

## Overview over the changes and new functionality of Motion Controller V3.0 firmware revision H.

### Changes and fixes

No.	Affected Component	Change Description
1	Calculation of relative References	<p>In case of chains of relative references calculation errors between the external references and the internal ones could have accumulated. This happened only, if the factor group is used. This is fixed.</p> <p>Example:</p> <ul style="list-style-type: none"> <li>• BL-Motor with A-Hall: internal pos resolution: 4096 increments</li> <li>• Gear reduction ration 13.9:1 – set in the factor group</li> <li>• Relative move by one turn               <ul style="list-style-type: none"> <li>→ would require a move of 56934.4 increments</li> <li>→ move is rounded to an integer number of 56934 increments, 0.4 increments will be added to the next move.</li> </ul> </li> </ul>
2	CANopen Stack	The time resolution of some services (Node-Guarding/Heartbeat) has been 50ms only. This is reduced to 1ms now.
3	RS232 / USB-Stack	The USB communication sometimes ran into a blocking condition were no new commands were evaluated. Side effect was an influence to system stability (see #4). This has been significantly improved. Even a stress test with all interfaces active does no longer show any of these effects
4	System stability	<p>Sometimes ET-controllers run into a deadlock due to an overload of communication related events. This is fixed now (see also #3). The handling of communication related interrupts has been improved. If still overloaded – the controller will be reset automatically.</p> <p><b>Please note:</b> We consider this a critical change. Customers using ET versions are encouraged to update to version “H”.</p>
5	Change of OpModes / Re-enable after disable	After disabling the control with a still active motor, the motor did some uncontrolled moves if re-enabled. That’s fixed now
6	Change of OpModes / Initialization of OpModes	<p>The OpModes PP and PV are now initialized during enable if default references for OpModes are selected in 0x233F. This guarantees a proper default reference at each change of OpMode and at each change to operation enabled.</p> <p><b>Please note:</b> this will overwrite any references sent to the controller before the state is changed to operation enabled!</p>
7	Hall-Adaption	The reset of the hall adaption has not been complete. Thus after a wrong adaption it might have been necessary to reset the parameters using a restore command. This is fixed. At each start of the dynamic adaption the parameters are reset. Additionally the parameters can be reset without starting an adaption.
8	Customized status Bit 15 in status word	The settings of this status bit were wrong. Meanwhile it can be configured correctly.
9	Handling of ref-pos in gear- or stepmode	In gear- or step-mode – which is APC using an encoder or a pulse train as a reference – the ref-pos is now adjusted to the actual position at each change into this OpMode and during enable. This prevents the motor from possibly unwanted movements if changing

		into and this OpMode.
11	Analog actual speed values	Analog inputs have not been supported for calculation of actual speed eg. tacho generators. This is fixed.

## New Functions

No.	Affected Component	Description
1	Position Encoder / Support of multi-turn encoders via SSI/BiSS-C/AES	MC V3.0 can now read and use protocol based absolute encoders. Supported protocols are SSI or BiSS-C. Available resolution in total is up to 30 bit. <b>Please note:</b> A special execution number of the controller might be needed for non-Faulhaber absolute encoders (please contact our MCSupport)
2	Encoder / Resolution	Single turn resolution can now be up to 22 bit
3	Position Encoder / load side sensor	A new parameter – reduction ratio in object 0x2319 – allows for correct calculation of internal speed reference, if the position encoder is mounted at the load side after a gearhead or a belt drive. See AppNotes.
4	Position Encoder / Scaling	The scaling of the motor encoder can now be changed in the same way as the ref encoder. This also enables to invert the direction by using a gain of -1.
5	OpMode-handling / compatibility to PLCs	The handling of switches between OpModes has been adjusted to suite the requirements of PLC environments. It is safe now to include the OpMode into cyclical PDOs even for the FAULHABER specific OpModes.
7	D-hall commutation – support of 3 <sup>rd</sup> party motors	A wider range of 3 <sup>rd</sup> party motors can now be operated. See AppNotes. Applies to block commutation only.
8	2pole-AES	2p AES are now fully supported
9	3rd party AES for commutation	The phase offset for 3 <sup>rd</sup> party SSI/AES sensors can now be configured. So these sensors can even be used for commutation if directly coupled to the motor. Please note: if such an encoder shall be used for commutation the $d\phi$ has to be $> 0$ for positive movement. See AppNotes.
10	Firmware update/downgrade	FW-updates are now supported via the MoMan using the new .bix file format. This also allows for in field downgrades. The required .bix archives have to be ordered via special execution number.