Low voltage DC drives

ABB DC Drives
DCS800, 10 to 4000 hp
Catalog

Power and productivity
for a better world™

ABB

Selecting and ordering your drive

Type designation is a unique reference number that clearly identifies the drive by construction, power and voltage rating and selected options. Using the type designation you can specify your drives from the wide range of options available. Options are added to the type designation using the corresponding "plus" (+) code.

Build up your own ordering code using the type designation key below or contact your local ABB drives sales office and let them know what you want.

Type designation:

| DCS800 | - | S01 | - | 0680 | - | 05 | | + | XXXX |

Product series

Type
A0 = Cabinet drive (600+ HP)
EP = Panel mounted converter
PC = Cabinet drive (5-500 HP)
R0 = Rebuild kit
S0 = 3-phase converter module

Bridge type
1 = non-reversing (2-Q)
2 = reversing (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

Revision
Blank = No option (D1 - D4)
B = High Efficiency Fans (D5-D7)*

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

**Additional Factory
Installed Options**

* Standard after July 15, 2013

Contents
ABB low voltage DC drive, DCS800

Trademarks

DriveWindow is a registered trademark of ABB

Modbus is a trademark of Schneider Electric

Profibus is a trademark of Siemens

ControlNet is a trademark of ControlNet International, Ltd.

DeviceNet is a trademark of the Open DeviceNet Vendor Association.

Windows in a registered trademark of Microsoft Corp

Reliance Electric® and FlexPak® 3000 are registered trademarks of Rockwell Automation, Inc.

DC Industrial Drives Overview

ABB DC Industrial Drives

The DCS800 DC industrial drive from ABB combines a powerful controller with a thyristor power platform that has been proven in factories 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
– Electrolysis
– Pulp & Paper
– Ski lifts
– Printing
– Magnets
– Material handling
– Food & Beverage
– Battery Chargers
– Test rigs
– Plastic & Rubber
– 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.

Highlights

– Reduced installation and commissioning work
– Internal three phase field power supply 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 numerous internally mountable fieldbus adapters
– Virtually all DCS800 component parts are suitable for recycling.
– Coated circuit boards as standard

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, as well as the DCS800.

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

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

– 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
    – Relay output for AC or DC contactor control
    – Motor brake control, including torque proving input
    – 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.

Reversing and Non-Reversing Drives
Non-reversing (2-Q) power converter modules are used when motor torque and speed are always in the same direction and when significant stopping power is not required.

This is ideal for applications such as:
– Fan or blower
– Mixer
– Pump
– Extruder

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. It is also not possible for a 2-Q drive to reverse direction unless field reversal is used.
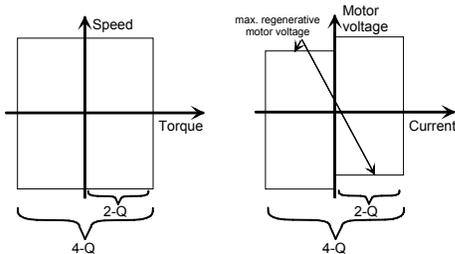
Reversing (4-Q) power converter modules are used when motor torque can occur in either direction. This is for applications such as:
– Stop-start conveyor
– Draw Roll
– Rolling mill
– Unwinder
– Overhead crane hoist

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 D5 are equipped with fused internal field power supplies. Sizes D6 – D7 require an external field power supply. See page 21 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.

AC line fuses to be separately mounted on sizes D1 - D4. They are included internally on D5 - D7. DC armature fuses are needed for all 4-Q drives and are to be separately mounted. See page 26 for fuse recommendations as well as specifications for other external system components.

Voltage Selection
The output voltage of the drive depends on the incoming AC line 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.

System input AC line voltage	DC voltage (recommended)		Ideal DC voltage without load	Recommended DCS800 voltage class type code
	2Q	4Q		
U_{VN}	$U_{dmax\ 2-Q}$	$U_{dmax\ 4-Q}$	U_{di0}	
[V]	[V]	[V]	[V]	
230	265	240	310	05
380	440	395	510	05
400	465	415	540	05
415	480	430	560	05
440	510	455	590	05
460	530	480	620	05
480	555	500	640	05
500	580	520	670	05
525	610	545	700	05 (D1-D4), 06
575	670	600	770	06
600	700	625	810	06
660	765	685	890	07
690	800	720	930	07
800	915	820	1060	08
990	1160	1040	1350	10
1200	1380	1235	1590	12

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

Low Mains Voltage - (30 to 120 V) SDCS-SUB-4 (+S186)

External DC Voltage Measurement - Measures Vdc at the motor; (D1-D4) SDCS-UCM-1; (not needed D5-D7)

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 are 16-bit resolution (15 plus one sign bit) which is the highest resolution in the industry.

The following interfaces are standard features:
– Analog DC tachometer
– Pulse encoder
– Motorized pot, speed pot and up to two analog meters

Optional modules are available to increase the number of analog, digital, tachometer, and encoder interfaces and to add isolated interfaces for temperature sensors and other devices.

DCS800 Panel Drive

The DCS800-EPx Panel Drive is a DCS800 power module and associated system components mounted and wired on a sub-panel and ready to be installed into an industrial enclosure. System components include AC input fuses, DC output fuses (4-Q only), control transformer, AC 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
– 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

Optional Features

Option	Size	Option Code
Integral line reactor *	Up to 150 hp	+E213
ABB Tmax MCP circuit breaker		+F278
ABB A-line blower motor contactor & overload	Blower from 1/2 to 15 hp	+M611 - +M641
Without AC contactor		+0F250
230 Vac supply		+S235

*Reactor or isolation transformer required!

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
– ABB's Replacement Guide (DCS800-PHTG01U-EN) makes conversions go smoothly

DCS800 Cabinet Drive
3 to 500 Hp

DCS800-PC cabinet drives, available from 3 to 500 horsepower at 230 and 480 volt, feature field-proven DCS800 power modules that are fully integrated into a robust drive system. The DCS800-PC cabinet drive is packed with features that are valued by American industry.

Those features include:

– UL listing; built in the USA
– Welded enclosures made of 12 gauge steel with multi-point door latching mechanism
– Oversized forced air cooling system optimized by ABB engineers to maximize heat removal
– Cabinet and drive fans that run only when needed
– Cabinet filter that can be changed from the outside; no need to shut down the line
– Intelligent E-stop circuit that ensures power is shut off before the contactor opens
– Fully documented; easy to integrate into your machine

DCS800 cabinet drives are ideal for a variety of industries including metals, mining, rubber and plastics, material handling, wood products and non-motoric. Applications include rolling mills, piercing mills, mine hoists, extruders, rubber mixers, cranes, veneer lines, and non-motoric applications such as battery chargers, electromagnets, and electrolysis. The DCS800 is most frequently used with shunt-wound DC motors but can also be used with specialty DC motors including permanent magnet DC motors, series wound motors, traction motors, and stab-shunt motors. Consult ABB Application Engineering when a specialty motor is used.

The emergency stop circuit can be adapted to provide safety functions Safe-Torque-Off (STO) or Safe-Stop 1 (SS1) if one or both standard relays is replaced with safety relays. This is possible because the standard e-stop circuit first commands the drive to decelerate (Off3) and then cuts off the power in two ways, by sending a signal to the drive (Off2) and then by opening the input contactor. This will provide compliance with SIL2 / PLd of IEC 62061 and IEC13849-2. Contact ABB for more information.

Standard Features

– UL type 1 cabinet construction
– Forced air cooling
– Top or bottom AC line entry and DC motor exit
– Through-the-door rotary handle disconnect
– Line reactor
– AC line contactor
– Field power supply
– Door-mounted:
    – Control panel
    – Emergency stop pushbutton
    – Armature current and voltage meters
– Isolated digital inputs and outputs, 120 Vac
– Isolated analog inputs and outputs, ± 10 Vdc
– Tachometer and encoder interface
– Wire labels that simplify troubleshooting

Optional features

– UL type 12 filtered cabinet construction
– Motor blower starter
– Extensive variety of fieldbus network adapters including Ethernet IP, Profibus, ControlNet, etc.
– Analog and digital input/output extensions
– Feedback adapters for encoders and resolvers
– High speed network adapter for DDCS fiber optic and drive-to-drive communications

DCS800 Cabinet Drive
600 to 3,000 Hp

DCS800-A0 cabinet drives, available from 600 to 3000 horsepower and beyond at voltages up to 1200 Vdc, provide optimal flexibility in a DC system for a wide variety of applications.

Standard 480 Vac drive cabinets that include features common to US industries can be ordered from our catalog.

Custom drive cabinets, available upon request, provide maximum flexibility for the most demanding applications, including 12-pulse parallel, serial and sequential and hard parallel configurations. Contact ABB for a custom quotation.

DCS800 cabinet drives are ideal for a variety of industries including metals, mining, rubber and plastics, material handling, wood products and non-motoric. Applications include rolling mills, piercing mills, mine hoists, extruders, rubber mixers, cranes, veneer lines, and non-motoric applications such as battery chargers, electromagnets, and electrolysis. The DCS800 is most frequently used with shunt-wound DC motors but can also be used with specialty DC motors including permanent magnet DC motors, series wound motors, traction motors, and stab-shunt motors. Consult ABB Application Engineering when a specialty motor is used.

DC drive systems excel at applications where full torque is needed at zero speed, when high-impact loads require heavy and frequent overloads, and on very large applications where other alternatives become cost-prohibitive.

Standard Drive Cabinet – Features

Frame	Power Rating ND - Normal Duty (110% OL) SD - Standard Duty (150% OL)	UL Listed	Circuit Breaker	Line Contactor	Line Reactor	Internal Field Supply *	External Field Supply *
D5	ND 1100 hp / SD 900 hp		Standard	#	Standard	Option	Option
D6	ND 1750 hp / SD 1500 hp		Standard	#			Option
D7	ND 3000 hp / SD 2250 hp		Option	#			Option

\# Circuit breaker can be electrically opened and closed to operate like a line contactor.
* Internal field supply located inside the drive module. External supply located elsewhere within the cabinet.

