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Table of Contents

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Overview and Safety Notes

This document is designed to provide detailed information on specifying and installing a DCS800-EP panel drive to replace an existing Reliance FlexPak® 3000 panel drive, including a list of incompatibilities and remedies.

Installing the DCS800-EP panel drive can be easily accomplished by following the steps outlined in this guide. These steps are intended as a quick guide and may not cover all required changes. It is the user's responsibility to consider all conditions before restarting the application.

Important!
Only qualified electricians are allowed to install and maintain the drive. Never work on the drive, motor cable or motor when main power is applied.

Important!
Use all appropriate lifting techniques when removing or installing a drive panel.

Most DCS800-EP panel drives are shipped ready for 460 Vac input power connection. Panel drives that are prewired for 230 Vac are clearly marked with a sticker on the panel nameplate. It is imperative that the installer verify that the input voltage matches the drive hardware and programming or damage to the drive will result. Kits for 230 to 460 Vac conversion are available from ABB. See *DCS800-EP Installation and Start-Up Manual* for more information.

Important!
See *DCS800 Hardware Manual* and *DCS800 Firmware Manual* for additional safety precautions

230V Drive
Cross Reference

The tables, below, show the type code of the ABB drive recommended for Reliance FlexPak 3000 drive replacement.

In cases where a 460V Flexpak has been converted to 230V, use ABB cross-reference for the 230V equivalent (substituting "2042" for "4042")

Important!
DCS800-EP armature and field current ratings vary slightly from FlexPak 3000 ratings in some cases. Be sure the actual motor nominal current rating is less than or equal to the DCS800-EP output rating for both field and armature current.

Frame	HP	Reliance Model	ABB Model	Input current (A_{RMS})		Armature Current (A_{DC})		Field Current (A_{DC})	
				Reliance	ABB	Reliance	ABB	Reliance	ABB
230V - Non-regenerative									
A	1.5	1FN2042	DCS800-EP1-0020-05+S235	10	16	7	20	10	6
	2	2FN2042	DCS800-EP1-0020-05+S235	11	16	9	20	10	6
	3	3FN2042	DCS800-EP1-0020-05+S235	13	16	12	20	10	6
	5	5FN2042	DCS800-EP1-0020-05+S235	19	16	20	20	10	6
	7.5	7FN2042	DCS800-EP1-0045-05+S235	26	33	29	37	10	6
	10	10FN2042	DCS800-EP1-0045-05+S235	33	33	38	37	10	6
	15	15FN2042	DCS800-EP1-0065-05+S235	48	44	55	54	10	6
	20	20FN2042	DCS800-EP1-0090-05+S235	63	58	73	71	15	6
	25	25FN2042	DCS800-EP1-0125-05+S235	80	102	93	105	15	6
	30	30FN2042	DCS800-EP1-0125-05+S235	94	102	110	105	15	6
B	30	-	DCS800-EP1-0180-05+S235	-	143	-	125	-	15
	40	40FN2042	DCS800-EP1-0230-05+S235	125	168	146	206	15	15
	50	50FN2042	DCS800-EP1-0230-05+S235	154	168	180	206	15	15
	60	60FN2042	DCS800-EP1-0230-05+S235	186	168	218	206	15	15
	75	75FN2042	DCS800-EP1-0315-05+S235	226	208	265	255	15	20
C	100	100FN2042	DCS800-EP1-0405-05+S235	307	278	360	341	15	20
	125	125FN2042	DCS800-EP1-0470-05+S235	370	347	434	425	15	20
	150	150FN2042	DCS800-EP1-0610-05+S235	443	413	521	506	15	25
230V - Regenerative									
A	1.5	1FR2042	DCS800-EP2-0025-05+S235	10	16	7	20	10	6
	2	2FR2042	DCS800-EP2-0025-05+S235	11	16	9	20	10	6
	3	3FR2042	DCS800-EP2-0025-05+S235	13	16	12	20	10	6
	5	5FR2042	DCS800-EP2-0025-05+S235	19	16	20	20	10	6
	7.5	7FR2042	DCS800-EP2-0050-05+S235	26	30	29	37	10	6
	10	10FR2042	DCS800-EP2-0050-05+S235	33	30	38	37	10	6
	15	15FR2042	DCS800-EP2-0075-05+S235	48	44	55	54	10	6
	20	20FR2042	DCS800-EP2-0100-05+S235	63	58	73	71	15	6
	25	25FR2042	DCS800-EP2-0140-05+S235	80	85	93	105	15	6
	30	30FR2042	DCS800-EP2-0140-05+S235	94	85	110	105	15	15
B	40	40FR2042	DCS800-EP2-0200-05+S235	125	143	146	175	15	15
	50	50FR2042	DCS800-EP2-0200-05+S235	154	143	180	175	15	15
	60	60FR2042	DCS800-EP2-0260-05+S235	186	168	218	206	15	15
	75	75FR2042	DCS800-EP2-0350-05+S235	226	208	265	255	15	20
C	100	100FR2042	DCS800-EP2-0450-05+S235	307	278	360	341	15	20
	125	125FR2042	DCS800-EP2-0520-05+S235	370	347	434	425	15	20
	150	150FR2042	DCS800-EP2-0680-05+S235	443	413	521	506	15	25

