



DC1 V★S DRIVES

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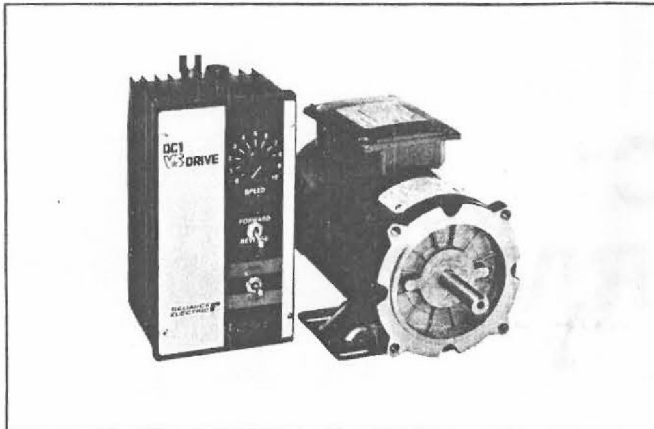
DC1

D-C V★S DRIVES



- Armature voltage, tachometer, or armature current (torque) feedback.
- Complete application adjustments.
- 20:1 constant torque speed range.
- Performance matched with DC1 permanent magnet motors.
- UL listed.
- Obtainable CSA Certified

SINGLE PHASE 1/4-2 HP



Flexible, reliable and affordable, with the right performance for your small D-C drive applications.

The DC1 V★S Controller product line combines flexibility, simplicity, and reliability into a compact affordable package to deliver the performance you need for a wide range of industrial applications.

The DC1 Controller provides full application adjustments, jumper reconections to quickly and easily match the controller to incoming plant line voltage as well as motor horsepower and voltage. Armature voltage feedback or tach feedback can also be jumper selected.

The current feedback circuit improves speed regulation, performance under cyclic loads and overall drive reliability. The standard model number controllers configured for specific application requirements allow reversing, accept 4-20 mA or 0-10 volt process signal input or use of armature current feedback to control shaft torque or web tension.

Every DC1 V★S Drive comes complete with a Reliance Electric D-C Motor. Choose from a broad selection of permanent magnet or wound field designs with the right base speed and enclosure to meet your requirements, or consider the DC1 permanent magnet motor, performance matched to the DC1 Controller for the maximum in economy and value.

STANDARD FEATURES

- Available in either open chassis or totally enclosed NEMA 12 construction.
- Operated from either local or remote operator controls.
- All circuitry - sequencing, regulator and terminals - packaged on a single, accessible printed circuit board.
- Fixed time rate acceleration for smooth starts and speed changes. May be bypassed for master reference applications.

- Jumper reconections adapt standard controllers to match:
 - Line voltage, either 115 or 230 volt A-C, 50 or 60 Hz.
 - Motor horsepower, from 1/4 through 2.
 - Desired feedback, either armature voltage or motor driven D-C tachometer. Non-reversing models only.
 - Separately adjustable maximum and minimum speeds set speed limits.
 - Adjustable current limit protects machinery, wiring and drive.
 - Adjustable IR drop compensation improves speed regulation when using armature voltage feedback.
- Full-wave, half-control power conversion with back diode for efficient power conversion, smooth armature current waveforms and cool motor operation over wide operating speed ranges.
- Built-in half-wave field supply for operation of wound field motors.
- Line fuse to provide short circuit protection.
- Built-in surge suppressor protects semiconductors from line transients for better reliability.
- Sequencing circuitry prevents automatic restarting after power outage for increased protection of personnel, driven-equipment and drive.
- Overload protection provided by motor thermostat - standard with every Reliance D-C motor that is stocked and cataloged.
- Run/Off switching arrangement allows positive disconnect of the motor from the plant line on a "Stop" command for added personnel safety.
- Two years from date of manufacture/one year in service full exchange warranty eliminates troubleshooting and returns you quickly to operation.
- Obtainable CSA certified.

DC1 CONTROLLERS FOR SPECIFIC APPLICATIONS

Standard model numbered DC1 controllers provide just the right controller for those special applications.

- Model DC1-71 is complete with switch reversing and dynamic braking for simple reversing applications.
- Process Control Models, DC1-42, -62, -72, feature automatic/manual operation from either a grounded or ungrounded 4-20 mA or 0-10 volt D-C reference (automatic) or speed potentiometer (manual).
- Models DC1-43, -63, and -73 provide torque control using armature current feedback for applications requiring control of applied torque or tension.
- Models DC1-44, -64, and -74 combine torque control with process control interface capabilities.