- Circuit breaker, reactor and contactors on some cabinets as shown in the chart
- Cabinet with 16 gauge steel panels covering 12 gauge steel frame
- IP21 construction (like UL type 1)
- Forced air cooling
- Bottom AC line entry, bottom DC motor exit
- Built to UL specifications but not UL-listed
- Through-the-door rotary handle disconnect
- Isolated digital inputs and outputs, 120 Vac
- Isolated analog inputs and outputs, ± 10 Vdc
- Tachometer and encoder interface
- Door-mounted:
  - Control panel
  - Emergency stop pushbutton
  - Armature current and voltage meters
- Documentation binder including AutoCAD drawings on CD-ROM

Standard Drive Cabinet - Options
- IP42 cabinet construction (like UL type 12)
- Cabinet lighting
- Additional meter on door
- Class A2 plus or class B1 cable marking
- Motor blower starter
- Extensive variety of fieldbus network adapters including Ethernet IP, Profibus, ControlNet, etc.
- Analog and digital input/output extensions
- Feedback adapters for encoders and resolvers
- High speed network adapter for DDCS fiber optic and drive-to-drive communications

Custom Drive Cabinet
Solutions up to 20,000 Amps and 1200 Vdc. Features and options vary widely. Contact your ABB representative for a custom quotation.

DCS800 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
– Reversing (4-quadrant) or non-reversing (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

# Adaptive Programming and Start-up Assistants

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.

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
– Similar to the ACS800 AC Drives

The DCS800 DC drive offers you all this as standard features. If more function blocks are required, ControlBuilder, which uses compact flash memory, is available with expanded capacity. See page 29 for details.
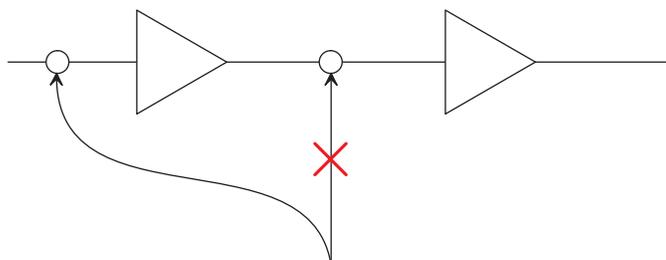
Start-Up Assistants

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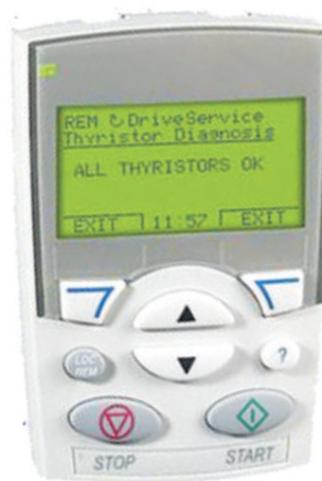
Features
– Easy and fast commissioning procedure
– Intelligent guide to assist you through the commissioning
– Available in 8 languages, including Spanish and French
– Info system always available
– Auto detection of connected hardware

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, as well as the DCS800.

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

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.

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.
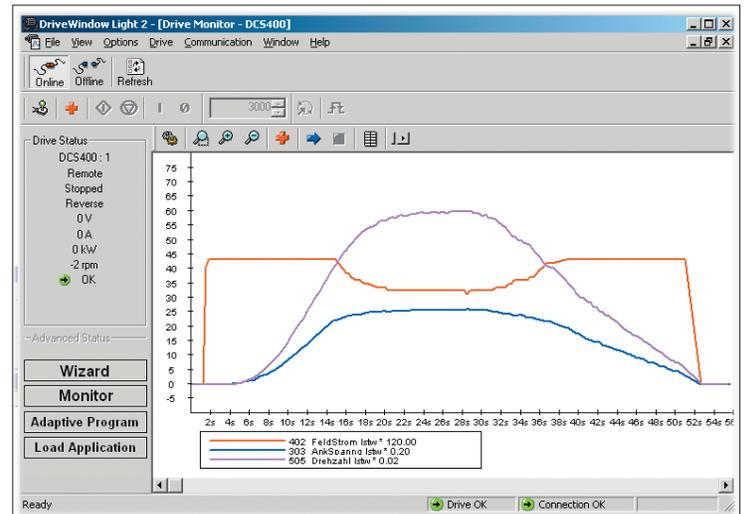
DriveWindow Light
Startup and Maintenance Tool

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 assistant collects motor and connection data and executes controller auto tunings
– Advanced assistants provide guidance for 12-pulse operation, field reversal, network communication (fieldbus) and master-follower configuration.
– A context-sensitive help function is present during the whole sequence
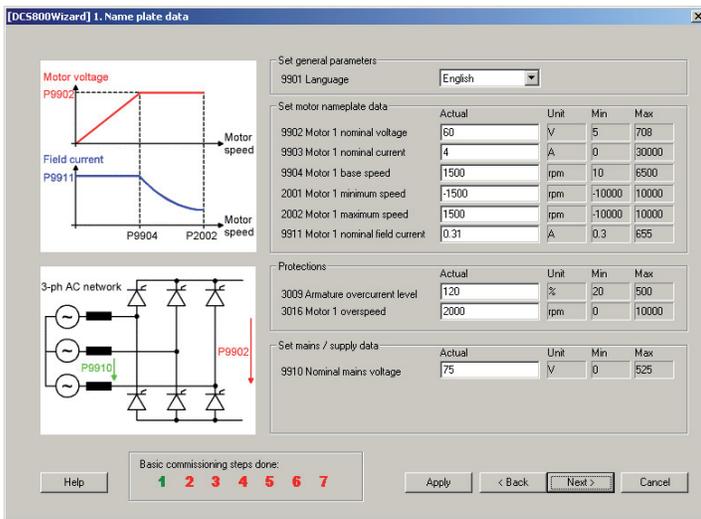
DWL AP is a graphical PC tool to create, document, edit and download Adaptive Programs. Adaptive Program tools contain 16 function blocks and are available in standard firmware. DWL AP offers a clear and easy way to develop, test and document these programs with a PC.

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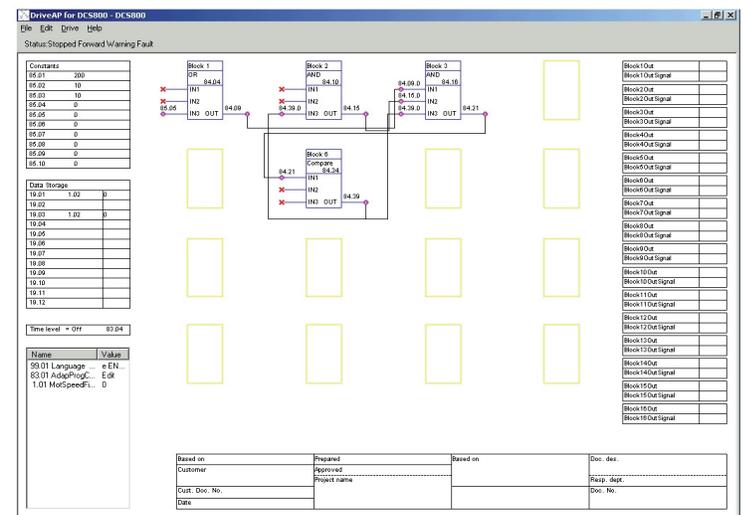
One page is freely configurable by the user. An individual commissioning sequence or parameter selection can be setup to application, machine or motor demands.

Adaptive Programming (AP) Tool

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.

Twelve (12) macros are available, plus the factory default macro. The program 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 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

The selections include the following macros:

| Macro	Description
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 network, 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.
3-Wire Jog	For Flexpak3000 replacements. DI5 switches between Manual (AI1) and Auto (AI2) speed reference. Jog input (DI3) initiates motion and reverses with DI4. Control is 3-wire.

DCS800 Firmware

DCS800 Basic Firmware

DCS800 firmware includes the basic function of speed control, armature current, field current and 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 by Profibus standard but can also be configured to adapt classic command structures.

All parameters can be accessed through network communication or by IEC 61131 or adaptive programming. Twelve 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 power supply operation
– Converter protection (temperature, voltage,...)

Motor protections

– Stall protections
– Thermal motor model
– 2 channel motor temperature measurement PTC or PT100
– Klixon supervision (RDIO-01 Recommended)
– 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.
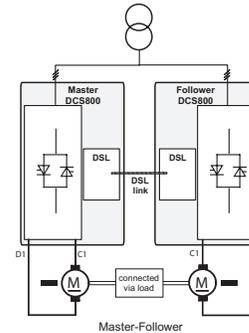
Master-Follower

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.

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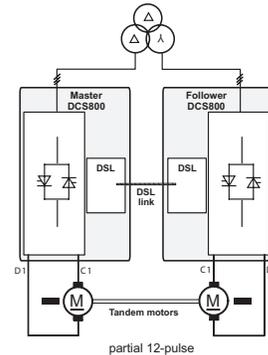
Typical configuration for high power drives connected in 12-pulse parallel, serial or sequential application

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.
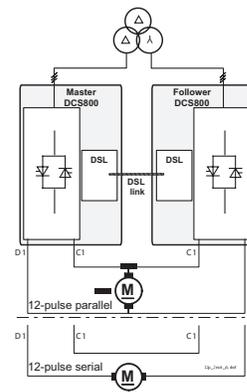
Technical Specifications - Power Converter Modules

System connection	
Voltage, 3-phase	240 to 990 V per 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
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

Speed Feedback / Accuracy	
Speed resolution	with encoder 0.005% of nominal speed, with analog tach, 0.1% (16 bits)
Cycle time, speed and current controller	2.77 ms at 60 Hz, 3.33 ms at 50 Hz
Step response, current controller	5 ms
Speed feedback	EMF (transducerless), analog tach, encoder, 2nd encoder with RTAC
Analog tach voltage	±8-30 Vdc, ±30-90 Vdc, ±90-270 Vdc
Pulse encoder voltage	5, 12, 15, 24 Vdc

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 temperature	< 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)
4000 to 5000 M.S.L.	with derating and factory approval

Sound pressure level

Size	Sound pressure level L_p (1 m distance)		Vibration
	as module	enclosed conv.	as module
D1	55 dBA	54 dBA	
D2	55 dBA	55 dBA	1.5 mm, 2...9 Hz
D3	60 dBA	73 dBA	0.5 g, 9...200 Hz
D4	66 - 70 dBA	77 dBA	
D5	73 dBA	78 dBA	
D6	75 dBA	73 dBA	1 mm, 2...9 Hz
D7	82 dBA	80 dBA	0.1 g, 9...200 Hz

North American Standards

In North America the system components fulfil the requirements of the table below.

Rated supply voltage	Standards		
	Converter module	Enclosed converter
to 600 V	UL 508 C Power Conversion Equipment cULus C 22.2 No. 14-95 Industrial Control Equipment, Industrial Products Available for converter modules including field power supply units. Types with UL mark: • see UL Listing www.ul.com / certificate no. E196914 • or on request	DCS800-A0 cabinet drives are built to UL specifications, but are not UL listed. DCS800-PC cabinet drives are UL listed per UL-508A.
>600 V to 1000 V	EN / IEC: see table below. Available for converter modules including field power supply units.	EN / IEC types: on request (for details see table below)

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.

