

DMC5

Firmware changes / Update notices

Version 2.7



1 Document History

Version	Date	Name	Comment
1.0	09.06.2010	Peter Oehry	New document
1.1	05.07.2010	Pascal Haltner Peter Oehry	Review of the document
1.2	07.07.2010	Peter Oehry	New Version SW-FW-DMC5-01-01-18
1.3	18.09.2010	Peter Oehry	New Version SW-FW-DMC5-02-01-01
1.4	07.02.2011	Peter Oehry	New Version SW-FW-DMC5-02-01-02
1.4a	10.02.2011	Peter Oehry	Correction of typo
2.0	14.12.2011	Peter Oehry	Change document version to 2.x
2.1	03.02.2016	Peter Oehry	New Version SW-FW-DMC5-02-01-04
2.2	06.03.2017	Peter Oehry	New Version SW-FW-DMC5-02-01-05
2.3	03.07.2017	Peter Oehry	New Version SW-FW-DMC5-02-01-06
2.4	17.12.2019	Peter Oehry	New Version SW-FW-DMC5-02-01-07
2.5	08.01.2020	Peter Oehry	New Version SW-FW-DMC5-02-01-08
2.6	30.04.2020	Peter Oehry	New Version SW-FW-DMC5-02-01-09
2.7	24.08.2020	Peter Oehry	New Version SW-FW-DMC5-02-01-10

2 Introduction

This document gives an overview over the recent changes and improvements of the DMC5 firmware. It contains important information for those who would like to update. To understand this document, you should be familiar with the basics of configuring and operating the DMC5. It is not the scope of this document to explain how to download a firmware or motor table to the DMC5.

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4 Identification of the DMC

Depending on your hardware you might need a different DMC5 SW-Version. This chapter will help you finding the right version for your hardware.

If you have a DMC with a serial number lower than 1000 (Ser. No. < 1000) you have to use a Software with version SW-FW-DMC5-01-01-xx.

If you have a DMC with a serial number higher or equal to 1000 (Ser. No. >= 1000) you have to use a Software with version SW-FW-DMC5-02-01-xx.

5 Version SW-FW-DMC5-02-01-10

Type	Description
IMPROVE	Default power limit is changed from 200kW to 360kW. With the DMC544 and bigger motors power > 200kW can be achieved.

6 Version SW-FW-DMC5-02-01-09

Type	Description
NEW	Support new HW version of DMC5 C01
NEW	Support measurement of phase4 temperatures
NEW	Readout of rotor offset from Motor EEPROM is enabled by default (if available) <ul style="list-style-type: none">After firmware update the configuration will be based on the previous used settings.
IMPROVE	Adjust PWM limitation based on operating point
IMPROVE	Support DC current up to 700A (if available)

7 Version SW-FW-DMC5-02-01-08

Type	Description
BUGFIX	After a hardware shutdown (caused by OV, ExtAw1/2, or others) it was possible that the DMC did not restart correctly without power cycle.
IMPROVE	We have less event log entries in the case of CAN timeout during start-up.
DEL	Software support for DMC5 with ability for AKS has been removed.

8 Version SW-FW-DMC5-02-01-07

Type	Description
IMPROVE	Optimized PWM generation with adjusted dead time and behaviour at 0% and 100%

9 Version SW-FW-DMC5-02-01-06

Type	Description
BUGFIX	Fix a bug with in the debug message multiplexer. Temperature messages were sent with wrong information.

10 Version SW-FW-DMC5-02-01-05

Type	Description
BUGFIX	Fix a bug with negative speed. The bug came in with version 02-01-04. The use of 02-01-04 is not recommended due to this bug.
IMPROVE	Stop integration of Current Controller I-Part if the voltage set point limit is reached. This can give the modulation controller the time to react.
IMPROVE	Controller for Modulation too high has been improved

11 Version SW-FW-DMC5-02-01-04

Please use version 02-01-05

Type	Description
NEW	Add support for DMC544
NEW	Software support for DMC5 with ability for AKS (special HW needed)
NEW	Add support for Motor tables with version 01-06-xx Improved Torque prediction
CHANGE	Some Debug messages have been added. Debug CAN base ID can also be an extended ID
IMPROVE	Controller for Modulation too high has changed to fix some issues with certain engines.
IMPROVE	Slew rate is deactivated if inverter is off

12 Version SW-FW-DMC5-02-01-03

This Version was never released.