Table 1: 230 V FlexPak 3000 to DCS800 cross reference

460V Drive
Cross Reference

Frame	HP	Reliance Model	ABB Model	Input current (A_{RMS})		Armature Current (A_{DC})		Field Current (A_{DC})	
				Reliance	ABB	Reliance	ABB	Reliance	ABB
460V - Non-regenerative									
A	3	3FN4042	DCS800-EP1-0020-05	10	14	6	17	10	6
	5	5FN4042	DCS800-EP1-0020-05	12	14	10	17	10	6
	7.5	7FN4042	DCS800-EP1-0020-05	15	14	14	17	10	6
	10	10FN4042	DCS800-EP1-0020-05	18	14	19	17	10	6
	15	15FN4042	DCS800-EP1-0045-05	24	29	27	35	10	6
	20	20FN4042	DCS800-EP1-0045-05	31	29	35	35	10	6
	25	25FN4042	DCS800-EP1-0065-05	39	43	45	53	10	6
	30	30FN4042	DCS800-EP1-0065-05	45	43	52	53	10	6
	40	40FN4042	DCS800-EP1-0090-05	63	55	73	68	15	6
	50	50FN4042	DCS800-EP1-0125-05	74	85	86	104	15	6
	60	60FN4042	DCS800-EP1-0125-05	86	85	100	104	15	15
B	75	75FN4042	DCS800-EP1-0180-05	110	102	129	125	15	15
	100	100FN4042	DCS800-EP1-0230-05	143	134	167	167	15	15
	125	125FN4042	DCS800-EP1-0230-05	177	167	207	205	15	15
	150	150FN4042	DCS800-EP1-0315-05	213	200	250	245	15	20
C	200	200FN4042	DCS800-EP1-0405-05	281	265	330	325	15	20
	250	250FN4042	DCS800-EP1-0470-05	351	330	412	405	15	20
	300	300FN4042	DCS800-EP1-0610-05	421	392	495	480	15	25
D	400	400FN4041	DCS800-EP1-0740-05	567	522	667	640	15	25
	500	500FN4041	DCS800-EP1-0900-05	680	649	800	795	15	25
	600	600FN4041	DCS800-EP2-1010-05[1,2]	816	775	960	950	15	25
460V - Regenerative									
A	3	3FR4042	DCS800-EP2-0025-05	10	14	6	17	10	6
	5	5FR4042	DCS800-EP2-0025-05	12	14	10	17	10	6
	7.5	7FR4042	DCS800-EP2-0025-05	15	14	14	17	10	6
	10	10FR4042	DCS800-EP2-0025-05	18	14	19	17	10	6
	15	15FR4042	DCS800-EP2-0050-05	24	29	27	35	10	6
	20	20FR4042	DCS800-EP2-0050-05	31	29	35	35	10	6
	25	25FR4042	DCS800-EP2-0075-05	39	43	45	53	10	6
	30	30FR4042	DCS800-EP2-0075-05	45	43	52	53	10	6
	40	40FR4042	DCS800-EP2-0100-05	63	55	73	68	15	6
	50	50FR4042	DCS800-EP2-0140-05	74	85	86	104	15	6
	60	60FR4042	DCS800-EP2-0140-05	86	85	100	104	15	6
B	75	75FR4042	DCS800-EP2-0200-05	110	102	129	164	15	15
	100	100FR4042	DCS800-EP2-0200-05	143	102	167	164	15	15
	125	125FR4042	DCS800-EP2-0260-05	177	167	207	205	15	15
	150	150FR4042	DCS800-EP2-0350-05	213	200	250	245	15	20
C	200	200FB4042	DCS800-EP2-0450-05	281	265	330	325	15	20
	250	250FB4042	DCS800-EP2-0520-05	351	330	412	405	15	20
	300	300FB4042	DCS800-EP2-0680-05	421	392	495	480	15	25
D	400	400FR4041	DCS800-EP2-0820-05	567	522	640	640	15	25
	500	500FR4041	DCS800-EP2-1000-05	680	649	800	795	15	25
	600	600FR4041	DCS800-EP2-1010-05[2]	816	775	960	950	15	25

Table 2: 460 V FlexPak 3000 to DCS800 cross reference

NOTES:

[1] Regenerative drive. Input bridge can be disabled in software to prevent regeneration. (7.03 b5 = 1)

[2] Overload rating for the ABB drive is 110%; the Reliance drive is 150%

Options
Cross Reference

Name	Description	Reliance Model	ABB Field Kit Code	Plus Code	ABB Comment
115 VAC Control Interface	Converts customer-supplied 115 VAC signals to 24 VDC for operating a FlexPak 3000.	917FK0101	IOB-22 Kit	NA	
460 VAC to 230 VAC Conversion Kit	Allows conversion of the 460 VAC drive to a 230 VAC drive at one-half the 460 VAC horsepower rating.	916FK series	DCS800-EP 230VAC SUPPLY - 1	+S235	
AC Line Disconnect Kit	Allows the three-phase line to be disconnected at the drive.	901FK series	NA	+F278	
AC Tachometer Feedback Kit	Allows the drive to accept feedback signals from AC tachometers to a maximum voltage of 275 VAC RMS.	907FK0301	NA	NA	See Incompatibilities and Remedies section
AutoMax Network Communication Board	Allows the drive to communicate on the Reliance AutoMax Distributed Control System (DCS).	915FK0101	NA	NA	Third party gateway may be available. Consult ABB.
Blower Motor Starter Kit	Provides a fused AC starter with adjustable overload and interlocking for control of the three-phase blower motor used to cool the DC motor.	902FK series	NA	+M6xx	where xx identifies blower current rating
DeviceNet Communication Board	Allows the drive to communicate over the open protocol DeviceNet network.	915FK1100	RDNA-01-KIT	NA	
Drive Control Configuration Software	Windows-based software that allows the user to connect any personal computer running Microsoft Windows to a drive. Allows you to create, store, upload, and download drive configurations. You can also start and stop the drive, monitor and change parameters through the PC, and read and reset the drive's fault log.	2CS3000	NA	Standard	Drive Windows Light is included as standard
ControlNet Network Communication Board	Allows the drive to communicate over the ControlNet network.	915FK2101	RCNA-01-KIT	NA	
Dynamic Braking Kit	Provides the hardware, including braking grids, needed to provide dynamic braking on stop.	908FK, 909FK, 912FK, and 913FK series	NA	NA	See Incompatibilities and Remedies section
Enhanced Field Supply Kit	Provides electronic field trim, field economy, and the ability to supply 240V field voltage and other special voltages.	923FK series	NA	Standard	On Board Field Exciter: DCS800 includes current-controlled field exciter as standard. Field economy and field weakening features are standard
Field Current Regulator Kit	Provides field economy, as well as pre-weakening of the field using a fixed reference or field weakening for above base speed operation. Tachometer feedback is required with this kit. This kit replaces the standard field supply.	911FK series	NA	Standard	
I/O Expansion Board	Gives the drive (5) digital inputs (DI); (2) relay outputs (RO); (2) analog inputs (AI); (2) analog outputs (AO); (1) frequency input; and (1) frequency output of additional IO. Also enables OCL (Outer Control Loop) functionality if DI-5 (OCL Enable) is connected.	914FK0101	"RAIO-01: (2) AI; (2) AO RDIO-01: (3) DI; (2) RO"	NA	See note below regarding frequency input and output. IF OCL is in use, typically for web tension control, contact ABB.
Inverting Fault Circuit Breaker Kit	This kit is an alternative to drives supplied with inverting fault fuses.	906FK series	NA	NA	
NEMA 1 Conversion Kit	Converts the standard chassis to a NEMA 1 enclosure.	904FK series	NA	NA	
Operator Interface Module (OIM) Remote Mounting Kit	Allows mounting of the OIM on the outside of the cabinet	905FK0101	OPMP-01	NA	
Pulse Encoder Feedback Kit	Allows for digital pulse encoder speed feedback.	907FK0101	NA	Standard	The standard DCS800 pulse encoder interface is 5V and 24V grounded (and 15V on frame D5 and over). Optional interface is the 5V, 12V or 24V isolated, using the IOB-3 board.