European union directive	Manufacturer's assurance	Harmonized standards	
		Converter module	Enclosed converter
Machinery Directive			
98/37/EEC 93/68/EEC	Declaration of Incorporation	EN 60204-1 [IEC 60204-1]	EN 60204-1 [IEC 60204-1]
Low Voltage Directive			
73/23/EEC 93/68/EEC	Declaration of Conformity	EN 60146-1-1 [IEC 60146-1-1] EN 61800-5-1 (EN 50178 [IEC--]) see additional IEC 60664	EN 60204-1 [IEC 60204-1] EN 61800-5-1 EN 60439-1 [IEC 60439-1]
EMC Directive			
89/336/EEC 93/68/EEC	Declaration of Conformity (Provided that all installation instructions concerning cable selection, cabling and EMC filters or dedicated transformer are followed.)	EN 61800-3 ① [IEC 61800-3] ① in accordance with 3ADW 000 032	EN 61800-3 ① [IEC 61800-3] ① in accordance with 3ADW 000 032/3ADW 000 091

Current Ratings - Modules
Non-Reversing (2-Quadrant)

Type code Non-reversing (2-Q)*	Frame Size	Input RMS Current A_{rms}	Normal Duty I_{2Nd} A_{dc}	P_{2Nd} HP	Standard Duty I_{2Sd} A_{dc}	P_{2Sd} HP	Heavy Duty I_{2Hd} A_{dc}	P_{2Hd} HP	Internal field current A	Air Flow 60 Hz ft³/min	Heat Dissipation BTU/hr
500 Vdc											
DCS800-S01-0020-05		16	19	10	18	10	18	10		nonvent.	375
DCS800-S01-0045-05		37	42	25	38	20	38	20		210	580
DCS800-S01-0065-05	D1	53	61	30	54	30	54	30	6A	210	751
DCS800-S01-0090-05		73	88	50	78	40	78	40		210	955
DCS800-S01-0125-05		102	124	75	111	60	104	60		210	1297
DCS800-S01-0180-05	D2	147	171	100	164	100	148	75	15A	210	1911
DCS800-S01-0230-05		188	219	125	205	125	205	125		210	2491
DCS800-S01-0315-05		257	300	150	264	150	264	150		210	3105
DCS800-S01-0405-05	D3	330	385	200	325	200	325	200	20A	420	3822
DCS800-S01-0470-05		384	447	250	405	250	405	250		420	4504
DCS800-S01-0610-05+S171		498	580	300	490	300	484	300		610	6005
DCS800-S01-0740-05+S171	D4	604	704	400	670	400	664	400	25A	610	7302
DCS800-S01-0900-05+S171		734	865	500	795	500	795	500		1160	9145
DCS800-S01-1190-05+S164**. ***	D4+	930	1040	600	840	500	815	500	25A	500	TBD
DCS800-S01-1200-05B+S164 ***		979	1105	700	950	600	851	550		500	17402
DCS800-S01-1500-05B+S164 ***	D5	1224	1450	900	1320	800	1280	800	25A	500	18084
DCS800-S01-2000-05B+S164 ***		1632	1904	1100	1480	900	1479	900		500	22520
DCS800-S01-2050-05B ***		1673	1985	1250	1585	1000	1585	1000		940	27297
DCS800-S01-2500-05B ***	D6	2040	2395	1500	1986	1250	1990	1250	External	940	30709
DCS800-S01-3000-05B ***		2448	2820	1750	2416	1500	2416	1500		940	37875
DCS800-S01-3300-05B ***		2693	3178	2000	2416	1500	2416	1500		2500	39922
DCS800-S01-4000-05B ***	D7	3264	3690	2250	2890	1750	2897	1750	External	2500	44358
DCS800-S01-5200-05B ***		4243	4820	3000	3972	2500	3800	2250		2500	64831
600 Vdc											
DCS800-S01-0290-06	D3	237	280	200	268	200	268	200	External	210	3105
DCS800-S01-0590-06+S171	D4	481	561	400	480	300	470	300	External	610	6347
DCS800-S01-0900-06B***		734	828	600	665	500	665	500		500	17402
DCS800-S01-1500-06B***	D5	1224	1428	1000	1325	1000	1325	1000	External	500	21496
DCS800-S01-2000-06B***		1632	1850	1250	1490	1100	1479	1100		500	27638
DCS800-S01-2050-06B***		1673	1850	1250	1490	1100	1479	1100		940	31392
DCS800-S01-2500-06B***	D6	2040	2380	1750	1990	1500	1990	1500	External	940	34804
DCS800-S01-3000-06B ***		2448	2790	2000	2380	1750	2380	1750		940	41628
DCS800-S01-3300-06B ***		2693	3035	2250	2380	1750	2380	1750		2500	44699
DCS800-S01-4000-06B ***	D7	3264	3720	2500	2970	2250	2970	2250	External	2500	51523
DCS800-S01-4800-06B ***		3917	4410	3250	3507	2500	3507	2500		2500	66537
700 Vdc											
DCS800-S01-0900-07B ***		734	820	700	620	500	620	500		500	17402
DCS800-S01-1500-07B ***	D5	1224	1428	1250	1160	1000	1160	1000	External	500	21496
DCS800-S01-2000-07B ***		1632	1850	1500	1490	1250	1479	1250		500	27638
DCS800-S01-2050-07B ***		1673	1850	1500	1490	1250	1479	1250		940	31392
DCS800-S01-2500-07B ***	D6	2040	2380	2000	1990	1750	1990	1750	External	940	34804
DCS800-S01-3000-07B ***		2448	2790	2500	2380	2000	2380	2000		940	41628
DCS800-S01-3300-07B ***		2693	3035	2500	2380	2000	2380	2000		2500	44669
DCS800-S01-4000-07B***	D7	3264	3720	3250	2970	2500	2970	2500	External	2500	51523
DCS800-S01-4800-07B***		3917	4480	4000	3507	3000	3507	3000		2500	66537

360 - 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

* 2-quadrant drives CANNOT decelerate a load or power motors in the reverse direction.
** Continuous rating is 1190 A_{dc} at 35°C; 1140 A at 40°C.
*** The "B" after the voltage indicates a European compliant fan for energy consumption and efficiency. It is physically different than older designs

Current Ratings - Modules
Reversing (4-Quadrant)

Type code Reversing (4-Q)	Frame Size	Input RMS Current A_{rms}	Normal Duty		Standard Duty		Heavy Duty		Internal field current A	Air Flow 60 Hz ft³/min	Heat Dissipation BTU/hr
			I_{2Nd} A_{dc}	P_{2Nd} HP	I_{2Sd} A_{dc}	P_{2Sd} HP	I_{2Hd} A_{dc}	P_{2Hd} HP			
500 Vdc											
DCS800-S02-0025-05		20	23	10	20	10	20	10		nonvent.	375
DCS800-S02-0050-05		41	47	25	38	20	38	20		210	580
DCS800-S02-0075-05	D1	61	71	40	54	30	54	30	6A	210	751
DCS800-S02-0100-05		82	95	50	84	50	79	40		210	955
DCS800-S02-0140-05		114	133	75	125	75	110	60		210	1297
DCS800-S02-0200-05	D2	163	190	100	166	100	166	100	15A	210	1911
DCS800-S02-0260-05		212	247	150	208	125	208	125		210	2491
DCS800-S02-0350-05		286	333	200	287	150	264	150		210	3105
DCS800-S02-0450-05	D3	367	428	250	360	200	357	200	20A	420	3822
DCS800-S02-0520-05		424	489	300	405	250	405	250		420	4504
DCS800-S02-0680-05+S171		506	647	400	605	300	544	300		610	6005
DCS800-S02-0820-05+S171	D4	669	806	500	740	400	664	400	25A	610	7302
DCS800-S02-1000-05+S171		816	965	600	815	500	810	500		1160	9145
DCS800-S02-1190-05+S164**, ***	D4+	930	1040	600	840	500	815	500	25A	500	TBD
DCS800-S02-1200-05B+S164 ***		979	1105	700	950	600	851	500		500	17402
DCS800-S02-1500-05B+S164 ***	D5	1224	1450	900	1320	800	1280	800	25A	500	18084
DCS800-S02-2000-05B+S164 ***		1632	1885	1100	1490	900	1479	900		500	22520
DCS800-S02-2050-05B ***		1673	1985	1250	1585	1000	1585	1000		940	27297
DCS800-S02-2500-05B ***	D6	2040	2395	1500	1995	1250	1990	1250	External	940	30709
DCS800-S02-3000-05B ***		2448	2820	1750	2382	1500	2382	1500		940	37875
DCS800-S02-3300-05B ***		2693	3178	2000	2416	1500	2416	1500		2500	39922
DCS800-S02-4000-05B ***	D7	3264	3690	2250	2890	1750	2890	1750	External	2500	44358
DCS800-S02-5200-05B ***		4243	4820	3000	3972	2500	3800	2250		2500	64831
600 Vdc											
DCS800-S02-0320-06	D3	261	295	200	268	200	268	200	External	210	3105
DCS800-S02-0650-06+S171	D4	530	619	400	540	400	540	400	External	610	6347
DCS800-S02-0900-06B ***	D5	734	828	600	665	500	665	500	External	500	17402
DCS800-S02-1500-06B ***		1224	1428	1000	1325	1000	1325	1000		500	21496
DCS800-S02-2050-06B ***		1673	1850	1250	1490	1100	1490	1100		940	31392
DCS800-S02-2500-06B ***	D6	2040	2380	1750	1980	1500	1980	1500	External	940	34804
DCS800-S02-3000-06B ***		2448	2790	2000	2293	1750	2293	1750		940	41628
DCS800-S02-3300-06B ***		2693	3035	2250	2370	1750	2370	1750		2500	44699
DCS800-S02-4000-06B ***	D7	3264	3720	2500	2970	2250	2970	2250	External	2500	51523
DCS800-S02-4800-06B ***		3917	4410	3250	3507	2500	3507	2500		2500	66537
700 Vdc											
DCS800-S02-0900-07B ***	D5	734	820	700	620	500	620	500	External	500	17402
DCS800-S02-1500-07B ***		1224	1428	1250	1160	1000	1160	1000		500	21496
DCS800-S02-2050-07B ***		1673	1850	1500	1490	1250	1490	1250		940	31392
DCS800-S02-2500-07B ***	D6	2040	2380	2000	1990	1750	1983	1750	External	940	34804
DCS800-S02-3000-07B ***		2448	2790	2500	2280	2000	2275	2000		940	41628
DCS800-S02-3300-07B ***		2693	3035	2500	2380	2000	2380	2000		2500	44669
DCS800-S02-4000-07B ***	D7	3264	3720	3250	2970	2500	2965	2500	External	2500	51523
DCS800-S02-4800-07B ***		3917	4480	4000	3507	3000	3507	3000		2500	66537

