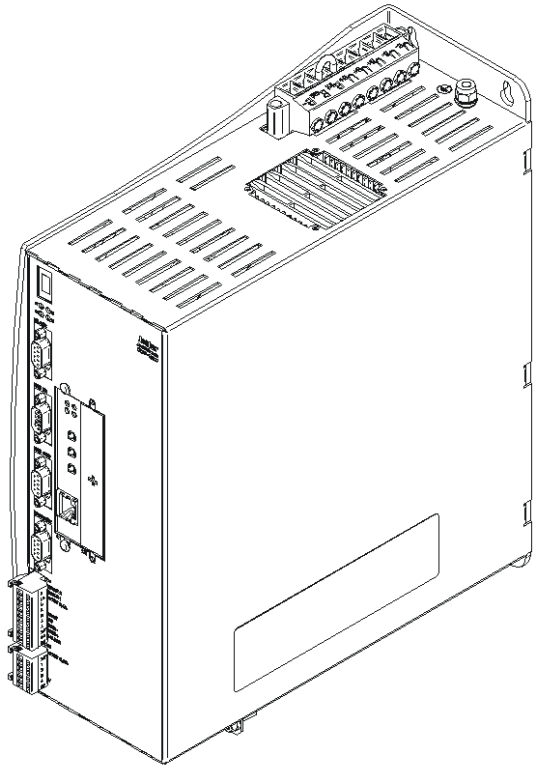
JetMove 2xx

at the NANO System Bus



JetWeb

User Information

Jetter
AKTIENGESELLSCHAFT

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History

Edition	Comment
2.03.4	First edition

Description of Symbols



Danger

This sign is to indicate a possible impending danger of serious physical damage or death.



Caution

This sign is to indicate a possible impending danger of light physical damage.
This sign is also to warn you of material damage.



Important!

This sign is to indicate a possible impending situation which might bring damage to the product or to its surroundings.
This symbol also points to conditions, which must be by all means be given heed to, in order to guarantee faultless functioning.



Note!

You will be informed of various possible applications and will receive further useful suggestions.
Further, it points to tipps and advice for efficient use of the device and for optimization of the corresponding software, in order to save you extra work.

· / -

Enumerations are marked by full stops, strokes or scores.



Operating instructions are marked by this arrow.



Automatically running processes or results to be achieved are marked by this arrow.



Illustration of PC and user interface keys.



This symbol refers to further information (data sheets, literature, etc.) on the subject or product or the like that is being dealt with. Further, this text provides helpful hints for your guidance through the manual.

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1 Introduction

This user information describes the functions of the product JetMove 2xx of the operating system version V 2.03.

In this manual, connecting the JetMove 2xx to the system bus of Jetter AG and the operation will be described. Additional information on the contents of this document is given in the instructions for the specific sizes of the JetMove 200 series.

1.1 Product Description

The JetMove 200 series by Jetter offers modern servo amplifers for being applied with synchronized servo motors.

1.2 System Requirements

The JetMove 200 amplifiers can be operated by NANO controllers and by the JX6-SB-I submodule. This document is valid as of version 2.03 of JetMove 2xx.

The JetMove 2xx amplifiers can directly be connected to the Jetter system bus. It is still possible to simultaneously operate all non-intelligent JX2-IO and all intelligent JX2 slave expansion modules made by Jetter AG at the system bus.
The following table shows the minimum required software versions supporting operation of JetMove 2xx on the Jetter system bus.

Software versions of controllers and the JX6-SB-I submodule	
Control	**Minimum Software Version**
NANO-B, NANO-C, NANO-D	no limitation
JX6-SB-I	2.10

2 Register Numbering

2.1 NANO-B/C/D

The following rules for register numbering apply to the controllers NANO-B, NANO-C and NANO-D:

The registers are addressed with the help of five-digit numbers. The first two digits are made up of the slot number of the JetMove 2xx module plus value 10. Below, the pattern of register numbering will be illustrated.

REG 1xzzz

1x zzz



Module Slot
2 .. X

Register Number
0 .. 999

only intelligent modules will be counted.

X = max. permitted amount of intelligent modules to be connected to the CPU (CPU = slot 1)

3 Information on Parameter Values

3.1 Decimal Positions

All parameter values that are exchanged between JetMove 2xx and the controller are integer values. Integer values are values without decimal positions. Nevertheless, internal decimal positions, such as position definitions in [°] or [mm]. In order to make this possible, the integer value that is read by, respectively written to, the parameter, will contain 1 to 3 decimal positions. The post-comma positions are noted as the one to three decimal positions of lowest value.

Whether there are decimal positions contained in the parameter value, and how many there are, can be taken from the register description. The SI unit of parameters having been set to an SI unit will be noted together with a decimal multiplier.

Example

Parameter "Current Limitation", register 127, unit [Aeff*100]:

Example value: 325 [Aeff*100]

Value applied internally (scaled to an SI-unit A_{eff}) = 3.25
Value read by the controller = 325
Value written by the controller = 325

If in formulas quoted in this manual a register has been specified as an operand, the value must generally be used the way for which it has been scaled internally. This means that in the example quoted above, the value would be 3.25.

3.2 Decimal Positions in Position Values

Position values, such as software limit switch position or target position, have been scaled internally to the unit [°] (mechanic degrees) or to the unit [mm]. Which unit is used depends on the settings of the axis type, on register 191 "Axis Type" (linear or rotatory).

Independent of the respective unit, the integer position values that are exchanged between JetMove 2xx and the controller, have got between 1 and 3 decimal positions. How many decimal places are to be used can be defined via register 870 "Decimal positions for position values". The decimal positions should only be defined once, namely during axis setup.

4 Brake

For the description of connections and electrical data, please refer to the JetMove 2xx operator's manual.

The brake is controlled by means of a relay placed in the amplifier. The following parameters for handling the brake are available:

- Register 540 "Mode of operation 1"
- Register 548 "Delay at closing the motor brake"
- Register 547 "Delay at releasing the motor brake"
- Register 574 "Control word 2"
- Register 575 "Status word 2"

Via register "Mode of operation 1", a choice can be made between automatic and manual operation of the brake.

If the default values are kept, automatic operation will be set. While selecting the mode of operation, the brake will always be controlled at activating and deactivating the amplifier. At switching on, the relay contacts will be closed; at switching off, the relay contacts will be released again.

If there is no brake, automatic mode can be set. This would mean, though, that the relay will always be controlled via the amplifier. Else, you can select the manual mode to prevent the relay from being controlled.

The control state of the brake can be read out of register 575 "Status word 2" in bit 0 at any time.

If manual mode has been selected, the brake can either be controlled via register 574 "Control word 2" by bit 0 (in automatic mode, setting and resetting the bit is of no effect), or it can be controlled via an external switch which connects the 24 V voltage supply to, respectively disconnects it from the brake.

If an external switch has been selected, bit 0 of register 574 "Control word 2" must always be set in order to always keep the relay contacts closed.

