

The easy-to-use three-phase digital DC Power Module drive for regenerative and non-regenerative applications from 5 to 400 HP



200 HP (375 Amps)
FlexPak 3000 Power Module
with Optional OIM

The FlexPak 3000 Power Module digital DC drive is ideal for configured drive applications in which maximum wiring and panel flexibility is required. The Power Module design is also ideal for offshore destinations where the systems integrator or OEM requires country-specific fusing and magnetics.

Simple: All control, signal and power field wiring is readily accessible through supplied terminal boards to streamline installation. Setup configuration and operation can be accomplished using the optional OIM (Operator Interface Module) or CS3000 configuration software.

Optional: In order to give the user the most flexible and lowest cost solution, the OIM (Operator Interface Module) is an option for the FlexPak 3000 Power Module drive. This interface, with its large graphics display and keypad allows for easy setup and troubleshooting using plain text. Diagnostic and status information as well as help text are displayed and entered in one of five languages easily selected through the keypad. A “Quick-Start” menu combines with self-tuning of the speed and current loops to ensure quick, straightforward drive setup and startup.

Compact: Extensive use of molded parts allows for a high density power module without compromising the accessibility of options and circuits.

This European-style Power Module drive package (IP00) does **not include a contactor, control transformer, or fusing**, allowing it to be customized and configured into a much smaller panel space. This FlexPak 3000 Power Module packaging also makes it ideal for retrofitting older analog drives such as the MaxPak Plus. Retrofits are an ideal application because most older analog drives had all of the mechanical hardware mounted separately on the panel. With the FlexPak 3000 Power Module, existing hardware, such as contactors, control transformers, and fusing can be reused, providing significant cost savings.

Flexible: The FlexPak 3000 Power Module drive is ideal for offshore destinations where the systems integrator or OEM can select the magnetics and fuses common to the country of destination. The FlexPak 3000 Power Module drive is not burdened with the cost of supporting multiple fuse ratings or control transformer ratings in order to be a

global drive. Similar to the standard FlexPak 3000 drive, the FlexPak 3000 Power Module drive can also be modified with standard kits to satisfy a wide array of applications without burdening the customer with unnecessary features. The FlexPak 3000 Power Module model uses most of the same kits as the standard FlexPak 3000 drive model.

STANDARD FEATURES

AC Supply

- 50/60 Hz AC line frequency input
- Phase-insensitive AC line input
- Interface control for either an AC or DC contactor

Power Section

- Full-wave, full-control 6-SCR power conversion for smooth, efficient operation and high performance
- IP00 power module construction
- Non-regenerative or regenerative (required for reversing) configurations available
- Capable of 150% full-load current for 1 minute

STANDARD FEATURES CONTINUED

Analog Signals (12-bit resolution)

- 0-10 VDC manual speed reference
- User selectable +10 volt or 4-20 mA speed reference
- Two 0-10 VDC analog outputs that are user-configurable
- Speed feedback from analog DC tachometer (250 VDC maximum input)

Digital Signals

- Coast stop, auto/manual, forward/reverse, jog, run and stop inputs
- Motor thermostat diagnostic input
- Brush wear diagnostic input or OCL (Outer Control Loop) enable
- Customer interlock diagnostic input
- Drive running contact output
- Drive alarm contact output
- Drive fault contact output

Other Significant Standard Features

- Field Current Regulator based on unit-type Amp rating providing field economy
 - 4 A (25-60 A Ratings)
 - 10 A (150-450 A Ratings)
 - 12 A (800 A Rating)
- Self-tuning of speed and current loops without disconnecting the field
- Field (current) loss protection
- User selectable stop modes

SERVICE CONDITIONS

- Standard altitude: to 3300 feet (1000 meters)
- Standard ambient temperature
 - Operating temperature @ nominal current: 0-40°C

- Maximum operating temperature: 55°C (derate at 1.5% per °C above 40°C)

- Nominal AC line voltage: 200 to 460 VAC +/- 10%
- Nominal AC line frequency: 50/60 Hz +/- 2Hz
- Atmosphere: non-condensing relative humidity 50% at 40°C

EFFICIENCY AND POWER FACTOR

- Typical displacement power factor at rated speed and load: 88%
- Typical efficiency of power module at rated load and speed: 98.6%
- Efficiency of drive including motor is typically 85%

OVERLOAD CAPACITIES

- Continuous unit type current rating
- Maximum load: 150% of nominal rating for one minute

SPEED RANGE/REGULATION

- Operator's speed adjustment: 0 to rated speed
- Specification speed range: 100:1 based on top speed and tachometer

Speed Regulation

Regulation Arrangement	Speed Change with 95% Load Change	Speed Change from All Other Variables
Armature Voltage w/ IR Compensation	2-3%	15%
Closed Loop		
w/ 5PY tachometer ⁽¹⁾	1%	2%
w/ RD120-1 encoder ⁽²⁾	0.01%	0.01%
w/ RD120-2 encoder ⁽²⁾	0.01%	0.01%
w/ RL1024 encoder ⁽²⁾	0.01%	0.01%

⁽¹⁾Standard DC tachometer interface included with drive; no pulse encoder feedback kit required.

