JetMove 2xx

Version update from V. 2.15 to V. 2.16

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1   Introduction

Overview - Version 2.16

The following table gives an overview of newly added or enhanced features and fixed software bugs:

Version	Function	New	Enhanced	Fixed
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	Capture feature for Encoder2		✓	
	Referencing to zero pulse for Encoder2		✓	
V. 2.15.0.02	Motor temperature warning threshold		✓	
	Incremental encoder emulation		✓	
	Status display of Safe Standstill			✓
V. 2.15.0.03 V. 2.15.0.04 V. 2.15.0.06	Torque-off with speed limitation		✓	
V. 2.15.0.07	Synchronization		✓	
V. 2.15.0.08	At a JC-940MC or JC-970MC, the axis cannot be enabled			✓
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V. 2.15.0.12	Control of the brake			✓
V. 2.15.0.13	Encoder optimization with sin-cos encoders		✓	
V. 2.15.0.14	At a JC-940MC or JC-970MC, the axis cannot be enabled			✓
V. 2.15.0.15	Reading out capture values			✓

2   Enhancements

Introduction

Jetter AG are continuously striving to add new features and functions to the JetMove 2xx servo drives. By updating your OS you are given the possibility to enhance the functionality of your servo drive. To do so, you need the following:

- an OS file
- the software tool JetSym
- a connection between PC and JetMove

Operating system of the controllers

Due to changes made to the sync offset when synchronizing an MC controller with the JetMoves, as of this OS version 2.16.0.00, only the controller OS versions of the following minimum version numbers may be applied:

Controller	Minimum OS version
JC-940MC	1.10.0.00
JC-360MC	1.28.0.00
JC-365MC	1.28.0.00

Encoder type SSI with option JM-200-CNT

Introduction	(#1771) By means of option JM-200-CNT, SSI encoders can from now on be evaluated.
Enhancement	The following prerequisites must be met for application:

- For encoder evaluation, either rotary single or multiturn encoders can be applied, given their resolution is not greater than 65,536 increments per revolution.
- The SSI encoder can only be used for sensing the master position to be reported to a follower control.
- The SSI encoder cannot be used for motor control or commutation.
- The sampling frequency must be set so that the total of transfer time + 10 µs is not greater than 250 µs.

Configuration

Take the following steps to configure an SSI encoder:

- R241 - Type encoder 2 = 20 (SSI encoder on optional board JM-200-CNT). Simultaneously, the value of R240 - Encoder 2, status bit #0 goes back to 0.
- R254 - Encoder2_SSI-Config1: Write value to register
- R255 - Encoder2_SSI-Config3: Write value to register
- R242 - Encoder2_Specify resolution (increments per revolution)
- R240 - Encoder2 status bit #0 = 1 indicates the end of encoder initialization.

R254

Encoder2 SSI-Config1

Bit	Purpose
0	Always = 1
3 … 1	Always = 0
7 … 4	SSI encoder transmission rate The following settings can be made: 1111 = 100 kHz 1110 = 200 kHz 1101 = 1 MHz
13 … 8	Data word length, binary notation Permitted lengths: 8 ... 48 bits
23 … 14	Always = 0
31 … 24	Always = 48 hex

Example: Hengstler RA58-M/1212EK.42TGSG of 24 bits @200 kHz:
R254 = 0x480018E1

R255

Encoder2 SSI-Config2

Bit	Purpose
0	Parity: OFF (0), ON (1)
1	Format: Fir-tree (0), serial, right-aligned (1)
2	Gray to bin: ON (1), OFF (0)
7 … 3	Resolution - Single-turn in bits/revolution (this is only required for fir-tree format)

Example: Hengstler RA58-M/1212EK.42TGSG, fir-tree format, Gray code: R255 = 0x00000064

Availability

The enhancement takes effect as of the following versions/revisions:

OS version	JetMove 2xx	2.15.0.01
	JetMove D203	not available
	JetMove 1xx	not available

Capture feature for Encoder2

Introduction	(#1771) Now, the capture feature is available for encoder 2 on option JM-200-CNT.
Enhancement	The capture feature can only be used, if the optional board JM-200-CNT has been populated, and if the connected encoder is to make the leading axis-position available for further motion systems on the bus. The feature is available for all encoder types which can be evaluated by the module JM-200-CNT.
Configuration	The capture function is enabled via R451 - Vax-Mode = 10. This way, the operating mode of the virtual leading axis of the controller is set to position capture of Encoder2.

