Welcome to the DCS800 product portfolio training module for the DCS800, ABB DC Drives.

If you need help navigating this module, please click the Help button in the top right-hand corner. To view the presenter notes as text, please click the Notes button in the bottom right corner.
Objectives

This training module covers:

- Power range of DCS800
- DCS800 Basic Package
- Firmware features
- DCS800 Control Panel
The practical requirements for modern DC Drives are extremely diverse. On the one hand operation and handling should be easy while on the other hand almost perfect functionality and performance for all different applications is expected. The challenge is to find an innovative solution which copes with both of them - the solution is DCS800.

This training is made to give an overview about the simplicity, scalability, programmability, hardware, firmware, options and performance of the DCS800.
The DCS800 has a power range from 9 kW to 5 MW in single converter modules. All converter modules are fitted with identical control boards called SDCS-CON-4. The optional communication board called SDCS-COM-8 is identical as well. Therefore the inventory of spares is minimized if a customer is using drives for different sizes.

The modules size D1 to D4 have a current range from 20 ADC to 1000 ADC with standard supply voltages of 400 VAC and 525 VAC. 600 VAC types are also available.

The modules size D5 have a current range from 900 ADC to 2000 ADC with standard supply voltages of 400 VAC, 525 VAC, 600 VAC and 690 VAC.

The modules size D6 have a current range from 1900 ADC to 3000 ADC with standard supply voltages of 400 VAC, 525 VAC, 600 VAC, 690 VAC and 800 VAC.

The modules size D7 have a current range from 2050 ADC to 5200 ADC with standard supply voltages of 400 VAC, 525 VAC, 600 VAC, 690 VAC, 800 VAC, 990 VAC and 1200 VAC.

Single modules over 3300 ADC is the specialty of ABB. ABB is the worlds only manufacturer with single module sizes over 3300 ADC. ‘Hard paralleling’ of several drive modules is only needed for currents over 5200 ADC.
The modules D1 to D4 come with the standard firmware including macros and Adaptive Program. Macros and Adaptive Program are used to adapt the DCS800 easy and quickly to every application.

The Startup Assistant helps to shorten the start-up time by means of a guided commissioning.

Worldwide acceptance is taken care of by fulfilling the approvals CE for the European market and cULus for the north American market.

For high quality all printed circuit boards are coated as standard.

Modules of size D1 to D4 can work with supply voltages up to 525 VAC plus 10 % minus 15 % and provide currents up to 1000 ADC. A 600 VAC supply voltage is possible for some modules size D3 and D4.

Modules of size D1 to D4 have an OnBoard field exciter. The field exciter is integrated on the SDCS-PIN-4. Thus fuses, line chokes, contactor and supply voltage for the field exciter can be dropped. Modules for 600 VAC cannot utilize the OnBoard field exciter, since it is not possible to use the OnBoard field exciter with supply voltages over 525 VAC.

The easy-to-use DCS800 Control Panel is included in the standard scope of delivery, and it is known from the ACS550 and ACS350.

The standard I/O come with connection for an analog tacho, inputs for a pulse encoder, 4 analog inputs, 3 analog outputs, 8 digital inputs, 7 digital outputs plus one additional digital output with a relay to control the main contactor. It is also possible to connect one PTC for motor temperature supervision. All analog inputs are converted with 16 bits.
The DCS800 has the same terminal layout as DCS 500 or DCS 600 for easy upgrading.

The commissioning and service tool DriveWindow Light is standard and delivered free of charge with every drive.
The module D5 comes with the standard firmware including macros and Adaptive Program.

The Startup Assistant helps to shorten the start-up time by means of a guided commissioning.

Worldwide acceptance is taken care of by fulfilling the approvals CE for the European market and cULus for the north American market.

For high quality all printed circuit boards are coated as standard.

Modules of size D5 can work with supply voltages up to 690 VAC plus 10 % minus 10 % and provide currents up to 2000 ADC.

Modules of size D5 can have an optional internal field exciter with can provide up to 25 A field current. The field fuses are integrated too. Line chokes, field contactor and supply voltage have to be provided externally.

Each DCS800 module comes with an easy-to-use DCS800 Control Panel known from the ACS550 and ACS350.

The standard I/O come with connection for an analog tacho, inputs for a pulse encoder, 4 analog inputs, 3 analog outputs, 8 digital inputs, 7 digital outputs plus one additional digital output with a relay to control the main contactor. It is also possible to connect one PTC for motor temperature supervision.