⁽²⁾Optional pulse encoder feedback interface kit required; model number 907FK0101

OPTIONAL OPERATOR INTERFACE MODULE FEATURES

- Complete operator controls for run, stop, forward/reverse, auto/manual, control source select and fault log
- "Quick Start" sequence for easy, complete drive set up
- Large, easy-to-read LCD display provides the following:
 - Built-in digital metering selectable in units proportional to speed or current such as FPM (feet per minute), percent load, or other user defined units
- Monitor of multiple parameter values in a single display such as speed and load
- Display available in multiple languages
- Drive status display indicators:
 - Drive fault and alarm
 - Interlocks are o.k.
 - Drive ready and drive running
 - Current/torque limit
- Extensive Diagnostics displays (recommended corrective action)

PRICING

FlexPak 3000 Power Module drives can support 200-460 VAC line input voltages. **The customer must select and provide the appropriate fusing, control transformer, and contactor for the desired line input voltage.**



200 HP (375 AMP) HP FlexPak 3000 Power Module with optional OIM

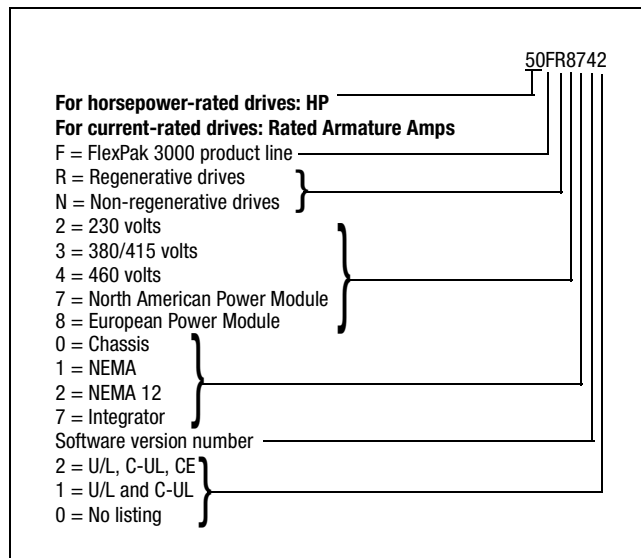
Non-Regenerative Power Module					
HP at 460 VAC ⁽¹⁾	Nom. Current Rating ^(2,4)	Unit Type Current Rating ^(3,4)	North American Model Number	European Stock No.	List
10	20	25	20FN8742	848.00.73	\$3,390
29	50	60	50FN8742	848.02.73	3,440
75	125	150	125FN8742	848.04.73	3,840
125	208	250	200FN8742	848.06.73	4,600
200	375	450	375FN8742	848.08.73	7,000
400	667	800	650FN8742	848.10.73	9,100

Regenerative Power Module					
HP at 460 VAC ⁽¹⁾	Nom. Current Rating ^(2,4)	Unit Type Current Rating ^(3,4)	North American Model Number	European Stock No.	List
10	20	25	20FR8742 ♦	848.01.73	\$3,850
29	50	60	50FR8742 ♦	848.03.73	4,000
75	125	150	125FR8742 ♦	848.05.73	4,655
125	208	250	200FR8742 ♦	848.07.73	5,710
200	375	450	375FR8742 ♦	848.09.73	8,100
400	667	800	650FR8742	848.11.73	11,300

Options			
Description	North American Model Number	European Stock No.	List
KeyPad Operator Interface Module (OIM)	317C160D ♦	922.95.00	\$600
Configuration Software (CS3000)	2CS3000 ♦		350

- (1) HP based on 40°C ambient & 460 VAC line input voltage at nominal rating. Derate at 1.5% per °C above 40°C
- (2) Nominal current rating is 100% continuous operation with 50% overload capability.
- (3) Unit-type current rating based on maximum continuous operation without overload.
- (4) Field current regulator rating: 4 A (25-60 A Ratings), 10 A (150-450 A Ratings), 12 A (800 A Rating). Rating is based on unit-type amp rating.

Note: All ratings are based on 40°C Ambient



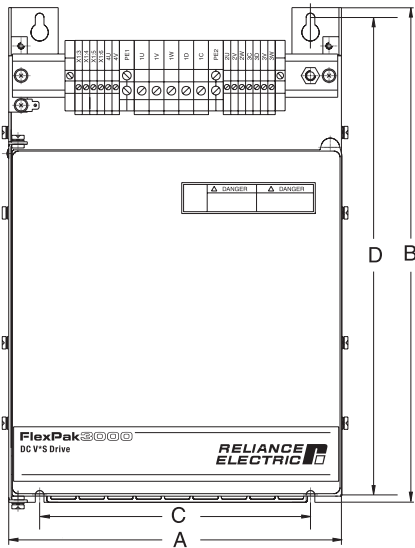
♦ Normally carried in stock

DISCOUNT VS-50D

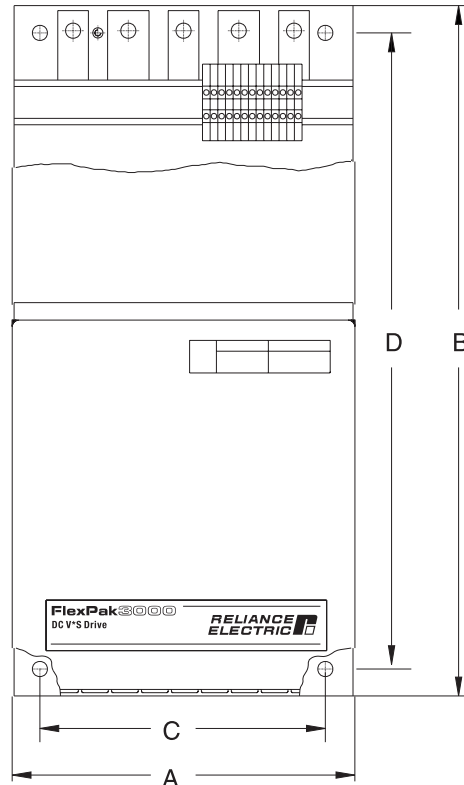
FlexPak 3000 Power Module Dimensions

Power Module Dimensions								
HP at 460 VAC ⁽¹⁾	Nom. Current Rating ⁽²⁾	Unit Type Current Rating ⁽³⁾	A	B	C	D	Depth	Weight
10	20	25	269 mm (10.6")	400 mm (15.8")	219 mm (8.62")	386 mm (15.2")	287mm (11.3")	10 kg (22 lb)
29	50	60	269 mm (10.6")	400 mm (15.8")	219 mm (8.62")	386 mm (15.2")	287mm (11.3")	10 kg (22 lb)
75	125	150	269 mm (10.6")	428 mm (16.9")	219 mm (8.62")	386 mm (15.2")	287mm (11.3")	14 kg (31 lb)
125	208	250	270 mm (10.6")	550 mm (21.7")	220 mm (8.66")	500 mm (19.68")	337mm (13.3")	40 kg (88 lb)
200	375	450	270 mm (10.6")	550 mm (21.7")	220 mm (8.66")	500 mm (19.68")	337mm (13.3")	40 kg (88 lb)
400	667	800	306 mm (12.1")	660 mm (26.0")	266 mm (10.47")	636 mm (25.0")	436 mm (17.2")	83 kg (183 lb)