Table 3: FlexPak 3000 to DCS800 options cross reference

NOTE: For FlexPak 3000, Frequency input and output were designed for LEADER / FOLLOWER applications where both drives have the I/O expansion board installed. For DCS800, use SDCS-DSL-4 boards on both drives and connect using ABB „DCSLink." See „Communication: DCSLink with SDCS-DSL-4" in the *DCS800 Firmware Manual* for setup information.

Product Differences and Remedies
Hardware

The DCS800-EP has been designed to match the form, fit, and function of the Reliance FlexPak 3000 in every way possible. However, some differences still exist. This section identifies known differences and suggests remedies.

Hardware

1. Armature current rating

Armature current variation between the two manufacturers does exist. The ABB drive current ratings are based on industry standard power ratings for DC motors.
REMEDY: Select the proper DCS800 rating by ensuring the actual motor's nominal current rating is less than or equal to the DCS800-EP armature current rating as shown in tables 1 & 2 above.

2. Field current rating

Variations in field current ratings also exist.
REMEDY: Be sure the actual motor field current rating is less than or equal to the DCS800-EP field current rating as shown in tables 1 & 2 above.

3. Field power supply type

The FlexPak 3000's internal field supply was voltage controlled. The DCS800-EP's field supply is current controlled. Current control is superior to voltage control since field strength is proportional to current, not voltage. One benefit is that the DCS800-EP will automatically provide constant field strength whether the motor is cold or hot.
REMEDY: None required but be prepared to enter the actual motor nominal field current rating, found on the motor nameplate, into the DCS800-EP during commissioning.

4. Line Impedance

Each DCS800-EP drive always requires a line reactor or transformer on the AC side of each drive. In some cases, the FlexPak 3000 did not require this.
REMEDY: If a line reactor or transformer is already in use, it can be reused with the DCS800-EP. If not, drives 150 hp and below can be ordered with an internal line reactor (+E213) but be sure sufficient cabinet depth is available. An external reactor can also be used. See *DCS800-EP Installation and Start Up Manual* for dimensions and reactor recommendations.

5. DC Contactor

FlexPak 3000 drives 400 hp and above included a DC contactor. The DCS800-EP includes an AC contactor instead.
REMEDY: Unless dynamic braking is also used, this should have no impact on system operation.

6. Dynamic Braking

The FlexPak 3000 had an option for dynamic braking. No option exists with the DCS800-EP.
REMEDY:
– Order the DCS800-EP **without** the AC contactor using plus code +0F250;
– Reuse existing DC contactor (the DC contactor may need to be relocated off of the FlexPak 3000 panel) or purchase new EHDB contactor from ABB Controls and mount in a convenient location.
– Reuse existing DB resistors.
– Use DCS800-EP relay output "DO8" to control the DC contactor by wiring to terminal X96 (rated at 3A at 24Vdc or 115/230Vac).
– Configure the drive for "US DC Contactor." See:
DCS800 Firmware Manual, sections:
"Firmware Description: DC-contactor US version"
"Firmware Description: Dynamic Braking."

7. Grounded vs. Isolated Inputs and Outputs

The common of the digital inputs and outputs on the FlexPak 3000 were isolated from the rest of the drive but they are grounded on the DCS800-EP. This is only a problem on systems that have input/output wiring that runs from bay to bay or cabinet to cabinet or, for example, from the cabinet to a pushbutton pedestal on the machine. Systems with all I/O wiring completely inside a single cabinet bay should not have a problem.
REMEDY: Add hardware to isolate the inputs and outputs such as the RDIO-01-KIT or 24Vdc relays (purchased from ABB controls).

> **Important!**
> Failure to add isolation when required as described above can cause damage to the DCS800 drive module!

Product Differences and Remedies
Hardware & Control/Interface

Hardware (continued)

8. AC Tachometer

When used with an optional AC Tachometer Feedback Kit (907KF0301), some FlexPak 3000 drives used an AC tachometer for speed feedback. The DCS800 is not compatible with AC tachometers.

REMEDY: Use the DCS800 in "transducerless" mode by setting para. 50.03 = EMF, or replace the AC tachometer with a DC tachometer, 8 to 270 Vdc at maximum speed. NOTE: It may be possible to relocate and reuse the Reliance AC Tachometer Interface board. Consult with ABB or use a commercially available diode bridge.

9. Disconnect handles

DCS800-EP drives that include the optional circuit breaker use an ABB Tmax breaker. This type of breaker uses an optional Type RH through-the-door rotary operating mechanism. The operating mechanisms from the FlexPak3000 cannot be reused and the handle location will be different.

