Standard Features

- Flexible and modular hardware structure
- Line-ups and stand-alone cabinets
- Integrated automation system available
- 6- and 12-pulse configuration up to 18 MW / 23,000 HP
- Supply voltage from 230 V to 990 (1200) V

ABB DC drive
DCS800-A, 18 A to 9800/19600 A

Enclosed converters
DCS800-A Enclosed Converters

Latest Technology, High Performance and a User-Friendly Concept

DCS800-A are DCS800 converter modules mounted in an enclosure. The series is a complete range of enclosed converters intended for the supply and control of DC machines. DCS800-A provides maximum flexibility in the firmware, the drive itself is programmable as well as a serial communication (e.g. Profibus) interface plus 12-pulse parallel, serial and sequential.

DCS800-A enclosed converters are fully digital. Optional equipment is available to meet different safety standards. The converter can be used for standard applications but has the flexibility to be customized for the most demanding applications.

Comprehensive Product Range
DCS800-A enclosed converters are available as 6-/ 12-pulse and in 2- or 4-quadrant, with current ranges from 18 to 9800/19600 A and supply voltages of 230...990 (1200) V AC. A selection of options is available to provide the user with a system meeting the most demanding technical requirements and performance expectations. Common control electronics throughout the product range reduces spare parts inventory and training requirements.

DCS800-A Concept
- A single drive control technology is available for a wide power range to reduce training costs and meets the requirements of various applications.
- Common AC busbar designs for group drives are available for the most cost-efficient and functional system structure.
- Incoming supply section for group drives can be equipped with air circuit breakers or insulation switches.
- Control cubicles offer various I/O solutions in combination with ABB controls e.g. AC800M.
- Approval for many application specific standards (e.g. ABS, DNV, Loyd, UL, CSA) can be ordered as option.
- Flexible design of power cable entry provide simple installation and minimum power down time especially for upgrades.

Digital Control
To meet the most stringent control requirements, the DCS800-A features speed control, which reduces the effects from gear backlash and torsional vibration arising in mechanical systems.

What is a DCS800 DC drive?
The DCS800 DC Drive is simple to buy, install, configure and use, saving considerable time.
- Precise delivery
- Quick installation
- Rapid start-up

The drive has common user and process interface with fieldbus, common software tools for sizing, commissioning, maintenance and common spare parts.

Where can it be used?
DCS800 can be used in the wide range of all industrial application of
- Metals
- Pulp & Paper
- Material handling
- Test rigs
- Food & Beverage
- Printing
- Plastic & Rubber
- Vessels
- Ski lifts
- Magnets
- Mining
- Electrolysis
- Battery Chargers
- and more

DCS800 DC drive promises
The drive meet the requirement of all demanding drive application like: • testrig • mine hoist • rolling mill as well as none motoric applications like: electrolysis • magnetics • battery charger ...

Embedded software functions offer the upgrades of all classic installations 12-pulse, shared motion, double motor operation, field reversal control.

High-performance speed and torque control will fulfill all requirements for rapid response and high control accuracy. Autotuning for ar-
**Highlights**

- Assistant control panel providing intuitive use of the drive.
- Excellent control performance up to highest dynamic application in field weakening operation.
- All ACS800 PC tools (via DDCS) can be connected
- Reduced installation and commissioning work.
- Internal three phase field exciter without additional external hardware.
- Prepared for additional software function by adaptive programming and IEC61131 programming.
- Flexible fieldbus system with built-in Modbus and numerous internally mountable fieldbus adapters.

**Software Tools**

**Start-up assistant**

Faster and easier commissioning

The Start-up assistant serves in DCS800 DC Drives. It guides you actively through the commissioning procedure either by the control panel or ABB PC tools. It is multilingual, requests data with clear and plain text messages, and sets the required parameters to your needs. It also comes with an online info system with step-by-step reference to printed manuals.

**IEC 61131 programming**

ControlBuilder DCS800

The ControlBuilder is a user-friendly tool based on the IEC61131-3 standard for programming the DCS800. With the ControlBuilder it is possible to develop - in a fast and easy way - new function e.g. winders, decentralized controls, safety functions, ... directly in the drive.

**Fieldbus control**

Gateway to your process

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.

**Start-up and maintenance tool**

DriveWindow Light 2

PC tool for ABB drives

DriveWindow Light 2 is an easy-to-use start-up and maintenance tool for ABB drives. Supported drives are ACS140, ACS160, ACS350, ACH400, DCS400, ACS550, ACH550, DCS800 and ACS800.

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

**Start-up, maintenance and integration**

DriveWindow 2

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

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

**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 and commercial PC software and creating PC-based controlling and monitoring systems.
**Structure of line-ups**

**DCS800-A enclosed converters**
DCS800-A enclosed converters are suitable for three-phase supply voltages from 230 V to 990 (1200) V, 50 or 60 Hz. The rated DC current range is from 18 to 9800/19600 A.

