DCS880

Release note
Firmware version: DCSF1x2.07.5.0
Cyber security included

	Released	Beta
Field reversal	X	
12-pulse	X	
Hardparallel	X	
Large field exciter	X	
Motor temperature measurement	X	
Safety functions (FSO-21 and FSE-31)		X

ABB

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This firmware version, bootloader version and unit logic version:
− Firmware version 2.07.5.0 (see 07.05 Firmware version) for SDCS-CON-H01 on electronic unit DCS880/DCT880 (3ADT220166R0002).
− Bootloader version 2.80.0.0 (see 07.08 Bootloader version) for cyber security.
− Control unit logic version 10.16.0.0 in the FPGA on the SDCS-CON-H01 (see 07.13 Control unit logic version).
− Power unit logic version 10.16.0.0 in the FPGA on the SDCS-OPL-H01 connected to channel 1 … 4 of the SDCS-DSL-H1x (see 07.14 … 07.17 Chx power unit logic version).

This firmware replaces:
All releases of 2.07.4.0 and lower.

This firmware is released for following hardware:
Safe **T**orque **O**ff (STO) for H1 … H8.
DCS880-S0x, all modules sizes (H1 … H8):
− Rated DC current from 20 … 5200 A.
− Rated AC voltage 100 V_{AC} … 1190 V_{AC}.
DCS880-S01 (single bridges) size H8 for alternate firing:
− DCS880-S01-5230-05 good for 5200 ADC continuous current when built in a cabinet (beta).
− DCS880-S01-5230-07 good for 5200 ADC continuous current when built in a cabinet (beta).
− DCS880-S01-5230-08 good for 5200 ADC continuous current when built in a cabinet (beta).
− DCS880-S01-4830-10 good for 4800 ADC continuous current when built in a cabinet (beta).
Drive-to-drive link.
OnBoard field exciter.
External/Internal field exciter:
− DCF803-0016.
− FEX-425-Int, only for module sizes H5 and H6.
− DCF803-0035.
− DCF803-0050/0060.
− DCF804-0050/0060.
− DCS880-S0x as large field exciter.
DCS880-R for rebuild projects (beta).
DCS880-U for upgrade projects (beta).
Large DC Drives:
− 12-pulse parallel.
− 12-pulse serial/sequential.
− Hardparallel converters (max. 3 hardparallel power units).
− Large field exciter operation.
Memory unit:
− Standard.
− Drive application programming with Drive Application Builder 1.0.0.319 or higher (drive application programming in the Automation Builder is not supported anymore).
Control panel:
− ACS-AP-I with panel firmware 5.80 or higher.
− ACS-AP-W (Bluetooth) with panel firmware 5.80 or higher.
Daisy chain adapter for panel bus:
− DPI-H01 kit.
Door mounting kits:
− DPMP-01 and DPMP-02.
Fieldbus adapter modules:
− FPBA-01, PROFIBUS DP, DPV0/DPV1.
− FCAN-01, CANopen®.
− FDNA-01, DeviceNet™ (beta).

- FENA-11, 1 port EtherNet/IP™, Modbus TCP, PROFINET IO. **Note:** This fieldbus adapter module is obsolete and not supported anymore.
- FENA-21, 2 port EtherNet/IP™, Modbus TCP, PROFINET IO. **Attention:** In case ODVA is used, internal fieldbus adapter parameters need to be validated after a speed feedback autotuning. When using 99.20 Tuning request = Speed feedback assistant, validate the internal fieldbus adapter parameters by setting either 51.27 FBA A par refresh = Refresh or 54.27 FBA B par refresh = Refresh.
- FECA-01, EtherCAT®.
- FSCA-01, Modbus RTU.
- FEPL-02, PowerLink (beta).
- FPNO-21, PROFINET IO.
- FMBT-21, Modbus TCP (beta).
- FEIP-21, 2 port EtherNet/IP™. **Attention:** In case ODVA is used, internal fieldbus adapter parameters need to be validated after a speed feedback autotuning. When using 99.20 Tuning request = Speed feedback assistant, validate the internal fieldbus adapter parameters by setting either 51.27 FBA A par refresh = Refresh or 54.27 FBA B par refresh = Refresh.
- FSPS-21 for PROFIsafe via PROFINET IO (beta). Available functions:
  - STO via PROFIsafe (beta).
  - SS1-t Via PROFIsafe (beta).

Attention:

Supported fieldbus profiles:
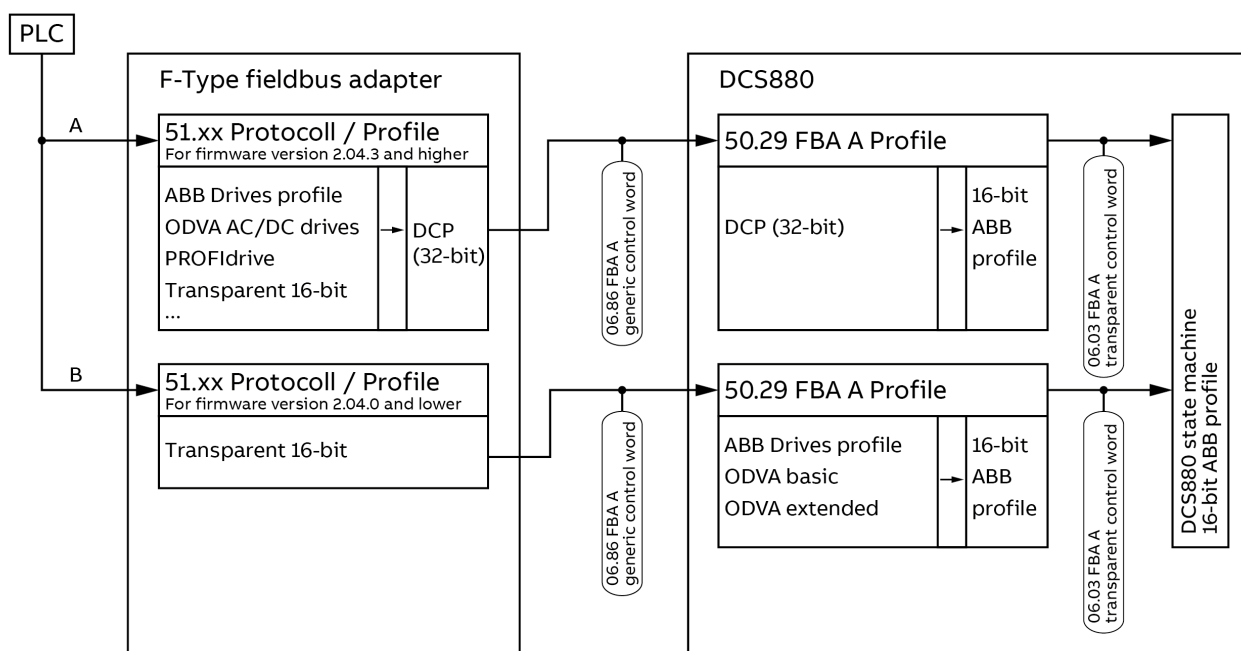
SB_880_031_profile_b.ai

- A: Full fieldbus functionality like ACS880 (see 51.xx Protocol/Profile) additionally set 50.29 FBA A Profile = DCP.
- B: **Not** supported for firmware version 2.04.3.0 and higher.
  DC specific solution with limited functionality with Transparent 16-bit (see 51.xx Protocol/Profile) additional set 50.29 FBA A Profile = ABB Drive profile.
  Only following instances work:
    - Instance 11 instance 61.
    - Instance 12 instance 62.
    - Instance 111 instance 161.
    - Instance 112 instance 162.

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I/O Extension modules:
− FIO-01, 4 DIO, 2 RO.
− FIO-11, 3 AI (mA/V), 1 AO (mA), 2 DIO.
− FAIO-01, 2 AI (mA/V), 2 AO (mA).
− FDIO-01, 3 DI, 2 RO.

Feedback interface modules:
− FEN-01, 2 inputs (TTL encoder), 1 output.
− FEN-21, 2 inputs (resolver, TTL encoder), 1 output (beta). Released when plugged into slot1 ... slot3 on the SDCS-CON-H01. Not released when plugged into a FEA-03 I/O extension adapter.
  Attention: [See known bugs](#).
− FEN-31, 1 input (HTL encoder), 1 output.

I/O extension adapter:
− FEA-03, 2 F-type option extension slots.

DDCS communication option modules:
− FDCO-01, optical DDCS (10 Mbd/10 Mbd).
− FDCO-02, optical DDCS (10 Mbd/5 Mbd).

DCSLink communication option modules:
− SDCS-DSL-H10, 1 DCSLink channel, no optical power link.
− SDCS-DSL-H12, 1 DCSLink channel, 2 optical power link channels.
− SDCS-DSL-H14, 1 DCSLink channel, 4 optical power link channels.

Remote monitoring:
− NETA-21 (beta).

Safety functions modules (FSO-21 and FSE-31):
− FSO-21 safety functions module e.g. for SS1 (beta). Access is possible using Drive Composer pro and is password protected.
− FSE-31 safety encoder module (beta).
− Following safety functions are available:

Safety function	Via FSO-21 I/O and FSE-31	Via FSO-21, FSE-31 and FENA-21
Safe torque off (STO)	Available (beta).	Available (beta). ①
Safe stop 1 (SS1)	Available (beta).	Available (beta). ①
Safe stop emergency (SSE)	Available (beta).	Available (beta). ①
Safe brake control (SBC) ②	Available (beta).	Available (beta). ①
Safely-limited speed (SLS)	Available (beta).	Available (beta). ①
Safe maximum speed (SMS)	Available (beta).	Available (beta). ①
Prevention of unexpected startup (POUS)	Available (beta).	Available (beta). ①
Safe direction (SDI)	Available (beta).	Available (beta). ①
Safe speed monitor (SSM)	Available (beta).	Available (beta). ①
Safe acceleration range (SAR)	Available (beta).	Available (beta). ①
Variable safely-limited speed (SLS)	Not available.	Available (beta). ①

① Available for PS2 PROFIsafe profiles.
② Safe brake control (SBC) can be configured to be triggered together with Safe torque off (STO).

− Measurement components:
− External DC voltage measurement at the motor terminals for H1 ... H5 via SDCS-UCM-01/DC-DC transducer and AI3, see 95.37 DC voltage measurement mode. See the DC measurement-set UCM-1 for H1 ... H5 (3ADT220184R0001).
− US style DC contactors.
− Mains voltages below 120 V_{AC} for H1 ... H5 via SDCS-SUB-4, see +S186 (beta).

- Mains voltages below 120 V$_{AC}$ for H1 … H5 via SDCS-SUB-4 and synchronization transformer (T91) (beta).
- Mains voltages below 120 V$_{AC}$ for H6 … H8 via synchronization transformer (T91) (beta).
- Galvanic isolation for H2 … H4 via SDCS-SUB-5, see +S189 (beta). Only for following units:
    - DCS880-S01-0135-05.
    - DCS880-S01-0180-05.
    - DCS880-S01-0225-05.
    - DCS880-S01-0315-05.
    - DCS880-S01-0405-05.
    - DCS880-S01-0470-05.
    - DCS880-S01-0610-05.
    - DCS880-S01-0740-05.
    - DCS880-S01-0900-05.