- (1) HP based on 40°C Ambient & 460 VAC line input voltage at Nominal Rating
Derate at 1.5% per °C above 40°C
- (2) Nominal Current Rating is 100% continuous operation with 50% overload capability.
- (3) Unit Type Current Rating based on maximum continuous operation without overload.



Typical 20, 50, and 125 Amp power module dimension outline. See instruction manual for details.



Typical 208, 375, and 667 Amp power module dimension outline. See instruction manual for details.

PRODUCT PUBLICATIONS

Instruction Manual.....D2-3475

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FlexPak 3000 and WebPak 3000 Drive Options

AC LINE DISCONNECTS FOR CHASSIS OR NEMA 1 ENCLOSED DRIVES

FlexPak 3000 drives supplied in wall-or floor-mounted enclosures can be supplied with rotary through-the-door operator and mechanical door interlock. Select and price disconnect per the table below. This kit cannot be used with FlexPak 3000 Power Module drives.

AC Line Disconnects Selection

Incoming Line Voltage		Disconnect for Chassis Drives			Disconnect for NEMA 1 Conversion Kit Mounting ⁽¹⁾		
230 VAC	460 VAC	Model Number	List		Model Number	List	
			Kit	Installed		Kit	Installed
1-1/2 - 25	3-50	901FK0101 ♦	\$555	\$630	901FK0101 ♦	\$555	\$630
30	60	901FK0201 ♦	660	735	901FK0201 ♦	660	735
40-60	75-125	901FK1102 ♦	1,350	1,425	901FK1112 ♦	1,425	1,500
75	150	901FK1202 ♦	2,100	2,175	901FK1212 ♦	2,175	2,250
100	200	901FK2101 ♦	2,500	2,575	-	-	-
125-150	250-300	901FK2201 ♦	4,075	4,150	-	-	-
-	400	901FK2401 ♦	5,070	5,170	-	-	-
-	500	901FK2401 ♦	5,070	5,170	-	-	-
-	600	901FK2501 ♦	7,625	7,725	-	-	-

(1) Enclosure not included in price. See page D4-25 for enclosure pricing.

Blower Motor Starter

This option provides a fused AC starter with adjustable overload and interlocking for control of the three-phase blower motor used to cool the DC motor. This kit cannot be used with FlexPak 3000 Power Module drives.

2-150 HP @ 230 VAC and 5-600 HP @ 460 VAC	
Blower 3-Phase Current Amps	Single Starter Model Number
.4-.63	902FK0101 ♦
.63-1.0	902FK0201 ♦
1.0-1.4	902FK0301 ♦
1.4-1.8	902FK0401 ♦
1.7-2.4	902FK0501 ♦
2.2-3.1	902FK0601 ♦
2.8-4.0	902FK0701 ♦
3.5-5.0	902FK0801 ♦
4.5-6.5	902FK0901 ♦
6.0-8.5	902FK0111 ♦
7.5-11.0	902FK0121 ♦

Kit \$400 List
 Factory Installed \$500 List

♦Normally carried in stock

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115 V Control Interface

This option consists of a printed circuit board which converts customer-supplied 115 VAC signals to 24 VDC for operating a FlexPak 3000. This card mounts separately on the chassis drives or can be mounted in drives with optional NEMA 1 conversion kits.

INPUTS AND OUTPUTS

- Run
- Stop
- Jog
- Fwd/Rev
- Auto/Man
- Coast/Stop
- Customer interlock
- Fault reset
- Brush wear
- Motor thermostat

Kit Model Number 917FK0101 ♦.....\$500 List

Conversion Kit 460 VAC to 230 VAC

This kit contains control transformer fuses that allows the user to convert a 460 VAC FlexPak 3000 or WebPak 3000 to a 230 VAC drive at one-half the 460 VAC horsepower rating. This kit can be obtained at no-charge if requested on the same purchase order as the 460 VAC FlexPak 3000 drive. This kit cannot be used with FlexPak 3000 Power Module drives.

A fuse kit is not required to convert 200-600 HP 460 VAC FlexPak 3000 drives to 230 VAC. See the instruction manual for conversion instructions or factory order as a 230 VAC drive.

Model Number 916FK0100 ♦..... This fuse kit will convert FlexPak 3000, 3-60 HP @ 460 VAC to 1-1/2 - 30 HP @ 230 VAC.

Model Number 916FK0200 ♦..... This fuse kit will convert FlexPak 3000, 75-150 HP @ 460 VAC to 40-75 HP at 230 VAC.

Model Number 916FK0100 and 916FK0200 Ordered w/ Drive. . N/C Ordered separately \$50

For 380 VAC/415 VAC operation, see page D4-13 for special voltage drives.

Dynamic Braking (DB)

Dynamic braking reduces the stopping time of the motor when the STOP button is depressed. Under normal operation, the motor will coast-to-rest. If Dynamic Braking has been installed, when the STOP button is pressed, the motor operates as a generator. The rotating mechanical energy is turned into electrical energy, which

♦Normally carried in stock

is dissipated as heat in the dynamic braking resistor.