360 - 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

** Continuous rating is 1190 A_{dc} at 35°C; 1140 A at 40°C.
*** The "B" after the voltage indicates a European compliant fan for energy consumption and efficiency. It is physically different than older designs

Current Ratings
DCS800-EP Panel Drive

Type code	Panel Size	Frame Size	Heavy Duty 460Vac / 500Vdc			Heavy Duty 230Vac / 240Vdc			Internal field current	Air Flow 60 Hz	Heat Loss without Inductor	Heat Loss with Inductor
			Input A_{rms}	I_{2HD} A_{dc}	P_{2HD} HP	Input A_{rms}	I_{2HD} A_{dc}	P_{2HD} HP	A	ft³/min	Watts	Watts
Non-reversing (2-Quandrant) *												
DCS800-EP1-0020-05	A	D1	14	17	10	16	20	5	6	nonvent.	162	182
DCS800-EP1-0045-05	A	D1	29	35	20	30	37	10	6	210	228	283
DCS800-EP1-0065-05	A	D1	43	53	30	44	54	15	6	210	291	350
DCS800-EP1-0090-05	A	D1	55	68	40	58	71	20	6	210	356	426
DCS800-EP1-0125-05	A	D1	85	104	60	85	104	30	6	210	483	578
DCS800-EP1-0180-05	B	D2	102	125	75	102	125	30	15	210	656	751
DCS800-EP1-0230-05	B	D2	167	205	125	168	206	60	15	210	882	1017
DCS800-EP1-0315-05	B	D3	200	245	150	208	255	75	20	210	1074	1209
DCS800-EP1-0405-05	C	D3	265	325	200	278	341	100	20	420	1326	-
DCS800-EP1-0470-05	C	D3	330	405	250	347	425	125	20	420	1551	-
DCS800-EP1-0610-05	C	D4	392	480	300	413	506	150	25	610	1996	-
DCS800-EP1-0740-05	D	D4	522	640	400	-	-	-	25	610	2334	-
DCS800-EP1-0900-05	D	D4	649	795	500	-	-	-	25	1160	2982	-
Reversing (4-Quadrant)												
DCS800-EP2-0025-05	A	D1	14	17	10	16	20	5	6	nonvent.	170	190
DCS800-EP2-0050-05	A	D1	29	35	20	30	37	10	6	210	246	301
DCS800-EP2-0075-05	A	D1	43	53	30	44	54	15	6	210	319	378
DCS800-EP2-0100-05	A	D1	55	68	40	58	71	20	6	210	387	457
DCS800-EP2-0140-05	A	D1	85	104	60	85	104	30	6	210	530	625
DCS800-EP2-0200-05	B	D2	134	164	100	143	175	50	15	210	776	903
DCS800-EP2-0260-05	B	D2	167	205	125	168	206	60	15	210	960	1095
DCS800-EP2-0350-05	B	D3	200	245	150	208	255	75	20	210	1168	1303
DCS800-EP2-0450-05	C	D3	265	325	200	278	341	100	20	420	1465	-
DCS800-EP2-0520-05	C	D3	330	405	250	347	425	125	20	420	1695	-
DCS800-EP2-0680-05	C	D4	392	480	300	413	506	150	25	610	2167	-
DCS800-EP2-0820-05	D	D4	522	640	400	-	-	-	25	610	2552	-
DCS800-EP2-1000-05	D	D4	649	795	500	-	-	-	25	1160	3252	-
DCS800-EP2-1010-05**	D	D4	775	950	600	-	-	-	25	1160	3305	-

* 2-Quadrant drives CANNOT decelerate a load or power motors in the reverse direction.
**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)
Environmental limit values	
Cabinet internal ambient temperature	0 to 40°C
Protection Class	UL Type Open / IP00
Environmental limit values	
cULus Listed	UL 508A with 65 kA SCCR

See module conditions and specifications for additional data

Current Ratings
Cabinet Drive

Type Code	Frame size	460 Vac / 500 Vdc					230 Vac / 240 Vdc					Field Current	UL Listed
		Input RMS Current	Normal Duty		Standard Duty		Input RMS Current	Normal Duty		Standard Duty			
		Input A_{RMS}	I_{Nd} A_{dc}	P_{Nd} HP	I_{Sd} A_{dc}	P_{Sd} HP	Input A_{RMS}	I_{Nd} A_{dc}	P_{Nd} HP	I_{Sd} A_{dc}	P_{Sd} HP		
Non-reversing (2-Quandrant) *													
DCS800-PC1-0020-05+N665	D1	15	18	10	18	10	15	17	3	17	3	6	√
DCS800-PC1-0045-05+N665	D1	33	39	20	39	20	33	39	10	39	10	6	√
DCS800-PC1-0065-05+N665	D1	49	59	30	58	30	49	59	15	58	15	6	√
DCS800-PC1-0125-05+N665	D1	94	113	60	104	60	94	113	30	104	30	6	√
DCS800-PC1-0230-05+N665	D2	155	188	100	186	100	155	188	50	186	50	15	√
DCS800-PC1-0315-05+N665	D3	233	282	150	250	150	233	282	75	250	60	20	√
DCS800-PC1-0405-05+N665	D3	290	332	200	266	150	290	341	100	266	75	20	√
DCS800-PC1-0610-05+N665	D4	441	534	300	462	250	441	534	150	462	125	25	√
DCS800-PC1-0740-05+N665	D4	555	673	400	666	400						25	√
DCS800-PC1-0900-05+N665	D4	661	802	500	759	400						25	√
DCS800-A01-1200-05-DBN+N665	D5	930	1026	600	817	500						optional	
DCS800-A01-1500-05-DBN+N665	D5	1163	1411	800	1297	800						optional	
DCS800-A01-2000-05-DBN+N665	D5	1510	1755	1100	1459	900						optional	
DCS800-A01-2050-05-LDBN+N665	D6	1640	1867	1100	1554	1000						optional	
DCS800-A01-2500-05-LDBN+N665	D6	1999	2349	1500	2000	1250						optional	
DCS800-A01-3000-05-LDBN+N665	D6	2448	2968	1750	2507	1500						optional	
DCS800-A01-3300-05-LDBN+N665	D7	2693	3039	1750	2489	1500						optional	
DCS800-A01-4000-05-LDBN+N665	D7	3264	3643	2250	2989	1750						optional	
DCS800-A01-5200-05-LDBN+N665	D7	4162	4760	3000	3909	2250						optional	
Reversing (4-Quadrant)													
DCS800-PC2-0025-05+N665	D1	18	24	10	22	10	18	24	5	22	5	6	√
DCS800-PC2-0050-05+N665	D1	37	49	25	39	20	37	49	10	39	10	6	√
DCS800-PC2-0075-05+N665	D1	55	74	40	61	30	55	74	20	61	15	6	√
DCS800-PC2-0140-05+N665	D1	102	130	75	112	60	102	130	30	112	30	6	√
DCS800-PC2-0200-05+N665	D2	145	185	100	152	75	145	185	50	152	40	15	√
DCS800-PC2-0260-05+N665	D2	188	239	125	186	100	188	239	60	186	50	15	√
DCS800-PC2-0350-05+N665	D3	245	311	150	273	150	245	311	75	273	75	20	√
DCS800-PC2-0450-05+N665	D3	316	392	200	340	200	316	392	100	341	100	20	√
DCS800-PC2-0520-05+N665	D3	367	447	250	383	200	367	447	125	383	100	20	√
DCS800-PC2-0680-05+N665	D4	490	673	400	567	300	490	675	200	567	150	25	√
DCS800-PC2-0820-05+N665	D4	612	812	500	696	400						25	√
DCS800-PC2-1000-05+N665	D4	734	915	500	793	500						25	√
DCS800-A02-1200-05-DBN+N665	D5	930	1026	600	817	500						optional	
DCS800-A02-1500-05-DBN+N665	D5	1163	1327	800	1106	700						optional	
DCS800-A02-2000-05-DBN+N665	D5	1510	1755	1100	1459	900						optional	
DCS800-A02-2050-05-LDBN+N665	D6	1640	1867	1100	1554	1000						optional	
DCS800-A02-2500-05-LDBN+N665	D6	1999	2375	1500	2006	1250						optional	
DCS800-A02-3000-05-LDBN+N665	D6	2448	2760	1750	2310	1250						optional	
DCS800-A02-3300-05-LDBN+N665	D7	2693	3039	1750	2489	1500						optional	
DCS800-A02-4000-05-LDBN+N665	D7	3264	3643	2250	2989	1750						optional	
DCS800-A02-5200-05-LDBN+N665	D7	4162	4760	3000	3909	2250						optional	

General Notes:
* 2-Quadrant drives CANNOT decelerate a load or power motors in the reverse direction.
The ratings apply at an ambient temperature of 40 °C (104 °F)
DCS800-PC cabinets: UL Listed; UL type 1 enclosure
DCS800-A0 cabinets: NOT UL Listed but built to UL specifications; IP21 enclosure (like UL type 1)

Definitions
I_{Nd} Continuous dc output current allowing 110% overload for 60 seconds; then <= 100% for 10 minutes
P_{Nd} Typical motor power in normal-overload use
I_{Sd} Continuous dc output current allowing 150% overload for 30 seconds; then <= 100% for 15 minutes
P_{Sd} Typical motor power in standard-duty use

Dimensions and Weights

Dimensions and Weights - Module Drive

Unit Size	Power Connection		Weight (lbs)	Dimensions	
	In	Out		h x w x d (in)	h x w x d (mm)
D1	Bottom	Bottom	24	14.6 x 10.6 x 7.9	370 x 270 x 200
D2	Bottom	Bottom	35	14.6 x 10.6 x 10.6	370 x 270 x 270
D3	Bottom	Bottom	55	18.1 x 10.6 x 12.2	459 x 270 x 310
D4	Bottom	Bottom	84	25.4 x 10.6 x 13.6	644 x 270 x 345
D4+	Bottom	Bottom	121	29.2 x 10.6 x 14.3	741 x 270 x 363
D5	Top	Bottom	242	39.6 x 20.1 x 15.7	1005 x 510 x 400
D6	Left	Left	396	69.0 x 18.1 x 16.1	1750 x 460 x 409
D7*	Left or Right (as selected in the type code)		693	69.0 x 30.0 x 22.0	1750 x 760 x 559

* Largest D7 rating in each voltage class has separately mounted control section with deimensions same as a D1 unit.