The DCS800 has the same terminal layout as DCS 500 or DCS 600 for easy upgrading.

To be able to connect field exciters a SDCS-DSL-4 board is standard and provides the DCSLink.

The commissioning and service tool DriveWindow Light is standard and delivered free of charge with every
drive.
The module D6 comes with the standard firmware including macros and Adaptive Program. The Startup Assistant helps to shorten the start-up time by means of a guided commissioning. Worldwide acceptance is taken care of by fulfilling the approvals CE for the European market and cULus for the north American market. For high quality all printed circuit boards are coated as standard. Modules of size D6 can work with supply voltages up to 800 VAC plus 10 % minus 10 % and provide currents up to 3000 ADC. Modules of size D6 have to be connected to an external field exciter via a SDCS-DSL-4 board. Each DCS800 module comes with an easy-to-use DCS800 Control Panel known from the ACS550 and ACS350. The standard I/O come with connection for an analog tacho, inputs for a pulse encoder, 4 analog inputs, 3 analog outputs, 8 digital inputs, 7 digital outputs plus one additional digital output with a relay to control the main contactor. It is also possible to connect one PTC for motor temperature supervision. The DCS800 has the same terminal layout as DCS 500 or DCS 600 for easy upgrading. To be able to connect field exciters a SDCS-DSL-4 board is standard and provides the DCSLink. The commissioning and service tool DriveWindow Light is standard and delivered free of charge with every drive.
The module D7 comes with the standard firmware including macros and Adaptive Program.

The Startup Assistant helps to shorten the start-up time by means of a guided commissioning.

Worldwide acceptance is taken care of by fulfilling the approvals CE for the European market and cULus for the north American market.

For high quality all printed circuit boards are coated as standard.

Modules of size D7 can work with supply voltages up to 1200 VAC plus 10 % minus 10 %.

The largest amount of current a module size D7 can provide is 5200 ADC.

Modules of size D7 have to be connected to an external field exciter via a SDCS-DSL-4 board.

Each DCS800 module comes with an easy-to-use DCS800 Control Panel known from the ACS550 and ACS350.

The standard I/O come with connection for an analog tacho, inputs for a pulse encoder, 4 analog inputs, 3 analog outputs, 8 digital inputs, 7 digital outputs plus one additional digital output with a relay to control the main contactor. It is also possible to connect a PTC for motor temperature supervision.

The DCS800 has the same terminal layout as DCS 500 or DCS 600 for easy upgrading.

To be able to connect field exciters a SDCS-DSL-4 board is standard and provides the DCSLink.

The commissioning and service tool DriveWindow Light is standard and delivered free of charge with every drive.
The DCS800 family includes:

- six pulse standard converter modules with one bridge for 2 quadrant operation and two anti parallel bridges for 4 quadrant operation,

- cabinets available in classes IP 21, IP 22, IP 31 and IP 41,

- drive modules on a backplate with all needed accessories to be mounted in an empty cabinet for example from Rittal or old drives cabinets for Tyraks and GE

- modernization packages for obsolete ABB DC dives and re-usable power stacks.
The same standard firmware is used in all sizes DCS800 regardless if the unit is used as armature converter, field exciter or stand-alone unit for example in a non motoric application. The change is simply done by setting parameters.

The DCS800 firmware includes a wide range of functions including several new features:

To adapt the DCS800 to almost every application the Adaptive Program is used.

All controllers can be tuned automatically this includes:

- the field current controller,
- the armature current controller,
- the speed feedback assistant
- the speed controller,
- the EMF controller and
- the flux linearization.

The DCS800 can communicate directly with each other via the drive-to-drive communication using the DCSLink.

Each DCS800 can fully control 2 field exciters that includes field weakening for both field exciters.

It is possible to store and access the parameters for two different motors in one parameter file. This is for example needed for shared motion.

Several Macros are available to adapt the DCS800 easy and quickly to common applications.
The Adaptive Program is based on parameters. Therefore, it is automatically coming with the standard firmware and is ready to go in every DCS800. No additional hardware or software is needed to use the Adaptive Program.

Programming is possible by simply setting parameters either with the DCS800 Control Panel, DriveWindow, DriveWindow Light or the visualization tool DWL AP.

Each drive has 16 function block available for programming and each function block can be changed to one of the 35 functions of the library.