This firmware is released for following:

Firmware functions:
- Standard and extension I/O (groups 10 … 16).
- Operation mode/Start/Stop/Operation (groups 19 … 21).
- Speed reference/control (groups 22 … 25).
- Torque reference chain (group 26).
- Armature current control (group 27).
- EMF and field current control (group 28), for e.g. field reversal.
- 12-pulse/Hardparallel (group 29). Alternate firing (beta).
- Control limits and fault functions (groups 30 … 31). No residual current detection.
- Motor thermal protection (group 35).
- Process PID (group 40) (beta).
- Shared motion (2nd motor) (group 42) (beta).
- Mechanical brake control (group 44).
- Monitoring/Scaling settings (group 46).
- Data storage (group 47).
- Panel port communication (group 49).
- Fieldbus adapter (FBA) (groups 50 … 56).
- Embedded fieldbus via drive-to-drive link (group 58) (beta).
- DDCS Communication, for e.g. master-follower (groups 60 … 62) via FDCO or XD2D, AC800 M.
- DCSLink Communication (group 70).
- Application specific groups (groups 74 … 89).
- Feedback selection (group 90).
- Encoder module settings (group 91).
- Encoder 1 and Encoder 2 settings (groups 92 … 93). Resolver.
- OnBoard speed feedback configuration (group 94).
- HW configuration (group 95).
- System (group 96). **Attention:** English, French, German, Italian, Polish, Russian, Simplified Chinese and Spanish are possible for parameter names, warnings and faults. Even more languages for the control panel itself can be selected.
- Motor data (group 99).
- Safety (group 200). For FSPS-21 (beta) for PROFIsafe via PROFINET IO, FSO-21 (beta) and FSE-31 (beta).

Special functions:
- MG-set (see separate manual) (beta).
- M3, 2 x M3 and M6 configuration (beta).

Diagrams
- The update of the diagrams in the Drive Composer pro includes bug fixes and the dynamization of the switches.

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Attention: There are still inconsistencies in the diagrams.

Control panel:
− Commissioning assistants.
− QR Code.

Drive Composer pro:
− Commissioning assistants with Drive Composer pro 2.1 or higher.
− Adaptive programming (AP).
− Parameter help for DCS880 (right klick on parameter in question).

Memory unit:
− Standard.
− Drive application programming with Drive Application Builder 1.0.0.319 or higher (drive application programming in the Automation Builder is not supported anymore).

This firmware is released for beta tests of following hardware:

DCS880-S01 (single bridges) size H8 for alternate firing:
− DCS880-S01-5230-05 good for 5200 ADC continuous current when built in a cabinet.
− DCS880-S01-5230-07 good for 5200 ADC continuous current when built in a cabinet.
− DCS880-S01-5230-08 good for 5200 ADC continuous current when built in a cabinet.
− DCS880-S01-4830-10 good for 4800 ADC continuous current when built in a cabinet.

DCS880-R for rebuild projects.
DCS880-U for upgrade projects.
Fieldbus adapter modules:
− FDNA-01, DeviceNet™.
− FEPL-02, PowerLink.
− FMBT-21, Modbus TCP.
− FSPS-21 for PROFIsafe via PROFINET IO. Available functions:
    − STO via PROFIsafe.
    − SS1-t Via PROFIsafe.

Feedback interface modules:
− FEN-21, 2 inputs (resolver, TTL encoder), 1 output. Released when plugged into slot1 … slot3 on the SDCS-CON-H01. Not released when plugged into a FEA-03 I/O extension adapter.
    Attention: See known bugs.

Remote monitoring:
− NETA-21.

Safety functions modules (FSO-21 and FSE-31):
− FSO-21 safety functions module e.g. for SS1. Access is possible using Drive Composer pro and is password protected.
− FSE-31 safety encoder module.
− Following safety functions are available:

Safety function	Via FSO-21 I/O and FSE-31	Via FSO-21, FSE-31 and FENA-21
Safe torque off (STO)	Available.	Available. [1]
Safe stop 1 (SS1)	Available.	Available. [1]
Safe stop emergency (SSE)	Available.	Available. [1]
Safe brake control (SBC) [2]	Available.	Available. [1]
Safely-limited speed (SLS)	Available.	Available. [1]
Safe maximum speed (SMS)	Available.	Available. [1]
Prevention of unexpected startup (POUS)	Available.	Available. [1]
Safe direction (SDI)	Available.	Available. [1]

Safe speed monitor (SSM)	Available.	Available. ①
Safe acceleration range (SAR)	Available.	Available. ①
Variable safely-limited speed (SLS)	Not available.	Available. ①

① Available for PS2 PROFIsafe profiles.

② Safe brake control (SBC) can be configured to be triggered together with Safe torque off (STO).

Measurement components:
- Mains voltages below 120 V_{AC} for H1 … H5 via SDCS-SUB-4, see +S186.
- Mains voltages below 120 V_{AC} for H1 … H5 via SDCS-SUB-4 and synchronization transformer (T91).
- Mains voltages below 120 V_{AC} for H6 … H8 via synchronization transformer (T91).
- Galvanic isolation for H2 … H4 via SDCS-SUB-5, see +S189. Only for following units:
    - DCS880-S01-0135-05.
    - DCS880-S01-0180-05.
    - DCS880-S01-0225-05.
    - DCS880-S01-0315-05.
    - DCS880-S01-0405-05.
    - DCS880-S01-0470-05.
    - DCS880-S01-0610-05.
    - DCS880-S01-0740-05.
    - DCS880-S01-0900-05.