R451

Function mode

Value	Purpose
10	Position capture of Encoder2

R515

DigIn.TriggerEdge

A capture event is triggered via trigger input at connector X10 of the controller. Via register R515 - DigIn.TriggerEdge, edge evaluation of the trigger input can be set:

Value	Purpose
0	Input disabled
1	Positive edge
2	Negative edge
3	Both edges

Note: The time constant of the trigger input is approximately 5 ms.

R256

Encoder2 - Amount of capture events

Each capture event is counted in this register. By writing to the register, its value can be set to zero.

By writing value 10 to R451 (operating mode of the virtual position counter), the counter value of R256 can be set to zero as well.

R257

Encoder2 - Capture position

To this register, the position of Encoder2 (R249) at the instance of the edge being at the trigger input of the controller is stored. By writing to the register, the position value can be set to zero.

By writing value 10 to R451 (operating mode of the virtual position counter), the position value of R257 can be set to zero as well.

Availability

The enhancement takes effect as of the following versions/revisions:

OS version	JetMove 2xx	2.15.0.01
	JetMove D203	not available
	JetMove 1xx	not available

Referencing to zero pulse for Encoder2

Introduction

(#1771) Option JM-200-CNT lets you reference the position of an incremental encoder as Encoder2 by means of the zero pulse.

Note

The referencing feature can only be used, if the optional board JM-200-CNT has been populated, and if R241 Encoder2.type = 12 (incremental encoder) has been set.

Configuration

Referencing is started by command R101 = 38 - Start referencing Encoder2.

This involves the following actions:
- R240 - Encoder2.Status bit 2 (waiting for zero pulse) is set.
- R240 - Encoder2.Status bit 3 (reference is set) is cleared, if it was set.

The encoder is still being evaluated. Simultaneously with the zero pulse, the following actions are being carried out:
- R243 - Encoder2.Phi is set to zero (encoder angle)
- R249 - Encoder2.PosAct is set to zero (load-side position)
- R250 - Encoder2.TurnAct is set to zero (load-side modulo turns)
- R240 - Encoder2.Status bit 2 (waiting for zero pulse) is cleared
- R240 - Encoder2.Status bit 3 (reference is set) is cleared

Note: Command 38 can also be triggered via trigger input at connector X10 of the controller. For this, the following steps have to be taken:
- R532 - Trigger command = 38 (start referencing Encoder2)
- R557 - Trigger mode = 2 (triggered command)

When the trigger input is active, it transmits the command written to R532 to command register R101.

Availability

The enhancement takes effect as of the following versions/revisions:

OS version	JetMove 2xx	2.15.0.01
	JetMove D203	not available
	JetMove 1xx	not available

Motor temperature warning threshold

Introduction

(#3808) R602 - Motor temperature warning threshold is now writable and can be set according to the requirements.

R602

Register 602: Motor temperature - Warning	
Function	**Description**
Read access	Present motor temperature warning threshold
Write	New motor temperature warning threshold
Variable type	int16
Value range	0 … 255 [°C]
Value after reset	120 [°C]

Availability

The enhancement takes effect as of the following versions/revisions:

OS version	JetMove 2xx	2.15.0.02
	JetMove D203	2.15.0.01
	JetMove 1xx	not available

Incremental encoder emulation

Introduction   (#3809) Optional board JM200-EMU lets you make an incremental encoder emulation.

Enhancement   Optional board JM-200-EMU lets you now make an incremental encoder emulation based on the set position value.

R233

Register 233: Type of encoder emulation	
Function	**Description**
Read access	Present encoder emulation
Write	New encoder emulation
Variable type	Enumerator
Value range	0 … 4
Value after reset	0

Value	Purpose
0	Encoder emulation has been switched off
1	Emulation referring to the actual position value at the motor
2	Emulation referring to the actual position value at the load
3	Emulation referring to the set position value for the motor
4	Emulation referring to the set position value for the load

Availability   The enhancement takes effect as of the following versions/revisions:

OS version	JetMove 2xx	2.15.0.02
	JetMove D203	not available
	JetMove 1xx	not available

Torque-off with speed limitation

Introduction

(#3833) Torque-off in mode 2, step 3, up to now caused the speed limitation to be completely undone after deactivating. Soft caps could cause the speed to be rapidly incremented during holding torque. This lead to negative screw-capping results.

