ABB DC Drives
DCS800, 10 to 4000 hp
Catalog

Power and productivity
for a better world™
Contact ABB Inc., Low Voltage Drives

www.abb.us/drives

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DCS800 Module Type Code

- **DCS800**
- **S01**
- **0680**
- **05**
- + XXXX

**DCS800 Product Family**

**Type**
- S0 = 3-phase converter module
- A0 = Enclosed converter
- E0 = Panel mounted converter
- R0 = Rebuild kit

**Bridge type**
- 1 = non-regenerative (2-Q)
- 2 = regenerative (4-Q)

**Rated Current**
- Current rating of drive unit (Amps)

**Rated Input Voltage**
- 05 = 230...525 V AC
- 06 = 270...600 V AC
- 07 = 315...690 V AC
- 08 = 360...800 V AC
- 10 = 450...990 V AC
- 12 = 540...1200 V AC

**Power Terminal Connection**
- Blank = No option (D1 - D6)
- L = Left side power terminals
- R = Right side power terminals

**Additional Factory Installed Options**
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ABB industrial drives

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ABB DC industrial drives

ABB DC Industrial Drives

The DCS800 DC industrial drive is the latest drive from ABB, combining the newest control technology with a thyristor power platform that has been factory-proven all over the world. The DCS800 boasts a wider power range than any other DC drive on the market. The hardware and software are designed with you, the user in mind. Special features make installation and configuration simple and allow you to customize the application to your needs.

Industrial Applications

The DCS800 can be used in a wide range of industrial applications including:

- Metals
- Ski lifts
- Electrolysis
- Pulping & Paper
- Pulp & Paper
- Printing
- Magnets
- Food & Beverage
- Battery Chargers
- Material handling
- Plastic & Rubber
- Test rigs
- Mining

DCS800 DC Drive Promises

The drive meets the requirements of the most demanding drive applications. Embedded software functions offer upgrades to all classic installations like 12-pulse, double motor operation, and field reversal.

Main Features

Basic control
- Transducer and transducerless operation
- Macros to simplify setup
- High-speed serial via Ethernet, ControlNet, etc.
- On/Off control with pulsed or maintained inputs
- Field heating
- Adaptive programming
- Remembers two sets of motor parameters
- Drive position display
- Save parameter set to PC or keypad

Motion
- Easily switches between local control via keypad and remote control via D-1/O or high-speed serial
- Window speed control
- Flying start
- Field reversal, boost and opti-torque
- Motor pot up and down control

Highlights

- Reduced installation and commissioning work
- Internal three phase field exciter without additional external hardware (D1-D5)
- Excellent control performance up to highest dynamic application in field weakening operation
- All ACS800 PC tools (via DDCS) can be connected
- Able to be customized to your needs with Adaptive programming and with option Control Builder
- Flexible fieldbus system with built-in Modbus and numerous internally mountable fieldbus adapters

Virtually all DCS800 component parts are suitable for recycling.

PC Tool for ABB Drives

DriveWindow Light is an easy-to-use tool for your PC for start up and maintenance of your ABB drive. It is included with every DCS800 drive and has the following features:

- User interface tool to view and set parameters
- Startup Assistant tool
- Adaptive programming (AP) tool

It supports a wide range of ABB industrial drives, including ACS350, ACS550, ACS800, DCS400, as well as the DCS800.

Drive Configurations

- Stand-alone
- Master-follower (up to 10 followers)
- 12-pulse operation
- Hard-parallel operation (D7 only)

Inputs and outputs

- All user-designated inputs and outputs
- Hard contact output for AC or DC contactor control
- Motor brake control, including torque proving
- Motor temperature sensor monitoring
- High speed DC breaker monitoring

Faults and Diagnostics

- Fault logging with time and date stamp
- Diagnostic assistant activates when fault occurs
Power Converter Modules

**Enclosure Rating**

The DCS800-S0x power converter module carries a NEMA TYPE OPEN (IP00) rating and must be mounted in a protective enclosure. There are seven different frame sizes, D1 through D7, graduated in terms of current and voltage.

**Regenerative and Non-Regenerative Drives**

Non-regenerative (2-Q) power converter modules are used when motor torque is always in the same direction or when significant stopping power is not required.

- Fan or blower
- Mixer
- Mill
- Extruder

This is ideal for applications such as:

It is not possible for a 2-Q drive to slow down an inertial load. The load will stop only due to friction, windage, or another form of load resistance. Reverse direction is possible but only if torque is always in the same direction such as when raising and lowering a weight.

Regenerative (4-Q) power converter modules are used when motor torque can occur in either direction. This is for applications such as:

- Stop-start conveyor
- Draw Roll
- Rolling mill
- Unwinder
- Overhead crane hoist

A 4-Q drive is able to start and stop an inertial load in both forward and reverse directions.

**Field Power Supplies and Fusing**

Converter modules sizes D1 through D4 are equipped with fused internal field power supplies. The internal field supply is optional on size D5. Sizes D6 – D7 require an external field power supply. See page 22 for details.

AC line fuses and DC armature fuses must be separately mounted. See page 24 for fuse information as well as information on other optional system components.

**Voltage Selection**

The output voltage of the drive depends on the connection voltage and whether a 2-Q or 4-Q drive is selected. The table below shows the maximum output voltage that will result for various input voltages for both the 2-Q and 4-Q drives.

<table>
<thead>
<tr>
<th>System connection voltage</th>
<th>DC voltage (recommended)</th>
<th>Ideal DC voltage without load</th>
</tr>
</thead>
<tbody>
<tr>
<td>U&lt;sub&gt;VN&lt;/sub&gt;</td>
<td>U&lt;sub&gt;stray, 2-Q&lt;/sub&gt;</td>
<td>U&lt;sub&gt;stray, 4-Q&lt;/sub&gt;</td>
</tr>
<tr>
<td>[V]</td>
<td>[V]</td>
<td>[V]</td>
</tr>
<tr>
<td>230</td>
<td>265</td>
<td>240</td>
</tr>
<tr>
<td>380</td>
<td>440</td>
<td>395</td>
</tr>
<tr>
<td>400</td>
<td>465</td>
<td>415</td>
</tr>
<tr>
<td>415</td>
<td>485</td>
<td>430</td>
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<tr>
<td>440</td>
<td>510</td>
<td>455</td>
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<tr>
<td>480</td>
<td>530</td>
<td>480</td>
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<tr>
<td>480</td>
<td>555</td>
<td>500</td>
</tr>
<tr>
<td>500</td>
<td>580</td>
<td>520</td>
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<tr>
<td>525</td>
<td>610</td>
<td>545</td>
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<tr>
<td>575</td>
<td>670</td>
<td>600</td>
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<tr>
<td>600</td>
<td>700</td>
<td>625</td>
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<tr>
<td>660</td>
<td>765</td>
<td>685</td>
</tr>
<tr>
<td>690</td>
<td>800</td>
<td>720</td>
</tr>
<tr>
<td>800</td>
<td>915</td>
<td>820</td>
</tr>
<tr>
<td>990</td>
<td>1160</td>
<td>1040</td>
</tr>
<tr>
<td>1200</td>
<td>1380</td>
<td>1235</td>
</tr>
</tbody>
</table>

The maximum output voltage of a 4-Q drive can be increased up to the level of \( U_{\text{stray, 2-Q}} \) if the torque reversal time from motor to regenerative mode is set above 300 ms.

**Analog, Digital and Encoder Interface**

The drive is equipped with high-speed, high-resolution analog inputs and outputs to interface with user signals. Analog inputs 16-bit resolution (15 plus one sign bit) which is the highest resolution in the industry.

The following interfaces are standard features:

- Analog tachometer
- Pulse encoder
- PTC or PT100 temperature sensor

Optional modules are available to increase the number of analog, digital, tachometer, encoder, and temperature sensor interfaces.
Panel Drive

The DCS800-EPx Panel Drive is a DCS800 power module and associated system components that are mounted and wired on a sub-panel, ready to be installed into an industrial enclosure. System components include AC input fuses, DC output fuses (regen only), control transformer, AC or DC contactor, plus optional components. The drive is designed to easily replace a Reliance Electric® FlexPak® 3000 drive.