This firmware is released for beta tests of following:

Firmware functions:
- Alternate firing (group 29).
- Process PID (group 40) .
- Shared motion (2nd motor) (group 42).
- Embedded fieldbus via drive-to-drive link (group 58).
- Safety (group 200). For FSPS-21 for PROFIsafe via PROFINET IO, FSO-21 and FSE-31.

Special functions:
- MG-set (see separate manual).
- M3, 2 x M3 and M6 configuration.

This firmware is not released for:
- Drive manager.

Changed signals and parameters:

Release	2.07.5.0			2.07.3.0			
Reason	Index	Name	Comments	Reason	Index	Name	Comments
2	28.59	Voltage residual magnetism	Set default to 0.00 %				
2	40.07	PID operation mode	Set default to Disable				

Reason for changes: **1** = New feature; **2** = Solved problems; **3** = Cleanup

Solved problems:

In firmware 2.07.5.0
− When 99.07 M1 used field exciter type is set to any other than OnBoard the connected field exciter does not start after cycling the auxiliary power.
 Now all settings of 99.07 M1 used field exciter type work again.

History of solved problems:

In firmware 2.07.4.0
− When 99.03 M1 nominal power = 0.00 kW the signals 01.25 Output power and 01.26 Reactive power run into their maximum values.
 Now the proper value of zero is calculated.
− A change of 46.13 Filter time motor torque results in the re-start of the filter time and leads to spikes in the filtered values.
 Now the filtered value is without spike.
− Shared motion rated motor data override after changing from motor 1 to motor 2. E.g. 42.11 M2 nominal (base) speed is internally overwritten with the value of 99.14 M1 nominal (base) speed when energizing the drive.
 Now motor 2 rated motor data are stable.
− The field exciter boot procedure during the routine test is causing problems.
 Now the boot procedure is running properly.

In firmware 2.07.3.0
− Speed reference is forced to zero between 23.03 Speed reference 7 and 24.01 Used speed reference if 19.01 Actual operation mode = Current.
 Now the speed reference is working properly.
− Fault F521 Field acknowledge appears, when energizing the auxiliary power with 99.07 M1 used field exciter type = OnBoard and 28.36 M1 field heating source = Enable field heating.
 Now there is no fault message anymore.
− When variable slope is enabled, see 23.28 Variable slope enable, the drive ramp including the Emergency ramp stop is completely bypassed.
 Now the Emergency ramp stop is active even if variable slope is enabled.

In firmware 2.07.0.0
− The armature current autotune determines a too high discontinuous current limit.
 Now a correction factor is introduced.
− Synchronization of the mains starts with the On command. Thus, sometimes the drive has a start delay of 600 ms.
 Now the synchronization starts with reaching the level defined in 31.53 Mains loss low level 1.
− The firing pulse generation is instable. A 6 μs jitter was measured.
 Now the firing pulse generation is stable.
− After an STO command and while the Run command = 1 the mechanical brake always remains open.
 Now in that situation the mechanical broke closes when zero speed, see 21.08 M1 zero speed level, has been reached.
− When the drive is switched off, the field current reference remains at 100 % in signals 01.77 28.14 M1 field current reference fast, 01.79 42.45 M2 field current reference fast, 28.14 M1 field current reference and 45 M2 field current reference.
 Now the signal show the correct value of zero.
− 06.18.b10 Drive status word 3 Auto-reclosing is not set at all.
 Now it is connected.
− When setting 35.11 Temperature 1 source = 35.21 Temperature 2 source = Direct temperature the unscaled value of the selected analog input is taken. This leads to a temperature range of -10 … +10.
 Now the scaled value of the selected analog input is taken, and the temperature range can be set accordingly.

– An active e-stop command, see 06.09.b02 Used main control word, is ignored when 21.03 Emergency stop mode = Coast stop MC on, Ramp stop MC on, Emergency ramp stop MC on, Torque limit MC on, Dynamic braking MC on and the Run command, see 06.09.b03 Used main control word, is toggled until zero speed is reached.
  Now the active e-stop command is always valid.
– For 35.11 Temperature 1 source = 35.21 Temperature 2 source = PTC DI6 the reaction is swapped.
  Now the reaction is correct.
– 46.21 At speed hysteresis is tied to 23.03 Speed reference 7 (located after the ramp).
  Now it is tied to 22.01 Speed reference unlimited (located before the ramp).
– Brake control, torque proving is started before the brake is closed completely.
  Now the torque proving is started after the brake is completely closed.

In firmware 2.06.0.0
– Warning A116 Brake long falling: After the warning it should be possible to start (give a Run command) the drive again. Unfortunately, the drive trips with fault 71A2 Mechanical brake closing failed when being re-started.
– Warning AFE1 Off2 (emergency off): The 12-pulse slave generates the warning without cause.
– 21.03 Emergency stop mode: When 21.03 = Emergency ramp stop MC on and an STO is pending (fault 5091 Safe torque off) it is not possible to reset the fault.
– 28.15 M1 field current: During armature current direction change the field current is clamped to zero. This causes problems in the field control and causes overcurrent trips when the armature current in constantly changed (e.g. when the motor is idling).
– 30.44 Minimum firing angle: The integral part of the current controller has no maximum limit when the firing angle = 30.44 Minimum firing angle.
– 95.24 Service mode: Single firing pulse V11 … V26 selections do not work properly.
– 95.33 DC current measurement: Wrong default setting. Correct default setting is 0.0 %.
– FENA-21 adapter: The FENA-21 adapter is re-booting after a speed feedback autotuning or when 46.01 M1 speed scaling is written to.