D1 D2 D3 D4 D4+ D5 D6 D7

Dimensions and Weights - Panel Drive

Panel Size	Drive Size	Power Connection		Weight (lbs)	Dimensions	
		In	Out		h x w x d (in)	h x w x d (mm)
A	D1	Top	Top	62	18.8 x 12.2 x 14.4	478 x 309 x 366
B	D2	Top	Top	103	19.3 x 20.0 x 13.8*	490 x 508 x 351
B	D3	Top	Top	130	19.3 x 20.0 x 13.8*	490 x 508 x 351
C	D3	Top	Top	231	35.3 x 23.6 x 16.2	897 x 599 x 411
C	D4	Top	Top	260	35.3 x 23.6 x 16.2	897 x 599 x 411
D	D4	Top	Top	355	45.7 x 26.7 x 16.0**	1160 x 678 x 406

*19.3 inch (490 mm) depth when internal reactor option is included.
**19.7 in (499 mm) depth when circuit breaker option is included.
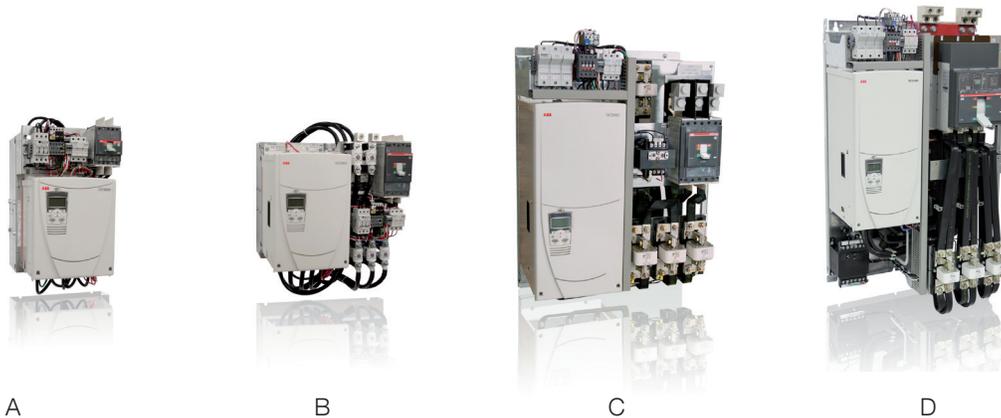
A B C D

Dimensions and Weights

Dimensions and Weights - Cabinet Drive

| Unit Size | Type Code | Power Connection | | Weight | | Dimensions | |
		In	Out	lb	kg	h x w x d (in)	h x w x d (mm)
D1	DCS800-PC	Top or Bottom	Top or Bottom	316	144	48 x 30 x 16	1219 x 762 x 406
D2	DCS800-PC	Top or Bottom	Top or Bottom	371	169	60 x 36 x 16	1524 x 914 x 406
D3	DCS800-PC	Top or Bottom	Top or Bottom	483	220	72 x 36 x 16	1829 x 914 x 406
D4	DCS800-PC	Top or Bottom	Top or Bottom	880	400	90 x 36 x 24	2286 x 914 x 610
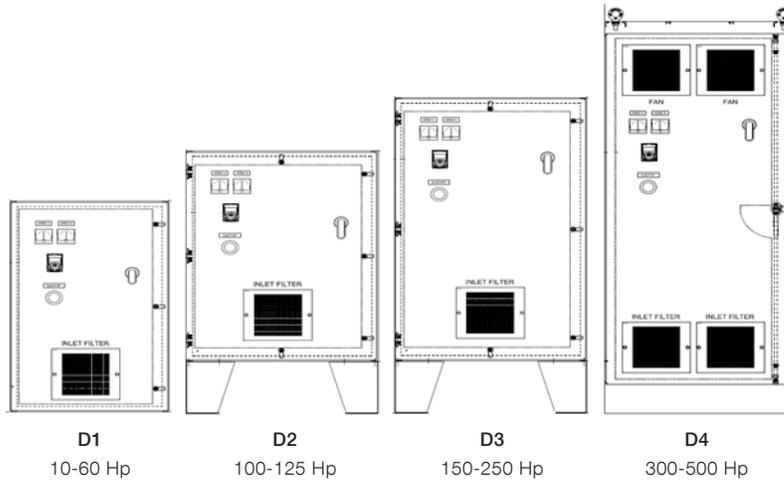
D1
10-60 Hp

D2
100-125 Hp

D3
150-250 Hp

D4
300-500 Hp

Dimensions and Weights - Cabinet Drive

| Unit Size | Type Code | Power Connection | | Weight | | Dimensions | |
		In	Out	lb	kg	h x w x d (in)	h x w x d (mm)
D5	DCS800-A0	Bottom	Bottom	1628	740	83.5 x 55.1 x 23.6	2120 x 1400 x 600
D6	DCS800-A0 (standard)	Bottom	Bottom	2750	1250	83.5 x 94.5 x 23.6	2120 x 2400 x 600
D6	DCS800-A0 (no circuit breaker)	Bottom	Bottom	2090	950	83.5 x 78.7 x 23.6	2120 x 2000 x 600
D7	DCS800-A0x-3300-05	Bottom	Bottom	2090	950	83.5 x 82.7 x 23.6	2120 x 2100 x 600
D7	DCS800-A0x-4000-05	Bottom	Bottom	2574	1170	83.5 x 106.3 x 23.6	2120 x 2700 x 600
D7	DCS800-A0x-5200-05	Bottom	Bottom	2640	1200	83.5 x 106.3 x 23.6	2120 x 2700 x 600

Note: Circuit breaker option on D7 units adds 31.5 in (800 mm) to the width

D5
600-1100 Hp

D6
1100-1750 Hp

D6 (no breaker)
1100-1750 Hp

D7
1750 Hp

D7
2250-3000 Hp

Technical Diagram

X3:1	90-270 VDC	
2	30-90 VDC	DC Tach Input
3	8-30 VDC	
4	GND	

115 VAC 1Ø (D1-D4)
230 VAC 1Ø (D4+ and D5)
460 VAC 3Ø (D6-D7)

X2:1	2	3	4	5
	Converter Fan			

X4:3	GND	
X3:5	AI-1-	analog in 1
X3:6	AI-1+	
X4:4	+10VDC	
X3:7	AI-2-	analog in 2
8	AI-2+	
9	AI-3-	analog in 3
10	AI-3+	
X4:1	AI-4-	analog in 4
2	AI-4+	

GND		X4:6
analog out 1	AO-1	7
analog out 2	AO-2	8

X5:1	Pulse Encoder Input
…	
9	
7	GND

digital inputs 1 - 8

X6:1	DI-1	drive fan ack
2	DI-2	motor fan ack
3	DI-3	main cont ack
4	DI-4	coast stop
5	DI-5	e-stop
6	DI-6	reset
7	DI-7	on-off
8	DI-8	start-stop
9	+24VDC	

digital outputs 1 - 8

fans on	DO-1	X7:1
field on	DO-2	2
	DO-3	3
	DO-4	4
	DO-5	5
	DO-6	6
	DO-7	7
	GND	8
main cont on	RO-8	X96:1
		2

X99:1	110-230 VAC
2	50/60 Hz 1-Phase

U1	LINE 1
V1	LINE 2
W1	LINE 3

ARM -		C
ARM +		D
FIELD -		X10:1
FIELD +		2

Frames D1 to D4 only

DCS800-S0x Module

3-wire control

X6:7	DI-7	run
8	DI-8	stop
9	+24VDC	

- **Digital Inputs and Outputs** can be freely configured by the user. This diagram shows the default settings with 2-wire control (maintained inputs). The drive can optionally be configured to accept 3-wire control (pulsed inputs).
- **RDIO-01 Digital Extension Module** adds three (3) isolated digital inputs and two (2) relay outputs. Up to two can be added providing a maximum of 14 digital inputs and 12 digital outputs.
- **RAIO-01 Analog Extension Module** adds two (2) isolated current/voltage analog inputs and two (2) isolated current analog outputs. One can be added providing a maximum of six (6) analog inputs and four (4) analog outputs.

Plug-in Options

1. Basic Control Panel

The DCS800 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 NEMA 4X (IP66) panel mount with 3m cable
        NEMA 12 panel mount with 3m cable (OPMP-01)

2. Plug-in Fieldbus Module

See "Fieldbus Control" section

Fast Optical DDCS Communication Module

This optional communications module gives the DCS800 the ability to communicate over fiber optics using ABB's DDCS communication protocol.

– 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 slot3

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

3. Drive-Specific Serial Communication Board

The SDCS-DSL-4 board provides the serial communication for:
– Drive to drive (e.g. master-follower)
– Drive to external field power supply
– 12-pulse applications
– Standard on D4+ and D5-D7

Plus code
+S199 SDCS-DSL-4 communication board

4. Field Power Supply

Sizes D1 through D4 drives have an internal field power supply. On Size D5, the field power supply is included as a US standard but can be omitted by dropping the plus code. Sizes D6 – D7 require an external field power supply.

Plus code
+S164 Internal field supply (D4+ and D5)

5. Control Builder

Control Builder is an optional, user-friendly tool for programming the DCS800 based on the IEC61131-3 standard. To include Control Builder with the drive, a compact flash memory card must be ordered with a plus code. Software for the PC is included with every drive. See page 29 for more information.

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

6. I/O Extension Option Module

The RAIO and RDIO plug-in options offer 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 configured 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 (isolated)
+L500 RAIO-01 Analog extension module 2xAI, 2xAO (isolated)

External isolated digital I/O modules are also available which replace the drive's non-isolated digital I/O.

Plus code
        24-48 Vdc Isolated I/O (8 DI, 8 DO) (SDCS-IOB-21)
        115 Vac Isolated I/O (8 DI, 8 DO) (SDCS-IOB-22)
        230 Vac Isolated I/O (8 DI, 8 DO) (SDCS-IOB023)

Feedback Options

Feedback Options

The DCS800 can be configured to work with a variety of feedback options to monitor motor and line speed. Together with the standard interface, the drive can read up to one tachometer and two encoders simultaneously. Resolvers can be used in place of encoders. "Encoderless" operation, using motor EMF as feedback, is also possible and an excellent choice in many applications.