5 Axis Setup

5.1 Step 1: Motor Settings

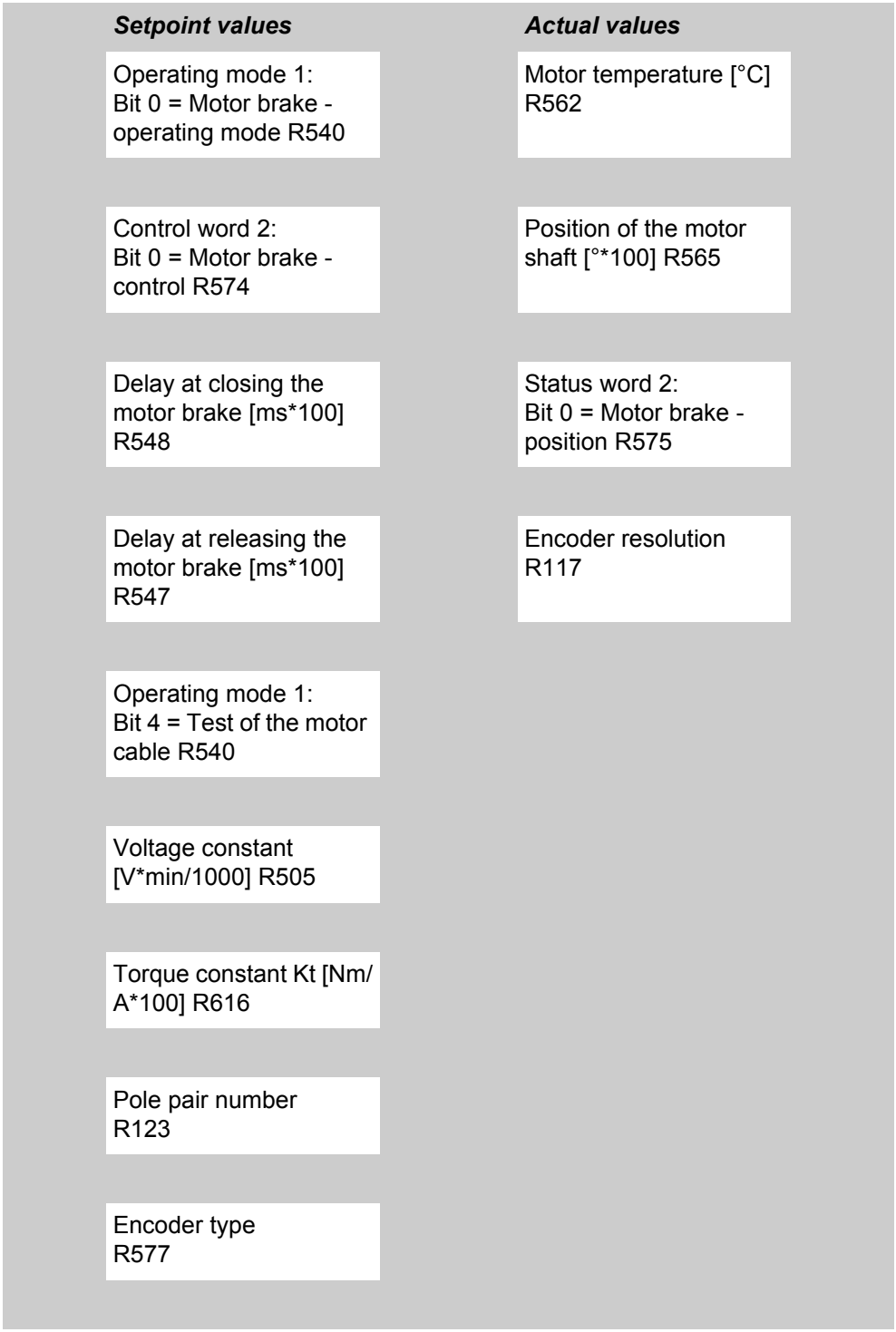


Fig. 1: Motor parameters

1 Defining the motor parameters for motors from other manufacturers

This only applies if no Jetter motor, but motors from other manufacturers are used

The default commutation offset value is 0. For a motor made by another company it must possibly be adjusted. If required, an appropriate value must be set by Jetter AG.

Possibly, the pole pair number must be adjusted as well. The default value is 3.

Example:

One Jetter motor has got 6 poles which are energized in pairs; this means there are 3 pole pairs. For further information, please refer to the register description of the motor parameters as of chapter 9.7 "Motor Parameters", page 95.

2 Defining the brake parameters

Only for motors equipped with a brake

Selecting the operating mode of the brake via operating mode 1. Via bit 0 of operating mode 1, the operating mode of the brake can be set as follows:

Bit 0:	0	=	Manual operation of the brake by the user (via register 574 "Control word 2")
	1	=	Automatic operation of the brake by the amplifier (The brake will automatically be released, respectively closed, when the amplifier is released, respectively closed)

The automatic mode is set by default.

Via **control word 2**, bit 0, the brake can be controlled the same way as in manual mode:

Bit 0:	0	=	Lock the brake
	1	=	Release the brake

In order to control the brake by control word 2, manual operation must first be set by means of operating mode 1.

Status word 2, bit 0, will indicate the status of the brake as follows:

Bit 0:	0	=	Brake is closed
	1	=	Brake has been released

Release and lock times of various brakes differ dependent on the respective motor manufacturers and motor types. For this reason, it might be necessary to adjust the delay times for releasing and closing the brake to your requirements. For this, please refer to **delay at releasing the motor brake** and **delay at locking the motor brake** as of page 97.

3 Setting the motor cable monitoring parameters

Setting the motor cable monitoring via operating mode 1. Via bit 4 of operating mode 1, motor cable monitoring can be set as follows:

Bit 4:	0	=	Motor cable monitoring is deactivated by default
	1	=	Motor cable monitoring is activated

Monitoring is activated by default If motor monitoring is active, a motor cable test will be carried out at switching on the axis after hardware reset. If the motor cable is defect, error F03 will be displayed. Possible error causes can be breakage of, or ground fault on the motor cable.

If long motor cables are used, error F03 can be recognized through the monitoring function, although none of the listed error causes applies. Only in this case, deactivating the monitoring function is useful.

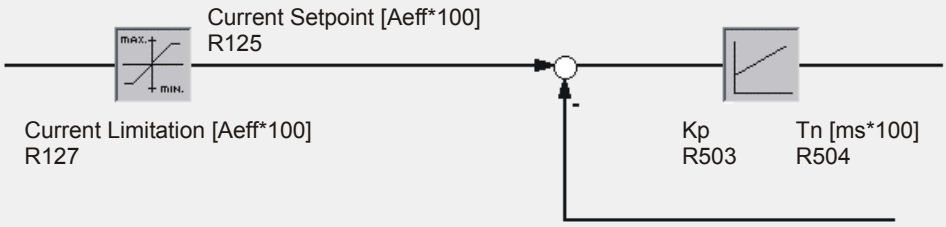
4 Setting the voltage constant

If highly dynamic drives are used, the parameter voltage constant should be adjusted. For this, please refer to the motor data sheet or the rating plate of the motor. For further information, please refer to the register description of the parameters as of page 96.

5 Setting the torque constant

The torque constant is necessary for displaying a valid actual torque in register 621 "Actual torque". If the torque constant equals zero, the actual torque equals zero as well.