REMEDY: Remove existing disconnect handle and cover up the holes. Install the ABB through-the-door operating mechanism Type RH in the appropriate location as shown in the DCS800-EP Installation and Start Up Manual.

10. Inverting Circuit Breaker

Inverting circuit breakers are standard on regenerative FlexPak 3000 drives from 400 to 600 hp (frames C & D). DCS800-EP drives use DC fuses instead. REMEDY: None required. The two are functionally equivalent.

Control/Interface

1. Coast/Stop and Customer Interlock Inputs

The FlexPak 3000 supported a "coast/stop" and a "customer interlock" input, which resulted in the same reaction, to cutoff current to the motor causing it to coast to a stop. The DCS800 only supports one of these ("coast," also called "Off2").

REMEDY: If two inputs are required, a RDIO-01 option board can be added to increase the number of digital inputs. "Customer interlock" would be configured as "external fault" (para. 30.31).

2. Brush Wear Indicator

The FlexPak 3000 supported a feature to monitor the wear of the DC motor brushes. The DCS800-EP does not support this feature.

REMEDY: Discontinue use of the brush wear indicator

3. Digital Inputs and Outputs

FlexPak 3000 has 9 digital inputs; DCS800 only has 8 native to the drive.

REMEDY: Use of the RDIO-01 digital I/O extension board adds 3 digital inputs (total 11). The RDIO-01 would be unnecessary if any of the following were done:

- Combine "customer interlock" with "Coast/Stop" as above
- Do not use "digital input 0" which could have been used as
  - "brush wear input"
  - "jog speed select" or
  - "outer control loop enable"
- Do not use one of the other inputs DI-1 through DI-9

4. Motor Thermal Switch

The FlexPak 3000 accepted a signal from the motor thermal switch as standard.

REMEDY: The DCS800 supports a motor thermal switch (KLIXON®) with an isolated digital input using the RDIO-01 expansion board. PT100 and PTC are also supported using analog input 2 or 3 (AI2, AI3) on the SDCS-I0B-3 or AI7 and AI8 of the RAIO-01 expansion board. See "Fault Tracing/Motor Protection" in *DCS800 Firmware Manual* for more infomration.

Product Differences and Remedies
Control/Interface & Features

Control/Interface (continued)

5. Field Power On/Off

With the FlexPak 3000, the field power was energized whenever 3-phase AC power was connected to the drive. With the DCS800, the field turns on and off during the motor on-off sequence.

REMEDY: If the field needs to be energized all the time, enable the "field heating" feature as described in "Field Excitation: Field Heating" section of the *DCS800 Firmware Manual*. NOTE: DCS800's current controlled field exciter supplies constant field strength whether the motor is cold or hot, so field heating may not be required.

6. AutoMax Interface

The FlexPak 3000, when used with the AutoMax® Network Communication Board, could talk to the AutoMax Distributed Control System. DCS800-EP does not have this interface.

REMEDY: Third party gateways are available to convert AutoMax to Ethernet IP. Consult with ABB for additional information.

7. Motor On/Off with 2-Wire control

The FlexPak 3000 only supported 3-wire (momentary) signals for motor on-off. In order to support maintained signals, the hardware needed to be wired in a specific configuration. The DCS800 can be configured to use 3-wire (momentary) or 2-wire (maintained) on-off inputs, but when 2-wire control is enabled, two inputs, ON and RUN, must be set and maintained to command motor rotation, not just one input.

REMEDY:

(1) Set up the DCS800 for 3-wire control and use the same hardware circuit as FlexPak 3000 to mimic 2-wire control.

(2) Configure the drive for 2-wire control and wire in a second input. NOTE: ON and RUN can be set and cleared at the same time, or the auxiliary contact from the AC contactor can be used to energize the RUN signal. ON cannot be "tied high" because it must be cleared before a fault can be reset.

Features

1. Jog Button on Operator Interface Module (OIM)

The DCS800-EP does not have a jog button on the drive's control panel like the FlexPak 3000 OEM.

REMEDY: The DCS800 drive can be commanded locally from the control panel using the panel's start and stop buttons and speed selector.

2. Direct Tension Control Winders

Some versions of the FlexPak 3000 had the ability to control a winder, reading feedback from a tension-measuring device such as a dancer arm. The DCS800 does not have this functionality. An optional program is available, however, that provides winder functionality using indirect tension control (using an estimate of web tension). Contact ABB about the "Center Winder/Unwinder" application program for more information.

3. Adaptive Programming

FlexPak 3000 had no ability to add any additional programmability to the drive. The Adaptive Programming (AP) feature of the DCS800 gives the user the freedom to add programming blocks. Sixteen function blocks can be added utilizing a library of 31 blocks including logic blocks, math blocks and an event block that creates a user-defined alarm or fault. See section "Adaptive Programming" in the *DCS800 Firmware Manual* for more information.

Drive Dimensions

The overall size of the DCS800-EP is slightly larger than the FlexPak 3000 in some cases. However, the FlexPak3000 required more clearance in width and height, so differences in those dimensions are unlikely to be a problem. Depth, however, could sometimes be an issue, especially with the optional B-frame reactor.

– Width: four inches of side clearance was required for the FlexPak 3000 to allow room for the control rack to swing open. DCS800 does not have a swing-out control rack so very little side clearance is required.

– Height: The FlexPak required more top and bottom clearance for airflow than does the DCS800.

– Depth: The depth of the DCS800 is greater in some cases. This may cause an issue if there is very little depth clearance in the existing enclosure.

Table 4, below, compares the dimensions and clearance requirements. (See tables 1 and 2 to determine frame size by model number.)