PERFORMANCE MATCHED D-C MOTORS COMPLETE THE PACKAGE

- DC1 Controllers are compatible with all standard Reliance D-C motors and together form a packaged V★S Drive. See Data Sheets C-2535 and C-2536 for details.
- DC1 permanent magnet D-C motors, power matched with the DC1 control, offer even more economy and value. See Data Sheet C-2540 for DC1 permanent magnet motor details.



DC1 V★S CONTROLLER ONLY PRICING

$\frac{1}{4}$ -1 HP @ 115 VAC 90 VDC ARMATURE, 50 VDC FIELD

$\frac{1}{2}$ -2 HP @ 230 VAC 180 VDC ARMATURE, 100 VDC FIELD

Regulator Type	DC1 ENCLOSURE		
	Chassis	NEMA 12	
		Without Operator Control	With Operator Control
Basic Regulator M/N List Price	DC1-40 ♦ \$330	DC1-60 ♦ \$345	DC1-70 ♦ \$370
Basic Instrument Interface M/N List Price	DC1-42 ♦ \$430	DC1-62 ♦ \$445	DC1-72 ♦ \$470
Basic and Reversing M/N List Price	N/A -	N/A -	DC1-71 ♦ \$470
Torque Regulator M/N List Price	DC1-43 ♦ \$390	DC1-63 (1) \$405	DC1-73 ♦ \$430
Torque Regulator and Instrument Interface M/N List Price	DC1-44 (1) \$490	DC1-64 (1) \$505	DC1-74 (1) \$530

RE-1DC

MOTOR ONLY PRICES FOR USE WITH DC1 CONTROLLERS (3)

• 1750 RPM • Permanent Magnet • Thermostat

HP	Armature Volts D-C	Enclosure	Frame Size	C-Face Size	Model Number	List Price
$\frac{1}{4}$	90	TENV	ED56C	56C	T56H1050 ♦ (4)	\$245
$\frac{1}{3}$	90	TENV	ED56C	56C	T56H1051 ♦ (4)	265
$\frac{1}{2}$	90	TENV	EF56C	56C	T56H1052 ♦ (4)	305
$\frac{3}{4}$	90	TEFC	EF56C	56C	T56H1055 ♦ (2)	360
1	90	TEFC	EM56C	56C	T56H1059 ♦ (2)	415
1	180	TEFC	EM56C	56C	T56H1056 ♦ (2)	415
$1\frac{1}{2}$	180	TEFC	FZ56HCZ	140TC	T56H1057 ♦ (2)	685
2	180	TEFC	FF56HCZ	140TC	T56H1058 ♦ (2)	820

ISOLATION TRANSFORMERS

See Page D6-19 for prices, Model Numbers and dimensions.
Select proper transformer from the table below.

HP	Transformer KVA
$\frac{1}{4}$ - $\frac{1}{3}$	0.75
$\frac{1}{2}$ - $\frac{3}{4}$	1.5
1	2.0
$1\frac{1}{2}$	3.0
2	5.0

Remote Operator Speed/Torque Potentiometer sealed for harsh environments and operator safety complete with knob and insulator.
M/N 14C231 \$30 List(5)

♦ Normally carried in stock.

(1) Models not normally stocked, but available upon request.

(2) Optional Tachometer Feedback is available:

- DC1 controllers may accept 18.5 to 21.5 VDC/1000 RPM Tachometers only.
- Applicable for Non-Reversing Controllers with motor base speed of 1750 RPM.
- Select REO20 tachometer and mounting kit (if required). Refer to pages D5-2 thru D5-4.
- Isolation transformers must be used on DC1 Drives employing tachometer feedback.

(3) DC1 motors are intended for use with DC1 controllers since they require a controller with a back diode.

(4) These motors do not have provisions for mounting tachometers. Price equivalent motor from page D3-19 if tachometer is required.

(5) Discount symbol RE-1KIT.