Enhancement

658 Torque-off: Current setpoint filter

659 Torque-off: Speed limitation

R658

Register 658: Current setpoint filter for torque-off	
Function	**Description**
Read access	Present current setpoint filter
Write	New current setpoint filter
Variable type	Float
Value range	0.0 ... 4.0 [A]
Value after reset	0.0 [A]

For mode 2 only:

After recognition of the speed-controlled shut-off threshold, the current setpoint filter R497 is set to the value of this register. By means of this parameter, the rate of the next current increase can be reduced following the speed-controlled shut-off threshold. This filter behaves like a T1 controlling device.

R659

Register 659: Positive speed limitation for torque-off	
Function	**Description**
Read access	Present positive speed limitation
Write	New positive speed limitation
Variable type	int32
Value range	0 ... R118 * = 1.05 rpm
Value after reset	R118 * = 1.05 rpm

For mode 2 only:

After recognition of the speed-controlled shut-off threshold, the positive speed limit is set to the value of this register. This helps to prevent too high speed values during dwell time.

Note

If the registers named above are applied, the changed values of R128 (speed limit) and R497 (current setpoint filter) must be reset after torque-off.

2 Enhancements

Availability

The enhancement takes effect as of the following versions/revisions:

OS version	JetMove 2xx	2.15.0.06
	JetMove D203	2.15.0.02
	JetMove 1xx	2.15.0.02

Referencing to zero pulse of the second encoder

Introduction

(#4038) While the axis is referencing, recognition of the K0 pulse can be switched from the first to the second encoder.

R462

Register 462: Referencing, K0 selection	
Function	**Description**
Read access	Present referencing, K0 selection
Write	New referencing, K0 selection
Variable type	Enumerator
Value range	1 … 2
Value after reset	1

Value	Purpose
1	K0 of the first encoder has been selected
2	K0 of the second encoder has been selected

For this selection, the second encoder must be an incremental encoder.

Availability

The enhancement takes effect as of the following versions/revisions:

OS version	JetMove 2xx	2.15.0.10
	JetMove D203	not available
	JetMove 1xx	2.15.0.03

Synchronization

Introduction	(#4091) For synchronization of an external JetMove or of an MC controller, only acceptable sync frames are used for sync control. After a set instance, the present time is corrected.

Enhancement	The synchronization window and the correction limit can now be modified:

R005

Register 005: Synchronization window	
Function	**Description**
Read access	Present synchronization window
Write	New synchronization window
Variable type	uint16
Value range	0 ... 65536 [0.1 µs]
Value after reset	1 % of the synchronization interval R543 * 100 [0.1 µs]

The synchronization window defines the time range, during which sync frames are accepted.

R006

Register 006: Correction limit for synchronization	
Function	**Description**
Read access	Present correction limit
Write	New correction limit
Variable type	int16
Value range	0 ... 32,767 [0.1 µs]
Value after reset	0.25 % of the synchronization interval R543 * 100 [0.1 µs]

The correction limit defines the time range, from which a 0.1-µs correction of the current time is carried out.

Availability	The enhancement takes effect as of the following versions/revisions:

OS version		JetMove 2xx	2.15.0.07
		JetMove D203	2.15.0.05
		JetMove 1xx	2.16.0.00

Encoder optimization with sin-cos encoders

Introduction	(#4422) For all encoder types which are equipped with a sin-cos interface, the analog values are optimized in JetMove. Encoders of a high number of periods per revolution may only be optimized, if only one change between quadrants per sampling interval has taken place.
Enhancement	After a multiple change of quadrants, recognition of the present quadrant was improved.
Availability	The enhancement takes effect as of the following versions/revisions:

OS version	JetMove 2xx	2.15.0.13
	JetMove D203	2.16.0.00
	JetMove 1xx	2.16.0.00

3 Fixed software bugs

Introduction   This chapter describes the software bugs which have been fixed in the new OS version.

Status display of Safe Standstill

Error description	(#3916) The status display of the Safe Standstill inputs of the option S1 is permanently**1**.