Product Offering
- 460 Vac, factory or field convertible to 230 Vac
- 10 to 500 HP with heavy duty overload ratings (150 pct for 60 sec.)
- 600 HP with normal duty ratings (110 pct for 60 sec.)
- Integral ABB AC contactor up to 300 HP; ABB DC contactor 400 to 600 HP
- UL Listed with 65 kA SCCR

Panel Drive Benefits
- Space efficient multilevel panel
- Easy to maintain
- Pre-wired, pre-tested solution for smooth start ups
- Greatly simplifies the procurement process
- Module can be replaced without replacing the entire panel
- Dynamic brake ready, 400 – 600 hp

Optional Features
- Integral line reactor up to 150 HP (+E213)
  NOTE: Reactor or isolation transformer required!
- ABB Tmax MCP Circuit breaker (+F278)
- ABB A-line blower motor contactor and overload for blowers from ½ to 15 HP (+M600 – +M623)
- Without AC contactor (+0F250)
- 230 Vac supply (+S235)

DCS800 Power Module Benefits
- Highly reliable DCS800 module drive
- Integral field supply, including field weakening
- Control Panel with 5-line display and 2 soft keys
- DriveWindows Light PC tool included

Excellent Reliance® FlexPak® 3000 Retrofit Drive
- Same bolt pattern
- Similar features
- Fits within FlexPak® 3000 clearance area

<table>
<thead>
<tr>
<th>Panel Size</th>
<th>DCS800-EPx Clearance</th>
<th>FlexPak® Clearance</th>
<th>Total Panel Clearance</th>
<th>Total DCS800 Total</th>
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<tbody>
<tr>
<td>A-high</td>
<td>18.8</td>
<td>10</td>
<td>18.8</td>
<td>28.8</td>
</tr>
<tr>
<td>A-wide</td>
<td>10.6</td>
<td>5</td>
<td>12.2</td>
<td>15.6</td>
</tr>
<tr>
<td>A-deep</td>
<td>12.2</td>
<td>0</td>
<td>14.4</td>
<td>12.2</td>
</tr>
<tr>
<td>B-high</td>
<td>19.3</td>
<td>17</td>
<td>19.3</td>
<td>36.3</td>
</tr>
<tr>
<td>B-wide</td>
<td>18.1</td>
<td>5</td>
<td>20.0</td>
<td>23.1</td>
</tr>
<tr>
<td>B-deep</td>
<td>13.5</td>
<td>0</td>
<td>13.8*</td>
<td>13.5</td>
</tr>
</tbody>
</table>

*19.3 inch depth when internal reactor option is included
Enclosed Converters

The DCS800-A enclosed converters are drive modules and supporting hardware that is mounted in an enclosure, intended to power and control DC industrial machines. In addition to the drive module, the basic package typically includes the following (varies by size):

- Single-door / multi-door cabinet (IP 21, similar to NEMA 1)
- Fused disconnect / circuit breaker
- Line contactor
- Line reactor
- Control transformer and fuses
- Converter fan relay and fuses
- E-stop relay
- I/O converter board - SDCS-IOB-2x
- I/O converter board - SDCS-IOB-3
- Terminals

Comprehensive Product Range
DCS800-A enclosed converters are available with regenerative (4-quadrant) and non-regenerative (2-quadrant) drives in standard 6-pulse or 12-pulse configurations. The cabinets have a continuous current rating which ranges from 18 Amps up to 9800 Amps. (19,600 Amps possible with parallel units.) Supply voltage ranges from 230 to 1200 Vac.

Custom configurations are possible with a wide range of optional components, including motor blower starter, 24 Vdc supply, external field supply, multiple drives, Advant (AC 800M) controller and S800 I/O system. Contact your local ABB factory sales team for additional information and for a custom quotation.

These cabinets are not UL listed. For large projects, UL-listed cabinets may be available. Contact ABB for more information.

Cabinets are built to meet CE LVD regulations and, with options, can be built to receive the CE mark.
Enclosed Converters

**Mechanics**

The robust frame body is made from 12 gauge steel. All enclosure panels are 16 gauge steel. To prevent corrosion, all metal parts have hot zinc galvanization. The standard height is 83-1/2 inches (2120 mm) which includes a detachable 4-1/2 inch high hood. Cabinet widths depend on the power and size of the drive but include 200, 400, 600, 800 and 1000 mm wide bays.
Rebuild and Upgrade Kits

The DCS800-R Rebuild or Upgrade Kit from ABB allows you to update the controls on your existing DC drive and continue to utilize the existing power section.

ABB, with the help of our channel partners, can make your existing drive look and act like a new DCS800 drive. Gain the benefits of having the latest motor control technology and high speed serial connectivity without having to replace the power section. This is an engineered solution which can have significant cost advantages over complete drive replacement, especially on large systems.

General Purpose Rebuild Kit

The DC800-R Rebuild Kit is recommended for thyristor-based power sections that are:
- 500 horsepower (800 Amps) and above
- Originally manufactured by ABB or another drive company
- Regenerative (4-quadrant) or non-regenerative (2-quadrant)
- From 1, up to 4 parallel bridges

In order to determine if your existing drive can be rebuilt, consider the following:
- Is the power section healthy? Replacing the controls usually does not reduce the occurrence of blown fuses or over-current faults. These conditions commonly indicate that there is a malfunction in the power section. Carefully consider the benefits of upgrading compared to replacing with a full drive with a brand new warranty.
- What data is available on the existing power section? An accurate, up-to-date schematic is essential. The schematic needs to include any changes that occurred over the years.
- Is there space to mount the retrofit components? A panel layout diagram, along with visual inspection of the panel is needed.
- Are there any special features in the existing controller? The DCS800 has functions to run most any application but it is important to be sure that the new controller has the functionality of the existing controller, or if other modifications will be required.

DCS500 to DCS800 Upgrade Kit

The DCS800-R Upgrade Kit is specifically designed to upgrade the controls of existing DCS500 drives.
- For frame sizes A5, A6, A7, C2b, C3, & C4
- For drives approx. 350 HP and above
- Replaces existing door, control tray and keypad

How it Works

A modern drive can be subdivided into two major sections, the power section and the controller. The power section transfers a measured amount of voltage and current from the incoming lines to the motor. The computer-based controller controls the power section, along with several other functions. The rebuild/upgrade kit replaces the existing controller with a DCS800 controller.

In addition to controlling the power section, the DCS800-R will also provide user interface (via keypad or DriveWindow Light) and encoder and/or tachometer interface, if present. After the drive is rebuilt, the complete drive system will operate like a DCS800, which may include communicating with your PLC via Ethernet, ControlNet, etc, receiving signals from switches, push-buttons and pots, and sending signals to lamps and meters.

DCS800-R Rebuild Kit

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Adaptive programming

Optimal Adaptability

Adaptive programming gives you the ability to customize the drive to your needs without adding more hardware. Change how a digital output works, modify speed or torque reference, or filter an analog input - all these things are possible. You program the drive with the control panel or your PC using DriveWindow Light. Adaptive programming gives you the flexibility you need to make the drive work to your specifications.

Adaptive Programming Features

• 16 programmable function blocks
• 31 Available functions:
  • Logical: AND, OR and XOR
  • Mathematical: add, mul, div, abs, max and min
  • Other: timer, switch, comparator, filter, SR, PI and user-defined warnings or faults
• Freely definable execution order
• Easy documentation
• Same as available with ACS800 AC Drives

The DCS800 DC drive offers you all this as standard features. If more function blocks are required, control builder, which uses compact flash memory, is available with expanded capacity. See page 27 for details.

Startup Assistant

Faster and Easier Commissioning

The Startup Assistant is part of the standard DCS800 DC Drives software package. It guides you actively through the commissioning procedure either through the control panel or with your PC using DriveWindow Light. It is multilingual, requests data with clear and plain text messages, and sets the required parameters to your needs.

On-line Info System

To make it easier and more informative, “info system” is available at each step, helping to set the correct values for each parameter and troubleshoot the problems. It also provides you with a step-by-step reference to the printed manuals.

Start-up Assistant Features

• Easy and fast commissioning procedure
• Intelligent guide to assist you through the commissioning
• Available in 8 languages, including Spanish and French
• Info system always available
• Auto detection of connected hardware

The DCS800 DC drive offers you all this as standard features.
DriveWindow Light
Startup and Maintenance Tool

PC tool for ABB drives

DriveWindow Light is an easy-to-use tool for PC-based start up and maintenance of your ABB drive. It is included with every DCS800 drive and has the following features:
- User interface tool to view and set parameters
- Startup Assistant tool
- Adaptive programming (AP) tool
- Fault Logging/Troubleshooting

It supports a wide range of ABB industrial drives, including ACS350, ACS550, ACS800, DCS400, as well as the DCS800.

Light software with Heavy Features

DriveWindow Light offers many functions in an easy-to-use package. It can be used in an offline mode, which enables parameter setting at the office even before going to the actual site. The parameter browser enables viewing, editing and saving of parameters. The parameter comparison feature makes it possible to compare parameter values between the drive and the file. With the parameter subset you can create your own parameter sets. Controlling of the drive is naturally one of the features in DriveWindow Light. Drive status and fault information keeps commissioning time low.