Panel Dimensional Comparison

Inches	Frame A (10 - 60 hp)			Frame B (75 - 150 hp)			Frame C (200 - 300 hp)			Frame D (400 - 600 hp)		
	FlexPak	DCS800	Difference	FlexPak	DCS800	Difference	FlexPak	DCS800	Difference	FlexPak	DCS800	Difference
Height												
Panel	18.8	18.8	0	19.3	19.3	0	33.5	33.5[1]	0	43.5[2]	43.5[3]	0
Clearance	10	9	-1	17	15	-2	17	15	-2	17	17	0
Panel + Clearance	28.8	27.8	-1	36.3	34.3	-2	50.5	48.5	-2	60.5	60.5	0
Width												
Panel	10.6	12.2	1.6	18.1	20	1.9	23.6	23.6	0	26.7	26.7	0
Clearance	4	1	-3	4	1	-3	4	1	-3	4	4	0
Panel + Clearance	14.6	13.2	-1.4	22.1	21	-1.1	27.6	24.6	-3	30.7	30.7	0
Depth												
Without optional reactor	12.2	14.4	**2.2**	13.5	13.8	**0.3**	16.7	16.2	-0.5	18.8	16/19.7[4]	-2.8/**0.9**[4]
With optional reactor	-	14.4	**2.2**		19.3	**5.8**	na	na		na	na	

Millimeters	Frame A (10 - 60 hp)			Frame B (75 - 150 hp)			Frame C (200 - 300 hp)			Frame D (400 - 600 hp)		
	FlexPak	DCS800	Difference	FlexPak	DCS800	Difference	FlexPak	DCS800	Difference	FlexPak	DCS800	Difference
Height												
Panel	477	477	0	490	490	0	851	851[1]	0	1104[2]	1104[3]	0
Clearance	254	229	-25	432	381	-51	432	381	-51	432	432	0
Panel + Clearance	731	706	-25	922	871	-51	1283	1232	-51	1536	1536	0
Width												
Panel	271	309	39	460	508	48	599	599	0	678	678	0
Clearance	102	25	-77	102	25	-77	102	25	-77	102	102	0
Panel + Clearance	373	335	-38	562	533	-29	701	624	-77	780	780	0
Depth												
Without optional reactor	310	366	**56**	342	351	**9**	424	411	-13	478	406/499[4]	-72/**21**[4]
With optional reactor	-	366	**56**	-	490	**148**	na	na		na	na	

Table 4: Panel dimension comparison chart

1 optional blower overload relay extends 1.8" (46mm) above panel
2 busbars extend 1-3/4" (45mm) above panel
3 lugs extend 2.2" (56mm) above panel
4 depth without circuit breaker option / depth with circuit breaker option.

Bolt Hole Locations

Bolt hole locations of the DCS800-EP are identical to the FlexPak 3000 as shown in table 5.

Mounting Bolt Location Comparison

Inches	Frame A (10 - 60 hp)			Frame B (75 - 150 hp)			Frame C (200 - 300 hp)			Frame D (400 - 600 hp)		
	FlexPak	DCS800	Difference	FlexPak	DCS800	Difference	FlexPak	DCS800	Difference	FlexPak	DCS800	Difference
Height												
Between bolts	18.2	18.2	0	18.3	18.3	0	32.4	32.4	0	42.4	42.4	0
Width												
Between bolts (left to center)	4.4	4.4	0	7.9	7.9	0	9.1	9.1	0	10.2	10.2	0
Between bolts (center to right)	4.4	4.4	0	6.9	6.9	0	9.5	9.5	0	10.3	10.3	0

Millimeters	Frame A (10 - 60 hp)			Frame B (75 - 150 hp)			Frame C (200 - 300 hp)			Frame D (400 - 600 hp)		
	FlexPak	DCS800	Difference	FlexPak	DCS800	Difference	FlexPak	DCS800	Difference	FlexPak	DCS800	Difference
Height												
Between bolts	462	462	0	465	465	0	823	823	0	1077	1077	0
Width												
Between bolts (left to center)	112	112	0	201	201	0	230	230	0	259	259	0
Between bolts (center to right)	112	112	0	175	175	0	240	240	0	262	262	0

Table 5: Mounting bolt location comparison chart

Installation Procedure

1. Disconnect all sources of power from the FlexPak 3000 panel.

2. Label any wires that are not already marked.

3. Remove all wiring connections from the FlexPak 3000 panel.

4. Loosen or remove the mounting screws holding the panel to the cabinet. (Frame A, up to 60 hp, drives have three screws; all others have six screws). Carefully remove the panel from the cabinet.

   Note : The DCS800-EP panel drive is designed with the same mounting hole placement as the Reliance Electric FlexPak 3000 panel. The drive width is slightly larger but the required clearances are less, allowing the DCS800-EP to use the existing cabinet.

5. Temporarily secure all individual wires, cables and harnesses away from the mounting surface to avoid damage during mounting.

6. Mount the DCS800-EP panel drive into the cabinet and secure the mounting screws to appropriate tightness.

7. Attach the power cables to the DCS800-EP using the table and diagram on the following pages and in the installation manual.

8. Attach the control wires to the DCS800-EP as discussed in the next section

> **Important!**
> Prior to start up, perform all items listed on the installation checklist from the *DCS800-EP Installation and Startup Manual.*

> **Important!**
> Only qualified electricians are allowed to install and maintain the drive. Never work on the drive, motor cable or motor when main power is applied.

> **Important!**
> Use all appropriate lifting techniques when removing or installing a drive panel.

Wiring and Configuration

Wiring and configuration changed after the release of Firmware Version 3.7 in late 2011 which included a new macro. The "3-wire jog" macro configures the drive to closely match the interface of the FlexPak 3000 drive. The startup procedures for version 3.6 and below and for version 3.7 and above are shown in separate tables and diagrams in this section.

NOTE: For firmware version number, see para. 4.01 or label on drive shipping carton (e.g. "0.360" indicates version 3.6.)