In firmware 2.05.0.0
– Speed autotuning is not working properly, when field reversal is chosen.
– Coast stop button in Drive Composer does not work.
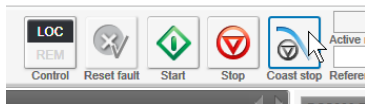
– Stabilized all autotunings, especially:
  – Armature current autotuning for AUX code 0002 0007.
  – Speed feedback assistant for 0004 000C.
  – Speed controller autotuning for too high p-parts.
  – Speed feedback assistant and speed controller autotuning at high ramp times.
– Fixed current and voltage display of following signals:
  – 01.60 12-pulse serial armature voltage sum in V.
  – 01.61 12-pulse parallel current sum in A.
  – 01.62 12-pulse slave current A.

In firmware 2.04.3.0
– Issues with the mechanical brake control (group 44).

In firmware 2.04.1.0
– Wrong setting of 07.65 Drive max. bridge temperature set in units size DCS880-S01-1190.
– When using FENA-11/21 and Ethernet/IP following instances do not function:
  – ODVA AC/DC drive assemblies
    – Instance 20 instance 70.
    – Instance 21 instance 71.
    – Instance 22 instance 72.
    – Instance 23 instance 73.

        – Instance 120 instance 170.
        – Instance 121 instance 171.
        – Instance 122 instance 172.
   – ABB Drives profile assemblies
        – Instance 1 instance 51.
        – Instance 101 instance 151.
        – Instance 2 instance 52.
        – Instance 102 instance 152.

– Do not use 90.41 M1 feedback selection = EMF. This leads to a speed feedback value even if the armature voltage is zero. Work around: set 90.41 M1 feedback selection = EMF voltage.
– Acceleration compensation is not implemented, see 25.06 Acceleration compensation derivation time and 25.07 Acceleration compensation filter time.
– Speed feedback is missing in 01.01 Used motor speed filtered when 31.35 Motor feedback fault = EMF/Warning and the speed feedback device fails.

In firmware 2.04.0.0
– Fault F521 Field acknowledge is incorrectly generated during start of the drive.
– 5 A terminals of DCF803-0016/35 and FEX425-Int did not work all the time.
– Warning A132 Parameter setting conflict during armature autotuning (AUX code 99139907).
– The drive is set to 20.01 Command location = Local I/O, the hardware commands On and Run are high, and the drive is Off from Local. Now the drive is switched back and forth several times between local and remote, then the drive suddenly starts running.
– Motor thermal protection (group 35) responds with a fault after cycling power.
   – As a work around either disable the function or increase the minimum value of the used analog input.
– 95.24 Service mode = Thyristor test does not detect a short circuit between C1 (+) and D1 (-).
– In case of warning A797 Speed feedback configuration the related fault 73A0 Speed feedback configuration is not generated after 3 minutes, but fault 7082 I/O extension communication. During the delay time of 3 minutes the LEDs of all I/O extension modules are toggling between green and orange.
– 27.33 M1 armature inductance is not used for the EMF calculation/compensation anymore.

In firmware 2.03.1.0
– Problem forcing additional toque signals to Zero after an emergency stop. See 26.16 Torque additive 1 source, 26.24 Torque additive 2 enable, 26.31 Torque step and 26.43 Torque correction enable.

In firmware 2.03.0.0
– Problem causing FB14 Memory unit, firmware load failed. For more information see document 3AXD10000682494 (ACS880 FW HINT22 - FB14 fault).
– 20.25 Jog function enable clamps the value in 22.01 Speed reference unlimited.
– 22.71 Motor potentiometer function = Enable (resume always) clamps the motor potentiometer in Off state.
– 94.26 OnBoard encoder transient filter, mismatch in filter time selection.
– Master-follower link, the pre-defined selections in parameters of groups 60 … 62.
– Armature autotuning:
   – Proper limits for 27.29 M1 current proportional gain and 27.30 M1 current integration time.
   – Result is depending on setting of 28.31 Field current at 40 % flux.
– 27.33 M1 armature inductance is not used for the EMF calculation/compensation anymore.
– Limits for the armature current controller are dependent on 27.27 Current control mode. 100 % for setting Standard or Feed forward reference. 325 % for setting No feed forward.
– Forward bridge (bridge 1) and reverse bridge (bridge 2) can be blocked independently and correctly.
– Block reverse bridge at too high armature voltage compared to the mains voltage (reversal volt function) is active. See 06.25.b03 Current controller status word 2.
– 95.33 DC current measurement offset has a new default value of 0.5 %. This causes a better current ramp up in case the response of the current controller is delayed when starting at zero current.
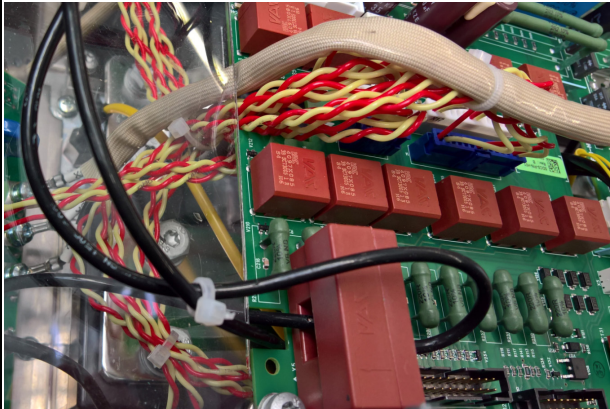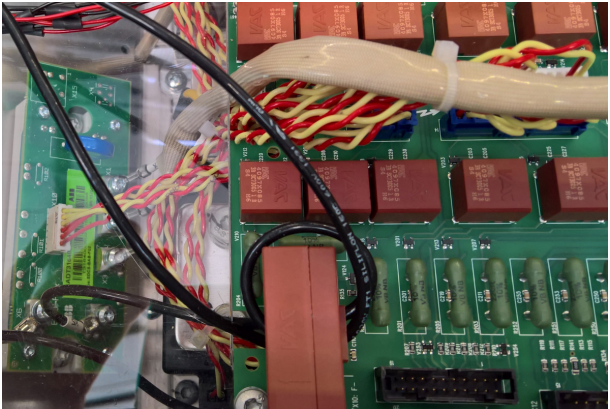
- 31.46 Current ripple monitor function is working now.
- PLL and mains frequency monitor function is working properly. See parameters 95.30 … 95.47.
- 31.98.b10 STO actual status = STO Active = high did not force 06.15.b02 Main status word = Ready reference (running) = low.