Highlights

- Viewing and setting parameters in offline and online modes
- Editing, saving and downloading parameters
- Comparing parameters
- Graphical and numerical signal monitoring
- Drive control
- Start-up assistants
- DWL AP tool for DCS800 (for adaptive programming)
- All DCS800 DC drives are equipped with DriveWindow Light

With DriveWindow Light, you can monitor up to four signals simultaneously. This can be done in both graphical and numerical format. Any signal can be set to start the monitoring from a pre-defined level.
DriveWindow Light, continued

**DWL Start-Up Assistant**

DWL Start-up assistant for DCS800 gives important assistance for commissioning by interactive dialog. The commissioning steps are presented in correct sequence and necessary parameters are preselected.

- The basic port collects basic motor and connection data and executes controller auto tunings
- The advanced port provides assistance for 12-pulse operation, field reversal, serial communication (fieldbus) and master-follower configuration.
- A context-sensitive help function is present during the whole sequence

**Adaptive Programming (AP) Tool**

DWL AP is a graphical PC tool to create, document, edit and download Adaptive Programs. Adaptive Program tools contain 16 function blocks and are available in standard firmware. DWL AP offers a clear and easy way to develop, test and document these programs with a PC.

It is a user-friendly tool to modify function blocks and their connections. No special programming skills are required; basic knowledge about block programming is sufficient.

Adaptive Programs are easy to document as hard copies are store as PC files. All related information is saved directly to the drive by parameter.

One page is freely configurable by the user. An individual commissioning sequence or parameter selection can be setup to application, machine or motor demands.
Commissioning Macros

DCS800 macros

The DCS800 includes macros that cover the most frequent parameter settings. Macros are pre-programmed parameter sub-sets. During start-up, the drive can be configured easily without the need to change many individual parameters by using a macro. The functions of inputs, outputs, and many allocations in the control structure are set up with the selection of a macro.

The macro will define:

• whether the drive is speed-controlled or torque-controlled
• if two-wire (maintained) or three-wire (pulsed) motor-on inputs are being used
• if a DC contactor is being used
• the type of control that is needed (standard, constant speed, hand/motor-pot, etc.)
• the source of the command (digital and analog inputs and outputs or via high-speed-serial link)
• which actual values are available at the analog outputs

With firmware release 2.6, additional macros were added, bringing the total available to 11 macros. It also allows you to switch between macros with ease. Except for a few special cases, motor and tuning parameters will be maintained when switching from one macro to another.

The selections include the following macros:

(* indicates a new macro.)

Factory
Resets all parameters to default values.

Standard
The Drive turns on with a maintained input. Motion is commanded with digital inputs (DI) RUN, JOG1, or JOG2. Run speed is set with an analog input. Jog speeds are set to preset levels.

Manual / Constant Speed
Run speed is set with an analog input, but if one of two digital inputs is set, speed is changed to preset levels. Control is by way of 3-wire control (pulsed inputs).

Hand / Auto
A digital input switches between Hand (Local I/O) and Auto mode, and also switches speed reference. In Hand mode, speed is set with an analog input; in Auto mode, speed and motor control are set over a high-speed serial link, usually by a PLC. Manual control is 2-wire.

Hand / Motor Pot
A digital input switches speed reference from an analog input to Motor Pot. In Motor Pot mode, one digital input (MOTOR POT UP) increases speed and another (MOTOR POT DOWN) decreases speed. Control is 3-wire.

Motor Pot
Speed is always controlled through the MOTOR POT-UP and -DOWN digital inputs. Motor pot minimum speed can be released by setting a digital input to allow MOTOR POT DOWN to reduce speed to zero. Control is 2-wire.

Torque Control
A digital input switches between Speed and Torque control mode. While in Torque mode, an analog input is used as reference; while in Speed mode, speed is set to a preset level. A digital output can control a DC circuit breaker. Control is 2-wire.

*Torque Limit
This macro is the same as “Standard,” except a second analog input determines torque limit.

*3-Wire Standard
Run speed is set with analog input, but if DI-1 is set, speed is changed to preset level. The drive turns on and runs with pulsed RUN digital input. It turns off with clearing of the STOP input. (3-wire control).

*2-Wire DC Contactor US
This macro is the same as “Standard” except it also sets up the drive to control a DC contactor with a digital output. A DC contactor acknowledge input is required.

*3-Wire DC Contactor US
This macro is the same as “3-Wire Standard” except it also sets up the drive to control a DC contactor with a digital output. A DC contactor acknowledge input is required.

User 1 and 2
The user is allowed to record the current set of parameters as one of two “User Macros” and restore the drive to one of these sets. Restoration is done by setting or clearing a digital input or by sending a signal over a high-speed serial link. This is handy if, for example, the machine setup changes (i.e., making snow throwers half the season, and lawn mowers the other half) or if changing a drive from being a master to being a follower, etc.
DCS800 Firmware

DCS800 Basic Firmware

DCS800 firmware includes the basic function of speed control, armature current, field current and motor voltage. The flexible design for command location enables fieldbus control, master-follower control, control from hardware signals as well as a mixed structure. The design of drive logic enables a drive reaction defined byProfibus standard but can also be configured to adapt classic command structures.

All parameters can be accessed through serial communication or by IEC 61131 or adaptive programming. Eleven macros are pre-defined and two user-macros can be configured by the user.

Functions of Basic Firmware

- Different speed ramp functions
- Speed control
- Torque control
- Armature current control
- Field current control
- Automatic field weakening
- E-stop function according to Profibus standard
- Dual field control
- Mechanical brake control
- DC breaker control
- Programmable digital and analogue outputs
- Master-Follower
- 16 blocks Adaptive Program
- Interface for IEC 61131 programming
- 12-pulse function - parallel, serial, sequential
- 3-phase field exciter operation
- Converter protection (temperature, voltage, ...)

Motor protections

- Stall protections
- Thermal motor model
- 2 channel motor temperature measurement PTC or PT100
- Klaxon supervision
- Speed feedback error
- Over speed
- Armature current ripple
- Armature over current
- Minimum field current

Master-Follower Applications

Drives connected in Master-Follower application

When motors run on a common shaft or other belted or mechanical connection, and run with the same speed or torque, use the master/follower configuration.

Partial 12-pulse Master-Follower configuration

Under this configuration, converters are fed by a 12-pulse transformer with separated secondary windings whose phase positions differ by 30°. This configuration delivers the same advantages concerning harmonics to the network as a standard 12-pulse application (see next item), but no T-reactor is needed.

Typical configuration for high power drives connected in 12-pulse parallel, serial or sequential application

12-pulse systems are used to reduce line harmonics or motor noise level, or to increase output current or voltage of the converter system. Only the 11th and 13th, the 23rd and 25th, the 35th etc. are present. The harmonics on the DC side are reduced also, which increases efficiency.
Environmental Conditions and Specifications - Modules

**System connection**

- **Voltage, 3-phase:** 240 to 990 V acc. to IEC 60038
- **Voltage deviation:** ±10% continuous; ±15% up to 0.5 sec.
- **Rated frequency:** 50 Hz or 60 Hz
- **Static frequency deviation:** 50 Hz ±2 %; 60 Hz ±2 %
- **Dynamic: frequency range:** 50 Hz: ±5 Hz; 60 Hz: ±5 Hz

**Please note:** Special consideration must be taken for voltage deviation in regenerative mode.

**Short Circuit Current Rating (SCCR)**

- D1-D4 = 65 kA
- D5-D7 = 100 kA

**Protection Class**

- Converter module and options (line chokes, fuse holder, field supply unit, etc.): UL Type Open

**Environmental limit values**

- **Permissible cooling air temperature.**
  - at converter module air inlet: 0 to +55°C
  - with rated DC current: 0 to +40°C
  - with different DC current: +40 to +55°C derating (1%/1°C)
  - Options: 0 to +40°C

- **Relative humidity (at 5...+40°C):** 5 to 95%, no condensation
- **Relative humidity (at 0...+5°C):** 5 to 50%, no condensation

**Change of the ambient temp.:** < 0.5°C / minute

**Storage temperature:** -40 to +55°C

**Transport temperature:** -40 to +70°C

**Pollution degree (IEC 60664-1, IEC 60439-1):** 2

**Site elevation**

- <1000 m above M.S.L.: 100%, without derating
- 1000 to 4000 M.S.L.: with derating (1%/100m)

**Sound pressure level**

<table>
<thead>
<tr>
<th>Size</th>
<th>Sound pressure level Lp (1 m distance)</th>
<th>Vibration</th>
</tr>
</thead>
<tbody>
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<td>as module</td>
<td>enclosed conv.</td>
<td>as module</td>
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<tr>
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<td>D7</td>
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</table>

**North American Standards**

- In North America the system components fulfill the requirements of the table below.