Note: Dynamic braking is **not** a holding brake, and will **not** keep a motor from turning.

HP Rating	240 VDC Dynamic Braking			
	NEMA 1 Enclosure Kit ⁽³⁾		Loose Parts Kit ⁽³⁾	
	Model Number	Kit List	Model Number	Kit List ⁽¹⁾
1-1/2	908FK0011	\$1,075	912FK0010	\$675
2	908FK0021	1,075	912FK0020	675
3	908FK0031	1,075	912FK0030	675
5	908FK0051 ♦	1,075	912FK0050	675
7-1/2	908FK0071 ♦	1,075	912FK0070 ♦	675
10	908FK0101 ♦	1,095	912FK0100 ♦	695
15	908FK0151 ♦	1,095	912FK0150 ♦	695
20	908FK0201 ♦	1,500	912FK0200 ♦	1,100
25	908FK0251 ♦	1,500	912FK0250 ♦	1,100
30	908FK0301 ♦	1,500	912FK0300 ♦	1,100
40	-	-	912FK0400	1,500
50	-	-	912FK0500	1,800
60	-	-	912FK0500	1,800
75	-	-	912FK0750	2,050

HP Rating	500 VDC Dynamic Braking			
	NEMA 1 Enclosure Kit ⁽³⁾		Loose Parts Kit ⁽³⁾	
	Model Number	Kit List	Model Number	Kit List ⁽¹⁾
3	909FK0031	\$1,140	913FK0030	\$740
5	909FK0051 ♦	1,140	913FK0050 ♦	740
7-1/2	909FK0071 ♦	1,140	913FK0070 ♦	740
10	909FK0101 ♦	1,140	913FK0100 ♦	740
15	909FK0151 ♦	1,140	913FK0150 ♦	740
20	909FK0201 ♦	1,190	913FK0200 ♦	790
25	909FK0201 ♦	1,190	913FK0200 ♦	790
30	909FK0301 ♦	1,190	913FK0300 ♦	790
40	909FK0401 ♦	1,500	913FK0400 ♦	1,100
50	909FK0501 ♦	1,725	913FK0500 ♦	1,325
60	909FK0501 ♦	1,725	913FK0500 ♦	1,325
75	-	-	913FK0750 ♦	1,850
100	-	-	913FK1000 ♦	2,000
125	-	-	913FK1000 ♦	2,000
150	-	-	913FK1500 ♦	2,200
200	-	-	913FK2000 ♦	2,600
250	-	-	913FK2500 ♦	4,900
300	-	-	913FK3000 ♦	5,000
400	-	-	913FK4000	2,800 ⁽²⁾
500	-	-	913FK5000	2,900 ⁽²⁾
600	-	-	913FK6000	3,200 ⁽²⁾

- (1) Includes D/B contactor and D/B resistors. Customer must supply fuses and 115 VAC power for contactor or price 115 VAC control transformer from option pages.
- (2) Kit consists of resistors and enclosure only. Drive has DB pole on contactor as standard.
- (3) This kit cannot be used with FlexPak 3000 Power Module drives. Contact factory for assistance.

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Enhanced Field Supply

This FlexPak 3000 Field Supply modification provides the following additional features:

- Electronic field trim
- Field economy
- The ability to have a 240 VDC field supply instead of a 150 VDC field supply on 230 VAC input drives.

AC Line Input	Field Voltage (DC) Output
230 VAC	103 to 207 DC 207 to 259 DC
460 VAC	207 to 414 DC 414 to 575 DC

This modification replaces the standard field supply or field current regulator. Motor field weakening is not possible with this kit.

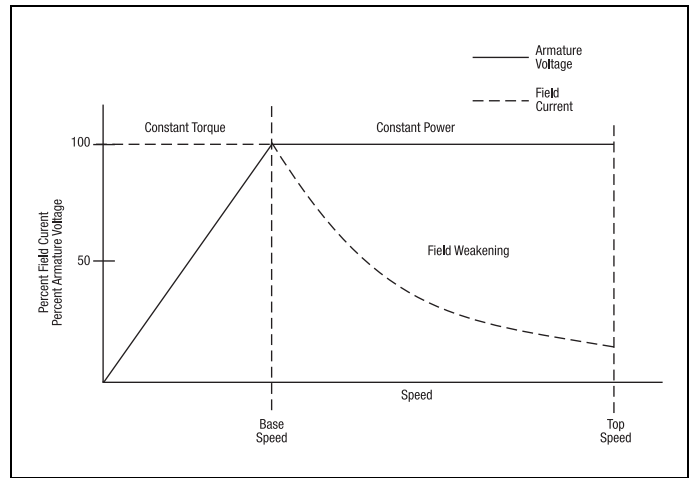
230 VAC HP	460 VAC HP	DC Amps	Model Number ⁽¹⁾	Kit List	Factory Installed List
1-1/2 - 15	3 - 30	10	923FK0101 ♦	\$500	\$500
20-300	40 - 600	20	923FK0201 ♦	650	650

(1) The enhanced field supply kit cannot be used when using a field current regulator kit.

Field Current Regulator

The Field Current Regulator kit replaces the standard field voltage supply with a current regulated supply. It provides field economy and constant horsepower (above base speed) operation. It can be used in drives that have software Version 3.0 or later. (Note: the second to last digit of the drive model number specifies the drive version number.) With this kit installed, the field control loop contained in the drive software is enabled, allowing the user to set field amps and adjust field regulator functions, either locally or over a network connection.

♦ Normally carried in stock



Three Field Current Regulator kits are available for use in FlexPak 3000 drives. Kit selection is based on motor hot field current. Use the kit that will provide the necessary motor field current required for your application. Field control resolution is optimized by using the smallest field regulator kit that meets necessary motor field current requirements. The motor being used must have extended speed range capability and speed feedback via analog tachometer or pulse encoder in order to operate above base speed.