Tachometer

The drive has a tachometer interface as standard for tachometers with maximum voltages of 8 to 270 Vdc. For AC tachometers with rectifiers, the drive has a filter to smooth out the signal going to the drive.

Pulse Encoders

The drive also has one encoder interface as standard, to operate with single-ended and differential pulse encoders. The non-isolated interface works with 5Vdc and 24Vdc devices, and also 12Vdc devices for drives over 1000 Amps (D5 and over).

A second pulse encoder interface (non-isolated) can be used with the addition of one of the RTAC pulse encoder interface adapters. The RTAC-03 is used for TTL encoders; the RTAC-01 is used for other types. To add an isolated pulse encoder interface, the IOB-03 can be used. The IOB-03 is separately mounted on DIN rail.

+L517   5 & 24 Vdc TTL encoder interface   (RTAC-03)
+L502   15 & 24 Vdc encoder interface   (RTAC-01)
        Analog and encoder I/O module   (SDCS-IOB-3)

Resolvers

Two options are available for resolver interface. The first option is for applications where the resolver is primarily used as a positioning device, a lifting table, for example. In this case, the RRIA-01 resolver interface adapter can be used. The RSCM-01 can also be used to double the resolver voltage to adapt it to the working range of RRIA-01.

+L516   Resolver interface adapter   (RRIA-01)
        Resolver signal conditioning mod. (RSCM-01)

When speed control is required, or whenever a premium interface is desired, the FEN-21 resolver interface adapter should be used. The FEN-21 provides an ultra-smooth speed feedback signal for optimal speed control. The FEN-21 is mounted to a DIN-rail extension adapter (FEA-01) which converts the feedback to a fiber optic signal and transmits it to the drive's COM-81 or COM-82 module. (Fiber optic cable and external 24Vdc supply also required.)

+L508   Fiber optic - standard   (COM-81)
+L509   Fiber optic - NETA   (COM-82)
external F-type resolver   (FEN-21)
external F-type extension adapter   (FEA-01)

FEN-21 resolver interface module mounted on a FEA-01 F-type extension adapter.

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 down time 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 protocols

Fieldbus	Plus Code	Kit
Profibus-DP	+K454	RPBA-01
DeviceNet	+K451	RDNA-01
CANopen	+K457	RCAN-01
ControlNet	+K462	RCNA-01
Modbus RTU	+K458	RMBA-01
Ethernet/IP, Modbus TCP	+K466	RETA-01
EtherCAT	+K469	RECA-01 (beta)
ProfiNet	+K467	RETA-02 (beta)

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-4 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-4 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 D4+ and the D5 Drive
The D5 drive with plus code +S164 has internal field supply FEX425-INT. This field supply should be seperately powered and requires its own line reactor as identified below. Maximum AC field input voltage is 500 Vac single- or three-phase power.

Field Supply Types

DCF803-0016, DCF803-0035 and FEX425
– Three-phase or single-phase operation
– Full-wave half-controlled 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
– Field Output voltage U_A (single-phase operation):

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

TOL = tolerance of line voltage in %
U_V = Line voltage
U_A = Field voltage

– Recommendation (single-phase operation):
U_A = 0.6 to 0.8 * U_V or U_V = 1.25 to 1.7 * U_A

– Field Output voltage U_A (three-phase operation):

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

TOL = tolerance of line voltage in %
U_V = Line voltage
U_A = Field voltage

– All field supplies except the FEX425 in the D5 drive require external fuses. This includes the FEX425 in the D4+ drive. See table on next page for selection.
– DCS800-DSL communications cable required.

Table of field converter units

Unit type	Output current I_{DC}	AC field supply voltage	Auxiliary supply voltage	Comments
DCF803-0016 DCF803-0035	0.3 to 16A 0.3 to 35A	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 DCF803-0016, DCF803-0035 needs external fusing
FEX425-INT	0.3 to 25A			
DCF803B-0050 DCF803B-0060	0.3 to 50A 0.3 to 60A	110V -15% to 500V**/1-ph +10%	115 or 230 V	Line reactor NOT required. (Internal line reactor included)
DCF804B-0050 DCF804B-0060	0.3 to 50A 0.3 to 60A	110V -15% to 500V**/1-ph +10%		External fusing required
DCS800-S0x-xxxx-05	25 to 520 A	200V. to 500V**/3-ph		Additional hardware components required for overvoltage protection (DCF506)

Notes:
* Up to 600 Vac with auto transformer
** Up to 690 Vac with auto transformer

External Field Supply

DCF803B-0050, DCF803B-0060

– Single-phase operation
– Full-wave half-controlled thyristor/diode bridge (1-Q)
– Internal line reactor included
– 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.
– Field Output voltage U_A :

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

TOL = tolerance of line voltage in %
U_V = Line voltage
U_A = Field voltage

– Recommendation:
    U_A= 0.6 to 0.8 * U_V or U_V = 1.25 to 1.7 * U_A

DCF804B-0050, DCF804B-0060

– Single-phase operation
– Full-wave fully-controlled regenerative thyristor bridge (4-Q)
– Internal line reactor included
– 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 fully-controlled mode.
– Same design as DCF503B, DCF504B
– Requires DCS800-DSL communications cable
– All external field supplies must be externally fused. See table below for selection
– DCS800-DSL communications cable required

External Field Supply AC Line Fuses

Field Supply	I_{field}	Fuse Single Phase	Fuse Three Phase
FEX425-INT DCF803-0035 DCF803B-0050 DCF804B-0050	6 Amps	FWP-10B	FWP-5B
	6 - 12 Amps	FWP-15B	FWP-10B
	12 - 25 Amps	FWP-25B	FWP-25B
	25 - 35 Amps	FWP-50B	FWP-30B
DCF803B-0050 DCF804B-0050	35 - 50 Amps	FWP-60B	-
DCF803B-0060 DCF804B-0060	50 - 60 Amps	FWP-70B	-

DCS800 as Field Supply

The DCS800-S0X Drive Module 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 $U_{dmax\ 2-Q}$: see table on page 5

– Recommendation:
    Field voltage = 0.5 to 1.1 * U_V

– **Overvoltage Protection Unit REQUIRED:** 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.

Overvoltage Protection Unit Selection Chart

Field supply converter for motor fields	Overvoltage protection
DCS800-S0x-0020-05	
...	DCF506-0140-51
DCS800-S0x-0140-05	
DCS800-S0x-0200-05	
...	DCF506-0520-51
DCS800-S0x-0520-05	

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 D4+, 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 reversing (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. DCS800 drives frames D4+ and D5-D7 include thyristor branch fuses which can protect the motor during a commutation (inversion) fault but thyristor or motor damage could still result. Use DC fuses or a high speed DC breaker for complete protection, especially for motors that regenerate routinely and on large motor drive systems.

Table of field converter units

| Type of Converter		Fuse	Fuse Holder	Fuse	Fuse Holder
2-Q Converter	4-Q Converter	North America		Worldwide	
DCS800-SO1-0020-05	DCS800-SO2-0025-05	FWP-50B	1BS101	170M 1564	OFAX 00 S3L
DCS800-SO1-0045-05	DCS800-SO2-0050-05	FWP-80B	1BS101	170M 1565	OFAX 00 S3L
DCS800-SO1-0065-05	DCS800-SO2-0075-05	FWP-125A	1BS103	170M 1568	OFAX 00 S3L
DCS800-SO1-0090-05	DCS800-SO2-0100-05	FWP-125A	1BS103	170M 1568	OFAX 00 S3L
DCS800-SO1-0125-05	DCS800-SO2-0140-05	FWP-200A	1BS103	170M 3815	OFAX 1 S3
DCS800-SO1-0180-05	DCS800-SO2-0200-05	FWP-250A	1BS103	170M 3816	OFAX 1 S3
DCS800-SO1-0230-05	DCS800-SO2-0260-05	FWP-300A	1BS103	170M 3817	OFAX 1 S3
DCS800-SO1-0315-05	DCS800-SO2-0350-05	FWP-500A	1BS104	170M 5810	OFAX 2 S3
DCS800-SO1-0405-05	DCS800-SO2-0450-05	FWP-700A	See Note 1	170M 6811	OFAX 3 S3
DCS800-SO1-0470-05	DCS800-SO2-0520-05	FWP-700A	See Note 1	170M 6811	OFAX 3 S3
DCS800-SO1-0610-05	DCS800-SO2-0680-05	FWP-900A	See Note 1	170M 6163	3X 170H 3006
DCS800-SO1-0740-05	DCS800-SO2-0820-05	FWP-900A	See Note 1	170M 6163	3X 170H 3006
DCS800-SO1-0900-05	DCS800-SO2-1000-05	FWP-1200A	See Note 1	170M 6166	3X 170H 3006
DCS800-SO1-0290-06	DCS800-SO2-0320-06	FWP-500A	1BS104	170M 5810	OFAX 2 S3
DCS800-SO1-0590-06	DCS800-SO2-0650-06	FWP-900A	See Note 1	170M 6813	OFAX 3 S3

Three (3) fuses and fuse holders are required for the AC side. DC fuses are required for 4-Q converters D1-D4. When needed, use 2 for the DC side.
Note 1: No fuse holder is available. Attach fuses directly to busbar.
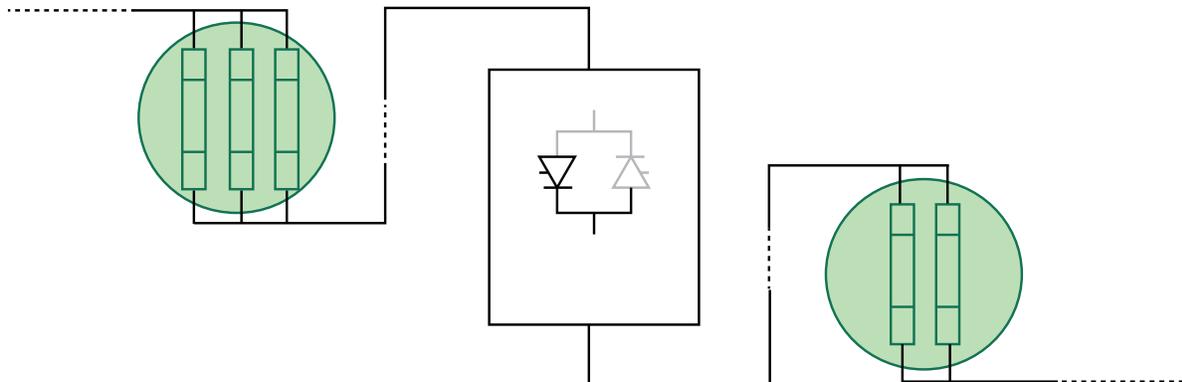
Line reactors