DCS800-A enclosed converters with rated DC current from 18 A up to 1850 A are available in two different layouts:
- Single drive configuration without horizontal busbars (therefore AC cable connection)
- Group drive configuration with horizontal busbars (size depending on rated amps)

Group drives from sizes D6 and D7 on request.

DCS800-A can be tailored to meet different needs by using combinations of the following options:
- Earth Fault Detection (current sensitive)
- Insulation Monitor (voltage sensitive)
- Motor Fan Starter
- Galvanic Isolation of converter voltage measurement
- Cabinet design according to EMC-regulations
- EMC Filters
- Protection Class IP 21 - Standard
- Protection Class IP 31 with filter (insect screen) in air inlet and outlet
- Protection Class IP 42 with filter in air inlet; air outlet same as IP 21
- IP 54 on request
- Gland plate and bottom plate
- Special Colour (only outside) acc. to RAL standard
- Heater
- Lighting
- Horizontal Busbars

**Incoming Supply Sections for Group Drives only**
In the incoming supply section (DCA 63x) only busbars are used. The connection to the AC supply can be made by cables or busbars. The cable / busbar entry is at the bottom of the incoming supply section.

Cable or busbar connection for 1000 A AC and 2000 A AC is possible.

Cable connections for 3000 A AC and 4000 A AC are on request, busbar connection is standard.

The cabinets standard protection class is IP21.

**Basic design**
- Rated voltage: 400, 500, 600, 690 V
- Rated frequency: 50 or 60 Hz
- Rated current: 1000, 2000, 3000, 4000 A AC
- Short circuit ratings: 50 kA (1 sec.)
- $i_{dy} = 105$ kA (peak)

**Options**
- Cabinet design according to EMC-regulations
- Isolation Switch (DCA 631)
- Breaker (DCA 632)
- Earthing switch
- Residual Current Detection
- AC Current Measurement
- AC Voltage Measurement
- Arc Detecting Relay
- Emergency stop relays, tripping circuits

**Important!**
EN61800-3 (IEC 1800-3) standard requires the options
- Cable marking A2 plus

CE mark requires the options
- EMC procedure/part list check
- EMC filter or dedicated transformer (performed by the customer)

Imported!
**Field Exciters**

**Several Solutions available**

- Ratings from 6 to 450 A
- Integrated, separate or external
- 2-phase or 3-phase versions
- 1-, 2-, 4-Quadrant
- Digital control
- Auto/manual tuning

The field exciters are controlled via a serial DSL-link with a speed of 500 kBaud for fast and accurate control.

**Internal field exciters**

Field exciters from 6 A up to 25 A can be included in armature converter modules up to 500/525 V, 2000 A (Size D5).

On board field exciters are 3-phase half controlled field exciters in D1 up to D4 converter modules (525 V). These field exciters are directly supplied from mains circuit and do not require any autotransformer.

FEX425 field exciter is also a 25 A 3-phase half controlled unit assembled in a D5 converter module. It can be supplied directly from mains circuit or from a separate field supply voltage.

DCF803: 0050 A

2-phase, 1-quadrant, half controlled, outside the converter module. An autotransformer is optional to reduce voltage ripple in the field circuit by adapting the AC voltage to a suitable level.

DCF804: 0050 A

2-phase, 4-quadrant, full controlled, field exciter for field reversal. An autotransformer is optional to reduce voltage ripple in the field circuit by adapting the AC voltage to a suitable level.

DCS800-S01: 18...400 A

3-phase, 2-quadrant, full controlled, separate cabinet (22...285 A inside D6/D7 armature cabinet is possible)

DCS800-S02: 22...450 A

3-phase, 4-quadrant, full controlled, separate cabinet (22...300 A inside D6/D7 armature cabinet is possible)

**DCS800 Converter modules**

**Basic design**

All units are provided with the same digital control board and software. The DCS800 flexibility allows the user to configure functions of the drive easily, suitable for different applications. Functions of the DCS800 are normally activated by parameters.

The basic software includes following options:

- Speed monitor
- Drive control logic
- Remote/local operation
- Emergency stop
- Electronic circuits are not sensitive to line phase sequence
- Motor overload protection
- Dual field
- Programmable analogue outputs
- Field supply
- Master/follower via fibre optics
- 12-Pulse link

**Monitoring functions**

- Self-test
- Fault logger
- Motor protection
- Power converter protection
- Incorrect supply protection

**I/O’s of the converter module**

The I/O connections in the DCS800 converter modules are used for safety and other drive specific functions like emergency stop and motor temperature measurement:

- 1 analogue tachometer input
- 4 analogue inputs
- 2 voltage reference outputs
- 3 analogue outputs
- 1 actual armature current output
- 1 pulse encoder input (with IOB-3 isolated)
- 8 digital inputs
- 7 digital outputs

**DCA 650 Control Cabinet**

Advant controller AC 800 • Fieldbus interface FCI (AF100) • Location of full range of S800 I/O modules.