The FlexPak 3000 Power Module Drive: The field current regulator is supplied as standard with the FlexPak 3000 Power Module drive.

Approx. HP ⁽²⁾		Motor Hot Field Amps	Field Current Regulator Model Number ⁽³⁾⁽⁴⁾	Kit List ⁽³⁾	Factory Installed List ⁽³⁾
230 VAC HP	460 VAC HP				
1-1/2 - 10	3-20	4	911FK0041 ♦	\$280	\$280
1-1/2 - 15	3-30	10	911FK0101 ♦	300	300
20-60	40-125	15	911FK0151 ♦	320	320
75-300	150-600	15	-	Std.	Std.

- (2) For estimating only. Field current regulator should be sized according to motor hot field amps.
- (3) Requires V3.0 or later FlexPak 3000. (Second to last digit of drive M/N must be a "3" or larger.) This kit is standard on all FlexPak 3000 drives 75 HP @ 230 VAC/150 HP @ 460 VAC and larger and on FlexPak 3000 Power Module drives.
- (4) A field current regulator kit cannot be used when using an Enhanced Field Supply kit.

DISCOUNT VS-50D

I/O EXPANSION CARD

The I/O expansion card mounts in the FlexPak 3000 chassis and gives the FlexPak 3000 additional analog, frequency and digital I/O capability. Some additional features with this card are:

- Dancer follower functions
- Outer Control Loop (OCL) applications
- External motor operated pot (MOP) function
- (3) preset speeds
- (2) user configurable analog outputs
- (1) user configurable frequency output
- (1) user configurable frequency input
- (2) timed threshold level detectors

AVAILABLE I/O

5 Digital Inputs (24 VDC, isolated)

- (2) inputs for preset speed selection
- (2) inputs for MOP increment and decrement
- (1) input for OCL enable

2 Level Detectors (30 VDC or 250 VAC)

- Selectable normally open or normally closed
- Detected when signals exceed an adjustable threshold
- Timed delay output from 0 to 300 seconds

2 Analog Inputs (Isolated)

- Input 1: ± 10 V, 4-20 mA, 10-50 mA
- Input 2: ± 10 V ONLY
- Voltage scalable from 4.4 V to 10.0 V
- Steerable to OCL reference and feedback, speed reference trim, positive current limit (negative also if regenerative) and inertia compensation

2 Analog Outputs (unfiltered)

- Output 1: ± 10 V, 4-20 mA
- Output 2: ± 10 V ONLY
- User configurable

1 Frequency Input

- Differential 5 to 15 V square wave (single direction)
- Scalable from 2 to 250 kHz
- User configurable

1 Frequency Output

- Differential 5 to 15 V square wave (single direction)
- Scalable from 2 to 250 kHz
- User configurable

Output Control Loop (OCL)

- Dancer follower (Type I position loop)
- Dancer position regulator (Type II position loop)

See I/M D2-3301 for more detailed information of the I/O expansion card.

Kit Model Number 914FK0101 ♦..... \$660 List⁽¹⁾

Factory Installed..... \$780 List⁽¹⁾

(1) Requires V3.0 or later FlexPak 3000. (Second last digit of controller M/N must be "3" or higher.)

NETWORK COMMUNICATIONS

AutoMax Network Communication Card

The AutoMax Network Communication card mounts in a FlexPak 3000 drive allowing it to communicate with an AutoMax network. The drive can be controlled, tuned, and monitored by way of the high speed (875 Kbaud) AutoMax network link. Up to 55 FlexPak 3000 drives can be connected to a single network using the basic configuration or up to 13 using the full configuration.

Kit Model Number 915FK0101 ♦ \$441 List⁽¹⁾
Factory Installed \$561 List

ACCESSORIES FOR AUTOMAX NETWORK

Passive Tap Model Number 57C380 ♦ \$93 List
75 Ohm Terminator Model Number 45C71 ♦ \$69 List
Drop Cable Model Number 57C381 ♦ \$38 List

ControlNet™ Communication Card

The ControlNet Communication card mounts in a FlexPak 3000 drive, allowing it to communicate over the open network ControlNet. ControlNet is a highly deterministic and repeatable control layer network. It provides real-time high speed transport of time critical I/O data and messaging data, all on one link. ControlNet is ideal for complex control systems that require synchronized and coordinated real-time performance.

ControlNet provides high speed (5 msec) updates to all scheduled reference and control data. It also provides access to all drive parameters through unscheduled traffic.

Kit Model Number 915FK2101 ♦ \$735 List⁽¹⁾⁽²⁾
Factory Installed \$855 List

DeviceNet™ Communication Card

The DeviceNet Communication card mounts in a FlexPak 3000 drive, allowing it to communicate over the open network DeviceNet. The card provides the ability to modify parameters plus operate and monitor the FlexPak 3000. Horner Electric Co. manufactures this card. More information is obtainable from I/M HE-FP3.