5.2 Step 2: Settings of the Current Control



Setpoint values	***Actual values***
Continuous rated current [A_{eff}*100] R618	Actual current [A_{eff}*100] R561
Overload factor R619	Actual current [%] R620
Current control Kp R503	Actual torque [Nm*1000] R621
Current control Tn R504	Max. output current [A_{eff}*100] R502

Fig. 2: Current control

1 Setting the maximum output current

The maximum output current, stored in register 502, is set by input of the continuous rated current, register 618 (continuous rated current put together of the motor parameters, as shown on the rate plate, for example), and the overload factor, register 619. The maximum output current can range between 200 % and 50 % of the continuous rated current of the amplifier as stored in register 501. The maximum output current is the product of continuous rated current and the overload factor.



Note!

At value input, please mind the value standardization of individual registers, see register description.

2 Setting the controller parameters K_p and T_n

The proportional amplification $\mathbf{K}_p$, register 503, and the integral-action time $\mathbf{T}_n$, register 504, of the current control must be calculated and input. Formulas for parameter calculation can be found in the register description.

5.3 Step 3: Axis Definition

Setting the axis type

First, the axis type must be set via register 191 "Axis type".

Setting the motion mode

In the motion mode, the definition is made, whether the axis is a standard or a modulo axis. The mode is set via register 192 "Modulo axis".

Software limit switch

The software limit switch monitoring is NOT active by default. If software limit switch monitoring is to be carried out, bit 6 of register 540 "Operating mode 1" must be set.

6 Referencing



Attention!

The axis could crash into the mechanical limits!

In the following cases, a limit switch will NOT be considered:

- **During reference run "With zero pulse only"**
- **If the axis is positioned on the reference switch**
- **From the moment of starting the search for the reference position (reference search) to finding it.**

In case of reverse polarity of the hardware limit switches, the limit switch being positioned in the direction of the reference run will be ignored; this will cause the axis to crash into the mechanical limits.

Before referencing is started for commissioning, proper functioning of the hardware limit switches and of the reference switch must be ensured. For this, please mind correct polarity and assignment to either negative or positive limit switch. The polarity is defined via register 510 "Digital inputs: Input polarity".

Definitions

Zero pulse	Zero-crossing of the resolver, reset pulse of the incremental encoder
"Reference switch active" flank	The reference switch signal will change from logical zero to logical one
"Reference switch deactived" flank	The reference switch signal will change from logical one to logical zero
Switch search	The first part of referencing: Searching for the reference switch, respectively for a limit switch
Searching for the reference position	The second part of referencing, after having found the reference or limit switch: Searching for the reference position, respectively for the zero pulse

Key to the following illustrations:

N	=	Negative limit switch	V_{ref}	=	Speed of switch search
P	=	Positive limit switch	V_{ZM}	=	Speed of search for reference position
R	=	Reference switch	ZM	=	Zero pulse ("zero mark")
SP	=	Starting position	NP	=	Normal position
s	=	Distance	NP distance	=	Normal position: distance

6.1 Control Mode

For referencing, the position control mode must be set. This is done via register 572 "JetMove set operating mode".

6.2 Starting the Reference Run

A reference run is started by means of command 9:

```
...
REGISTERLOAD (rCommando, zkRefSearch)
WHEN BIT_CLEAR (rStatus, zbBusy) THEN
...
```



Attention:

During the reference run, command 9 "Search for reference" cannot be given again.

If the parameters for referencing are changed while a reference run is in process, they will at first have no effect on this reference run. As of the next reference run, the alterations will be effective.

6.3 Interrupting the Reference Run

The user can interrupt a reference run by means of the following commands:

- Command 5
- Command 6
- Command 7

6.4 Status Information

If bit 0 "RefOK" of register 100 "Status" is set at starting the reference run, it will be reset. Bit 1 "Stopped" of register 100 will also be reset.

If referencing has been completed and correct, both bits will be set. If referencing has been stopped due to an error or by the user (by means of command 6, for example), only bit 1 "Stopped" will be set, as soon as the axis has come to a standstill again.

Those two bits can be used for continuing the PLC program after starting the reference run.

Error Messages

Referencing errors are output in register 170 "Positioning errors". They will not be displayed at the amplifier by means of F and error number. If a referencing error occurs, bit 0 "RefOK" of register 100 "Status" will not be set. Bit 1 "Stopped" of register 100 will be set in case of an error, as soon as the axis has come to a standstill.

6.5 Axis Type

Referencing is possible without any restrictions both with settings for a linear axis and with settings for a rotatory axis via register 191 "Axis type". If a modulo axis has been set in register 192 "Modulo axis", there are no restrictions for referencing either.

6.6 Modes of Referencing

There are various modes of referencing to choose from:

- Referencing by means of zero pulse only
- Referencing by means of reference and limit switch
- Referencing by means of limit switch (there is no reference switch, for example)
- Referencing by reference switch only

The mode of referencing is selected by means of the switch type parameter of register 161 "Switch type". The modes of referencing will be explained below.

6.7 Settings of Speed

Two different speed values can be set for referencing:

- Speed of the reference switch search set in register 162 "Speed of switch search".
- Speed of searching for the reference position set in register 166 "Speed of reference search".

The speed setting for switch search will also be used for driving back to the normal position, see "Setting the Specific Reference Position" below.

Referencing will be started by the speed of switch search. When the switch has been found, the speed of the reference point search will be set for driving to the reference position.

Normally, the speed of the reference point search is lower than the speed of the switch search. These values have also been set by default.

For neither of the two speed settings, there is a specific limitation. Normally, though, referencing is done in low speed.

The speed values will be set once before referencing; they cannot be changed during referencing.

Fig.: 3 shows a typical motions sequence of various speeds:

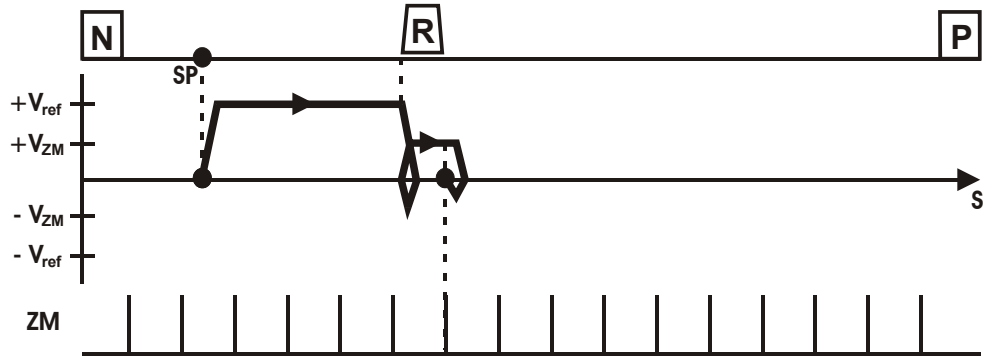


Fig. 3: Referencing by various speeds

6.8 Speed Reversal

Besides setting the direction of referencing via register 160 "Direction of referencing", the rotational direction of the axis can be set via register 540 "Operating mode 1", bit 5 "Change of rotation". This value applies to all axis motions, not only to referencing.