**Advant controller and S800 I/O System**

The S800 I/O system consists of the control module (AC 80 , FCI, AC 800M), digital and analogue I/O modules. The control module has a connection to several different bus systems and optical channels to connect the drives. The modules are attached to mounting rails (DIN).

**AF 100 field bus interface FCI**

Within this AF 100 interface up to 12 drives can be connected.

**Advant controller AC 800M**

Powerful controller with several fieldbus interfaces. Up to 12 drives can be connected with the optical module bus.

The above mentioned control modules can also handle up to 12/24 I/O modules.

**Digital inputs and outputs**

- 8 channels • input voltages from 24V...250V
- 8 channels

**Analogue inputs and outputs**

- (12 bit resolution)

**Engineering Tool for Individual Programming**

The Advant controllers (AC 800M) are programmable controllers using ControlIT Control Builder.

- Graphical editor for creating and modifying program diagrams
- Function-oriented engineering
- Windows-based application programming
- Online editing
- Constant and parameter value changes
- Connection changes
- Deleting/Inserting function blocks or tasks
- Program downloading to AC 800M
- Temporary change of input terminal values
- Displaying actual values at terminals

**I/O's of the converter module**

The I/O connections in the DCS800 converter modules are used for safety and other drive specific functions like emergency stop and motor temperature measurement:

- 1 analogue tachometer input
- 4 analogue inputs
- 2 voltage reference outputs
- 3 analogue outputs
- 1 actual armature current output
- 1 pulse encoder input (with IOB-3 isolated)
- 8 digital inputs
- 7 digital outputs

**DCA 650 Control Cabinet**

Advant controller AC 800 • Fieldbus interface FCI (AF100) • Location of full range of S800 I/O modules.
### Table 1: DCS800-A Types

<table>
<thead>
<tr>
<th>Voltage class:</th>
<th>400 V...525 V</th>
<th>600 V...690 V</th>
<th>600 V...1000 V</th>
<th>800 V...990 V</th>
<th>990 V...1200 V</th>
</tr>
</thead>
</table>

#### Power Supply Voltage

- **400 V...525 V:** 3000 A at 7%<br>3300 A at 13%<br>7000 A at 100%<br>
- **600 V...690 V:** 3000 A at 7%<br>3300 A at 13%<br>7000 A at 100%<br>
- **600 V...1000 V:** 3000 A at 7%<br>3300 A at 13%<br>7000 A at 100%<br>
- **800 V...990 V:** 3000 A at 7%<br>3300 A at 13%<br>7000 A at 100%<br>
- **990 V...1200 V:** 3000 A at 7%<br>3300 A at 13%<br>7000 A at 100%<br>

#### Load current (I<sub>LOAD</sub>)

- **400 V...525 V:**
  - DC I:<br>  - DC II:<br>  - DC III:<br>
- **600 V...690 V:**
  - DC I:<br>  - DC II:<br>  - DC III:<br>
- **600 V...1000 V:**
  - DC I:<br>  - DC II:<br>  - DC III:<br>
- **800 V...990 V:**
  - DC I:<br>  - DC II:<br>  - DC III:<br>
- **990 V...1200 V:**
  - DC I:<br>  - DC II:<br>  - DC III:<br>

#### Enclosed 3-phase Field exciters

- **525 V:**
  - DC I:<br>  - DC II:<br>  - DC III:<br>
- **600 V:**
  - DC I:<br>  - DC II:<br>  - DC III:<br>
- **800 V:**
  - DC I:<br>  - DC II:<br>  - DC III:<br>
- **990 V:**
  - DC I:<br>  - DC II:<br>  - DC III:<br>
- **1200 V:**
  - DC I:<br>  - DC II:<br>  - DC III:<br>

#### Selecting the DC800-A Type

Select the DC800-A type from Table 1, according to the nominal supply voltage and the rated DC current.

#### DCS800-A Enclosed Converters

DCS800-A enclosed converters are suitable for three-phase supply voltages from 230...990 (1200) V AC 50 or 60 Hz.
Dimensions Converter cabinet

<table>
<thead>
<tr>
<th>DC-Converter, Size D1</th>
<th>Height (mm)</th>
<th>Depth (mm)</th>
<th>Width (mm)</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC-Converter, Size D4</td>
<td>Height (mm)</td>
<td>Depth (mm)</td>
<td>Width (mm)</td>
<td>Weight (kg)</td>
</tr>
<tr>
<td>DC-Converter, Size D5</td>
<td>Height (mm)</td>
<td>Depth (mm)</td>
<td>Width (mm)</td>
<td>Weight (kg)</td>
</tr>
<tr>
<td>DC-Converter, Size D6</td>
<td>Height (mm)</td>
<td>Depth (mm)</td>
<td>Width (mm)</td>
<td>Weight (kg)</td>
</tr>
<tr>
<td>DC-Converter, Size D7</td>
<td>Height (mm)</td>
<td>Depth (mm)</td>
<td>Width (mm)</td>
<td>Weight (kg)</td>
</tr>
</tbody>
</table>