RE-2DC

DC1

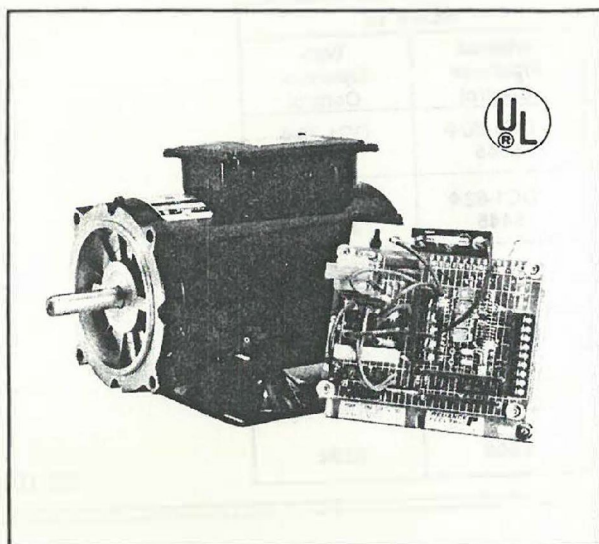
D-C V★S DRIVES



DC1 SERIES 50 CONTROLLER ONLY PRICING

1/4-1 HP @ 115 VAC 90 VDC ARMATURE, 50 VDC FIELD
 1/2-2 HP @ 230 VAC 180 VDC ARMATURE, 100 VDC FIELD (1)

Use DC1 motor



Refer to Page D3-11 for ENGINEERING DATA.
 Refer to Page D3-9 for MOTOR PRICING.

PRODUCT PUBLICATIONS

Data Sheet

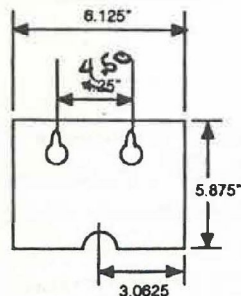
DC1 V★S Series 50 Controller D-2813
 DC1 Perm. Mag. D-C Motor C-2540

INSTRUCTION MANUAL

DC1 V★S Series 50 Controller D2-3099-1

DC1 SERIES 50 DRIVE

Dimensions In Inches (mm)



Maximum Projection
 2.250"
 58 mm

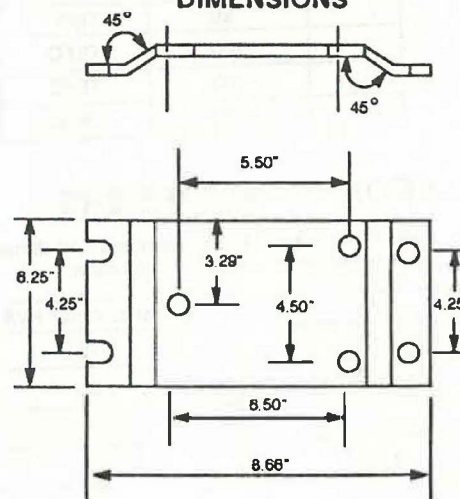
Regulator Type	DC1 Series 50 Drive (1)(2)
Basic Regulator List Price	DC1-50* \$125
Basic Instrument Interface List Price	DC1-52* \$163
Basic and Reversing List Price	N/A
Torque Regulator List Price	DC1-53* \$147
Torque Regulator and Instrument Interface List Price	DC1-54 \$184

- (1) DC1 Series 50 Drive must be mounted to a metal surface 18" by 18" to meet 1 HP @ 115 VAC and 2 HP @ 230 VAC or an optional heat sink (HS1-50) can be purchased.
 (2) Sold in box lots (10 individually packaged controllers per box). Discount based on box lot purchase.

Optional Heat Sink Kit

Model HS1-50 \$47 List

HS1-50 HEATSINK DIMENSIONS



*Available on short cycle delivery

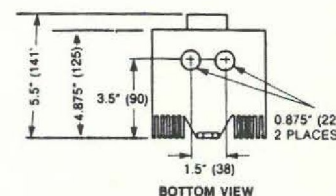
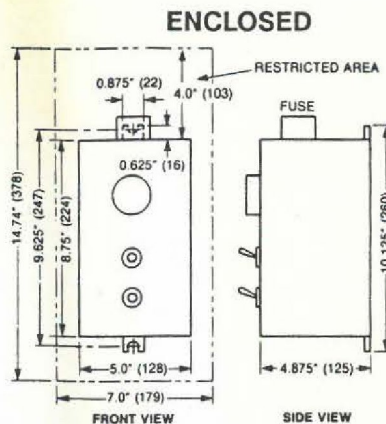
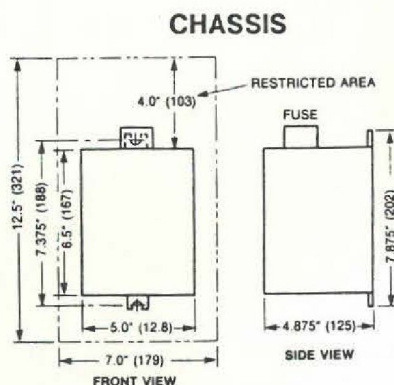