Unit Type		Line Choke for Config. A		Line Choke for Config. B
2Q Converters	4Q Converters	1.5% impedance	3% impedance	5% impedance
500 Vdc				
DCS800-S01-0020-05	DCS800-S02-0025-05	KLR21BTB	KLR21ATB	KLR21CTB
DCS800-S01-0045-05	DCS800-S02-0050-05	KLR45BTB	KLR45ATB	KLR45CTB
DCS800-S01-0065-05	DCS800-S02-0075-05	KLR80BTB	KLR80ATB	KLR80CTB
DCS800-S01-0090-05	DCS800-S02-0100-05	KLR110BCB	KLR110ACB	KLR110CCB
DCS800-S01-0125-05	DCS800-S02-0140-05	KLR130BCB	KLR130ACB	KLR130CCB
DCS800-S01-0180-05	DCS800-S02-0200-05	KLR200BCB	KLR200ACB	KLR200CCB
DCS800-S01-0230-05	--	KLR200BCB	KLR200ACB	KLR200CCB
--	DCS800-S02-0260-05	KLR250BCB	KLR250ACB	KLR250CCB
DCS800-S01-0315-05	DCS800-S02-0350-05	KLR300BCB	KLR300ACB	KLR300CCB
DCS800-S01-0405-05	--	KLR360BCB	KLR360ACB	KLR360CCB
DCS800-S01-0470-05	DCS800-S02-0450-05	KLR420BCB	KLR420ACB	KLR420CCB
--	DCS800-S02-0520-05	KLR480BCB	KLR480ACB	KLR480CCB
DCS800-S01-0610-05	DCS800-S02-0680-05	KLR600BCB	KLR600ACB	KLR600CCB
DCS800-S01-0740-05	DCS800-S02-0820-05	KLR750BCB	KLR750ACB	KLR750CCB
DCS800-S01-0900-05	--	KLR750BCB	KLR750ACB	KLR750CCB
--	DCS800-S02-1000-05	KLR850BCB	KLR850ACB	KLR850CCB
DCS800-S01-1190-05	DCS800-S02-1190-05	KLR1100BCB	KLR1100ACB	KLR1100CCB
DCS800-S01-1200-05B	DCS800-S02-1200-05	KLR1100BCB	KLR1100ACB	KLR1100CCB
DCS800-S01-1500-05B	DCS800-S02-1500-05	KLR1250BCB	KLR1250ACB	KLR1250CCB
600 Vdc				
DCS800-S01-0290-06	--	KLR250BCB	KLR250DCB	KLR250ECB
--	DCS800-S02-0320-06	KLR300BCB	KLR300DCB	KLR300ECB
DCS800-S01-0590-06	DCS800-S02-0650-06	KLR600BCB	KLR600DCB	KLR600ECB
DCS800-S01-0900-06B	DCS800-S02-0900-06	KLR750BCB	KLR750DCB	KLR750ECB
DCS800-S01-1500-06B	DCS800-S02-1500-06	KLR1250BCB	KLR1250DCB	KLR1250ECB

Note:
- 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
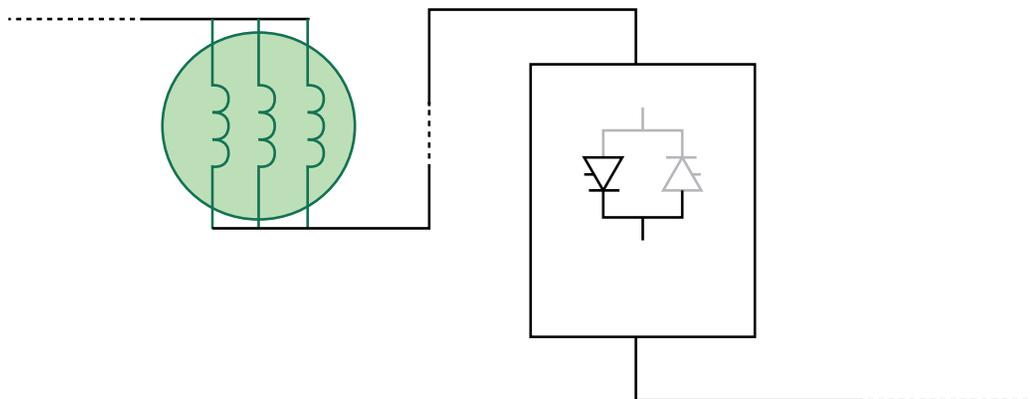
Input and Output Contactors

Unit Type		AC Input Contactors 3-Pole (NO)	DC Output Contactors 2-Pole (NO)	Dynamic Brake Contactors 2-NO & 1-NC
2Q Converters	4Q Converters			
500 Vdc				
DCS800-S01-0020-05	DCS800-S02-0025-05	A12-30-11-84	DA75-20-11-84	DA75-21-21-84
DCS800-S01-0045-05	DCS800-S02-0050-05	A30-30-11-84	DA75-20-11-84	DA75-21-21-84
DCS800-S01-0065-05	DCS800-S02-0075-05	A50-30-11-84	EHDB220C2P-1L	EHDB220C-1L
DCS800-S01-0090-05	DCS800-S02-0100-05	A75-30-11-84	EHDB220C2P-1L	EHDB220C-1L
DCS800-S01-0125-05	DCS800-S02-0140-05	A110-30-11-84	EHDB220C2P-1L	EHDB220C-1L
DCS800-S01-0180-05	DCS800-S02-0200-05	A145-30-11-84	EHDB220C2P-1L	EHDB220C-1L
DCS800-S01-0230-05	- -	A210-30-11-84	EHDB280C2P-1L	EHDB280C-1L
- -	DCS800-S02-0260-05	A210-30-11-84	EHDB280C2P-1L	EHDB280C-1L
DCS800-S01-0315-05	DCS800-S02-0350-05	A260-30-11-84	EHDB360C2P-1L	EHDB360C-1L
DCS800-S01-0405-05	- -	AF400-30-11-70	EHDB520C2P-1L	EHDB520C-1L
DCS800-S01-0470-05	DCS800-S02-0450-05	AF400-30-11-70	EHDB520C2P-1L	EHDB520C-1L
- -	DCS800-S02-0520-05	AF400-30-11-70	EHDB520C2P-1L	EHDB520C-1L
DCS800-S01-0610-05	- -	AF580-30-11-70	EHDB650C2P-1L	EHDB650C-1L
- -	DCS800-S02-0680-05	AF580-30-11-70	EHDB800C2P-1L	EHDB800C-1L
DCS800-S01-0740-05	- -	AF750-30-11-70	EHDB800C2P-1L	EHDB800C-1L
	DCS800-S02-0820-05	AF750-30-11-70	EHDB960C2P-1L	EHDB960C-1L
DCS800-S01-0900-05	- -	AF1350-30-11-70	EHDB960C2P-1L	EHDB960C-1L
- -	DCS800-S02-1000-05	AF1350-30-11-70	Bar Contactor	Bar Contactor
DCS800-S01-1190-05	DCS800-S02-1190-05	AF1350-30-11-70	Bar Contactor	Bar Contactor
DCS800-S01-1200-05B	DCS800-S02-1200-05B	AF1350-30-11-70	Bar Contactor	Bar Contactor
DCS800-S01-1500-05B	DCS800-S02-1500-05B	AF1650-30-11-70	Bar Contactor	Bar Contactor
600 Vdc				
DCS800-S01-0290-06	DCS800-S02-0320-06	A260-30-11-84	EHDB360C2P-1L	EHDB360C-1L
DCS800-S01-0590-06	DCS800-S02-0650-06	AF460-30-11-70	EHDB680C2P-1L	EHDB680C-1L
DCS800-S01-0900-06B	DCS800-S02-0900-06B	AF750-30-11-70	EHDB960C2P-1L	EHDB960C-1L
DCS800-S01-1500-06B	DCS800-S02-1500-06B	AF1650-30-11-70	Bar Contactor	Bar Contactor

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.
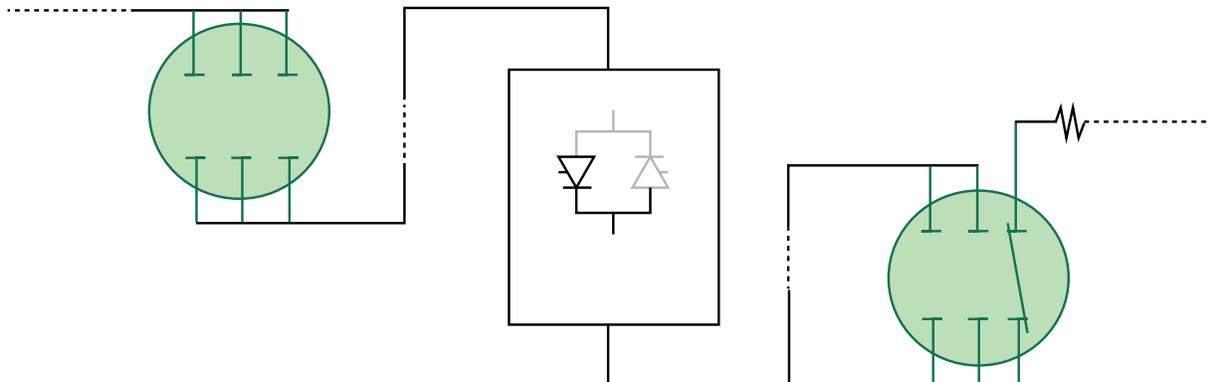
Either an AC or DC contactor is required, but not both.

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:
– Programming software for the PC
– Compact flash memory card
– Expanded library of functions

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. The MC is optional. One is required for each drive using Control Builder.

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. The library is included as standard with every DCS800 on the DCS800 Tools CD.

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 – Programming software is not connected to the drive. The application program can be written in the office and later downloaded to the drive.
– Off-line mode – Programming software 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 – Programming software 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 10.