<table>
<thead>
<tr>
<th>Rated supply voltage</th>
<th>Converter module</th>
<th>Enclosed converter</th>
</tr>
</thead>
<tbody>
<tr>
<td>to 600 V</td>
<td>UL 508 C</td>
<td>Power Conversion Equipment cULus C 22.2 No. 14-95 Industrial Control Equipment, Industrial Products Available for converter modules including field exciter units. Types with UL mark: • see UL Listing <a href="http://www.ul.com">www.ul.com</a> / certificate no. E196914 • or on request</td>
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<td>&gt;600 V to 1000 V</td>
<td>EN / IEC: see table below.</td>
<td>Available for converter modules including field exciter units. EN / IEC types: on request (for details see table below)</td>
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</table>

**Regulatory compliance**

- The converter module and enclosed converter components are designed for use in industrial environments. In EEA countries, the components fulfill the requirements of the EU directives, see table below.

<table>
<thead>
<tr>
<th>European union directive</th>
<th>Manufacturer’s assurance</th>
<th>Harmonized standards</th>
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</thead>
<tbody>
<tr>
<td>EMC Directive 89/336/EEC 93/88/EEC</td>
<td>Declaration of Conformity (Provided that all installation instructions concerning cable selection, cabling and EMC filters or dedicated transformer are followed.)</td>
<td>EN 61800-3 ① [IEC 61800-3]</td>
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</table>

① in accordance with 3ADW 000 032
① in accordance with 3ADW 000 032/3ADW 000 091
## Current Ratings - Modules

### Non-Regenerative

<table>
<thead>
<tr>
<th>Type code</th>
<th>Frame Size</th>
<th>Input RMS Current $I_{rms}$</th>
<th>Normal Duty $I_{2nd}$</th>
<th>P2nd</th>
<th>Standard Duty $I_{rms}$</th>
<th>P2nd</th>
<th>Heavy Duty $I_{rms}$</th>
<th>P2nd</th>
<th>Internal field current $A$</th>
<th>Air Flow 60 Hz ft³/min</th>
<th>Heat Dissipation BTU/hr</th>
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<td>360 - 800 Vdc line voltage</td>
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<td>450 - 990 Vdc line voltage</td>
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<td>540 - 1200 Vdc line voltage</td>
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# Current Ratings - Modules

## Regenerative

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<th>Type code</th>
<th>Frame Size</th>
<th>Input RMS Current $I_{nms}$</th>
<th>Normal Duty</th>
<th>Standard Duty</th>
<th>Heavy Duty</th>
<th>Internal field current A</th>
<th>Air Flow 60 Hz ft/min</th>
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<td>2500</td>
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</table>

## 600 Vdc

260 - 800 Vdc line voltage | DATA AVAILABLE UPON REQUEST
450 - 990 Vdc line voltage | DATA AVAILABLE UPON REQUEST
540 - 1200 Vdc line voltage | DATA AVAILABLE UPON REQUEST

### Note:
- Normal Duty: 110% overload for 60 seconds; then <= 100% for 10 minutes
- Standard Duty: 150% overload for 30 seconds; then <= 100% for 15 minutes
- Heavy Duty: 150% overload for 60 seconds; then <= 100% for 15 minutes

---

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www.abbdrivesales.com | sales@grossautomation.com
# Current Ratings - DCS800-EP Panel Drive

<table>
<thead>
<tr>
<th>Type code</th>
<th>Panel</th>
<th>Frame Size</th>
<th>Heavy Duty 460Vac / 500Vdc</th>
<th>Heavy Duty 230Vac / 240Vdc</th>
<th>Internal field current</th>
<th>Air Flow 60 Hz ft/min</th>
<th>Heat Loss without Inductor Watts</th>
<th>Heat Loss with Inductor Watts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Input A&lt;sub&gt;ms&lt;/sub&gt;</td>
<td>I&lt;sub&gt;hed&lt;/sub&gt;</td>
<td>P&lt;sub&gt;2HD&lt;/sub&gt;</td>
<td>A&lt;sub&gt;ac&lt;/sub&gt;</td>
<td>A&lt;sub&gt;ac&lt;/sub&gt;</td>
<td>HP</td>
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<tr>
<td>Non-regenerative</td>
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<td>16</td>
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<td>104</td>
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<td>950</td>
<td>600</td>
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*All DCS800-EP panel drives have a heavy duty rating except DCS800-EP2-1010-05 which has a normal duty rating

---

# Environmental Conditions and Specifications - DCS800-EP Panel Drive

## Environmental limit values

- **Input Voltage**: 3-Phase 460 Vac (230 Vac as option)
- **Cabinet internal ambient temperature**: 0 to 40°C
- **Protection Class**: UL Type Open / IP00
- **ULus Listed**: UL 508A with 65 kA SCCR

See module conditions and specifications for additional data.
### Dimensions and Weights - Module Drive

<table>
<thead>
<tr>
<th>Unit Size</th>
<th>Power Connection</th>
<th>Weight (lbs)</th>
<th>Dimensions</th>
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<tbody>
<tr>
<td></td>
<td>In</td>
<td>Out</td>
<td>h x w x d (in)</td>
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<td>D1</td>
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<td>Bottom</td>
<td>24</td>
</tr>
<tr>
<td>D2</td>
<td>Bottom</td>
<td>Bottom</td>
<td>35</td>
</tr>
<tr>
<td>D3</td>
<td>Bottom</td>
<td>Bottom</td>
<td>55</td>
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<tr>
<td>D4</td>
<td>Bottom</td>
<td>Bottom</td>
<td>84</td>
</tr>
<tr>
<td>D5</td>
<td>Top</td>
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<tr>
<td>D6</td>
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<td>Left</td>
<td>396</td>
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<tr>
<td>D7</td>
<td>Left or Right (as selected in the type code)</td>
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*19.3 inch depth when internal reactor option is included.

### Dimensions and Weights - DCS800-EP Panel Drive

<table>
<thead>
<tr>
<th>Panel size</th>
<th>Drive size</th>
<th>Power Connection</th>
<th>Weight (lbs)</th>
<th>Dimensions</th>
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<td>In</td>
<td>Out</td>
<td>h x w x d (in)</td>
<td>h x w x d (mm)</td>
</tr>
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<td>D1</td>
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<td>62</td>
<td>18.8 x 12.2 x 14.4</td>
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<td>B</td>
<td>D2</td>
<td>Top Top</td>
<td>103</td>
<td>19.3 x 20.0 x 13.8*</td>
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<tr>
<td>B</td>
<td>D3</td>
<td>Top Top</td>
<td>130</td>
<td>19.3 x 20.0 x 13.8*</td>
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<tr>
<td>C</td>
<td>D3</td>
<td>Top Top</td>
<td>231</td>
<td>35.3 x 23.6 x 16.2</td>
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<tr>
<td>C</td>
<td>D4</td>
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<tr>
<td>D</td>
<td>D4</td>
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<td>36 x 20.3 x 20</td>
<td>914 x 516 x 508</td>
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*19.3 inch depth when internal reactor option is included.

### Options - DCS800-EP Panel Drive

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<th>Option</th>
<th>Frame</th>
<th>Plus Code</th>
<th>Option Kit</th>
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<tbody>
<tr>
<td>Circuit breaker</td>
<td>All</td>
<td>+F278</td>
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<td>A, B</td>
<td>+E213</td>
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<tr>
<td>Without AC Line Contactor</td>
<td>A, B, C</td>
<td>+0F250</td>
<td>NA</td>
</tr>
<tr>
<td>230 Vac supply voltage</td>
<td>A, B, C</td>
<td>+S235</td>
<td>DCS800-EP 230VAC Supply</td>
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<td>Fan/Blower motor starter A, B</td>
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<td>+M600 to +M604</td>
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<tr>
<td>Fan/Blower motor starter C</td>
<td></td>
<td>+M611 to +M621</td>
<td>NA</td>
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</table>
Plug-in options

Basic Control Panel

The DCS800 alphanumeric control panel is standard with every drive. It features a 5-line display and two soft keys. The panel is used to commission and control the drive. Parameters can be saved to it for backup or to download to another drive.

Plus code
+0J400 If no control panel is required
- J409 Panel mounting kit ACS/H-CP-EXT plus cable

Plug-in Fieldbus Module

See next section.