In firmware 2.02.3.0:

- Armature current controller assistant in Control panel and setting of 95.25 Set: Type code using the Control panel does not work:

DCS880 Firmware		2.02.2.0	2.02.3.0
Control panel firmware			
5.20	Armature current controller assistant	Fails	**OK**
	95.25 Set: Type code	Fails	Fails
5.60	Armature current controller assistant	Fails	Fails
	95.25 Set: Type code	**OK**	**OK**
5.80	Armature current controller assistant	Fails	**OK**
	95.25 Set: Type code	**OK**	**OK**

- Armature current autotuning is only possible if the drive is already in ON stage. It is not possible to use Drive Composer entry/pro.
- Speed depending proportional gain and integration time is not working. See parameters 25.18 … 25.22.
- Torque depending proportional gain is not working. See parameters 25.25 … 25.27.
- Instable PLL. See parameters 95.39 … 95.50.
- Changing value of 99.07 M1 used field exciter type needs a power cycle.
- OnBoard field exciter field current measurement corrected for converters size H3 (290 A … 520 A):

Firmware version 2.02.3.0 or higher	Firmware version 2.01.1.0 or lower
T100 threads: 1 (equals no loop).	T100 threads: 2 (equals 1 loop).

For any firmware update please adapt the T100 threads. Otherwise the field current measurement is incorrect.

New features in firmware 2.07.5.0:

Hardware:

DCS880-S01 (single bridges) size H8 for alternate firing:
− DCS880-S01-5230-05 good for 5200 ADC continuous current when built in a cabinet.
− DCS880-S01-5230-07 good for 5200 ADC continuous current when built in a cabinet.
− DCS880-S01-5230-08 good for 5200 ADC continuous current when built in a cabinet.
− DCS880-S01-4830-10 good for 4800 ADC continuous current when built in a cabinet.

DCS880-U for upgrade projects:
− Upgrade projects.

Safety functions module:
− FSO-21 safety functions module e.g. for SS1. Access is possible using Drive Composer pro and is password protected.
− FSE-31 safety encoder module.
− Following safety functions are available:

Safety function	Via FSO-21 I/O and FSE-31	Via FSO-21, FSE-31 and FENA-21
Safe torque off (STO)	Available.	Available. ①
Safe stop 1 (SS1)	Available.	Available. ①
Safe stop emergency (SSE)	Available.	Available. ①
Safe brake control (SBC) ②	Available.	Available. ①
Safely-limited speed (SLS)	Available.	Available. ①
Safe maximum speed (SMS)	Available.	Available. ①
Prevention of unexpected startup (POUS)	Available.	Available. ①
Safe direction (SDI)	Available.	Available. ①
Safe speed monitor (SSM)	Available.	Available. ①
Safe acceleration range (SAR)	Available.	Available. ①
Variable safely-limited speed (SLS)	Not available.	Available. ①

① Available for PS2 PROFIsafe profiles.
② Safe brake control (SBC) can be configured to be triggered together with Safe torque off (STO).

Measurements components:
− Mains voltages below 120 V_{AC} for H1 … H5 via SDCS-SUB-4, see +S186.
− Mains voltages below 120 V_{AC} for H1 … H5 via SDCS-SUB-4 and synchronization transformer (T91).
− Mains voltages below 120 V_{AC} for H6 … H8 via synchronization transformer (T91).
− Galvanic isolation for H2 … H4 via SDCS-SUB-5, see +S189. Only for following units:
  − DCS880-S01-0135-05.
  − DCS880-S01-0180-05.
  − DCS880-S01-0225-05.
  − DCS880-S01-0315-05.
  − DCS880-S01-0405-05.
  − DCS880-S01-0470-05.
  − DCS880-S01-0610-05.
  − DCS880-S01-0740-05.
  − DCS880-S01-0900-05.

Firmware functions:
− Standard AO (group 13): Added excitation mode for a temperature sensor to AO2.
− I/O extension module 1 … 3 (groups 14 … 16): Added excitation mode for a temperature sensor to AO2.
− Alternate firing (group 29).

- Fault functions and fault levels (group 31). With parameters 31.70 ... 31.79 it is possible to set the fault and warning levels of all external events.
- Process PID (group 40).
- Safety (group 200). FSO-21 and FSE-31.

Special functions:
- MG-set (see separate manual).
- M3, 2 x M3 and M6 configuration.

Diagrams
- The update of the diagrams in the Drive Composer pro includes bug fixes and the dynamization of the switches.

