

Overview over the changes and new functionality of Motion Controller V3.0 firmware revision L (compared to K).

Changes and fixes

No.	Affected Component	Change Description
1	CSP & round table (0x60F2)	When CSP is used in round table mode (position option code 0x60F2.00 = 0x00C0 and a non-integer reduction ratio of a gearhead is scaled into the factor group the quantization errors are now accumulated and even after numerous turns a move to e.g. 3 o'clock will end at the correct position.
2	BiSS-C encoders	The warning bit of the frame is no longer reported as an error.
3	Motors	Added a suitable commutation angle for BXT motors when operated in sine-commutation combined with an AESL encoder
4	BASIC	FW revision K: $n=a-1$ resulted in an error, $n=a-1$ worked FW revision L: $n=a-1$ is interpreted correctly
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7		

New Functions

No.	Affected Component	Description
1	Target values in CSP and CSV modes	<p>An interpolation rate for target position (0x607A), target speed (0x60FF) or target torque (0x6071) can now be configured in multiples of 100µs. The entry in 0x2332.00.</p> <p>This can be used to avoid stepwise setting new target values and is recommended to be set to the communication cycle time of either CANopen or EtherCAT when CSP or CSV is used.</p>
2	Torque filter	<p>Torque actual value (0x6077) can now be filtered by a filter time configured in 0x234B.02. This is used to remove measurement noise from the signal. Default value is 2ms filter time.</p>
3	Sine Commutation	<p>Commutation rate is now 20kHz</p>
4	BiSS-C Encoder	<p>For a BiSS-C encoder additional error codes and improved error handling has been added.</p> <p>Error code for a Fault signaled from the encoder is 0x7320.</p> <p>Error code for an CRC error is 0x7321.</p> <p>Encoder errors are deleted, when the respective encoder is no longer configured</p> <p>In case of an CRC error the actual position is estimated out of the last one and the last speed value.</p> <p>The frame can be configured to have a fixed number of preceding bits. The frame format is configured in 0x2315.06</p> <p>Frame format Rev K [16bit]:</p> <ul style="list-style-type: none"> • single turn bits [8] • multi turn bits [8] <p>Frame format Rev L [32bit]:</p> <ul style="list-style-type: none"> • reserved [8] • preceding bits [8] • single turn bits [8] • multi turn bits [8]
5	BiSS-C Absolute Encoder	<p>Using the bit 11 in the encoder configuration 0x2315.01 the position of a multi-turn absolute encoder can be interpreted to be signed value. So left from 0 there is a -1 ... - whatever</p>
6	BiSS-C Encoder	<p>Preliminary compensation of encoder errors added. Can be fully used with the next MotionManager 6.7</p>

7	Motor control	<p>Gain scheduling for position loop</p> <p>Using 0x2347.02 a gain scheduling similar to the one of the speed loop (0x2347.01) can be configured. The gain of the position loop will be reduced accordingly when inside the target corridor. Can be used to avoid oscillations in applications having stick/slip effects</p>																		
8	Motor control	<p>Turn of the integral part of the velocity loop</p> <p>Object 0x2344.06 can either disable the integral part of the velocity loop or freeze it when inside the target corridor.</p> <p>Settings are:</p> <p>0x2344.06 = 01: Value of the integral part is frozen when inside the target corridor</p> <p>0x2344.06 = 02: integral part of the velocity loop is completely switched off</p>																		
9	Profile generator	<p>For trapezoidal profiles acceleration and deceleration can be reduced to $1/s^2$.</p>																		
10	Motors	<p>Support of the sin/cos version of the LM series. The mapping is</p> <table border="1" data-bbox="459 862 1136 1346"> <thead> <tr> <th data-bbox="459 862 794 918">3 x Hall</th> <th data-bbox="794 862 1136 918">Sin/Cos</th> </tr> </thead> <tbody> <tr> <td data-bbox="459 918 794 969">Phase C</td> <td data-bbox="794 918 1136 969">Phase C</td> </tr> <tr> <td data-bbox="459 969 794 1021">Phase B</td> <td data-bbox="794 969 1136 1021">Phase B</td> </tr> <tr> <td data-bbox="459 1021 794 1072">Phase A</td> <td data-bbox="794 1021 1136 1072">Phase A</td> </tr> <tr> <td data-bbox="459 1072 794 1124">GND</td> <td data-bbox="794 1072 1136 1124">GND</td> </tr> <tr> <td data-bbox="459 1124 794 1176">UDD</td> <td data-bbox="794 1124 1136 1176">UDD</td> </tr> <tr> <td data-bbox="459 1176 794 1227">Hall C</td> <td data-bbox="794 1176 1136 1227">reserved</td> </tr> <tr> <td data-bbox="459 1227 794 1279">Hall B</td> <td data-bbox="794 1227 1136 1279">Sin</td> </tr> <tr> <td data-bbox="459 1279 794 1330">Hall A</td> <td data-bbox="794 1279 1136 1330">Cos</td> </tr> </tbody> </table>	3 x Hall	Sin/Cos	Phase C	Phase C	Phase B	Phase B	Phase A	Phase A	GND	GND	UDD	UDD	Hall C	reserved	Hall B	Sin	Hall A	Cos
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