Fast Optical DDCS Communication Module

DCS800 provides an interface SDCS-COM-8 fast serial communication:
- Master channel ModuleBus to AC800M
- I/O channel to AIMA-01 board
- Master-Follower DDCS channel
- Tools channel e.g DriveWindow, remote diagnostic NETA, as well as the CDP 312 from ACS800 range can be connected on this board
- The board must be located in slot 3

Plus code
+L508 Module bus 10 Mbd (SDCS-COM-81)
+L509 NxxA fieldbus adapter 5 Mbd (SDCS-COM-82)

Drive-Specific Serial Communication Board

The SDCS-DSL board provides the serial communication for:
- Drive to drive (e.g. master-follower)
- Drive to external field power supply
- 12-pulse applications

Plus code
+S199 SDCS-DSL communication board

Field Power Supply

Sizes D1 through D4 drives have an internal field power supply. On Size D5, the field power supply is optional. Sizes D6 – D7 require an external field power supply.

Plus code
+S164 Internal field supply, not prewired (D5)

Control Builder

To include Control Builder with the drive, the compact flash memory card must be ordered with a plus code. CoDeSys software for the PC is ordered separately.

Plus code
+S200 Compact flash memory card (SDCS-MEM-8)

I/O Extension Option Module

This plug-in option offers additional analog or digital I/O. They can be used, for example, in a Master-Follower application for interlocking functions. All the relays can be programmed to on/off by parameter. Alternatively, a fieldbus module can be used to control any external components in the system. I/O extension modules can be located in any of the three available option slots.

Plus code
+L501 RDIO-01 Digital extension module 3xDI, 2xDO
+L500 RAIO-01 Analog extension module 2xAI, 2xAO
**Communication Options**

**Fieldbus Control**

DCS800 DC Drives have connectivity to major automation systems. This is achieved with a dedicated gateway concept between the fieldbus systems and ABB drives.

The fieldbus gateway module can easily be mounted inside the drive. As a result of the wide range of fieldbus gateways, your choice of automation system is independent from your decision to use first-class ABB drives.

**Manufacturing flexibility**

**Drive control**
The drive control word (16 bit) provides a wide variety of functions from start, stop and reset to ramp generator control. Typical setpoint values like speed, torque and position can be transmitted to the drive with 15 bit accuracy.

**Drive monitoring**
A set of drive parameters and/or actual signals, like torque, speed, position, current etc., can be selected for cyclic data transfer providing fast data for operators and the manufacturing process.

**Drive diagnostics**
Accurate and reliable diagnostic information can be obtained via the drive alarm, limit and fault words, reducing the drive downtime and, therefore, the downtime of the manufacturing process.

**Drive parameter handling**
Total integration of the drives in the production process is achieved by single parameter read/write up to complete parameter set-up or download.

**Easy to expand**
Serial communication simplifies the latest trend of modular machine design enabling the installation to be expanded at a later stage with low effort.

**Reduced installation and engineering effort**

**Cabling**
Substituting the large amount of conventional drive control cabling with a single twisted pair reduces costs and increases system reliability.

**Design**
The use of fieldbus control reduces engineering time at installation because of the modular structure of the hardware and software.

**Commissioning and assembly**
The modular machine configuration allows pre-commissioning of single machine sections and provides easy and fast assembly of the complete installation.

**Currently available gateways**

<table>
<thead>
<tr>
<th>Gateway</th>
<th>Plus Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profinet-OP</td>
<td>+K454</td>
</tr>
<tr>
<td>DeviceNet</td>
<td>+K451</td>
</tr>
<tr>
<td>CANopen</td>
<td>+K457</td>
</tr>
<tr>
<td>ControlNet</td>
<td>+K462</td>
</tr>
<tr>
<td>Modbus RTU</td>
<td>+K458</td>
</tr>
<tr>
<td>Ethernet/IP, Modbus TCP</td>
<td>+K466</td>
</tr>
</tbody>
</table>
External Field Supply

General Data

- Currents from 0.3 to 520 A
- Minimum field current monitor
- Integrated external field power converter or completely separate switchgear cubicle
- Single-phase or 3-phase model
- Controlled by serial communication via DSL board

The three-phase field power converter causes less voltage stress on the motor over the single-phase field converter. This is because rectifying three-phase power provides a smoother DC voltage.

For single-phase operation, we recommend integrating an auto transformer in the field power converter's supply circuit to adjust the AC input voltage to the field voltage and to reduce the voltage ripple in the field circuit.

All field converters are controlled by the armature converter via a serial interface (SDCS-DSL board). This interface serves to set-up, control and diagnose the field converter and thus provides an option for exact control.

Reactor for Field supply on the D5 Drive:

The D5 drive with plus code +S164 has internal field supply FEX425-INT. This field supply should be separately powered and requires its own line reactor as identified below.

Field Converter Types

DCF803-0035 and FEX425

- Three-phase or single-phase operation
- Half-wave thyristor/diode bridge
- Microprocessor control, with the electronic system being supplied by the armature-circuit converter (24 V)
- Construction and components have been designed for an insulation voltage of 600 Vac
- Fast-response excitation is possible with an appropriate voltage reserve; de-excitation takes place by field time constant
- Output voltage $U_A$ (single-phase operation)

$$U_A \leq U_r \cdot \left(\frac{100\% + TOL}{100\%}\right) \cdot 0.9$$

$TOL = \text{tolerance of line voltage in } \%$
$U_r = \text{Line voltage}$

- Recommendation (single-phase operation): Field voltage 0.6 to 0.8 * $U_r$
- Output voltage $U_A$ (three-phase operation):

$$U_A \leq U_r \cdot \left(\frac{100\% + TOL}{100\%}\right) \cdot 1.35$$

$TOL = \text{tolerance of line voltage in } \%$
$U_r = \text{Line voltage}$

Note: Calculation valid also for FEX425 (internal supply for D5 frame)

Table of field converter units

<table>
<thead>
<tr>
<th>Unit type</th>
<th>Output current $I_{dc}$</th>
<th>AC field supply voltage</th>
<th>Auxiliary supply voltage</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| DCF803-0016       | 0.3 to 16A              | 110V -15% to 500V**/1-ph +10% single-phase or three-phase | 24 V DC 200 mA           | Line reactor required:  
                                  • for 3 phase operation use KLR16BTB, KLR45CTB  
                                  • for 1 phase, use ND-30  
                                  DCF803-0035 needs external fusing       |
| DCF803-0035       | 0.3 to 35A              |                         |                          |                                                                         |
| FEX425-INT        | 0.3 to 25A              |                         |                          |                                                                         |
| DCF503B-0050      | 0.3 to 50A              | 110V -15% to 500V**/1-ph +10% |                          | if necessary via matching autotransformer; fuse external; Dimensions HxWxD: 370x125x342 [mm] Requires DCS800-DSL communications cable |
| DCF503B-0060      | 0.3 to 60A              |                         |                          |                                                                         |
| DCF504B-0050      | 0.3 to 50A              | 110V -15% to 500V**/1-ph +10% | 115 or 230 V            | additional hardware components required for overvoltage protection (DCF506) |
| DCF504B-0060      | 0.3 to 60A              |                         |                          |                                                                         |
| DCS800-S0x-xxxx-05| 25 to 520 A             | 200V. to 500V**/3-ph    |                          |                                                                         |

Notes:
* Up to 600 Vac with auto transformer
** Up to 690 Vac with auto transformer
External Field Supply

**DCF503B-0050, DCF503B-0060**
- Single-phase operation
- Half-wave thyristor/diode bridge (1-Q)
- Built-in line chokes
- Microprocessor control with the control electronics being supplied separately (115...230 V/1-ph)
- Construction and components have been designed for an insulation voltage of 690 VAC.
- Output voltage $U_A = \frac{100\% + TOL}{100\%} \times 0.9$

$TOL =$ tolerance of line voltage in $\%$

$U_V =$ Line voltage
- Recommendation:
  - Field voltage 0.6 to 0.8 * $U_V$
  - Requires DCS800-DSL communications cable

**DCF504B-0050, DCF504B-0060**
- Single-phase operation
- Full-wave regenerative thyristor bridges (4-Q)
- Built-in line chokes
- This unit offers field reversal as well as fast-response excitation / de-excitation
  In the steady-state condition, the full-wave bridge runs in half-wave mode so as to keep the voltage ripple at a minimum. With a quickly alternating field current, the bridge switches to full-wave mode.
- Same design as DCF503B
- Requires DCS800-DSL communications cable

**DCF800**

This converter can also be used for field exciter operation. An additional overvoltage protection unit is required. It provides field currents from 25 A up to 520 A unipolar and bipolar for field reversal function.
- Output voltage $U_A$ respectively $U_{\text{dmax},2-Q}$:
  - see table on page 7
- Recommendation:
  - Field voltage 0.5 to 1.1 * $U_V$
  - The three-phase field supply converters DCS800-S01/S02 need a separate active overvoltage protection unit DCF 506 for protecting the power part against inadmissibly high voltages.