13 Version SW-FW-DMC5-02-01-02

Type	Description
NEW	Add oscillation damping controller (OscLim). See separate documentation for this controller.
CHANGE	CAN Matrix updated to 3.9 (due to new signals used by OscLim)
IMPROVE	Less log information is produced on start-up and shut-down. Therefore IAC and IDC overcurrent are not logged if KL15 is disabled. The Internal supply error has a filter to be recognised.
IMPROVE	Slew rates can be configured by parameter.
BUGFIX	The DC Limits are initialised with parameter values when DMC_LIM message is disabled. This was not the case in the last version.

14 Version SW-FW-DMC5-02-01-01

14.1 Changes due to revised hardware

Type	Description
IMPROVE	The temperature measurement has been revised. <ul style="list-style-type: none">• all module temperatures are measured• all com trafo temperatures are measured
IMPROVE	The DMC has new current sensors
IMPROVE	The processor is 25% faster → general software incompatibility and new configuration for software download.
NEW	The DMC is now ISU ready → new CAN errors and warnings
NEW	The DMC can support two external shutdown paths → new CAN errors and warnings

14.2 Changes (to SW-FW-DMC5-01-01-18)

Type	Description
IMPROVE	CAN Spec has changed to Version 3.8b Visit the document "DMC5_Can_Spec_Changes" for detailed information.
IMPROVE	Cycle of the internal statemachine has been increased from 187.5Hz to 1500Hz
IMPROVE	An invalid rotor offset [01:11] is shoed as NaN. The DMC will have an INIT error if this is the case. This will prevent the inverter from unintentional acceleration if the rotor offset was not configured.

15 Version SW-FW-DMC5-01-01-18

15.1 Changes (to SW-FW-DMC5-01-01-16)

Type	Description
NEW	Support of Motor Tables with a Version code of 01-05-xx <ul style="list-style-type: none">• This will support a current vector >512A• This will support customer specific temperature sensors. The sensor has to be compatible to our hardware. Ask BRUSA if such a sensor should be implemented. Then we will check if the compatibility is given.
NEW	<p>Improvement of data integrity by checking a CRC for:</p> <ul style="list-style-type: none">• Non volatile configuration• Motor Parameters• Internal Flash• External Flash <p>The check of the parameter CRC is done before start-up. A system check flag will signal that the CRC checking of the flash data is in progress. The internal flash will be checked in less than a second. The external flash, which is 4MB, will take some more time to be checked. With motor tables of version < 01-05-xx the CRC is only calculated but no error will be set. This is because we don't know what the CRC should be. On new motor tables the correct CRC is always 0x0000.</p> <p>Care has to be taken if parameters are changed. Without telling the DMC5 that this was intentionally the change will be ignored and the DMC5 starts with the old parameters.</p> <p>Therefore the PARAM has an "Update & Reset Target" button which will update the necessary CRC parameters. The DMC5 will also reset the microcontroller and restart with the changed parameters.</p>
NEW	Transmit and timeout times of all CAN messages can be configured by PARAM tool.
IMPROVE	The terminal in the PARAM tool is now case insensitive.
IMPROVE	<p>CAN Spec has changed to Version 3.7 Visit the document "DMC5_Can_Spec_Changes" for detailed information.</p> <p>ATTENTION! The DLC of the DMC_ERR message is now 8 bytes (it was 4 bytes).</p>
IMPROVE	The hole parameter list in the PARAM tool has been reorganised.
IMPROVE	Some Parameters in the PARAM tool have changed their sign. Read the comment of each parameter carefully to not fall in a trap.
IMPROVE	The maximal modulation controller will limit it's output value. This will limit the possible torque coming from this limiter in the case of miss configuration or some hardware errors.
BUGFIX	A short interruption of the KL15 did not switch off the DMC. Now the error E_KL15_Lost will be set as soon as a interruption of the KL15 signal is detected.

15.2 Update notice

The reorganisation of some internal data and the building of all initial CRC values need some special task when updating from an old firmware. Most of these tasks are done automatically on the first run of the new firmware. If the DMC starts without any errors the update process was successful. Keep in mind that the PARAM tool will not work properly with the wrong XML file.