With the Adaptive Program it is possible to create for example signals, faults and alarms. Thus, the DCS800 firmware can be adapted to the needs of most applications - motoric and non-motoric.

DWL AP is a tool to visualize, create, document, edit, save and download Adaptive Programs. DWL AP is integrated into DriveWindow Light and comes free of charge with every drive.
Since the DCS800 firmware includes a wide range of functions over 1000 parameters are needed. On the first view this is frightening, but experience shows that usually only 20 to 40 parameters are used, even for more complicated applications.

To speed up the commissioning process and to help the commissioning engineer with the right commissioning sequence the DSC800 provides a modular startup assistant. The modular startup assistant compounds of the six wizards shown on the current slide.

To utilize the startup assistant either the DCS800 Control Panel or DriveWindow Light has to be used.

In DriveWindow Light simply press the ‘Wizard’ button to start the assistants.

The assistant overview page is called. It is possible to choose one or several assistants by ticking their box or start the commissioning by means of the Start button.

Now the slide ‘Name plate data’ is called. Here it is possible to fill in the name plate data of the motor and the most important protections. In case of problems simply call the online help by pressing the help button.

Pushing the help button displays context sensitive help. With the hyperlinks in the help page it is possible to get to the parameter descriptions. Additionally, the function of all buttons on the page ‘Name plate data’ are explained.
The OnBoard field exciter is integrated on the printed circuit boards of the DCS800. Thus, it is possible to supply the DCS800 with only 3 wires. For the output 4 wires are needed, two for the armature and two for the excitation. This principle 3 wires in and 4 wires out is available for drives up to 1000 ADC - module sizes D1 to D4 - and for incoming voltages up to 525 VAC. The OnBoard field exciter is connected in parallel to the armature converter.

This is the classic connection as used for the DCS 600. The field exciter has its own transformer, breakers, fuses, line chokes and wiring.

The DCS800 features the OnBoard field exciter consisting of a thyristor-based half controlled 3-phase bridge. The OnBoard field exciter is connected together with the armature to the mains supply. This cuts out the need for the extra field exciter hardware, the wiring and of course its mounting and testing. Also, the ordering process is shortened because the OnBoard field exciter is part of the basic package.

Since the OnBoard field exciter is connected to all three phases the field voltage ripple is very small, especially compared to one phase systems. A smooth field voltage is not only good for the brushes and smooth commutation also autotransformers are not needed anymore. For example, with an incoming voltage of 525 VAC a field voltage of 90 VDC or lower is possible.

If the OnBoard field exciter is not needed it is possible to deselect it via parameter setting.

The maximum field current is depending on the cooling and thus depending on the module size. See table on the current slide.
The compact and easy to use DCS800 Control Panel is included in the standard scope of delivery, and it is known from the ACS550 and ACS350.

The large display is divided into three areas:

- The top line is variable depending on operation, for example local mode or remote mode.
- The middle area is variable and shows - in general - signals, parameters menus and lists.
- The bottom line shows the function of the two soft keys and the time.

For cabinets two different door mounting kits including cable are available. One door mounting kit features a click in possibility, whereas the other features a fixed panel connection to the cabinet door.

On the right and left bottom corners of the display two soft keys are shown. Both soft keys have variable functions depending on the text displayed.

The key with the question mark displays context sensitive help, for example in case of faults and alarms.

The local / remote key changes between local mode and remote mode.

The arrow up and arrow down keys scroll through lists, increases and decreases the speed reference and are used to set parameter values.

The start and stop keys start and stop the unit in local mode.

The DCS800 Control Panel is multilingual and uses for example English, French, German, Italian and Spanish.

The Startup Assistant and the Adaptive Program can be accessed by the DCS800 Control Panel.

Fault- and alarm messages are shown in plain text as well as up to 20 events which are stored in the fault logger.

The actual values are shown in physical units or percent depending on the displayed signal.

All parameter sets, including user 1 and user 2, can be saved in the DCS800 Control Panel and copied to other drives. For service purposes it is possible to compare the actual used parameter set of the DCS800 with the default parameter set and the differences are shown in the DCS800 Control Panel.

Finally, the DCS800 Control Panel has a real time clock which can be shown on the display.
Key points of this module are:

- Power range of DCS800
- DCS800 Basic Package
- Firmware features
- DCS800 Control Panel
Power and productivity for a better world™