**Assignment of field supply converter to overvoltage protection unit**

<table>
<thead>
<tr>
<th>Field supply converter for motor fields</th>
<th>Overvoltage protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCS800-S0x-0020-05</td>
<td>DCF506-0140-51</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>DCS800-S0x-0200-05</td>
<td>DCF506-0520-51</td>
</tr>
<tr>
<td>DCS800-S0x-0520-05</td>
<td>...</td>
</tr>
</tbody>
</table>

**External Field Supply AC Line Fuses**

<table>
<thead>
<tr>
<th>Field Supply</th>
<th>$I_{\text{hold}}$</th>
<th>Fuse Single Phase</th>
<th>Fuse Three Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCF503B-0060</td>
<td>50 - 60 Amps</td>
<td>FWP-70B</td>
<td>-</td>
</tr>
<tr>
<td>DCF504B-0060</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DCF803-0035,</td>
<td>6 Amps</td>
<td>FWP-10B</td>
<td>FWP-5B</td>
</tr>
<tr>
<td>DCF503B-0050</td>
<td>or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or DCF504B-0050</td>
<td>6 - 12 Amps</td>
<td>FWP-15B</td>
<td>FWP-10B</td>
</tr>
<tr>
<td></td>
<td>12 - 25 Amps</td>
<td>FWP-25B</td>
<td>FWP-25B</td>
</tr>
<tr>
<td></td>
<td>25 - 35 Amps</td>
<td>FWP-50B</td>
<td>FWP-30B</td>
</tr>
<tr>
<td>DCF503B-0050</td>
<td>35 - 50 Amps</td>
<td>FWP-60B</td>
<td>-</td>
</tr>
<tr>
<td>or DCF504B-0050</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DCF506-140-51, without cover
Fuse Connections

**Semiconductor type F1 fuses and fuse holders for AC and DC power lines**

**AC Line Fuses**
The converter units are subdivided into two groups. Frame sizes D1, D2, D3, and D4, with rated currents up to 1000 Amps, require external AC line fuses. Recommendations are shown below. Frame sizes D5, D6, and D7, with rated currents of 900 to 5200 Amps, have semiconductor fuses installed internally. No additional external semiconductor line fuses are needed.

**DC Fuses**
DC fuses between the drive and the motor are required for regenerative (4-quadrant) converters. This is to protect the drive in the possible event of an inversion fault. When needed, DC fuses should be the same size and type as AC line fuses. For large drives (above 1000 Amps), high speed DC breakers are often used instead.

<table>
<thead>
<tr>
<th>Type of Converter</th>
<th>Fuse</th>
<th>North America</th>
<th>Worldwide</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Q Converter</td>
<td>4-Q Converter</td>
<td>Fuse</td>
<td>Fuse</td>
</tr>
<tr>
<td>DCS800-SO1-0020-05</td>
<td>DCS800-SO2-0025-05</td>
<td>FWP-50B</td>
<td>1BS101</td>
</tr>
<tr>
<td>DCS800-SO1-0045-05</td>
<td>DCS800-SO2-0050-05</td>
<td>FWP-80B</td>
<td>1BS101</td>
</tr>
<tr>
<td>DCS800-SO1-0065-05</td>
<td>DCS800-SO2-0075-05</td>
<td>FWP-125A</td>
<td>1BS103</td>
</tr>
<tr>
<td>DCS800-SO1-0125-05</td>
<td>DCS800-SO2-0140-05</td>
<td>FWP-200A</td>
<td>1BS103</td>
</tr>
<tr>
<td>DCS800-SO1-0180-05</td>
<td>DCS800-SO2-0200-05</td>
<td>FWP-250A</td>
<td>1BS103</td>
</tr>
<tr>
<td>DCS800-SO1-0230-05</td>
<td>DCS800-SO2-0260-05</td>
<td>FWP-300A</td>
<td>1BS103</td>
</tr>
<tr>
<td>DCS800-SO1-0315-05</td>
<td>DCS800-SO2-0350-05</td>
<td>FWP-500A</td>
<td>1BS104</td>
</tr>
<tr>
<td>DCS800-SO1-0405-05</td>
<td>DCS800-SO2-0450-05</td>
<td>FWP-700A</td>
<td>See Note 1</td>
</tr>
<tr>
<td>DCS800-SO1-0470-05</td>
<td>DCS800-SO2-0520-05</td>
<td>FWP-700A</td>
<td>See Note 1</td>
</tr>
<tr>
<td>DCS800-SO1-0610-05</td>
<td>DCS800-SO2-0680-05</td>
<td>FWP-900A</td>
<td>See Note 1</td>
</tr>
<tr>
<td>DCS800-SO1-0740-05</td>
<td>DCS800-SO2-0820-05</td>
<td>FWP-900A</td>
<td>See Note 1</td>
</tr>
<tr>
<td>DCS800-SO1-0900-05</td>
<td>DCS800-SO2-1000-05</td>
<td>FWP-1200A</td>
<td>See Note 1</td>
</tr>
<tr>
<td>DCS800-SO1-0290-06</td>
<td>DCS800-SO2-0320-06</td>
<td>FWP-500A</td>
<td>1BS104</td>
</tr>
<tr>
<td>DCS800-SO1-0590-06</td>
<td>DCS800-SO2-0650-06</td>
<td>FWP-900A</td>
<td>See Note 1</td>
</tr>
</tbody>
</table>

Three (3) fuses and fuse holders are required for the AC side. DC fuses are required for 4-Q converters. When needed, use 2 for the DC side.

Note 1: No fuse holder is available. Attach fuses directly to busbar.
# Line reactors

<table>
<thead>
<tr>
<th>Unit Type</th>
<th>Line Choke for Config. A</th>
<th>Line Choke for Config. B</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 Vdc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2Q Converters</td>
<td>4Q Converters</td>
<td>1.5% impedance</td>
</tr>
<tr>
<td>DCS800-S01-0020-05</td>
<td>DCS800-S02-0025-05</td>
<td>KLR21BTB</td>
</tr>
<tr>
<td>DCS800-S01-0045-05</td>
<td>DCS800-S02-0050-05</td>
<td>KLR45BTB</td>
</tr>
<tr>
<td>DCS800-S01-0065-05</td>
<td>DCS800-S02-0075-05</td>
<td>KLR80BTB</td>
</tr>
<tr>
<td>DCS800-S01-0090-05</td>
<td>DCS800-S02-0100-05</td>
<td>KLR110BCB</td>
</tr>
<tr>
<td>DCS800-S01-0125-05</td>
<td>DCS800-S02-0140-05</td>
<td>KLR130BCB</td>
</tr>
<tr>
<td>DCS800-S01-0180-05</td>
<td>DCS800-S02-0200-05</td>
<td>KLR200BCB</td>
</tr>
<tr>
<td>DCS800-S01-0230-05</td>
<td>--</td>
<td>KLR200BCB</td>
</tr>
<tr>
<td>DCS800-S01-0315-05</td>
<td>DCS800-S02-0350-05</td>
<td>KLR300BCB</td>
</tr>
<tr>
<td>DCS800-S01-0405-05</td>
<td>--</td>
<td>KLR360BCB</td>
</tr>
<tr>
<td>DCS800-S01-0470-05</td>
<td>DCS800-S02-0450-05</td>
<td>KLR420BCB</td>
</tr>
<tr>
<td>DCS800-S01-0610-05</td>
<td>DCS800-S02-0680-05</td>
<td>KLR600BCB</td>
</tr>
<tr>
<td>DCS800-S01-0740-05</td>
<td>DCS800-S02-0820-05</td>
<td>KLR750BCB</td>
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<tr>
<td>DCS800-S01-0900-05</td>
<td>--</td>
<td>KLR750BCB</td>
</tr>
<tr>
<td>DCS800-S01-1200-05</td>
<td>DCS800-S02-1200-05</td>
<td>KDRX3L*</td>
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<tr>
<td>DCS800-S01-1500-05</td>
<td>DCS800-S02-1500-05</td>
<td>KDRY1L*</td>
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<tr>
<td>600 Vdc</td>
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<td></td>
</tr>
<tr>
<td>DCS800-S01-0290-06</td>
<td>--</td>
<td>KLR250BCB</td>
</tr>
<tr>
<td>DCS800-S01-0590-06</td>
<td>DCS800-S02-0650-06</td>
<td>KLR600BCB</td>
</tr>
<tr>
<td>DCS800-S01-0900-06</td>
<td>DCS800-S02-0900-06</td>
<td>KLR750BCB</td>
</tr>
<tr>
<td>DCS800-S01-1500-06</td>
<td>DCS800-S02-1500-06</td>
<td>KDRY41L*</td>
</tr>
</tbody>
</table>

