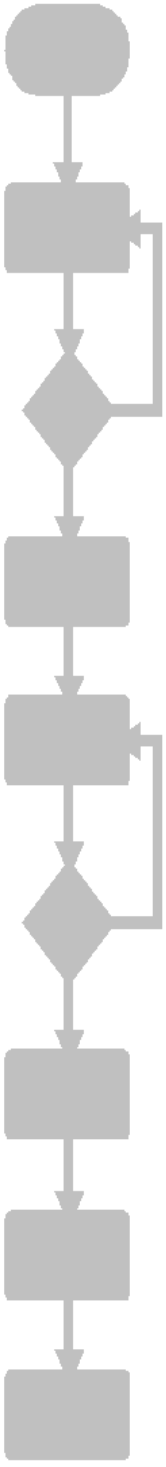

JetMove 105
Version Update
from V2.10 to V2.11

Jetter

Revision 1.01

18.02.2011/ Printed in Germany

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	Oscilloscope		✓

Overview of Version Updates

Version	Feature	New	Fixed
V. 2.11.0.0	Position overflow		✓
	Oscilloscope		✓
	"Reference Set" flag		✓
	Change of positioning speed		✓
	Oscilloscope		✓
	System bus initialization by JetControl 3xx		✓
	Positioning		✓
	Capture edge detection		✓

1 New Features

1.1 Limit switch monitoring

(# 709) As of version 2.10.0.01, only the limit switches will be considered in future during a reference run, which are needed for the selected reference run. Thus, limit switch inputs at the JetMove that are not needed can be used otherwise.

1.2 Table configuration

(# 758) From the first version up to now, 8 table configurations could be carried out.

As of version 2.10.0.02, 24 configurations can be carried out.

1.3 Controlling a linear motor made by LinMot

(# 705) As of version 2.10.0.02, it is possible to run a linear motor made by LinMot at the JetMove 105.
The following parameters have to be set for operating as a minimum:

- Mechanic configuration: linear, normal
- Transmission ratio motor / mechanics: 1:1
- Transmission ratio linear / rotatory: 20 mm / rev.
- Set motor type to value 5 (2-phase stepper motor).
- Carry out a commutation search or set commutation offset (register 116) to approximately -100°.
- Pole pair number (register 123) = 1
- Encoder type: 16 (LinMot)

Register 608: Motor Type	
Function	**Description**
Amplifier status	The amplifier has to be deactivated.
Type / unit	Integer
Value range	0 : 3-phase synchronous motor 5 : 2-phase stepper motor 6 : DC motor
Value after reset	0

As of version 2.10.0.02, this feature is available.

1.4 Current pre-control

(#329) As of version 2.11.0.0, there is a current pre-control to improve the dynamic performance and accuracy of the control.

The function is addressed by the following registers that have to be set according to the driveline characteristics:

- R616 Motor Torque Constant K_T
- R628 Mass Inertia of the Driveline
- R629 Scaling Factor for Current Pre-Control

Registers R628 and R629 have been added and are described below:

Register 628: Mass Inertia of the Driveline	
Function	**Description**
Read / Write	Mass inertia of the driveline at the motor shaft
Type / unit	Float / [kgcm²]
Value range	0.0 …
Value after reset	0.0

Register 629: Scaling for Current Pre-Control	
Function	**Description**
Read / Write	Scaling factor for the current pre-control
Type / unit	Float / [%]
Value range	0.0 … 100.0
Value after reset	0.0

1.4.1 Setting the current pre-control

The current pre-control is to improve the dynamic performance of the entire system in case of motion profiles of high acceleration values. This is achieved by easing the speed controller's integral-action component of having to provide the current setpoint value needed for acceleration. The reason is that the integral-action component can only be changed via setpoint-actual value difference at the controller input. The dynamic performance of this process is mainly determined by the integral-action time of the speed controller.

For correct setting of the current pre-control, the following steps are recommended:

- Displaying the behavior of register R125 "Current Setpoint Value" and R507 "Integral-Action Component" by oscilloscope.
- Set R629 "Scaling the Current Pre-Control" to 100.0 %
- Slowly increase the value of R628 "Inertia" from 0.0 kgcm² up to the known value. In this case, the integral-action component will influence acceleration less and less.
- Ideally, the only remaining issue in the system caused by the integral-action component will be friction. This means, the integral-action component will be approximately proportional to the speed value. The target position is approached directly and without tracking.

- Mass inertia is over-compensated, when the axis starts exceeding, and then tracking back to the target position. In this case, the oscilloscope shows how the integral-action component starts partially compensating the current pre-control, i.e. functioning against the acceleration current.