Below, referencing for setting a positive rotatory direction will be illustrated. If a negative direction of rotation has been set, the respective graphic referring to positive direction of rotation must be used for illustrating features such as the motion sequence at referencing in negative direction.

6.9 Reference Position

The reference position can either be the position of the zero pulse ("zero mark") or the position of the switch flank, if referencing is being carried out without zero pulse.

Zero pulse ("zero mark") or switch flank

In register 165 "Reference mark" it is defined, whether the reference point is to be the position of the zero pulse ("zero mark") or the position of the switch flank.

We recommend setting the zero pulse ("zero mark") as home position ("reference mark"). Referring to the zero pulse ("zero mark") offers a much greater repeat accuracy.

Fig.: 4will illustrate referencing with zero pulse ("zero mark") for the switch types "reference and limit switch" and "limit switch only":

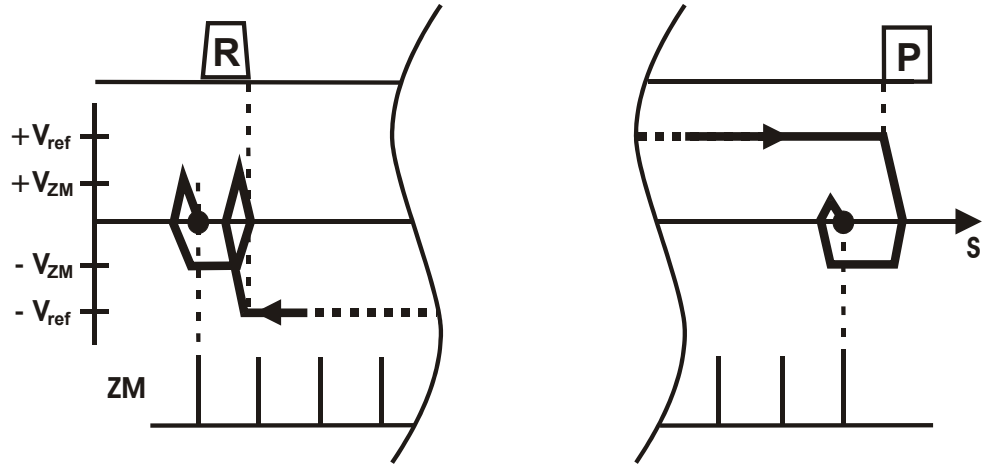


Fig. 4: Referencing with zero pulse ("zero mark")

Fig.: 5will illustrate referencing without zero pulse ("zero mark") for the switch types "reference and limit switch" and "limit switch only":

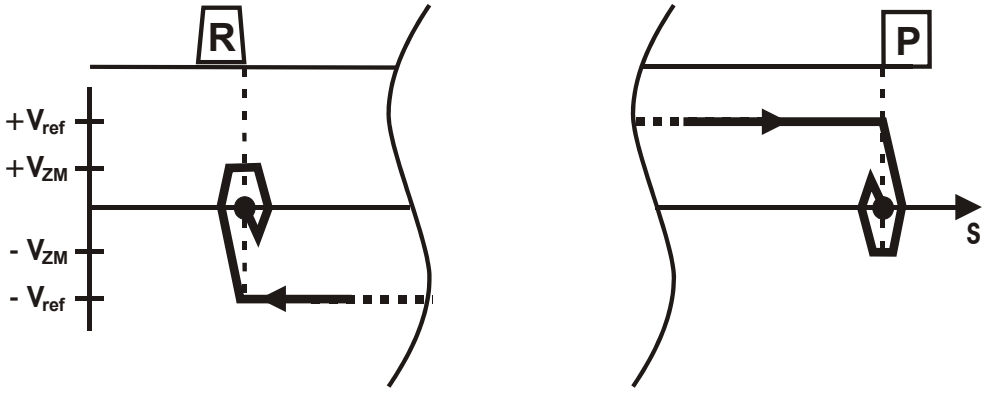


Fig. 5: Referencing without zero pulse ("zero mark")

6.10 Setting the Specifically Defined Reference Position

There is the possibility of driving to another position in the travel range immediately after finding the reference position (register 168 "Normal position - distance"). This position is called normal position.

For "normal position", any position value can be chosen (register 169 "Normal position - position").

In the following illustration Fig.: 6, the motion sequence of the axis when driving towards normal position will be shown (NP = normal position, NP distance = normal position - distance):

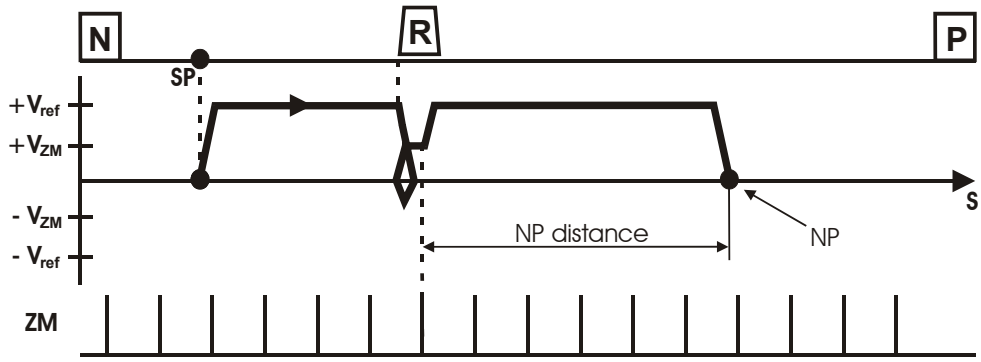


Fig. 6: Driving towards "normal position"

The speed by which the axis is driving towards normal position is the speed of the switch search; it is set in register 162 "Speed switch search".

Via register 168 "Normal position - distance", the distance to be covered from reference to normal position will be input. A negative value causes the axis to move in negative direction, seen from the reference position.

Via register 169 "Normal position - position", the position will be input that is to be set as virtual position after having reached "normal position". The virtual position is set at the reference position, if there is no "normal position" to be driven to; this means that register 168 = 0.

6.11 Referencing by Means of Zero Pulse ("Zero Mark") Only

For this reference run, the axis will start in the set referencing direction by the set reference search speed. When the zero pulse ("zero mark") has been recognized, the axis will return towards the position of the zero pulse ("zero mark").

During this travel, the motor will make one rotation as a maximum. The setting of the reference position in register 1x165 "Reference mark" does not take effect here.



Please mind:

During this reference run, limit switches will not be monitored.

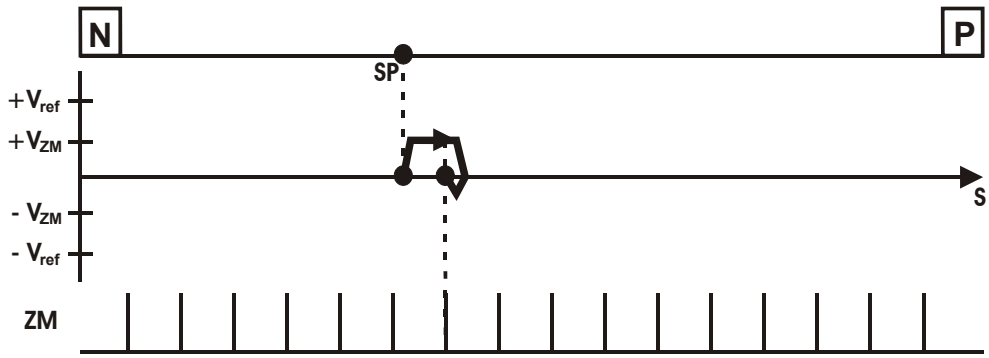


Fig. 7: Referencing only by means of zero pulse ("zero mark") in positive direction; the rotatory direction is positive; the starting position is on the negative side of the zero pulse.