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 the DCS800 and other ABB 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.
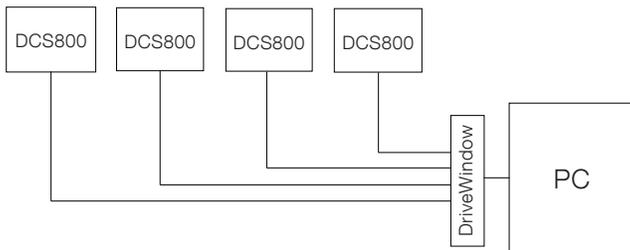
Monitoring Drives

Using DriveWindow you can monitor several drives simultaneously. The history buffer makes it possible to record a largeamount 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
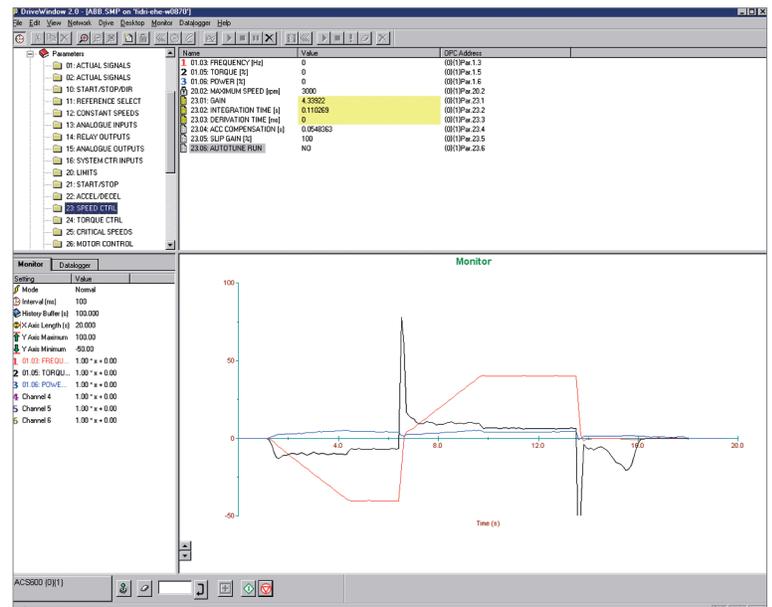
Start-up, maintenance and integration
DriveSize

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
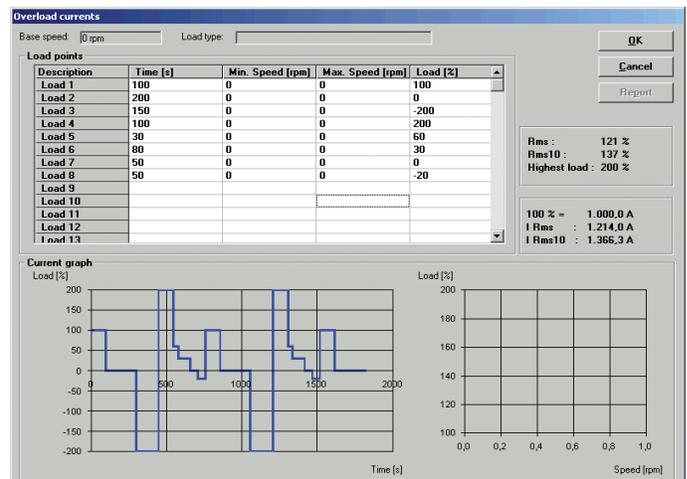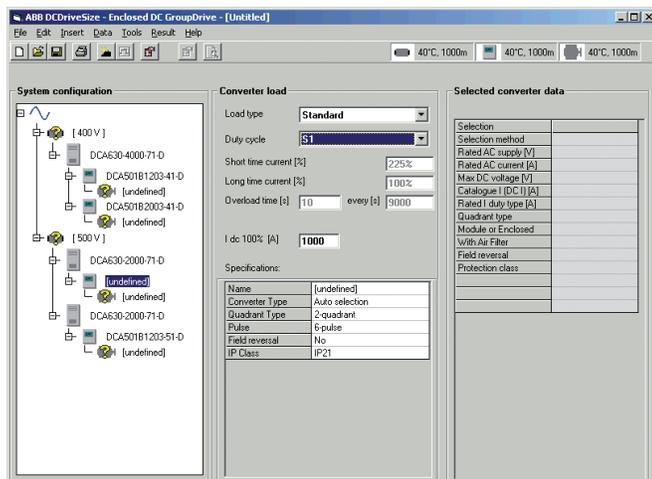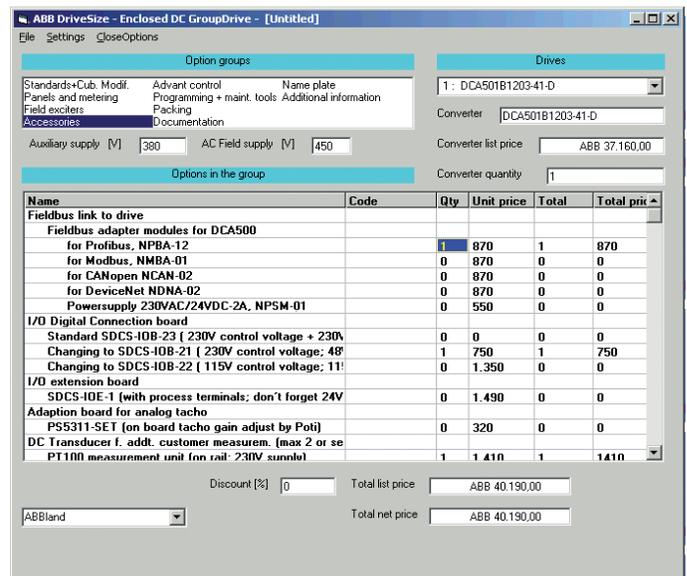
Start-up, maintenance and integration

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.

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

DriveBrowser
DriveBrowser allows parameter upload/download, editing and saving, monitoring up to four (4) signals from a single PC. Unique connections to networks of drives can be configured and saved. The user can assign user friendly names to each drive and save the network set-up for future connectivity.

This ABB drive PC software tool uses the PC's standard Ethernet port and existing fieldbus network as the communication media.

DriveBrowser supports connection to the DCS800 drive using these fieldbus adapters:
– Ethernet IP / Modbus TCP (RETA-01)
– ProfiNET (RETA-02)
– ControlNet (SECG-01)
– DeviceNet (SEDG-01)

DriveBrowser supports ABB's standard drives ACS350, ACS355, ACS550, ACH550, industrial drives ACS800 Standard Application firmware in addition to DCS800.

Remote monitoring access
Worldwide

Browser-Based, User-Friendly

The remote monitoring tool, NETA-21, gives easy access to the drive via the Internet or local Ethernet network. NETA-21 comes with a built-in web server. Being compatible with standard web browsers, it ensures easy access to a web-based user interface. Through the interface the user can configure drive parameters, monitor drive log data, and follow up load levels, run time, energy consumption, I/O data and bearing temperature of the motor connected to the drive.

The user can access the remote monitoring tool web page using 3G modem from anywhere with a standard PC, tablet or a mobile phone. The remote monitoring tool helps to reduce cost when personnel are able to monitor or perform maintenance for unmanned or manned applications in a range of industries. It is also very useful when more than one user wants to access the drive from several locations.

Enhanced monitoring functions

The remote monitoring tool supports process and drive data logging. Values of process variables or drives actual NETA-21 values can be logged to NETA-21´s SD memory card which is situated in the remote monitoring tool or sent forward to a centralized database. NETA-21 does not need an external database as the remote monitoring tool is able to store valuable data of the drive during its entire lifetime.

Unmanned monitoring of processes or devices is ensured by the built-in alarm functions that notify maintenance personnel if a safety level is reached. Alarm history with true time stamps are stored internally to the memory card as well as technical data, which is provided by the drive for troubleshooting purposes. True time stamps are also used with drives that do not have a real time clock as standard for ensuring events of all connected drives are synchronized.

The NETA-21 connects to the DCS800 using the NEXA-21 extension unit which mounts to the NETA-21. A fiber optic channel on the NEXA-21 connects to the DCS800 fiber optic interface adapter, SDCS-COM-81 or SDCS-COM-82.

Through the NETA-21, you can:
– monitor drives using standard web browser
– limit access with password protection
– read and adjust drive parameter values
– read status information and actual values from drives
– set up and monitor the data logger and save its content to a file
– read the contents of the fault log from monitored devices and save it to the memory
– send email messages on events
– use email for continuous monitoring of drives
– reset a fault on drives
– use an SD card for continuous monitoring of drives
– use an SD card to store all events
– use the FTP server for storing drive parameters and events
– create custom events
– create custom reports such as email reports, SD card reports and FTP reports

The NETA-21 is not intended for controlling or commissioning the drive. The NETA-21 provides stand-alone logging without a PC and automated data reporting to external data systems.

Drawings
DCS800-S01, S02 Power Modules D1-D5 Frames (500 Vdc)

Circuit Breaker
FLA x .816 x 1.25 (min)
FLA x .816 x 2.50 (max)

Motor Blower Overload
Size from motor data

Wire
FLA x.816 x 1.25

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

EMC Filter (Optional)
required to meet CE

EMC Filter

EMC Filter

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

Wire
1φ - 6 AWG
3φ - 8 AWG

AC Line Reactor*

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

AC Contactor
1φ - ABB A30-30-11-84
3φ - ABB A12-30-11-84

For D5, when line voltage
is greater than 400 VAC ±15%

AC fan power

DCS800

D1- D4   D5

AC control power
115 -230 Vac 1 phase

Field Power Supply
D1 - 6 Adc
D2 - 15 Adc
D3 - 20 Adc
D4 - 25 Adc
D5 - 25 Adc

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

M

Wire
FLA x 1.25

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

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

Drawings
DCS800-S01, S02 Power Modules D1-D5 Frames (600 Vdc and above)
DCS800 D6-D7 Frames (all voltages)

Circuit Breaker
FLA x .816 x 1.25 (min)
FLA x .816 x 2.50 (max)

Motor Blower Overload
Size from motor data

Wire
FLA x.816 x 1.25

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

EMC Filter (Optional)
required to meet CE

EMC Filter

AC field fusing*

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

Transformer required for 600V and above

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

DCS800

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

DCS800[1]
DCF503B-0050
DCF504B-0050
DCF803-0035[2]

External 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

AC fan power

Wire
FLA x1.25

M

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

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 _____

Spare Parts and Service Products

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.

Spare Part Services

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

http://www.online.abb.com

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.

www.abb.com/drives, then "Tools/Training"

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.

Genuine spare parts

Using genuine spare parts lets your drive operate as planned, leading to trouble-free operation of your plant or process.

Contact us

ABB Inc.
Discrete Automation & Motion
Drives and Controls
16250 W. Glendale Drive
New Berlin, WI 53151
Tel: (800) 752-0696

www.abb.us/drives

Power and productivity
for a better world™

ABB