Fan data

<table>
<thead>
<tr>
<th>Fan type</th>
<th>Air volume freely blowing (m³/h)</th>
<th>Converter size</th>
</tr>
</thead>
</table>

Notes:

All dimensions are in mm. Please add for each end panel 15 mm and for a door (without buttons) 20 mm

1. Height is including detachable hood (120 mm)
2. with circuit breaker or contactor
3. without circuit breaker or contactor
4. DC800-A with AC supply voltage 3 x 800 V...1200 V or current ≥3300 A are generally without circuit breaker.
5. Max length of a shipping split is 3.40 m, if the line-up width is longer than 3.40 m busbar joining cabinets are required.
6. at 600 V (6) and 690 V (7) only available as Q-converter
7. z: Weight for busbars: 1000 A/2000 A=35kg/m; 3000 A=70kg/m
8. The air circuit breaker stands out of the line-up's front.
9. Thus 78 mm have to be added to the total depth of the line-up.
10. Listed width for cable connection reduced width for busbar connection on request
11. DCA 632 rated current as IEC rating 3000 A UL type on request

Table 2: Dimensions of the DCS800-A series.

<table>
<thead>
<tr>
<th>Voltage class: (example: DCS800-A0x-0025-04y-D)</th>
<th>04 400V</th>
<th>05 500/525V</th>
<th>06 600V</th>
<th>07 690V</th>
</tr>
</thead>
<tbody>
<tr>
<td>08 800V</td>
<td>10 980V</td>
<td>12 1200V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P = hard parallel (two conv. mod. in parallel) u=s incoming, without options
DCS800 family

DCS800-S modules
The versatile drive for any application

- Compact
- Highest power ability
- Simple operation
- Comfortable assistants, e.g. for commissioning or fault tracing
- Scalable to all applications
- Free programmable by means of integrated IEC61131-PLC

<table>
<thead>
<tr>
<th>Current (DC)</th>
<th>Voltage (DC)</th>
<th>Voltage (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 A</td>
<td>5,200 V</td>
<td>1,160 V</td>
</tr>
<tr>
<td>0 A</td>
<td>1,160 V</td>
<td>1,000 V</td>
</tr>
<tr>
<td>230 A</td>
<td>1,200 V</td>
<td>1,000 V</td>
</tr>
</tbody>
</table>

IP00

DCS800-A enclosed converters
Complete drive solutions

- Individually adaptable to customer requirements
- User-defined accessories like external PLC or automation systems can be included
- High power solutions in 6- and 12-pulse up to 20,000 A, 1,500 V
- In accordance to usual standards
- Individually factory load tested
- Detailed documentation

<table>
<thead>
<tr>
<th>Current (DC)</th>
<th>Voltage (DC)</th>
<th>Voltage (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 A</td>
<td>20,000 V</td>
<td>1,500 V</td>
</tr>
<tr>
<td>0 A</td>
<td>1,500 V</td>
<td>1,200 V</td>
</tr>
<tr>
<td>230 A</td>
<td>600 V</td>
<td>1,000 V</td>
</tr>
</tbody>
</table>

IP21 – IP54

DCS800-E series
Pre-assembled drive-kits

- DCS800 module with all necessary accessories mounted and fully cabled on a panel
- Very fast installation and commissioning
- Squeezes shut-down-times in revamp projects to a minimum
- Fits into Rittal cabinets
- Compact version up to 450 A and Vario version up to 2,000 A

<table>
<thead>
<tr>
<th>Current (DC)</th>
<th>Voltage (DC)</th>
<th>Voltage (AC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 A</td>
<td>2,000 V</td>
<td>700 V</td>
</tr>
<tr>
<td>0 A</td>
<td>(29,584),(92,589)</td>
<td>1,000 V</td>
</tr>
<tr>
<td>230 A</td>
<td>600 V</td>
<td>1,000 V</td>
</tr>
</tbody>
</table>

IP00

DCS800-R Rebuild Kit
Digital control-kit for existing powerstacks

- Proven long life components are re-used, such as power stacks, (main) contactors, cabinets and cabling / busbars, cooling systems
- Use of up-to-date communication facilities
- Increase of production and quality
- Very cost-effective solution
- Open Rebuild Kits for nearly all existing DC drives
tailor-made solutions for...

- BBC PxD
- BBC SZxD
- ASEA TYRAK
- other manufacturers

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