D3-10 EFFECTIVE July 1, 1989

RE-50DC

ENGINEERING DATA

Dimensions In Inches (mm)



NOTE: OPERATOR'S DEVICES
SUPPLIED ONLY ON MODEL
DC1-70 THROUGH DC1-76

SERVICE CONDITIONS

Elevation Up to 3300 feet
Ambient Temperature 32°F to 104°F
Enclosed Models (0°C to 40°C)
Chassis Model 32°F to 131°F
..... (0°C to 55°C)
A-C Line Voltage Variation ±10% rated voltage
A-C Frequency 48 to 62 Hz

APPLICATION DATA

Service Factor 1.0
Maximum Load 150% for 1 minute
Acceleration Rate (1) Approx. 6 seconds (factory set)
Speed Regulation:
Voltage Feedback 2-5% (95% load change)
Tachometer Feedback 1% (95% load change)
Speed Range 20:1 with armature voltage feedback
..... 30:1 with tachometer feedback

(1) May be increased/decreased by capacitor change (0.5 seconds to 20 seconds)

ADJUSTMENTS

Maximum Speed (Percent of rated) 70 to 100%
Minimum Speed (Percent of rated) 10 to 50%
Current Limit (Percent of rated) 10 to 150%
IR Drop Compensation 0 to 13%

PRODUCT PUBLICATIONS

Data Sheet
DC1 V★S Controller D-2707
DC1 Perm. Mag. D-C Motor C-2540
Instruction Manual D2-3099

CONTROLLER RATINGS

Motor HP	115 VOLT A-C INPUT					
	230 VOLT A-C INPUT					
	Rated A-C Line Amperes (1)	Input KVA	D-C Armature Voltage	Rated Armature Current (Amperes)	Available Field Voltage	Rated Field Current (Amperes)
1/4	3.1	.36	90	2.5	50	2.0
	-	-	-	-	-	-
1/3	4.2	.48	90	3.7	50	2.0
	-	-	-	-	-	-
1/2	6.2	.71	90	5.0	50	2.0
	3.1	.71	180	2.5	100	2.0
3/4	9.4	1.0	90	7.5	50	2.0
	4.7	1.0	180	3.7	100	2.0
1	12.5	1.4	90	10.0	50	2.0
	6.2	1.4	180	5.0	100	2.0
1 1/2	-	-	-	-	-	-
	9.4	2.2	180	7.5	100	2.0
2	-	-	-	-	-	-
	12.5	2.9	180	10.0	100	2.0



OEM MULTIPLIER SHEET V★S DRIVES

SMALL ELECTRICAL DRIVES ■

Discount Symbol	Product Line		OEM	Reseller	User
RE-1AC RE-1DC RE-2AC RE-2DC	1 to 10 HP A-C and 1/4 to 5 HP D-C V★S Drives, DC1, ImPak/MinPak/FlexPak Plus, GP800, GP1000, GP1200, GP1500 and Non-Modified D-C Motors. EXCLUDING ALL KITS, OPER. CONTROL & ACCESSORIES				
	Order Qty. (2) 1- 9	Min. Ship Qty. (1) Order Qty.	.72	.76	.80
	10-19	Order Qty.	.72	.76	.80
	20-39	Order Qty.	.68	.76	.80
	40-99	40	.65	.724	.76
	100-up	Contact Reliance	-	-	-

LARGE ELECTRICAL DRIVES ■

Discount Symbol	Product Line		OEM	Reseller	User
RE-3AC	3-Phase A-C V★S Drives, 5 to 500 HP & Associated Kits/Mods.				
	Order Qty. All	Min. Ship Qty. (1) Order Qty.	.719	.778	.84
RE-4AC	3-Phase A-C V★S Drives, 15 to 350 HP & Associated Kits/Mods.				
	Order Qty. All	Min. Ship Qty. (1) Order Qty.	.633	.665	.722
RE-5AC	Variable Torque A-C & Associated Kits & Mods. V★S Drives 5 to 500 HP				
		Qty. - All	.746	.806	.872
RE-3DC	3-Phase 3-40 HP MinPak/FlexPak Plus Excluding Kits & Mods.				
	Order Qty. 1-4	Min. Ship Qty. (1) Order Qty.	.72	.76	.80
	5-9	Order Qty.	.72	.76	.80
	10-UP	10	.68	.76	.80
	3-Phase 50-300 HP FlexPak Plus Excluding Kits & Mods.				
	All	Order Qty.	.72	.76	.80
RE-4V	Engineered V★S Drives and Modifications				
		Qty. - All	.890	.936	.936