6.12 Referencing by Means of Reference and Limit Switch

Prerequisites for this reference run are a reference switch, as well as the positive and negative limit switch.

The reference run with its respective starting positions and directions will be explained below.

6.12.1 Positive direction

Die Achse wird durch die automatische Referenzfahrt immer so bewegt, dass die Referenzpunktsuche immer von der negativen Seite des Referenzschalters durchgeführt wird.

Starting from the positive side of the reference switch

– The axis will start by "Speed switch search" in positive direction.
– When the positive limit switch has been recognized, the axis will reverse and continue in negative direction by "Speed switch search".
– The axis will cross the reference switch, until the "Reference switch deactivated" flank has been recognized.
– There, the axis will reverse again to drive in positive direction by "Speed reference search".
– The reference position is set to the first zero pulse after having recognized the "Reference switch active" flank again. For referencing without zero pulse ("zero mark"), the reference position is set to the position of the "Reference switch active" flank.

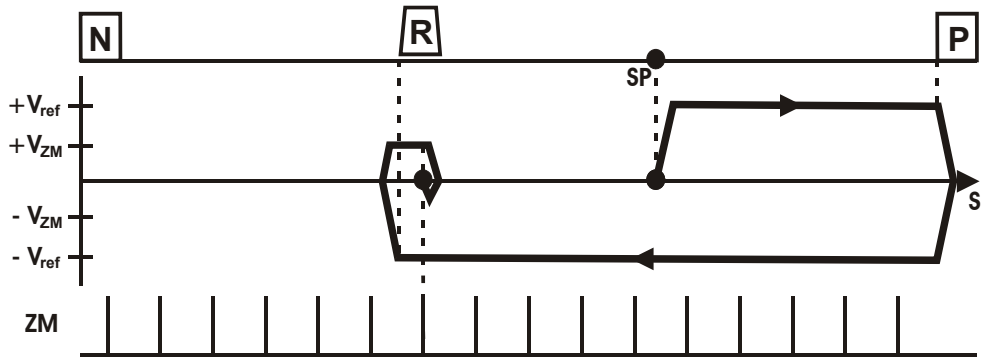


Fig. 8: Referencing by reference and limit switch in positive direction; the rotatory direction is positive; with zero pulse ("zero mark"), the starting position is on the positive side of the reference switch.

Starting from the negative side of the reference switch

– The axis will start in positive direction by "Speed switch search".
– When the reference switch active flank has been recognized, the axis will drive back in negative direction by "Speed switch search", until it reaches the position, where the reference switch active flank has been recognized.
– There, the axis will reverse again to drive in positive direction by "Speed reference search".
– The reference position is set to the first zero pulse after having recognized the "Reference switch active" flank again. For referencing without zero pulse ("zero mark"), the reference position is set to the position of the "Reference switch active" flank.

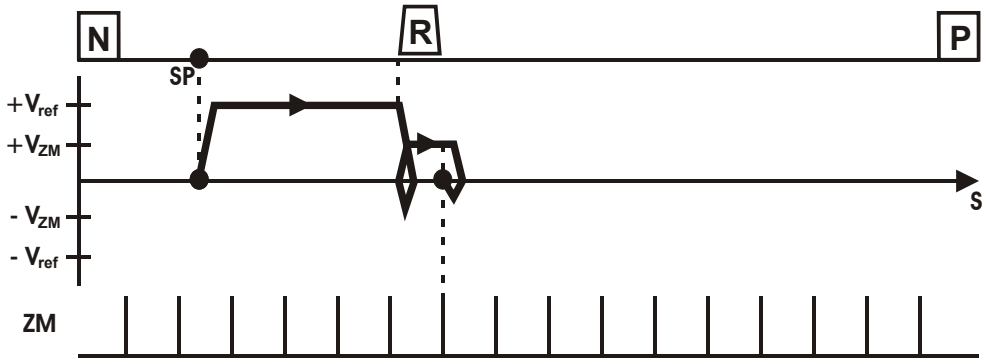


Fig. 9: Referencing by reference and limit switch in positive direction; the rotatory direction is positive; with zero pulse ("zero mark"), the starting position is on the negative side of the reference switch.

Starting on the reference switch

– The axis will start in negative direction by "Speed switch search".
– When the reference switch has become deactivated, the axis will reverse and continue in positive direction by "Speed reference search".
– The reference position is set to the first zero pulse after having recognized the "Reference switch active" flank again. For referencing without zero pulse ("zero mark"), the reference position is set to the position of the "Reference switch active" flank.

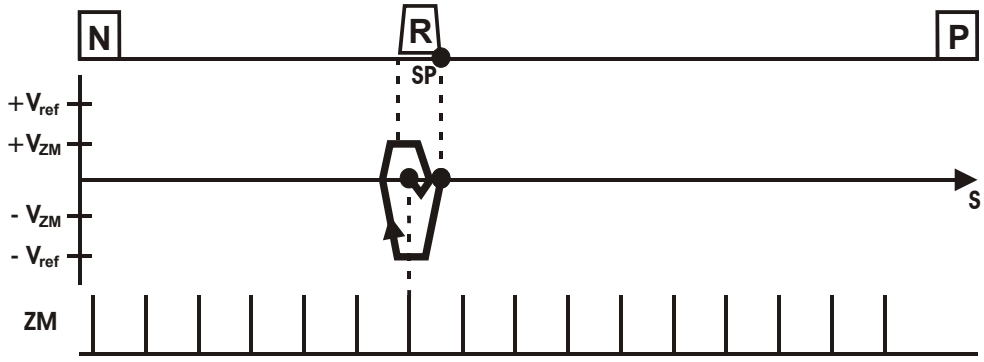


Fig. 10: Referencing by reference and limit switch in positive direction; the rotatory direction is positive; with zero pulse ("zero mark"), the starting position is on the reference switch.

6.12.2 Negative direction

During automatic referencing, the axis will always be moved so that reference search is being carried out from the positive side of the reference switch.

Starting from the positive side of the reference switch

– The axis will start in negative direction by "Speed switch search".
– When the reference switch active flank has been recognized, the axis will drive back in positive direction by "Speed switch search", until it reaches the position, where the "Reference switch active" flank has been recognized.
– There, the axis will reverse again to drive in negative direction by "Speed reference search".
– The reference position is set to the first zero pulse after having recognized the "Reference switch active" flank again. For referencing without zero pulse ("zero mark"), the reference position is set to the position of the "Reference switch active" flank.