Kit Model Number 915FK1100 ♦ \$560 List⁽¹⁾⁽³⁾
Factory Installed \$680 List

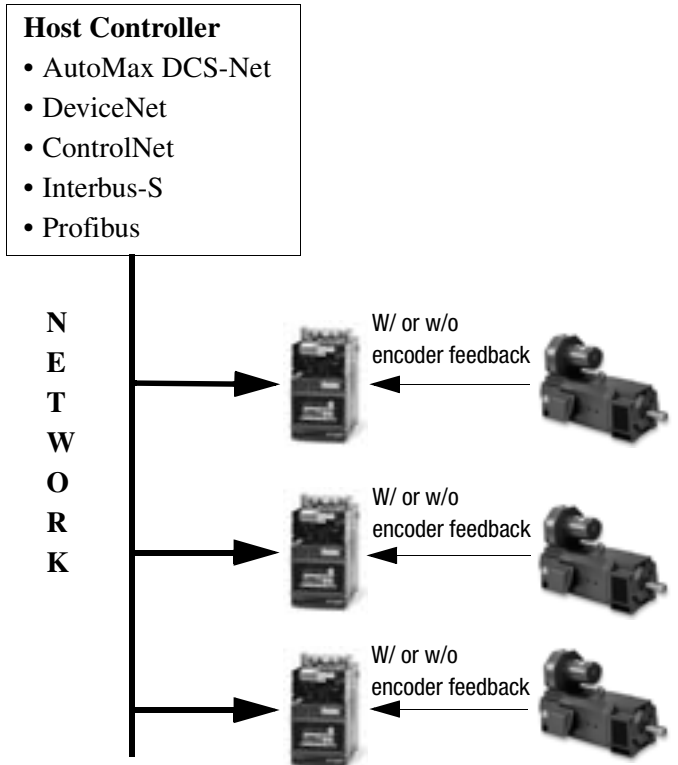
♦Normally carried in stock

Interbus-s™ Communication Card

The Interbus-s Communication card mounts in the FlexPak 3000 drive, allowing it to communicate with an Interbus-s network. The card allows the FlexPak 3000 drive to be controlled and monitored over the network.

Kit Model Number 915FK3101 \$735 List⁽¹⁾⁽⁴⁾
Factory Installed \$855 List

Note that this card also requires a remote to local bus connector, such as the Phoenix Model IBS24BK/LC



- (1) Only one network card can be installed in the drive at one time
- (2) Must use V4.2 or higher firmware
- (3) Must use V3.12 or higher firmware
- (4) Contact Reliance Electric for availability

Profibus™ Communication Card

The Profibus Communication card allows the FlexPak 3000 to communicate over the Profibus network. This card allows the FlexPak 3000 to be controlled and monitored over the network.

Kit Model Number 915FK4101 \$735 List
Factory Installed \$855 List

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INVERTING FAULT CIRCUIT BREAKER

This modification replaces the standard inverting fault fuse. The inverting fault circuit breaker is recommended when applying regenerative FlexPak 3000 drives to high inertia loads (where the reflected load (WR²) to the motor is equal to or greater than the motor's). It also is used on applications where the drive is frequently in a low power regenerative mode, such as on un-winders and pay-offs. The inverting fault breaker must be mounted separately from the drive, unless the drive is mounted in a cabinet.

240 VDC HP	500 VDC HP	Kit Model Number	Kit List
1-1/2 - 2	3-5	906FK0101 ♦	\$775
3-5	7.5-10	906FK0201 ♦	775
7-1/2 - 10	15-20	906FK0301 ♦	775
15-20	25-40	906FK0401 ♦	900
25-30	50-60	906FK0501 ♦	950
40-60	75-125	906FK1101 ♦	1,600
75	150	906FK1201 ♦	2,350
100-150	200-300	906FK2101 ⁽¹⁾	⁽¹⁾
-	400-600	906FK3101	⁽²⁾

- (1) Standard on all **FB** models. Example 300FB4042.
- (2) Included in drive price and must be specified with regenerative 400-600 HP drives.

LINE FILTER KIT

The Line Filter kit is used on 400-600 HP FlexPak 3000 drives when the primary of the drive's source transformer is greater than 2300 VRMS. The kit helps attenuate high voltage spikes that capacitively couple from the transformer primary to secondary.

400 HP VAC	Kit Model Number	Kit List
400-600	918FK0601 ♦	\$750

OPERATOR INTERFACE MODULE (OIM) REMOTE MOUNTING KIT

The kit includes a cable bezel and blank OIM replacement panel for mounting to the drive chassis in applications where it is desirable to locate the OIM away from the drive or in a cabinet door. The OIM can be then mounted up to 5 meters from the drive.

Kit Model Number 905FK0101 ♦.....\$150 List

♦Normally carried in stock

V4.2 REGULATOR UPGRADE⁽¹⁾⁽³⁾

This kit includes a V4.2 regulator board, grounding harness, CS3000 software and V4.2 software manual. This kit can be used to upgrade V3.0⁽²⁾ or higher FlexPak 3000 drives.

Kit Model Number 920FK0042 ♦\$600 List

OPERATOR INTERFACE MODULE (OIM) DRIVE-MOUNTED KIT⁽³⁾

This kit includes an OIM and all necessary connection hardware. This option is available for FlexPak 3000 **Power Module** drives (standard on FlexPak 3000 drives).

Kit Model Number 317C160D ♦\$600 List

- (1) Contact Reliance for upgrading V2 or lower drives.
- (2) Second last digit of controller M/N must be "3" or higher.
- (3) Upgrading from a Version 2 FlexPak3000 Drive to Version 4 requires that both the regulator board and OIM kit be upgraded.

NEMA 1 CONVERSION KIT

This modification allows conversion of standard chassis to a NEMA 1 enclosure. This kit cannot be used with FlexPak 3000 Power Module drives.