KITS, OPERATOR'S CONTROL, AND ACCESSORIES FOR ALL V★S DRIVES ■

Discount Symbol	Product Line		OEM	Reseller	User
RE-1 KIT	Standard Operator Control and Kits for all 1-Phase and 3-Phase ImPak/MinPak/FlexPak Plus and all GP series A-C V★S Drives. All Quantities.	Qty. - All	.72	.76	.80
RE-1MOD	Isolation Transformers, Accessories, Control Stations, Modified D-C Motors	Qty. - All	.786	.84	.90

- (1) Quantity must be on one shipment to qualify for listed multiplier.
- (2) All A-C and D-C Controllers and D-C Motors within these discount symbols may be combined for quantity discounts. Kits may not be used to determine order quantity. NOTE: Quantity discounts do not apply to kits, operator's control, and accessories.
 Example: (10) DC1 Controllers + (10) ImPak Plus Controllers + (20) D-C Motors + (5) GP1000 Controllers + (25) Kits:
 Use the 40-99 order quantity multiplier on the motors and controls.
 Use the "All" order quantity multiplier on the kits.

V★S[®] DRIVES

DC1 Series 50 Drive

Single-Phase
1/4 – 2 HP



Flexible, reliable and affordable

DC1 packaged V★S Drives combine application flexibility, compact size and reliability into an affordable adjustable speed drive which delivers the performance needed for a wide range of industrial applications.

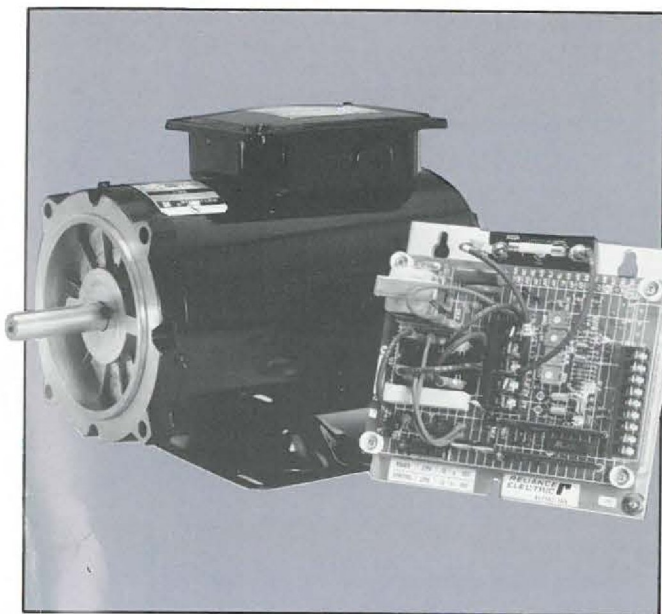
The DC1 Series 50 Drive is equipped with a full range of application adjustments including internal jumper reconnections to quickly and easily match the controller to incoming power. Motor horsepower selection and a choice of either armature voltage or speed feedback signals are also provided by internal jumper reconnection.

The current feedback circuit improves speed regulation and performance under cyclic loads, while improving overall drive reliability. Standard model number controllers are available which provide features for specific applications. These specific features include reversing and process signal input of either 4-20 mA or 0-10 volts.

Choose from a broad selection of permanent magnet or wound field motors with the right base speed and enclosure to meet your requirements, or consider the DC1 Permanent Magnet Motor, performance matched to the DC1 Controller for the maximum in economy and value.