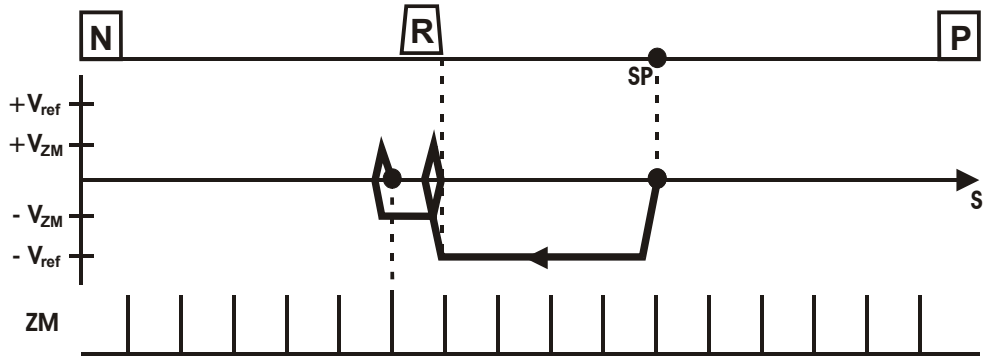


Fig. 11: Referencing by reference and limit switch in negative direction; the rotatory direction is positive; with zero pulse ("zero mark"), the starting position is on the positive side of the reference switch.

Starting from the negative side of the reference switch

– The axis will start in negative direction by "Speed switch search".
– When the negative limit switch has been recognized, the axis will reverse and continue in positive direction by "Speed switch search".
– The axis will cross the reference switch, until the "Reference switch deactivated" flank has been recognized.
– There, the axis will reverse again to drive in negative direction by "Speed reference search".
– The reference position is set to the first zero pulse after having recognized the "Reference switch active" flank again. For referencing without zero pulse ("zero mark"), the reference position is set to the position of the "Reference switch active" flank.

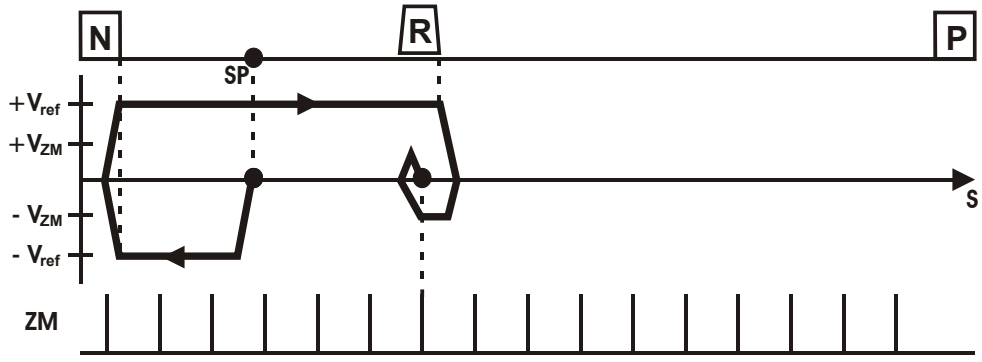


Fig. 12: Referencing by reference and limit switch in negative direction; the rotatory direction is positive; with zero pulse ("zero mark"), the starting position is on the negative side of the reference switch.

Starting on the reference switch

– The axis will start in positive direction by "Speed switch search".
– When the reference switch has become deactivated, the axis will reverse and continue in negative direction by "Speed reference search".
– The reference position is set to the first zero pulse after having recognized the "Reference switch active" flank again. For referencing without zero pulse ("zero mark"), the reference position is set to the position of the "Reference switch active" flank.

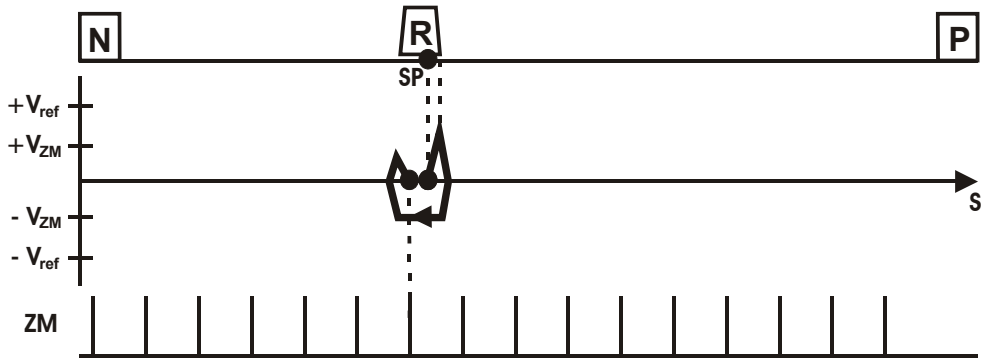


Fig. 13: Referencing by reference and limit switch in negative direction; the rotatory direction is positive; with zero pulse ("zero mark"), the starting position is on the reference switch.

6.13 Referencing by only One Limit Switch

If the limit switch has been found when driving in referencing direction, the axis will be referenced there.

The limit switch being positioned in negative direction will be ignored, until the axis has reversed on the limit switch positioned in positive direction. When the axis has reversed and the limit switch being positioned in the new direction has been recognized, the axis will be stopped and an error will be output in register 170 "Positioning Error" (bit 18 "Reference: Limit switch positive" or bit 19 "Reference: Limit switch negative").

Starting in positive direction

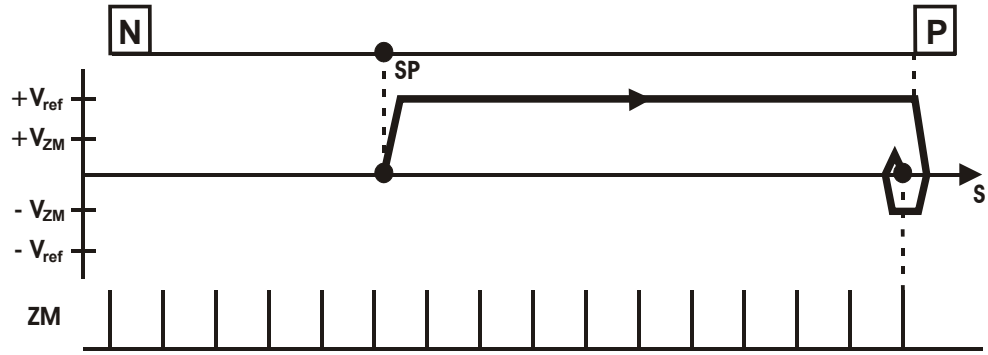


Fig. 14: Referencing by limit switch only; positive direction, positive rotatory direction, starting position preceeding the positive limit switch.

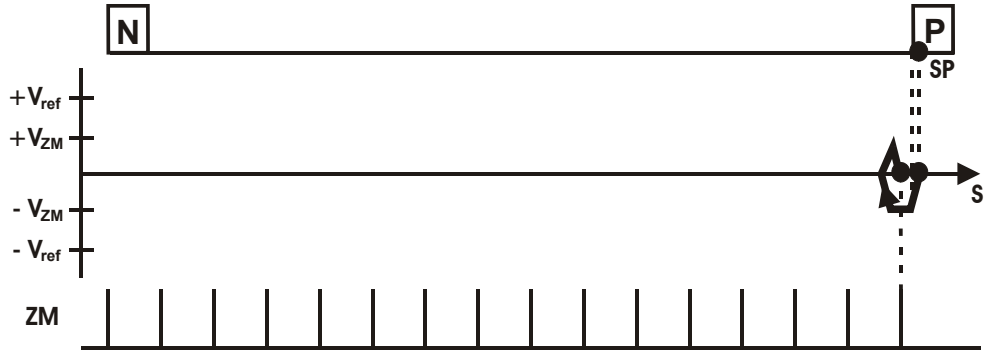


Fig. 15: Referencing by limit switch only; positive direction, positive rotatory direction, starting position on the positive limit switch.