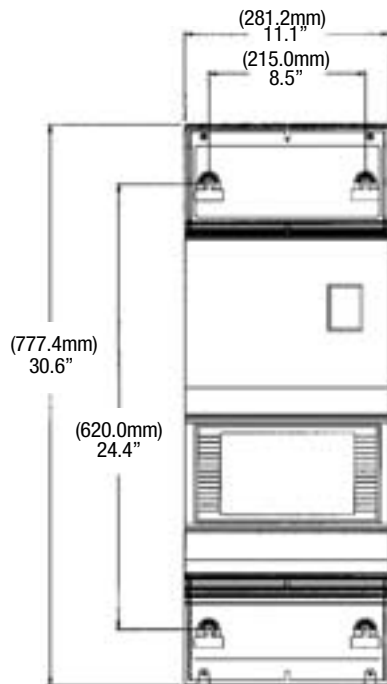
230 VAC HP	460 VAC HP	Kit Model Number	Kit List	Factory Installed
1-1/2 - 30	3-60	904FK0101 ♦	\$795	\$895
40-75	75-150	904FK0201 ♦	1,100	1,200
100-150	200-300	N/A	N/A	N/A
-	400-600	N/A	N/A	N/A



FlexPak 3000 drive shown with the optional NEMA 1 enclosure

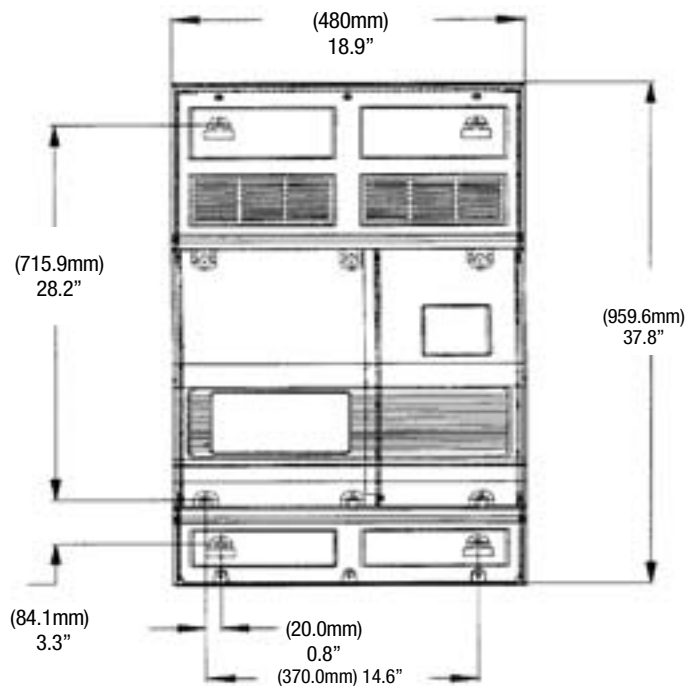
DIMENSIONS WITH NEMA 1 CONVERSION KIT INSTALLED

**1 1/2-30 HP @ 230 VAC, 3-60 HP @ 460 VAC
Model Number 904FK0101**



Attached Depth: (308.57mm) 12.15"

**40-75 HP @ 230 VAC, 75-150 HP @ 460 VAC
Model Number 904FK0201**



Attached Depth: (332.8mm) 13.1"

♦ Normally carried in stock

DISCOUNT VS-50D

SOFTWARE PROGRAMMING & RS-232 CABLES

CS3000 Software, Control & Configuration

This is a Windows® based software package which allows drive Control & Configuration. The user is allowed to create, store, upload, download, monitor, control and/or compare parameter values in a user-friendly environment.

Configuration and operation of the drive from a PC provides the flexibility and power desired by today's sophisticated users and OEMs alike.

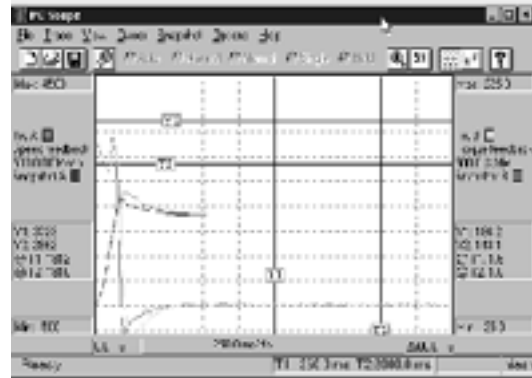
- Compare; when performed either locally or over a remote modem allows quick qualification of any changed parameters. Differences are displayed on the PC and may be printed.
- Edit; allows programing via PC.
- Download; allows one step programming of multiple parameters from drive memory.
- Upload; allows identification of existing drive parameters from drive memory.
- Drive control;
 - Monitors 6 display values;
 - Speed reference (scalable)
 - Motor speed
 - Armature volts
 - Motor current
 - Percent load
- Configurable displays are;
 - Speed reference
 - Control source
 - Auto/Manual mode
 - Fwd/Rev direction
- Operational keys displayed;
 - Run, Jog, Stop, Reset
- Fault/Alarm Log; allows fault and alarm history for diagnosis of operation.
- PC Scope feature; allows monitoring and trace of two drive parameters for diagnostics and tuning of the drive. Captured data can also be saved as an ASCII text file or can be compared to previous traces.⁽¹⁾

(1) Requires V4.0 or later

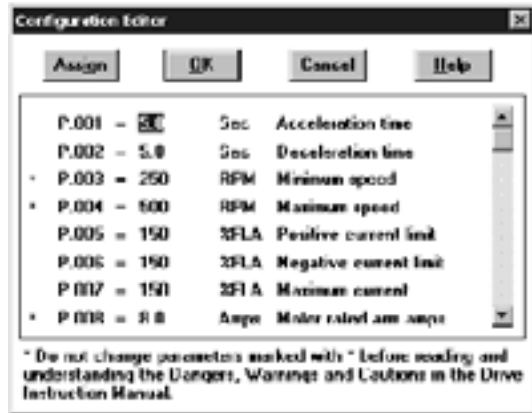
Provided on a 3.5" diskette with manual. Note that this software is also compatible with GV3000 AC drives.

Reference Manual Number: D2-3348

Model Number 2CS3000♦.....\$350 List



PC Scope screen from CS3000



Configuration Editor screen from CS3000

CS3000 Computer Cable

The 9-pin connector connects to the PC and the 25-pin connector connects to the FlexPak 3000 drive.

Model Number *61C127♦.....\$88 List

♦Normally carried in stock

Tachometer/Encoder (Speed Feedback)

ADVANTAGES OF CLOSED-LOOP SPEED REGULATION

Normal voltage regulation using IR drop compensation provides 1-2% speed regulation with a 95% load change. However, changes in other variables (temperature, frequency, and voltage) can cause significantly greater speed changes, sometimes as much as 15%.