Attention: There are still inconsistencies in the diagrams.

Differences between firmware 2.07.5.0 and 2.07.0.0:

- See new features.

Known firmware or tools problems, bugs, and information:

In firmware 2.07.5.0
- If the firmware 2.06 or lower is upgraded to firmware 2.07 and higher the speed controller p-part, see 25.02 Speed proportional gain 1, must be adapted, otherwise not only the p-part is scaled wrong, but also the i-part, see 25.03 Speed integration time 1.
  In firmware 2.06 or lower the p-part is scaled using 99.14 M1 nominal (base) speed.
  In firmware 2.07 or higher the p-part is scaled using 46.02 M1 speed scaling actual.
  Thus, use following formular for calculation:

$$25.02 \text{ } Speed \text{ } proportional \text{ } gain \text{ } 1 \text{ } (FW \text{ } 2.07) = 25.02 \text{ } Speed \text{ } proportional \text{ } gain \text{ } 1 \text{ } (FW \text{ } 2.06) * \frac{46.02 \text{ } M1 \text{ } speed \text{ } scaling \text{ } actual}{99.14 \text{ } M1 \text{ } nominal \text{ } (base) speed}$$

- There are still inconsistencies in the Drive Composer pro diagrams.
- FEN-21:
  - Connector monitoring for the resolver input (X52):
    - If the connector is disconnected and reconnected, fault connector monitoring sometimes cannot be reset. Solution: Cycle the power of the drive.
    - After a power-on, sometimes fault connector monitoring is generated. This fault can be reset normally.
  - Does not work properly, when plugged into a FEA-03 I/O extension adapter.
  - In case of a fault in the adapter (e.g. communication problems with drive/PLC) the adapter crashes the complete I/O-bus. Thus all other I/O adapters connected to that I/O-bus do not work anymore.
- The field current autotuning does not start, when 99.06 Operation mode = Large field exciter and the setting in 99.10 Nominal mains voltage is 2 times higher than the setting in 99.12 M1 nominal voltage.
  - **Bad example:**
    99.10 Nominal mains voltage = 400 V and 99.12 M1 nominal voltage < 200 V.
  - As a work around increase the setting in 99.12 M1 nominal voltage and execute the field autotuning. Afterwards set 99.12 M1 nominal voltage back to its original setting.

In firmware 2.07.4.0
- When 99.07 M1 used field exciter type is set to any other than OnBoard the connected field exciter does not start after cycling the auxiliary power.
- There are still inconsistencies in the Drive Composer pro diagrams.
- FEN-21:
  - Connector monitoring for the resolver input (X52):
    - If the connector is disconnected and reconnected, fault connector monitoring sometimes cannot be reset. Solution: Cycle the power of the drive.

- After a power-on, sometimes fault connector monitoring is generated. This fault can be reset normally.
  - Does not work properly, when plugged into a FEA-03 I/O extension adapter.
  - In case of a fault in the adapter (e.g. communication problems with drive/PLC) the adapter crashes the complete I/O-bus. Thus all other I/O adapters connected to that I/O-bus do not work anymore.
- The field current autotuning does not start, when 99.06 Operation mode = Large field exciter and the setting in 99.10 Nominal mains voltage is 2 times higher than the setting in 99.12 M1 nominal voltage.
  - **Bad example:**
    99.10 Nominal mains voltage = 400 V and 99.12 M1 nominal voltage < 200 V.
  - As a work around increase the setting in 99.12 M1 nominal voltage and execute the field autotuning. Afterwards set 99.12 M1 nominal voltage back to its original setting.

In firmware 2.07.0.0 … 2.07.3.0
- There are still inconsistencies in the Drive Composer pro diagrams.
- FEN-21:
  - Connector monitoring for the resolver input (X52):
    - If the connector is disconnected and reconnected, fault connector monitoring sometimes cannot be reset. Solution: Cycle the power of the drive.
    - After a power-on, sometimes fault connector monitoring is generated. This fault can be reset normally.
  - Does not work properly, when plugged into a FEA-03 I/O extension adapter.
  - In case of a fault in the adapter (e.g. communication problems with drive/PLC) the adapter crashes the complete I/O-bus. Thus all other I/O adapters connected to that I/O-bus do not work anymore.
- The field current autotuning does not start, when 99.06 Operation mode = Large field exciter and the setting in 99.10 Nominal mains voltage is 2 times higher than the setting in 99.12 M1 nominal voltage.
  - **Bad example:**
    99.10 Nominal mains voltage = 400 V and 99.12 M1 nominal voltage < 200 V.
  - As a work around increase the setting in 99.12 M1 nominal voltage and execute the field autotuning. Afterwards set 99.12 M1 nominal voltage back to its original setting.

In Drive Application Builder 1.1.1.000
- Extended interface for I/O extension modules (FIAO-01, FDIO-01,FIO-01, FIO-11) is missing. Thus, it is not possible to add additional I/O extension boards beyond the ones connected via groups 14 … 16.
  - As a work around use the parameter read and write function to access the extension modules. See page 26 of:
    [DAB - First steps & Information, presentation](#).

In firmware 2.06.0.0
- FEN-21:
  - No connector monitoring available for the resolver input (X52).
  - In case of a fault in the adapter (e.g. communication problems with drive/PLC) the adapter crashes the complete I/O-bus. Thus all other I/O adapters connected to that I/O-bus do not work anymore.

In firmware 2.05.0.0
- FEN-21:
  - No connector monitoring available for the resolver input (X52).
  - In case of a fault in the adapter (e.g. communication problems with drive/PLC) the adapter crashes the complete I/O-bus. Thus all other I/O adapters connected to that I/O-bus do not work anymore.