Connection Diagram

FlexPak Conversion to DCS800-EP

Refer to Table 6 or 7 for Section A – F Details
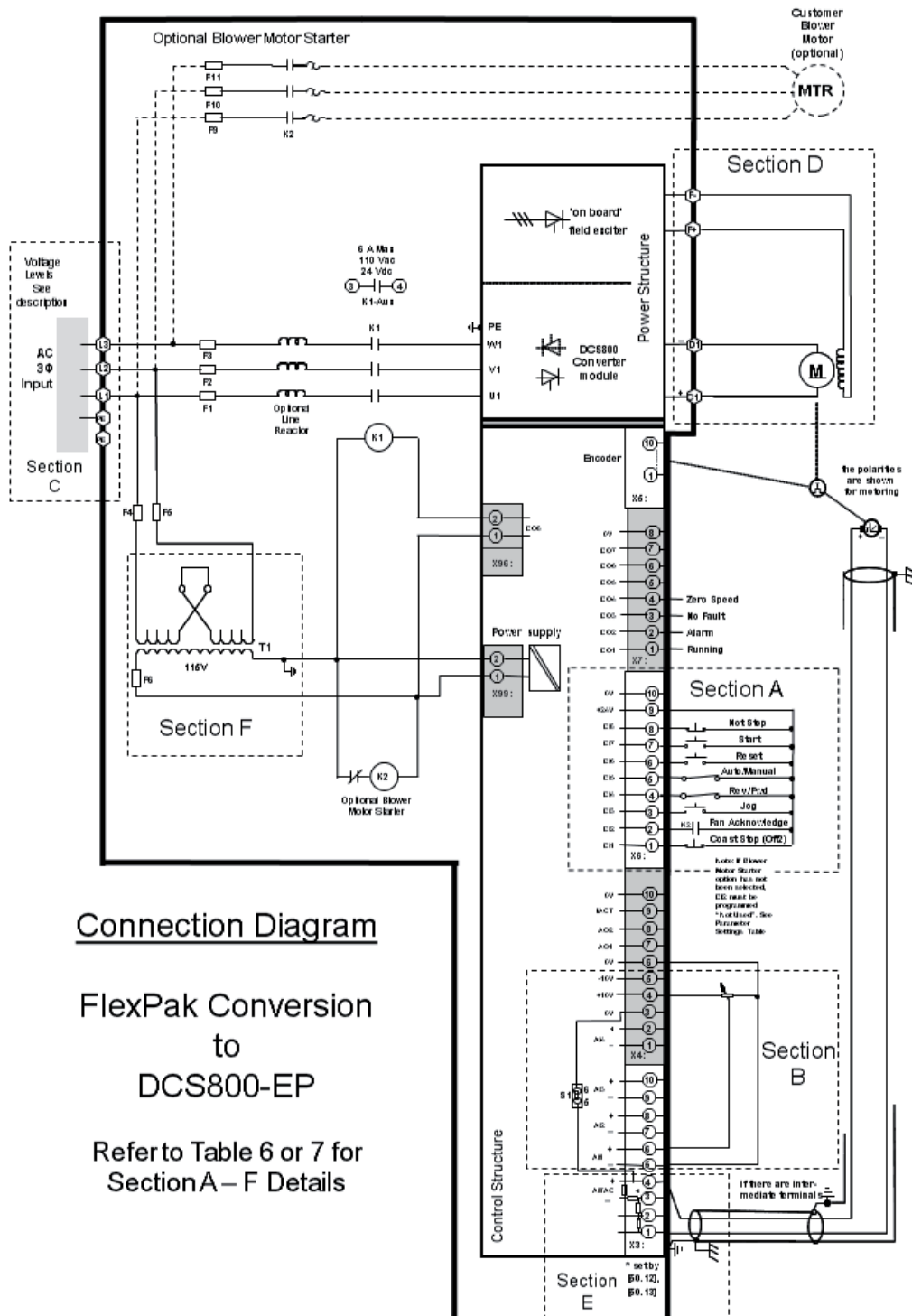
Wiring and Configuration

Firmware Version 3.6 and below

Wire and configure the drive as shown in table 6 below and the accompanying diagram. The table references a section of the diagram to make it easier to locate the connections

Drawing Section	Function	Typical Reliance Terminal	Recommended DCS800-EP Terminal	DCS800-EP Parameter(s) to change*
Power				
C	AC Mains - L1	81, 181	L1	Use commissioning assistant to program the appropriate armature and field parameters
	AC Mains - L2	82, 182	L2	
	AC Mains - L3	83, 183	L3	
D	DC Motor Armature +	A1	(C1)	Use proper procedures to determine correct polarity of armature, field and tachometer
	DC Motor Armature -	45	(D1)	
	DC Motor Field +	F1	(F+)	
	DC Motor Field -	F2	(F-)	
E	Tachometer +	21	X3:1,2 or 3*	*Depends on tach voltage. See *Hardware Manual* section "SDCS-CON-4 board" or Quick Guide.
	Tachometer -	22	X3:4	
	Tachometer Shield	23		
F	Control Transformer	Verify DCS800-EP matches the AC input voltage. See "Alternate Line Voltage" Section of the *DCS800 Installation and Start Up manual.*		
Digital Control				
A	+24 V	1,7,11,14	X6:9	None
	3-wire control			
	Start (Run)	2	X6:7 DI7)	Set 10.15 to "DI7DI8"
	Not Stop	3	X6:8 (DI8)	Set 10.16 to "DI7DI8"
	2-wire control			ABB function only
	On / Off	NA	X6:7 (DI7)	10.15 = "DI7" (default)
	Run / Stop	2, 3	X6:8 (DI8)	10.16 = "DI8" (default)
	Jog[1]	4	X6:3 (DI3)	Set 10.17 to "DI3"
	All			
	Rev / Fwd[2]	5	X6:4 (DI4)	Set 10.02 to "DI4"
	Auto / Manual	6	X6:5 (DI5)	Set 11.02 to "DI5"
	Coast Stop (Off2)	8 or 9 or both in series	X6:1 (DI1)	Set 10.08 to "DI1"
	Reset	10	X6:6 (DI6)	10.03 = "DI6" (default)
	Motor Fan Ackn	- - -	X6:2 (DI2)	10.06 = "DI2" (default)
	Running Output	27, 28	X7:1 (DO1)	14.01 = 801 14.02 = 2
	Alarm Output	29, 30	X7:2 (DO2)	14.03 = 801 14.04 = 7
	No fault Output	31, 32	X7:3 (DO3)	14.05 = - 801 14.06 = 3
	Zero Speed	- - -	X7:4 (DO4)	14.07 = 802 14.08 = 11
Analog Control				
B	Manual Speed Pot 0V	18	X3:5 and X4:6	Set 11.06 to "AI1"
	Manual Speed Pot +10V	16	X4:4	
	Manual Speed Pot signal	17	X3:6	
	Auto Speed 0V	20	X3:7 and X4:6	Set 11.03 to "AI2"
	Auto Speed +10V	16	X4:4	
	Auto Speed signal[3]	19	X3:8	