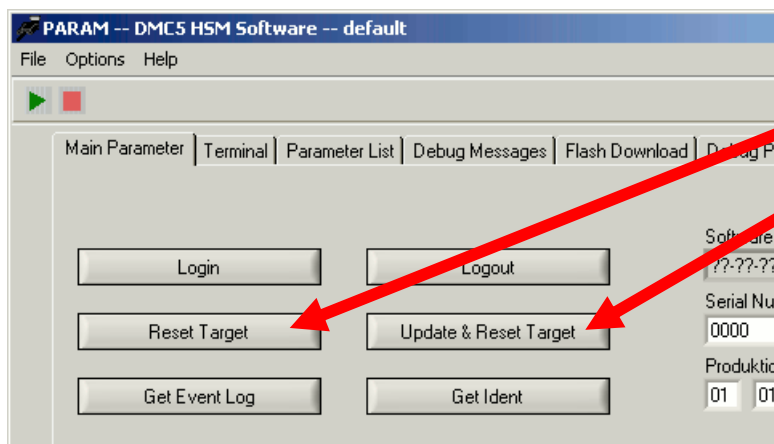
15.3 Downgrade notice

The new CVI SW-CANAP-DMC5-03-00-07 will not (or only partially) work with older firmware versions. The new organisation of the internal parameters will make some restrictions when downgrading to older version. It's important to check all parameters (especially the motor parameters) if an older firmware will be loaded on the DMC. The analog mode and all special features will be reset after downgrade. Keep in mind that the PARAM tool will not work properly with the wrong XML file.

15.4 Test Tools

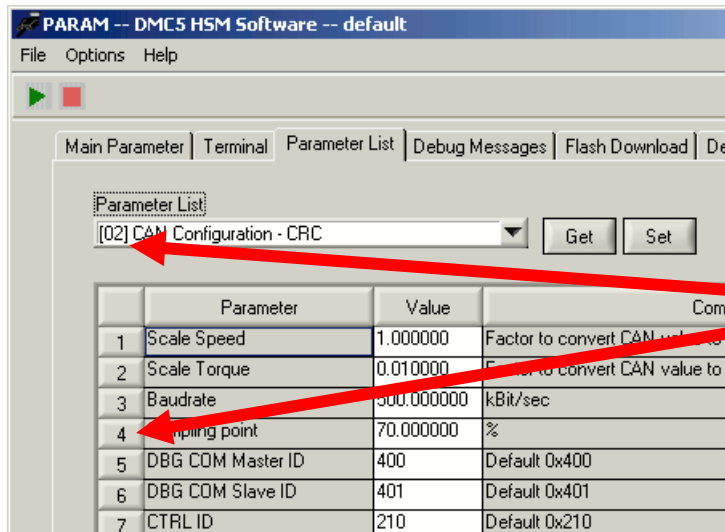
15.4.1 PARAM

For the full functionality the PARAM Tool Version 01-00-05 or higher is needed. The updated PARAM has an "Update & Reset Target" Button on the first tab which will send a command to the DMC5 to recalculate and update all CRC parameters. The DMC5 will also reset the microcontroller and restart with the changed parameters. This procedure has to be done after every change of a parameter. If this procedure is missed the DMC5 will reset the changed parameter to it's previous values.



New Buttons:

- Reset Target
- Update & Reset Target
Update all CRC and reset the target DMC.



The Parameter List has more space for the list name.

The Parameter Lists are now numbered. This gives the possibility to reference a parameter by a number:

Example:

Parameter List [02] / Line 4

[02:4] Sampling point

15.4.2 CVI (CAN User Interface)

To be compatible to the CAN Spec. Version 3.7 the CVI SW-CANAP-DMC5-03-00-07 or higher is needed. Older Versions will not display the detailed error bitmaps.

16 Version SW-FW-DMC5-01-01-17

This Version was never released. Changes are described in Release Documentation of 01-01-18

17 Versions prior to SW-FW-DMC5-01-01-17

17.1 SW-FW-DMC5-01-01-16

Type	Description
NEW	Check differences between speed signal (quadrature) and absolute position signal. The error E_SpeedSensor is set if this plausibility fails.
IMPROVE	Filter the PTC signal to detect severe motor over temperature with more tolerance to reduce unintentionally set errors.
IMPROVE	Detection of EnableRq signal on start-up has been improved.
BUGFIX	The CTRL3 and TRQS2 CAN messages can now be switched of separately

17.2 SW-FW-DMC5-01-01-15

Type	Description
NEW	With a special feature it's possible to switch of the max modulation controller
IMPROVE	Behaviour of max modulation controller for ASM machines.
BUGFIX	SW-FW-DMC5-01-01-14 read some motor parameters where always from parameter set zero. This has been fixed with this version.

17.3 Older versions

Ask BRUSA for detailed information on older DMC Versions.