors, Emerson now has advanced, coordinated research and development being conducted in three separate locations. In fact, Emerson's leadership in the application of solid-state power conversion technology is unsurpassed especially in such crucial areas as computerization, automated manufacturing, energy conservation and industrial processing. Emerson continues to explore new and advanced technologies, including micro-processor controls and diagnostics. These efforts are now being applied to the complete line of Emerson drives and motors to reduce costs and to increase application benefits.

Emerson Industrial Controls Division is dedicated to providing service for its customers through a network of the highest quality, application oriented, well trained industrial distributors. Emerson's distributors maintain strong inventories and provide

application support to their customers.

Emerson believes that the strong partnership with its distributors will continue to present to the ultimate customer, the best product, the best availability and the best service.



Santa Ana, California



Grand Island, New York



Swindon, England



Emerson Electric Co.
Industrial Controls Division
3036 Alt Boulevard
Grand Island, New York 14072
(716) 773-2321 Telex 91-6459