Table 6: Wiring and configuration chart (Rev. 3.6 and below)

[1] Jog only operates in 2-wire mode. (Firmware Version 3.7 allows it to also work in 3-wire mode.)
  Note: "Customer Interlock" and "Coast Stop" both result in coast stopping the motor on the FlexPak 3000. Only one input (Coast Stop) is assigned on DCS800. See "incompatibility" section above for suggested remedy if more than one input is required.
[2] Reverse operation requires the use of a regenerative drive (EP2 or FR)
[3] For both DCS800 and FlexPak 3000, can be voltage or current signal, selected by jumper

NOTE: Motor thermostat requires RDIO-01 digital I/O extension board.

Wiring and Configuration

Firmware Version 3.7 and above (3-Wire Jog Macro)

A macro was introduced in firmware version 3.7 that automatically configures the DCS800-EP for FlexPak 3000 conversions.

The macro configures the drive as shown in table 7 and the accompanying diagram below. See "Application Macros" chapter of the *DCS800 Firmware Manual* for more information on macros.

Drawing Section	Function	Typical Reliance Terminal	Recommended DCS800 Terminal	DCS800-EP Parameters to change*
Power	Connect the power cables as shown in table 6 above			
	+24 V	1, 7, 11, 14	X6:9	
Digital Inputs				
A	Start (Run)	2	X6:7 DI7)	To install the macro:
	Not Stop	3	X6:8 (DI8)	
	Jog	4	X6:3 (DI3)	1. Set para. 99.08 = 3-Wire Jog
	Rev / Fwd[1]	5	X6:4 (DI4)	
	Auto / Manual	6	X6:5 (DI5)	2. Set para. 99.07 = Yes
	Coast Stop (Off2)	8 or 9 or both in series	X6:1 (DI1)	
	Reset	10	X6:6 (DI6)	
	Motor Fan Ackn	- - -	X6:2 (DI2)	
Digital Outputs				
A	Running Output	27, 28	X7:1 (DO1)	
	Alarm Output	29, 30	X7:2 (DO2)	
	No fault Output	31, 32	X7:3 (DO3)	
	Zero Speed	- - -	X7:4 (DO4)	
Analog Inputs				
B	Manual Speed Pot 0V	18	X3:5 and X4:6	
	Manual Speed Pot +10V	16	X4:4	
	Manual Speed Pot signal	17	X3:6	
	Auto Speed 0V	20	X3:7 and X4:6	
	Auto Speed +10V	16	X4:4	
	Auto Speed signal[2]	19	X3:8	

Table 7: Wiring and configuration chart (Rev. 3.7 and above)

[1] Reverse operation requires the use of a regenerative drive (EP2 or FR)
[2] For both DCS800 and FlexPak 3000, can be voltage or current signal, selected by jumper
* Also see next section

NOTE: Motor thermostat requires RDIO-01 digital I/O extension board.

Parameter Cross-Reference

	FlexPak 3000 I/O No.	Parameter Number	and Name	Setting	DCS800-EP I/O No.	Parameter Number	and Name	Setting
Local Control of Drive								
Jog from the OIM / Control Panel								
enable	OIM		"Control source select"	"keypad"	Control panel		"LOC/REM" key	local (LOC)
jog initiate	OIM		"Jog"		Control panel		"Start" key	pressed
speed		P.012	Jog speed 1		Control panel		"Up arrow" to increase speed	pressed
Digital Inputs								
3-wire run	DI-1				DI-7	10.15	On/Off1 command	DI7DI8
auto speed source		P.103	auto reference select			11.03	Speed reference 1 select	AI2
manual speed source						11.06	Speed reference 2 select	AI1
3-wire stop	DI-2				DI-8	10.16	Start/Stop command	DI7DI8
stop mode		P.114	Stop Mode Select			21.02	Stop Mode	
Threshold		P.113	Stop speed threshold			20.03	Zero speed limit	
2-wire on/off (alt)					DI-7	10.15	On/Off1 command	DI7
stop mode						21.02	Off1 Mode	
2-wire run/stop (alt)					DI-8	10.16	Start/Stop command	DI8
stop mode						21.03	Stop Mode	
Jog	DI-3				DI-3	10.17	Jog 1 command	DI3+DIR
Speed		P.012	Jog speed 1			23.02	Fixed speed 1	
accel time		P.001	Acceleration time	shared with run		22.12	Jog accel time	
decel time		P.002	Deceleration time	shared with run		22.13	Jog decel time	
Jog off delay		P.121	jog off delay time			21.13	3-wire jog off delay	
rev/fwd	DI-4				DI-4	10.02	direction of rotation	DI4
auto/manual	DI-5				DI-5	11.02	Speed ref. 1 mux (auto)	DI5
						11.12	Speed ref. 2 mux (manual)	Invert1102
speed - auto		P.103	auto reference select			11.03	Speed ref. 1 select (auto)	AI2
speed - manual		P.106	manual ref select			11.06	Speed ref. 2 select (manual)	AI1
accel time 1		P.001	Acceleration time			22.01	Accel time 1 (auto & manual)	
decel time 1		P.002	Deceleration time			22.02	Decel time 1 (auto & manual)	
accel/decel 2 (alt)		P.122	Stop decel select			22.11	Ramp 2 selector	
accel time 2 (alt)						22.09	Accel time 2	
decel time 2 (alt)		P.018	Ramp stop decel time			22.10	Decel time 2	
coast stop	DI-6				DI-1	10.08	Off2 command	DI1
emergency stop (alt)					DI-1	10.09	Emergency stop command	DI1
stop mode						21.03	Emergency Stop Mode (Select: ramp, torque limit, coast, or dynamic brake)	
customer interlock	DI-7				user choice	30.31	External fault (coast stop)	
						30.33	External fault on select	Fault&RdyRun
reset	DI-8				DI-6	10.03	fault reset	DI6
motor fan acknowledge					DI-2	10.06	motor fan acknowledge	DI2
main contactor acknowledge (alt)					DI-2	10.21	main contactor acknowledge	DI2
Digital input 0	DI-9				user choice			
Brush wear		P.428	Dig in 0 select	Brush wear		NA	not supported by DCS800	
Jog speed select		P.428	Dig in 0 select	Jog speed select		10.18*	Jog2 select IMPORTANT: Setting this input initiates motion	
Jog speed		P.017	jog speed 2			23.03	Fixed speed 2	fixed speed 2
OCL enable		P.428	Dig in 0 select	OCL enable		group 40* or winder software*	PID control or winder software (dancer arm not supported)	
Digital Outputs								
running	DO-1				DO-1	14.01	DO1 index	801
						14.02	DO1 bit number	2
alarm	DO-2				DO-2	14.03	DO2 index	801
						14.04	DO2 bit number	7
no fault	DO-3				DO-3	14.05	DO3 index	-801
						14.06	DO3 bit number	3
zero speed					DO-4	14.07	DO4 index	802
						14.08	DO4 bit number	11
threshold		P.113	stop speed threshold			20.03	Zero speed limit	