In Drive Application Builder 1.0.0.319
- Extended interface for I/O extension modules (FIAO-01, FDIO-01,FIO-01, FIO-11) is missing. Thus, it is not possible to add additional I/O extension boards beyond the ones connected via groups 14 … 16.

      – As a work around use the parameter read and write function to access the extension modules. See page 26 of:
[DAB - First steps & Information, presentation](#).

In Drive Composer pro 2.4:
– Custom parameter set do not update values.
– Custom parameter sets of older Drive Composer versions appear empty when loaded.

In Drivetune 2.04.3.0
– The iOS app will create backup and support packages and transmit them by email, but files are not able to be opened by Drive Composer pro. It was noted that when creating the same backup and support files by Drive Composer pro the ones created by the computer were much larger than the ones created by the iOS app.

In firmware 2.04.1.0/2.04.3.0
– No connector monitoring available for resolver input (X52) on the FEN-21.
– Speed autotuning is not working properly, when field reversal is chosen.

In firmware 2.04.0.0
– No connector monitoring available for resolver input (X52) on the FEN-21.
– Speed autotuning is not working properly, when field reversal is chosen.

In Drive Composer pro 2.2:
– Custom parameter set do not update values.
– The step function does not work:
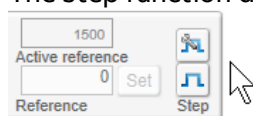
Not a Drive Composer problem. Fixed in DCS880 firmware 2.04.0.0.

In firmware 2.03.1.0
– The drive is set to 20.01 Command location = Local I/O, the hardware commands On and Run are high, and the drive is Off from Local. Now the drive is switched back and forth several times between local and remote, then the drive suddenly starts running.
– Motor thermal protection (group 35) responds with a fault after cycling power.
    – As a work around either disable the function or increase the minimum value of the used analog input.
– 95.24 Service mode = Thyristor test does not detect a short circuit between C1 (+) and D1 (-).
– In case of warning A797 Speed feedback configuration the related fault 73A0 Speed feedback configuration is not generated after 3 minutes, but fault 7082 I/O extension communication. During the delay time of 3 minutes the LEDs of all I/O extension modules are toggling between green and orange.

In firmware 2.03.0.0
– Motor thermal protection (group 35) responds with a fault after cycling power.
    – As a work around either disable the function or increase the minimum value of the used analog input.
– 95.24 Service mode = Thyristor test does not detect a short circuit between C1 (+) and D1 (-).
– In case of warning A797 Speed feedback configuration the related fault 73A0 Speed feedback configuration is not generated after 3 minutes, but fault 7082 I/O extension communication. During the delay time of 3 minutes the LEDs of all I/O extension modules are toggling between green and orange.

In Drive Composer pro 2.1:
– Parameters freeze after communication break.
– Custom parameter set do not update values.

In firmware 2.02.3.0:
- Changes of units (°C, °F and Ohm) in parameter group 35 will not automatically trigger a parameter refresh in the Drive Composer. This must be initiated manually. Range of Ohms is limited to 1000 instead of 5000.
- In 99.20 Tuning request the functions Armature current manual tuning and Find discontinuous current limit do not work.

In Drive Composer pro 2.1:
- Parameters freeze after communication break.
- Custom parameter set do not update values.

Known documentation problems, bugs and information:
- None.

Compatibility of firmware, hardware and documentation:

Firmware	2.01.1.0	2.02.2.0	2.02.3.0	2.03.1.0	2.04.x.0	2.05.0.0	2.06.0.0	2.07.x.0
DCS880 Firmware Manual 3ADW000474 Rev.: A and higher.	x	x	x	x	x	x	X	X
Electronic Unit DCS880/DCT880 3ADT220166R0002.	x	x	x	x	x	x	X	X
Control panel (ACS-AP-I) with panel firmware 5.80 and higher	x	x	x	x	x	x	X	X
Control panel (ACS-AP-I) with panel hardware D and higher.	x	x	x	x	x	x	X	X

Appendix:
- None.

DCS family

DCS550-S modules
The compact drive for machinery application

20 … 1,000 A_{DC}
0 … 610 V_{DC}
230 … 525 V_{AC}
IP00

- Compact
- Robust design
- Adaptive and winder program
- High field exciter current

DCS880 modules
For safe productivity

20 … 5,200 A_{DC}
0 … 1,500 V_{DC}
230 … 1,200 V_{AC}
IP00

- Safe torque off (STO) built in as standard
- Compact and robust
- Single drives, 20 A_{DC} to 5,200 A_{DC}, up to 1,500 V_{DC}
- IEC 61131 programmable
- Intuitive control panel and PC tool with USB connection and start up assistant
- Wide range of options to serve any DC motor application

DCS880-A enclosed converters
Complete drive solutions

20 … 20,000 A_{DC}
0 … 1,500 V_{DC}
230 … 1,200 V_{AC}
IP21 – IP54

- Suitable for motoric and non motoric applications (e.g. electrolysis & hydrogen production)
- 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_{DC}, 1,500 V_{DC}
- In accordance to usual standards
- Individually factory load tested
- Detailed documentation

DCT880 modules
Thyristor power controller

20 … 4,200 A_{AC}
110 … 990 V_{AC}
IP00

- Precise power control in industrial heating applications
- Two or three phase devices
- Power optimizer for peak load reduction
- Built on ABB's all-compatible drives architecture
- Intuitive control panel and PC tool with USB connection and start up assistant
- Application control programs and drive application programming with IEC 61131 programming

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