For improved speed regulation, add a motor-mounted tachometer. For the best regulation, use an encoder (pulse tachometer) kit. Use the chart below to select speed feedback kits and factory mounted tachometers/encoders.

Speed Feedback	Maximum Input	Type Tachometer	Regulation	Non-Regen.	Regen.	Speed Feedback Kit Model Number	Speed Feedback Kit Less Tachometer/Encoder List	Speed Feedback Kit Factory Installed Less Tachometer/Encoder List
Voltage	-	-	2%	✓	✓	-	-	-
AC Tachometer	250 VAC	RE 045	1%	✓		907FK0301 ⁽²⁾ ♦	\$300	\$385
DC Tachometer	250 VDC	5PY	1%	✓	✓	Std.	Std.	Std.
Encoder (Pulse)	73KHz ⁽¹⁾	RD-120-1 ⁽³⁾⁽⁵⁾	.01%	✓		907FK0101 ♦	300	385
Encoder (Pulse)	73KHz ⁽¹⁾	RD-120-2 ⁽³⁾⁽⁵⁾	.01%		✓	907FK0101 ♦	300	385
Encoder (Pulse)	73KHz ⁽¹⁾	H56 ⁽³⁾	.01%	✓	✓	907FK0101 ♦	300	385
Encoder (Pulse)	73KHz ⁽¹⁾	RL-1024 ⁽⁴⁾	.01%	✓	✓	907FK0101 ♦	300	385

- (1) $\frac{PPR \times RPM}{60,000} = KHz$
- (2) Kit is intended for use with existing motors that have RE045 tachometers. For new motor and tachometer applications, select another tachometer and appropriate feedback kit.
- (3) 120 PPR
- (4) 1024 PPR
- (5) Not suitable for use in TENV frames DC180, DC210, or C180.

♦Normally carried in stock

COMPLIANCE TO CE DIRECTIVES

Reliance Mains Filter and Inductor kits are designed for use with the FlexPak 3000 DC drive, when compliance with European Community requirements for electromagnetic compatibility is required. When used in conjunction with a FlexPak 3000 drive, the AC Mains Filter and AC Mains Inductor kits, along with specific wiring practices (as detailed in Instruction Manual D2-3404) and an electrical cabinet, comply with standards EN50081-1, EN50081-2, EN50082-1 and EN50082-2.

EN50081-1: Electromagnetic compatibility-Generic emissions standard, Part 1: residential, commercial, and light industry.

EN50081-2: Electromagnetic compatibility-Generic emissions standard, Part 2: industrial environment.

EN50082-1: Electromagnetic compatibility-Generic immunity standard, Part 1: residential, commercial, and light industry.

EN50082-2: Electromagnetic compatibility-Generic immunity standard, Part 2: Industrial environment.

Compliance Requirements

For the FlexPak 3000 DC Drive to conform to the standards listed on the Declaration of Conformity (DOC), the drive must:

- Be accompanied by the DOC for that drive. If you need a copy of the DOC, call the Autofax product information system at 440-646-7777 and request the FlexPak 3000 DOC.
- Be specified by model number on the DOC.
- Have a CE mark, which is below the drive nameplate.
- Be mounted and wired on the conductive, non-coated back panel of an electrical cabinet.
- FlexPak 3000 Power Module version: Consult drive manual for compliance requirements (D2-3475).

- Include an AC Mains Filter and AC Mains Inductor (as specified under AC Mains Filter and AC Mains Inductor Selection).
- Be installed and wired according to the instructions as specified in the FlexPak 3000 Instruction Manual D2-3404.
- Be operated with the electrical cabinet doors closed.

NOTE: Conformity of the FlexPak 3000 Drive does not guarantee that the entire installation will be in compliance.

Required Kits

In addition to the CE model⁽¹⁾ drive, you will need the following to install the drive for CE compliance:

- AC Mains Filter kit
- AC Mains Inductor kit
- Electrical cabinet with back mounting panel (See data sheet D-2928 and Drive Hardware manual D2-3404)

Rating HP		Inductor Part Number	List	Mains Filter Amp Rating	Filter Model Number	List
230 VDC	460 VAC					
1-1/2	3	608895-63H ♦	\$290	15	3DF4353 ♦	\$650
2	5	608895-63H ♦	290	15	3DF4353 ♦	650
3	7.5	608895-63K ♦	300	15	3DF4353 ♦	650
5	10	608895-63K ♦	300	30	3DF4354 ♦	680
7-1/2	15	608895-63M ♦	330	30	3DF4354 ♦	680
10	20	608895-63P ♦	345	50	3DF4355 ♦	875
-	25	608895-63P ♦	345	50	3DF4355 ♦	875
15	30	608895-63R ♦	375	50	3DF4355 ♦	875
20	40	608895-63W ♦	435	100	3DF4357 ♦	1,020
25	50	608895-63W ♦	435	100	3DF4357 ♦	1,020
30	60	608895-63Y ♦	550	100	3DF4357 ♦	1,020
40	75	608895-63AA	610	300	3DF4359	3,110
50	100	608895-63AC	720	300	3DF4359	3,110
60	125	608895-63AE	860	300	3DF4359	3,110
75	150	608895-63AG	1,355	300	3DF4359	3,110
-	200	608895-63AK	1,360	320	3DF4359	3,110
-	250	608895-63AN	1,365	400	3DF4359	6,220 ⁽²⁾
-	300	608895-63AR	1,735	500	3DF4359	6,220 ⁽²⁾

(1) Model number must have a "2" in the last digit to be CE-compliant. Example 60FN4042.

(2) Requires quantity two. Specify two, price includes two.

DISCOUNT VS-50D