**Note:**
- 3 pct. impedance
- Configuration A: For most installations
- Configuration B: For installations that require compliance with EN 61-800-3 or when AC and DC drives are on the same line
- See DCS800 hardware manual for additional information
## Input and Output Contactors

<table>
<thead>
<tr>
<th>Unit Type</th>
<th>2Q Converters</th>
<th>4Q Converters</th>
<th>AC Input Contactors 3-Pole (NO)</th>
<th>DC Output Contactors 2-Pole (NO)</th>
<th>Dynamic Brake Contactors 2-NO &amp; 1-NC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>500 Vdc</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DCS800-S01-0020-05</td>
<td>DCS800-S02-0025-05</td>
<td>A12-30-11-84</td>
<td>DA75-20-11-84</td>
<td>DA75-21-21-84</td>
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</tr>
<tr>
<td>DCS800-S01-0045-05</td>
<td>DCS800-S02-0050-05</td>
<td>A30-30-11-84</td>
<td>DA75-20-11-84</td>
<td>DA75-21-21-84</td>
<td></td>
</tr>
<tr>
<td>DCS800-S01-0060-05</td>
<td>DCS800-S02-0075-05</td>
<td>A50-30-11-84</td>
<td>EHD8220C2P-1L</td>
<td>EHD8220C-1L</td>
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<tr>
<td>DCS800-S01-0090-05</td>
<td>DCS800-S02-0100-05</td>
<td>A75-30-11-84</td>
<td>EHD8220C2P-1L</td>
<td>EHD8220C-1L</td>
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<tr>
<td>DCS800-S01-0125-05</td>
<td>DCS800-S02-0140-05</td>
<td>A110-30-11-84</td>
<td>EHD8220C2P-1L</td>
<td>EHD8220C-1L</td>
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<tr>
<td>DCS800-S01-0180-05</td>
<td>DCS800-S02-0200-05</td>
<td>A145-30-11-84</td>
<td>EHD8220C2P-1L</td>
<td>EHD8220C-1L</td>
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<tr>
<td>DCS800-S01-0230-05</td>
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<td>A210-30-11-84</td>
<td>EHD8280C2P-1L</td>
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<tr>
<td>DCS800-S01-0315-05</td>
<td>DCS800-S02-0350-05</td>
<td>A260-30-11-84</td>
<td>EHD8360C2P-1L</td>
<td>EHD8360C-1L</td>
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<td>DCS800-S01-0405-05</td>
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<td>AF400-30-11-70</td>
<td>EHD8520C2P-1L</td>
<td>EHD8520C-1L</td>
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<tr>
<td>DCS800-S01-0470-05</td>
<td>DCS800-S02-0450-05</td>
<td>AF400-30-11-70</td>
<td>EHD8520C2P-1L</td>
<td>EHD8520C-1L</td>
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<tr>
<td>DCS800-S01-0610-05</td>
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<td>AF580-30-11-70</td>
<td>EHD8650C2P-1L</td>
<td>EHD8650C-1L</td>
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<td>DCS800-S01-0740-05</td>
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<td>AF750-30-11-70</td>
<td>EHD8800C2P-1L</td>
<td>EHD8800C-1L</td>
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<td>AF750-30-11-70</td>
<td>EHD8960C2P-1L</td>
<td>EHD8960C-1L</td>
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<tr>
<td>DCS800-S01-1200-05</td>
<td>DCS800-S02-1200-05</td>
<td>AF1350-30-11-70</td>
<td>EHD8960C2P-1L</td>
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<tr>
<td>DCS800-S01-1500-05</td>
<td>DCS800-S02-1500-05</td>
<td>AF1650-30-11-70</td>
<td>Bar Contactor</td>
<td>Bar Contactor</td>
<td></td>
</tr>
<tr>
<td><strong>600 Vdc</strong></td>
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<tr>
<td>DCS800-S01-0290-06</td>
<td>DCS800-S02-0320-06</td>
<td>A260-30-11-84</td>
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<td>DCS800-S01-0580-06</td>
<td>DCS800-S02-0650-06</td>
<td>AF400-30-11-70</td>
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<tr>
<td>DCS800-S01-0900-06</td>
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<td>AF750-30-11-70</td>
<td>EHD8960C2P-1L</td>
<td>EHD8960C-1L</td>
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</tr>
<tr>
<td>DCS800-S01-1500-06</td>
<td>DCS800-S02-1500-06</td>
<td>AF1650-30-11-70</td>
<td>Bar Contactor</td>
<td>Bar Contactor</td>
<td></td>
</tr>
</tbody>
</table>

AC Input Contactors: Contactors have 120Vac / 50-60Hz coil with 1-NO and 1-NC aux. contact.

DC Output and Dynamic Brake Contactors: Contactors have 120Vac / 60Hz coil with 1-NO and 1-NC aux. contact.

* Either an AC contactor or a DC contactor is required, but not both.
Control Builder

Programming Tool

Control Builder is an optional, user-friendly tool for programming the DCS800 based on the IEC61131-3 standard. With Control Builder, it is possible to develop application programs directly in the drive quickly and easily, programs that customize the application, decentralize control, add additional interlocks, and much more. Control Builder offers a clear and easy way to develop, test and document your application programs.

Control Builder consists of the following:
- CoDeSys programming software for the PC
- Compact flash memory card
- Expanded library of functions

CoDeSys is a PC software tool for creating, documenting, editing and downloading your custom application program. No special programming skills are required. CoDeSys supports all five programming languages of IEC61131-3. Additionally, a Continuous Function Chart option is included. This makes it possible for you to program the drive in whatever language you are most comfortable with.

Compact flash memory card: The application program is stored on a compact flash memory card (MC) which is plugged into the drive. MC memory is sufficient to store a program made up of hundreds of functions.

Expanded library of functions: More than 100 types of functions are available including strings, timers, counters, and triggers, in addition to math and conversion functions. Various pre-configured functions are also included such as a PID-controller and a winder. User defined functions can also be created and saved.

Upload and Download

Application programs can be uploaded from connected drives and displayed graphically on a PC screen for service and documentation purposes. Online debugging functions include single-step, single-cycle, and breakpoint modes. An event triggered recording tool for variables and signals is also available. Programs made off-line can be downloaded to any of the connected drives that support them.

Three Operating Modes

Control Builder can be used to program the drive in three different ways:
- Standalone mode – CoDeSys is not connected to the drive. The application program can be written in the office and later downloaded to the drive.
- Off-line mode – CoDeSys is connected to the drive. Changes can be made to the application program without any affect on the drive until the program is downloaded.
- On-line mode – CoDeSys is connected to the drive. Changes to the application program are written immediately to the drive and actual values are shown on the screen in real-time.

Advantages and Features

- Easy-to-use tool, no special skills required
- Create and download custom programs
- Automatic documentation
- Can eliminate the need for an external PLC
- The application, including source code, is always part of the drive and thus, can be maintained during the whole life cycle of the machine
- The source code can be password protected against unauthorized access

If 16 or fewer function blocks are required, you may be able to use Adaptive programming instead, which is standard on all DCS800 drives. See page 11.
Start-up, maintenance and integration

**DriveWindow**

**Start-up and Maintenance Tool**

ABB’s DriveWindow is an advanced, easy-to-use PC software tool for the start-up and maintenance of ABB DCS800 DC Drives. Its host of features and clear, graphical presentation of the operation make it a valuable addition to your system providing information necessary for troubleshooting, maintenance and service, as well as training.

With DriveWindow the user is able to follow the operation of several drives simultaneously by collecting the actual values from the drives onto a single screen or printout.

Additionally, the client part of DriveWindow may reside on one Local Area Network PC, and the server side on another PC closer to the drives. This enables plant-wide monitoring to be easily accomplished with two PCs.

**High Speed Communication**

DriveWindow uses a high-speed fiber optic cable network with DDCS communication protocol. This makes communication between PC and drives very fast. The fiber optic network is safe and immune to external disturbance. A fiber optic communication card is needed inside the computer.

**Monitoring Drives**

Using DriveWindow you can monitor several drives simultaneously. The history buffer makes it possible to record a large amount of data in the PC’s memory. The drive's data logger can be accessed with DriveWindow and viewed in graphical form. The fault logger inside the drive automatically documents every faults, warnings and events that occur. The fault history stored in the drive can be uploaded to your computer.

**Versatile Back-Up Functions**

Drive parameters can be saved to the PC with DriveWindow, and can easily be downloaded back to the drive whenever needed.