1.5 Set and Clr registers for capture command

(# 766) As of version 2.10.0.02, the following registers have been made available for directly setting or resetting register R519 "CaptureCommand". These registers also help solving the following problem:
At changing the contents of register R519 "Capture Command" by means of the controlling instructions BitSet( ) or BitClear( ), malfunctions can occur, if the capture function is active at the same time, because the JetSym instructions BitSet( ) or BitClear( ) would be executed by the controller as follows:

- R519 "CaptureCommand" is read by the JetMove
- Set or clear the desired bit
- Writing the contents of R519 "CaptureCommand" to the JetMove

In the time slot between read and write access of the controller, the interrupt task which is in the JetMove can also change register R519 "CaptureCommand" - exactly at the moment of a capture event. This change gets lost because of the write access of the controller, because the controller writes back a former state with changed bit.

Thanks to the Set and Clear registers, there is a smart solution to this problem. Register R519 CaptureCommand can be changed as desired without its value being fed to the controller and back again.
Settings of the registers mentioned below:

- The bit assignment corresponds to R519
- = 1: The set bits clear the corresponding bit in R519.
- = 0: The set bits have no effect.
- Values can be written to the register at any time with immediate effect.

Register 631: CaptureCmd Set	
Function	**Description**
Read / Write	Register for setting R519 CaptureCommand
Type / Unit	Integer / [-]
Value range	0x0000 – 0x010E
Value after reset	0x0000

Register 632: CaptureCmd Clear	
Function	**Description**
Read / Write	Register for resetting R519 CaptureCommand
Type / Unit	Integer / [-]
Value range	0x0000 – 0x010E

Value after reset	0x0000

1.6 Current setpoint filter

Register 497: Current Setpoint Filter	
Function	**Description**
Read / Write	Current time constant for the current setpoint filter
Type / unit	Float / [ms]
Value range	0.0 – 4.0
Value after reset	0.0

The current setpoint filter influences the setpoint value of the current control as a T1 constituent. As the setpoint value is within the speed control loop, the filter-time constant is directly integrated into the total of the minor time constants. This has to be considered when setting the parameters for the speed controller.

1.7 Oscilloscope function: Pre-trigger

(# 830) As of version 2.11.0.0, a pre-trigger is available in the osci function.

1.8 Analog input deactivation

(# 960) Analog input deactivation is applied if the analog input is to carry out an action within JetMove. When the first voltage threshold is exceeded, the motor is decelerated; when a subsequent voltage threshold is exceeded, the brake is locked. The reaction time is 2 ms max.

As of version 2.10.0.05, this function is available.

2 Corrections

2.1 Capture values influenced by dead time

(# 743) Until now, capture values have been recorded internally with a dead time of 2 ms.

As of version 2.10.0.01, this problem has been resolved.

2.2 "Ready for Operation" flag

(# 745) Until now, encoder reinitialization was started immediately after an F09 encoder error was acknowledged and the "Ready for Operation" flag R100.10 was set again.

With a resolver, reinitialization takes approximately 700 ms. The axis must not be activated during this time, as it may behave in an uncontrolled way. As a workaround, register R520.0 = 1 (encoder status.encoder init. = ok) has to be queried before issuing command 1.

As of version 2.10.0.01, bit R100.10 "Ready for Operation", which is in the status register, is linked with the encoder status bit R520.0 by an AND operation. This makes it possible to activate the axis immediately (after issuing command 8), if the R100.10 "Ready for Operation" bit is set.

2.3 Oscilloscope

(# 747) As of the first version, the analog input could not be recorded by the oscilloscope.

As of version 2.10.0.01, this problem has been resolved.

2.4 Position overflow

(# 750) At positioning by position overflow or underflow around position 0, a tracking error would sometimes occur. This problem only occurred during operation by an external MC.

As of version 2.10.0.01, this problem has been resolved.

2.5 Oscilloscope

(# 695) The trigger function applying to the tracking error would not function.

As of version 2.10.0.03, this problem has been resolved.

2.6 "Reference Set" flag

(# 871) Until now, the "Reference Set" bit in the R100 status register of the controller was always reset if registers R158 Bus_fm_MasterPosMax or R159 Bus_fm_MasterPosMin

were written to in the relevant JetMove. As these two registers affect the leading axis configuration, the reference status of the axis must not change.

As of version 2.10.0.03, this situation has been given due consideration.

2.7 Change of positioning speed

(# 912) Since the first version, it has been possible to initiate positioning by changing the positioning speed (command 13).

This is no longer possible as of version 2.10.0.03.

2.8 Oscilloscope

(# 859) Since the first version, simultaneously writing and reading an oscilloscope record has proven capable of triggering a system reset.

As of version 2.10.0.03, this problem has been resolved.

2.9 System bus initialization by JetControl 3xx

(# 923) Until now and under certain circumstances, CAN bus initialization performed in conjunction with a JetControl 3xx would sometimes freeze.

As of version 2.10.0.04, this problem has been solved.

2.10 Positioning

(# 944) Until now, very short travel distances and linear ramps could lead to sudden changes in position after positioning had been completed.

As of version 2.10.0.05, this problem has been resolved.

2.11 Capture

(# 986) Via capture command 34, the capture signal has been statically recorded and is not edge-triggered.

As of version 2.11.0.0, this problem has been resolved.