Parameter Cross-Reference

	FlexPak 3000				DCS800-EP			
	I/O No.	Parameter Number and Name		Setting	I/O No.	Parameter Number and Name		Setting
Analog Inputs								
manual reference speed	AI-1	P.106	manual ref select	analog	AI-1	11.06	Speed reference 2 select	AI1
scaling		P.104	manual ref gain adjust			13.01*	Analog 1 high value	
scaling		P.105	manual ref zero adjust			13.02*	Analog 1 low value	
type						13.03 & jumper S2	Conversion mode AI-1	±10V Bi or 0V-10V Uni
filter						13.04	Filter AI-1	
actual value		P.192	analog man reference			2.31	Speed ref ext 1 signal (rpm)	
actual value						5.03	AI-1 signal (Volts or Amps)	
auto reference speed	AI-2	P.103	auto ref select	analog	AI-2	11.03	Speed reference 1 select	AI2
scaling		P.101	auto ref gain adjust			13.05*	Analog 2 high signal	
scaling		P.102	auto ref zero adjust			13.06*	Analog 2 low signal	
type		P.100 & jumpers J10, J12	auto signal type	±10V Bi, +10V Uni, 4-20 mA, or 10-50 mA		13.07 & jumper S3	Conversion mode AI-2	±10V Bi, +10V Uni, or 4-20 mA
filter						13.08	Filter AI-2	
actual value		P.188	analog auto reference			2.30	Speed ref ext 2 signal (rpm)	
actual value						5.04	AI-2 signal (Volts or Amps)	
Analog Outputs								
meter out 1	AO-1	P.404	meter 1 select		AO-1	15.01	Index AO-1 (see table 8)	104
scaling		P.400	meter 1 gain adjust			15.05*	Scale AO-1 (high value in mV)	
scaling		P.402	meter 1 zero adjust					
type						15.03	Conversion mode AO-1	±10V Bi
filter			100 ms (fixed)			15.04	Filter AO-1	100 ms
actual value						5.11	AO-1 signal	
meter out 2	AO-2	P.405	meter 2 select		AO-2	15.06	Index AO-2 (see table 8)	113
scaling		P.401	meter 2 gain adjust			15.10	Scale AO-2 (high value in mV)	
scaling		P.403	meter 2 zero adjust					
type						15.08	Conversion mode AO-2	±10V Bi
filter			100 ms (fixed)			15.09	Filter AO-2	100 ms
actual value						5.12	AO-2 signal	
Application Specific								
torque reference	Jumper J15		current			26.01	Torque selector	torque
						26.04	Torque Mux	TorqSel2601
						25.10	Torque Reference A selector	AI-1 or AI-2
actual value		P.189				2.24	Torque Ref Ext signal	
Field economy						21.18	Field heating select	On
delay/limit		P.501	field economy delay			20.03*	Zero speed limit (rpm)	
reference		P.511	field economy reference			44.04	Field heat reference	
actual status		P.599	field economy active			6.03, bit 5*	Field on signal	
Dynamic braking USA						21.16	Main contactor control mode	DC contact
Digital input select						10.21	Main contactor acknowledge	DI-X
Digital output select						14.15	DO8 Index	603
Digital output select						14.16	D08 Bit Number	10
stop mode						21.02	Off1 mode	
stop mode						21.03	stop mode	
stop mode						21.04	emergency stop mode	
Motor thermostat	Pin 13 & 14					31.08	Klixon selector	DI9, DI10 or DI11 (RDIO-01 req'd)

NOTES:

(alt) Signal or function with (alt) is an alternative to the previous

* Parameters with * are not equivalent to the FlexPak 3000 parameter

FlexPak	DCS800 Signal	Name	Unit
P.296	1.04	motor speed actual	rpm
P.397	1.06	motor current actual	pct
	1.13	armature voltage actual	pct
	1.29	field current actual	pct
P.193	2.01	reference speed	rpm
	1.11	mains voltage actual	pct
	xx.yy	other	

Table 8. Enter the parameter number without the decimal point.

Notes:

Notes:

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