Starting in negative direction



Fig. 16: Referencing by limit switch only; negative direction, positive rotatory direction, starting position preceeding the negative limit switch.

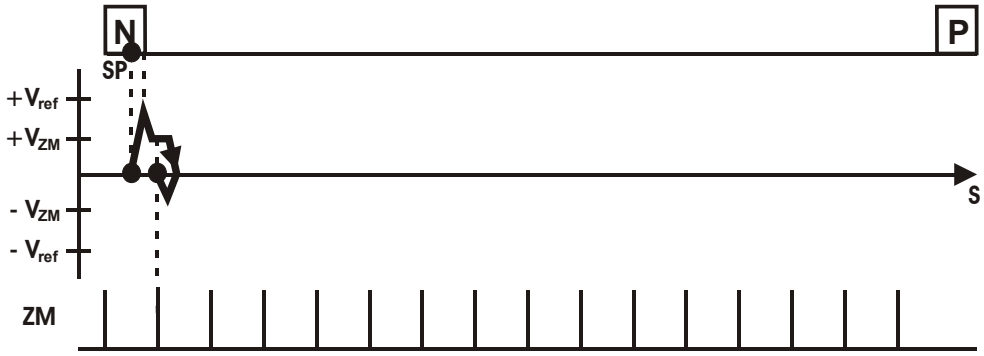


Fig. 17: Referencing by limit switch only; negative direction, positive rotatory direction, starting position on the negative limit switch.

6.14 Referencing by Reference Switch Only

The axis drives to the reference switch to be referenced there. When, during the reference run, the limit switch being positioned in the referencing direction has been recognized, the axis will be stopped and an error will be output in register 170 "Positioning Error" (bit 18 "Reference: Limit switch positive" or bit 19 "Reference: Limit switch negative"). The limit switch being positioned in negative direction will be ignored.

This type of referencing is used with a conveyor belt, for example, which is to be reset to zero after each turnover.

For the sequence of motions, please refer to chapter 6.12 "Referencing by Means of Reference and Limit Switch", page 29.

7 Positioning

7.1 Endless Positioning



Attention!

Endless positioning is only allowed, if the axis is set to modulo mode.

Transition can be made from endless positioning to Ptp-positioning. Yet, it is not possible to make transition from a running Ptp-positioning endless positioning.

Command 57 "Reversing of an endless positioning" will not consider the changes in the positioning parameters, such as speed, which have been made after starting the endless positioning.

8 Oscilloscope Function

The following registers can be used for oscilloscope recording in JetSym both as recording and as trigger parameters:

- Register 109 "Actual position"
- Register 111 "Set speed value"
- Register 112 "Actual motor speed"
- Register 119 "Actual tracking error"
- Register 125 "Set current value"
- Register 129 "Actual mechanic speed"
- Register 130 "Set position value"
- Register 560 "DC link voltage"
- Register 561 "Actual current value"
- Register 562 "Motor temperature"
- Register 563 "Device temperature"
- Register 564 "Ballast workload"
- Register 565 "Motor shaft position"
- Register 566 "Device input current"
- Register 567 "Supply voltage"
- Register 568 "Controller card temperature"

9 Register Description

9.1 Control Parameters

Register 101: Command	
Function	**Description**
Read	Latest command
Write	Issuing a new command
Amplifier status	No specific status
Validity	Wait for the busy-bit in the status to be reset
Value range	0 ... 32.767
Value after reset	0

ATTENTION:

When a command has been issued, the PLC program cannot make another access to the amplifier, unless the busy-bit in the status register has been reset by the amplifier.

Commands:

The following commands are available:	
1	Activating the output stage
2	Deactivating the output stage
3	Set the reference (actual position = the target position has been set, also considering the tracking error)
5	Stop positioning by the maximum deceleration rate that is permitted (see R180)
6	Stop positioning by the deceleration ramp (R106)
7	Stopping an axis motion by the emergency stop ramp (R549) **ATTENTION:** When the ramp has been covered, the output stage will automatically be deactivated.
8	Acknowledging an error
9	Search for reference
10	Starting an absolute positioning run
11	Starting an absolute positioning run related to time
12	Changing an absolute target position

The following commands are available:	
13	Changing a speed value
15	Changing an acceleration value
16	Changing a deceleration value
20	Starting a relative positioning run
22	Changing a relative target position
32	Starting the setup mode
33	Stopping the setup mode (The stop will not be made unless the next target position has been reached)
56	Starting an endless positioning run **ATTENTION:** Endless positioning is only allowed, if the axis is set to modulo mode. The direction of rotation is defined via register 142.
57	Reversing an endless positioning run **PLEASE NOTE:** Command 57 is used in order to reverse an endless positioning run that has already been started. This means that the actual motion direction will be reversed.

Register 515: Dig. outputs - switch status	
Function	**Description**
Read	Value of the actual switch status
Write	New value of the switch status
Amplifier status	No specific status
Validity	Immediately
Value range	bit-coded, 24 bits
Value after reset	0

This only applies to JetMove 215/208

By means of this register, the status of the outputs can be queried, while other outputs can be set and reset.

Meaning of the values:

0 : The output has been / will be reset

1 : The output has been set / will be reset

Meaning of the individual bits:

Bit 0:	Output 1
Bit 1:	Output 2
Bit 2:	Output 3
Bit 3:	Output 4

Register 516: Dig. registers for setting outputs	
Function	**Description**
Read	Value set last
Write	New set value
Value range	bit-coded, 24 bits
Value after reset	0

This only applies to JetMove 215/208

By means of this register, only outputs can be set. If only individual outputs are to be set, this register will make faster setting of outputs possible than if register 515 were used.

Meaning of the values:

0 : The output will not be affected

1 : The output is set

Meaning of the individual bits:

Bit 0:	Output 1
Bit 1:	Output 2
Bit 2:	Output 3
Bit 3:	Output 4

Register 517: Dig. outputs are reset by this register	
Function	**Description**
Read	Latest reset value
Write	New reset value
Value range	bit-coded, 24 bits
Value after reset	0

This only applies to JetMove 215/208

By means of this register, only outputs can be reset. If only individual outputs are to be reset, this register will make faster resetting of outputs possible than if register 515 were used.

Meaning of the values:

0 : The output will not be affected

1 : The output will be reset

Meaning of the individual bits:

Bit 0:	Output 1
Bit 1:	Output 2
Bit 2:	Output 3
Bit 3:	Output 4

Register 540: Operating mode	
Function	**Description**
Read	Present state value of drive mode 1
Write	New state value of drive mode 1
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	bit-coded, 16 bits
Value after reset	0b 00000010 1001x011

ATTENTION:
If JetMove 2xx is used together with a NANO-CPU, bit 9 must **always** be set. The bit has been set by default. In order to prevent important bits from being reset unintentionally, we recommend to set, respectively reset, the bits one by one.