When several JetMove 2xx (> 4) are applied, the capacity at the safe standstill inputs increases to such an extend, that the edges of an OSSD pulse can be delayed. When launching the JetMove, recognition of the optional board S1 is carried out. If this recognition exactly coincides with an OSSD edge, the optional S1 board cannot be recognized precisely.

Under fault condition, the Safe Standstill inputs are permanently set to 1 (R511, bits 6 and 7), while the state of the optional board S1 is set to **0** (R100, bit 9).

This fault does not interfere with the Safe Standstill feature, because the safety function has explicitly been provided via hardware and is still functioning correctly.

Affected versions/revisions

The following versions/revisions are affected by this bug:

OS version	JetMove 2xx	< 2.15.0.02
	JetMove D203	not relevant
	JetMove 1xx	not relevant

Remedy / workaround

Restart of the JetMove

Remedy

Starting from the following versions/revisions this bug has been fixed:

OS version	JetMove 2xx	2.15.0.02
	JetMove D203	not relevant
	JetMove 1xx	not relevant

Synchronization

Error description	(#4091 / 4249 / 4252) As of version 2.15.0.09, time synchronization between JetMove 1xx, 2xx and D203 or between MC controller and JetMove did not function reliably.

- Special value of the synchronization offset (R533) could not be set correctly at a synchronization cycle of 4 ms.
- In case of special constellations, faulty processing could lead to reading the resolver not functioninig any more.
- Various enhancements were made to synchronization control.

Affected versions/revisions

The following versions/revisions are affected by this bug:

Software version	JetMove 2xx	< 2.15.0.11
	JetMove-D203	< 2.15.0.05
	JetMove 1xx	< 2.16.0.00

Remedy / workaround   Disabled

Remedy   Starting from the following versions/revisions this bug has been fixed:

OS version	JetMove 2xx	2.15.0.11
	JetMove D203	2.15.0.05
	JetMove 1xx	2.16.0.00

Control of the brake

Error description	(#4129) The brake of a motor at a JetMove 2xx could get released, although the controller was not active.
	This error occurs, if several motion systems are combined in one technology group, and if the command **Power enable** is to activate the control of all drives. Thus, if one of the drives is not ready for operation (no DC link voltage, Safe Standstill has been requested), it cannot activate the controller and therefore reports an error. This causes the MotionControl to immediately deactivate all drives being part of the group. If these drives have not got to the state **Power enabled** yet, the brake could remain released, although its control was not active.

Affected versions/revisions

The following versions/revisions are affected by this bug:

OS version	JetMove 2xx	< 2.15.0.12
	JetMove D203	< 2.16.0.00
	JetMove 1xx	< 2.16.0.00

Remedy / workaround

Disabled

Remedy

Starting from the following versions/revisions this bug has been fixed:

OS version	JetMove 2xx	2.15.0.12
	JetMove D203	2.16.0.00
	JetMove 1xx	2.16.0.00

At a JC-940 or JC-970, the axis cannot be enabled

Error description	(#4033/4126) Operating a JetMove is not always possible after launching the controller. Wrong values have been written to the variables for input current, DC link voltage, mains voltage, device temperature or ballast load.

Affected versions/revisions

The following versions/revisions are affected by this bug:

OS version	JetMove 2xx	< 2.15.0.14
	JetMove D203	< 2.15.0.06
	JetMove 1xx	< 2.16.0.00

Remedy / workaround   Restart of the controller, new initializing of the system bus

Remedy   Starting from the following versions/revisions this bug has been fixed:

OS version	JetMove 2xx	2.15.0.14
	JetMove D203	2.15.0.06
	JetMove 1xx	2.16.0.00

Reading out capture values

Error description	(#4076) The capture function (storing actual positions in case of a trigger being applied) lets you retrieve the store values from registers 521 through 524. Yet, this register access was not consistent, if, at the same time, data storage was being carried out. In this case, faulty value were read.

Affected versions/revisions

The following versions/revisions are affected by this bug:

OS version	JetMove 2xx	< 2.15.0.15
	JetMove D203	< 2.16.0.00
	JetMove 1xx	< 2.16.0.00

Remedy / workaround

Do not read registers R521 through 524, before the capture event is reported to R513 (Capture status).

Remedy

Starting from the following versions/revisions this bug has been fixed:

OS version	JetMove 2xx	2.15.0.15
	JetMove D203	2.16.0.00
	JetMove 1xx	2.16.0.00

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