Standard Features

- Compact mounting
- Operates from Remote operator controls
- All circuitry – sequencing, regulator and terminals – packaged on a single, accessible printed circuit board.
- Fixed time rate acceleration for smooth starts and speed changes. May be bypassed for master reference applications.
- Built-in half-wave field supply for operation of wound field motors.
- Jumper reconnections adapt standard controllers to match:
 - Line voltage, either 115 or 230 VAC, 50 or 60 Hz.
 - Motor horsepower, from 1/4 through 2
 - Desired feedback, either armature voltage or motor driven D-C tachometer.
- Application adjustments tailor drive performance to your needs:
 - Separately adjustable maximum and minimum speeds set speed limits.
 - Adjustable current limit protects machinery, wiring and drive.
 - Adjustable IR drop compensation improves speed regulation when using armature voltage feedback.
- Power cube contains all power semiconductors for maximum reliability.
- Full-wave, half-control power conversion with back diode for efficient power conversion, smooth armature current waveforms and cool motor operation over wide operating speed ranges.
- Fuse provides short-circuit protection.



- Built-in surge suppressor protects semiconductors from line transients for better reliability.
- Relay in control circuit prevents automatic restarting after power outage for increased protection of personnel, driven equipment and drive.
- Overload protection provided by motor thermostat – standard with every numbered model – Reliance D-C motor.
- Two years from date of manufacture (one year in service) full-exchange warranty eliminates troubleshooting and returns you quickly to operation.

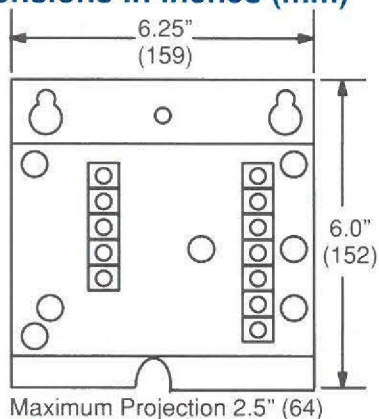
DC1 Controllers for Specific Applications

Standard model numbered DC1 Controllers provide just the right controller for those special applications.

- Model DC1-50 comes with run/stop and speed input for basic applications.
- Model DC1-52, process control interface, features automatic/manual operation from either a grounded or ungrounded 4-20 mA or 0-10 volt D-C reference (automatic) or speed potentiometer (manual).
- Model DC1-53 provides torque control using armature current feedback for applications requiring control of applied torque or tension.
- Model DC1-54 combines torque control with process control interface capabilities.

Engineering Data

Dimensions In Inches (mm)



Service Conditions

Elevation Up to 3300 ft (1000 meters)
 Ambient Temperatures 82°F to 104°F
 (0°C to 55°C)
 A-C Line Voltage Variation $\pm 10\%$ rated voltage
 A-C Line Frequency 48-62 Hz

Application Data

Service Factor 1.0
 Maximum Load 150% for 1 minute
 Acceleration Rate* Approx. 6 seconds
 Speed Regulation
 Voltage Feedback ... 2-5% (95% load change)
 Tachometer Feedback . 1% (95% load change)
 Speed Range 20:1 with armature voltage feedback
 30:0 with tachometer feedback

* May be increased/decreased by capacitor change (0.5 seconds to 20 seconds).

Adjustments

Maximum Speed
 (Percent of rated) 70 to 100%
 Minimum Speed (Percent of rated) ... 10 to 50%
 Current Limit (Percent of rated) 10 to 150%
 IR Drop Compensation 0 to 13%

Controller Ratings

Motor HP	115-Volt A-C Input			230-Volt A-C Input		
	Rated A-C Line ⁽¹⁾ Amperes	Input KVA	D-C Armature Voltage	Rated Armature Current (Amperes)	Available Field Voltage	Available Field Current (Amperes)
1/4	3.1	.36	90	2.5	50	2.0
	—	—	—	—	—	—
1/3	4.2	.48	90	3.7	50	2.0
	—	—	—	—	—	—
1/2	6.2	.71	90	5.0	50	2.0
	3.1	.71	180	2.5	100	2.0
3/4	9.4	1.0	90	7.5	50	2.0
	4.7	1.0	180	3.7	100	2.0
1	12.5	1.4	90	10.0	50	2.0
	6.2	1.4	180	5.0	100	2.0
1-1/2	—	—	—	—	—	—
	9.4	2.2	180	7.5	100	2.0
2(2)	—	—	—	—	—	—
	12.5	2.9	180	10.0	100	2.0

(1) Includes motor field current.

(2) 2 HP rating is achieved when mounted on a painted or non-painted steel subpanel of at least 18" by 18" or with an optional heatsink assembly.

Reliance Electric / 24701 Euclid Avenue / Cleveland, Ohio 44117 / (216) 266-7000

**RELIANCE
ELECTRIC**