**DriveWindow Features**

- Easy-to-use tool for commissioning and maintenance
- Several drives connected and monitored at the same time
- Monitor, edit or save signals and parameters, clear graphical presentation
- High-speed communication between PC and drive
- Versatile back-up functions
- View data collected and stored in the drive
- Fault diagnosis; DriveWindow indicates the status of drives, and also reads fault history data from the drive
- Compare function for comparing parameter sets
Start-up, maintenance and integration

DriveSize

Quality Dimensioning

DriveSize is a PC program to help the user select the optimal converter and options, especially in those cases where a straightforward selection from a catalog is not possible. Additionally, it can be used to create printed documents about the dimensioning based on actual load.

The default values make DriveSize simple to use, but the user is provided with many options for drive selection. The shortcut keys make drive selection easy while still honoring the relatively complicated rules.

A manual selection mode is also supported.

DriveSize is currently used by more than 1000 engineers globally.

DriveSize is for Drive System Components

- Motors
- DCS converter modules
- DCS enclosed converters
- Group drives (line-ups)
- Drive options

DriveSize Features

- Selects the optimal drive unit and motor
- Calculates duty load cycles for converters
- Supplies dimensioning results in graphical and numerical format
- Same tool used for AC and DC
- Excellent tool for supporting small systems
- Prints and saves the results
Start-up, maintenance and integration

DriveOPC

Integration Tool

DriveOPC is a software package which allows OLE for Process Control (OPC) communication between Windows applications and DCS800 DC drives. It allows Object Linking and Embedding (OLE) for Process Control (OPC) communication. This OPC server is an ideal tool for integrating DCS800 DC drives with commercial PC software and creating PC-based controlling and monitoring systems.

Remote Monitoring

DriveOPC enables remote connection via LAN (local area networks). The remote PC can be connected by its IP address (e.g. “164.12.43.33”) or by the DNS name (e.g. “Gitas213”).

OPC Based Software

OPC is an industry standard created in cooperation with Microsoft. It is an open architecture interface design, managed by the international OPC foundation. OPC is meant for different kinds of factory automation.

DriveOPC is based on OPC foundation data access standard 1.0A and Microsoft COM/DCOM technology. DriveOPC has full access to all drives, even when remote connection via LAN is used.

High Speed Communication

DriveOPC uses a high-speed fiber optic cable network with DDCS communication protocol. This makes communication between PC and drives very fast. The fiber optic network is safe and immune to external disturbance. A fiber optic communication card is needed inside the computer.

DriveOPC Features

DriveOPC supports OPC’s data access 1.0A. Read access to:

- Drive status: local, running, direction, fault, warning, reference
- Signals and parameters
- Fault logger contents
- Event logger contents
- General drive information
- Data logger settings, status and contents

Write access to:

- Drive control: local, start, stop, forward, reverse, coast stop, reset fault, home, teach-in, contactor on/off, reference
- Parameters
- Fault logger clear
- Data logger init, start, trig, clear
Remote monitoring tool
Ethernet module

Browser-Based, User-Friendly

The intelligent Ethernet NETA-01 module gives simple access to the drive by means of the Internet communicating via a standard web browser. The user can set up a virtual monitoring room wherever there is a PC with an Internet connection or via a simple dial-up modem connection. This enables remote monitoring, configuration, diagnostics and, when needed, control. The drive can also provide process related information, such as load level, run time, energy consumption and I/O data, the bearing temperature of the driven machine, for instance.

This opens new possibilities for the monitoring and maintenance of unmanned applications across a range of industries, for instance water, wind power, building services and oil & gas, as well as any application where the user needs access to the drives from more than one location. It also provides an opportunity for OEMs and system integrators to support their installed base globally.

No PC Needed at Local End

The intelligent Ethernet module has an embedded server with the necessary software for the user interface, communication and data storage. This gives ease of access, realtime information and the possibility for two-way communication with the drive, enabling immediate response and actions, saving time and money. This is possible without using a PC at the local end, as required by other remote solutions.

Powerful and Versatile

Up to nine drives can be connected to the intelligent Ethernet module via fiber optic links. It is available as an option for new drives, as well as an upgrade for existing systems. Access to the module is secured by user ID and passwords.

The web page of the module is opened like any other web address. The home page shows a general overview of the system with traffic lights and action buttons to guide the user through the different sections.

Features

- Virtual monitoring room for
  - Monitoring
  - Configuration of parameters
  - Diagnostics
  - Control, if needed
- Browser based access via
  - Intra-/extra-/Internet or
  - Email Client
  - Event Notification
  - Drives status update
- No PC needed at the local end
- Can be used as a Modbus/TCP bridge for control purpose
**Drawings**

**DCS800-501, 502 Power Modules D1-D5 Frames (500 Vdc)**

**Motor Data:**
- HP
- Model
- Frame

- RPM Base/Max
- Armature Voltage
- Field Voltage
- Overload requirements / Duty cycle
- Tach: Volts/1000RPM
- Encoder: PPR
- Blower: Voltage

**Notes:**
- * Product recommendations are included in this catalog. See section 3 for details.
- Sizing information given on this page are general guidelines. Sizing of system components must comply with local and national electrical codes.
- **FLA = Nominal DC Motor Current**
Drawings

DCS800-501, 502 Power Modules D1-D5 Frames (600 Vdc and above)
DCS800 D6-D7 Frames (all voltages)

Motor Blower Overload
Size from motor data

Wire
FLA x .816 x 1.25

EMC Filter (Optional)
required to meet CE

AC Line Reactor*
line reactor is required
unless a dedicated isolation
transformer is utilized

AC Contactor*
ABB recommends AC contactors over
DC contactors for better motor control
FLA x .816 (min)
Drive Rating x .816 (typical)

DC Control Power
115 Vac -15%/+10%

AC Field Power Supply

DC Contactor*
FLA x O.L.
(Customer Supplied)
not required if AC
contactor is utilized

NOTE:
DC fuses are required
for regenerative applications

DC Fusing*
Sized same as AC fusing

Wire
FLA x 1.25

Circuit Breaker
FLA x 0.816 x 1.25 (min)
FLA x 0.816 x 2.50 (max)

AC Fusing* (Required)
Size for SCR protection (typical)
FLA x O.L. X 0.816 x 1.25 (min)
(D5-D7 have internal fuses)

Transformer
required for 600V and above

Motor Data:

HP_________ Model_________ Frame_________
RPM Base/Max ___________/___________
Armature Voltage_________ Amps_________
Field Voltage_________/Amps_________/Ohms_________
Overload requirements / Duty cycle_________

Tach:_________ Encoder:_________
Volts/1000RPM_________ PPR_________ Volts_________

Blower:
Voltage_________/Amps_________/Phase_________

Altitude_________ Ambient Temp ___________

Notes:

1 Overvoltage protection unit and AC Line
reactor required

2 Requires AC line reactor. For single phase
supply, autotransformer is recommended

* Product recommendations are included in
this catalog. See section 3 for details.

Sizing information given on this page
are general guidelines. Sizing of system
components must comply with local and
national electrical codes.

FLA = Nominal DC Motor Current
Spare Part Kits

A stock of spare parts for your DCS800 drive will save you time and minimize expense. Spare parts kits are available to provide ready replacements for the most common parts.

Our standard spare part kits include the following:

- AC input fuses when internally mounted (D5 – D7)
- Field supply fuses when internally mounted (D1 – D5)
- Cooling fan
- Thyristors for one bridge

We also offer optional kits for critical applications which include the following:

- Control board
- Power interface board
- Pulse transformer board
- Power supply board
- Field supply board

Spare parts kits are ordered by drive type code. Not every kit will include all of these parts; it depends on the drive. Spare plug-in options (fieldbus, I/O extensions, etc.) must be ordered separately.
Service products

To reduce the total cost of owning ABB drives and to maximize their availability, ABB offers the following services:

**Training Services**

ABB offers dedicated training on ABB drives for your service and operating personnel. Upon successful completion of the training course, your personnel will have acquired the skills to use ABB drives correctly and safely, and also to get the best results from their application.

ABB has a service organization that spans the globe. Contact your local ABB sales office for more information about our services.

http://www.abb.us/drives

**Start-Up Services**

Using ABB’s start-up services, you can trust that your drives are correctly commissioned and well-tuned to their application. ABB employs authorized professionals who have been thoroughly trained for their job.

**ABB Maintenance Services**

ABB maintenance services ensure optimal operation of your drives and extend their useful life.

<table>
<thead>
<tr>
<th>Service product code</th>
<th>Service type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>US190</td>
<td>DCS800 - 3 days</td>
<td>Maintenance &amp; Commissioning</td>
</tr>
<tr>
<td>US191</td>
<td>DCS800 - 1 day</td>
<td>Serial Communications</td>
</tr>
</tbody>
</table>

**Spare Part Services**

ABB offers a fast and effortless information and ordering system to facilitate spare part management. Parts OnLine is at your service 24 hours.

http://www.abb.com/partsonline
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