Meaning of the individual bits:

Bit 0: **Automatic control of the brake by means of the amplifier**

0 = Manual control by the user (via register 574, bit 0)

1 = Automatic control by the amplifier

Value after reset: 1

Bit 1: **Automatic control of the ventilator placed in the amplifier**

0 = The ventilator is always switched on

1 = Depending on the respective temperature, the ventilator will automatically be switched off or switched on

Value after reset: 1

Bit 2: **Reserved**

Bit 3: **Phase monitoring**

Here, the decision is made, whether, in 3-phase-mode, phase monitoring is to be activated or not. If phase monitoring has been activated, yet not all three phases are pending, error message F02 will be output.

0 = Phase monitoring has been deactivated

1 = Phase monitoring has been activated

Value after reset for JetMove 215: 1

Value after reset for JetMove 203, 206: 0

Bit 4: **Motor cable test**

Here, a decision is made, whether the motor cable test is to be carried out or not. Switching off might be necessary in case of long motor cables. When the motor cable test has been activated, and if a ground fault of the motor or a motor cable break have been detected, error message F03 will be output.

0 = Motor cable test has been deactivated

1 = Motor cable test has been activated

Value after reset: 1

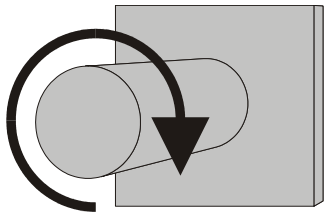
Bit 5: **Speed reversal**

By means of this bit, for all axis motions (position, speed and current control), the direction of rotation will be conversed.

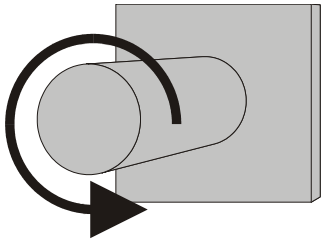
ATTENTION:
Please mind correct assignment of the hardware limit switches

Meaning of the individual bits:

0 = Positive direction of rotation (clockwise rotation of the motor shaft, looking at the shaft from the A-side; the set values are positive)



1 = Negative direction of rotation (counterclockwise rotation of the motor shaft, looking at the shaft from the A-side; the set values are positive)



Value after reset: 0 (Positive direction of rotation)

Bit 6: Software limit switch

0 = The software limit switch evaluation has been deactivated

1 = The software limit switch evaluation has been activated

Value after reset: 0

Bit 7: Hardware limit switch

0 = The hardware limit switch evaluation has been deactivated

1 = The hardware limit switch evaluation has been activated

Value after reset: 1

Bit 8: Reserved

Bit 9: JetMove 2xx at the NANO / ConMove

ATTENTION:

If JetMove 2xx is used together with a NANO-CPU, this bit must **always** be set.

0 = JetMove 2xx at ConMove

1 = JetMove 2xx at NANO

Value after reset: 1

Register 541: Operating mode of the 7-segment display	
Function	**Description**
Read	Number of the actual operating mode
Write	New number of the operating mode
Value range	0 ... 1
Value after reset	0

See JetMove 2xx operator's manual

Meaning of the values:

0 : Normal operation

1 : Installation

Register 572: Set operating mode	
Function	**Description**
Read	Number of the presently set operating mode
Write	Number of the newly set operating mode
Amplifier status	The amplifier must be deactivated
Validity	When the amplifier is activated again
Value range	101, 102, 103
Value after reset	103

Here, the operating mode is set, in which the controller is to be run.

Meaning of the values:

101 : Current control (only the current control is active)
A set current value can be input via register 125

102 : Speed control (current control and speed control are active)
A set speed value can be input via register 111

103 : Position control (current control, speed control and position control are active)

Register 573: Actual mode of operation	
Function	**Description**
Read	Value of the actual operating mode
Write	Illegal
Value range	100 ... 103
Value after reset	100

Here, the actual operating mode the controller had when the output stage was switched on last, can be read.

Meaning of the values:

100 : The output stage has not been activated yet

101 : Current control (only the current control is active)

102 : Speed control (current control and speed control are active)

103 : Position control (current control, speed control and position control are active)

Register 574: Control word 2	
Function	**Description**
Read	Value of the actual control word
Write	New value of the control word
Value range	bit-coded, 24 bits
Value after reset	0

Meaning of the individual bits:

Bit 0: Manual control of the brake

0 = Lock the brake

1 = Release the brake

(A requirement for manual control: In register 540 "Operating mode 1", bit 0 must be set to "Manual operation by the user".)

Register 575: Status word 2	
Function	**Description**
Read	Value of the actual status word
Write	Illegal
Value range	bit-coded, 24 bits
Value after reset	0

Meaning of the individual bits:

Bit 0: Brake

0 = The brake is locked / the relay contacts have been released

1 = The brake has been released / the relay contacts are locked

9.2 Diagnose Parameters

Register 100: Status	
Function	**Description**
Read	Present status
Write	Illegal
Value range	bit-coded, 24 bits
Value after reset	0

From here, the amplifier status can be read. It contains information on the most important amplifier parameters.

Meaning of the individual bits:

Bit 0:	RefOK
Bit 1:	Stopped
Bit 2:	Destination window
Bit 3:	-
Bit 4:	Hardware limit switch negative
Bit 5:	Hardware limit switch negative
Bit 6:	Reference switch
Bit 7:	Software limit switch, negative
Bit 8:	Software limit switch, positive
Bit 9:	-
Bit 10:	The power section is ready for operation
Bit 11:	Power has been released
Bit 12:	Setup mode active
Bit 13:	Busy bit: (For all commands, register 180, register 181, register 184)
Bit 14:	The maximum positioning speed has been reached (the axis has driven beyond the range of the ramps)
Bit 15:	Acceleration ramp
Bit 16:	Deceleration ramp
Bit 17:	-
Bit 18:	There is an error or warning

Meaning of the individual bits:

Bit 19:	Errors
Bit 20:	Danger
Bit 21:	The pulse has been released (hardware release)

Register 170: Error referencing / positioning	
Function	**Description**
Read	Actual errors
Write	Illegal
Value range	bit-coded, 24 bits
Value after reset	0

Actual errors can be read here during referencing or positioning.



Attention!

A number of these errors will NOT be shown on the display of the JetMove 2xx.

Meaning of the individual bits:

Bit 16:	**Referencing: Max. distance reference search** The permitted maximum distance of reference search has been exceeded. The distance can be set via register 167 "Max. distance reference search".
Bit 17:	**Referencing: Max. distance switch search** The permitted maximum distance of switch search has been exceeded. The distance can be set via register 164 "Max. distance switch search".
Bit 18:	**Referencing: Positive limit switch** **Reference switch type consisting of reference and limit switch:** The positive limit switch has been found after changing direction at the negative limit switch during a reference run in negative direction. **Reference switch type, with limit switch only:** The positive limit switch has been found after changing direction at the negative limit switch during a reference run in negative direction. **Reference switch type, with reference switch only:** The positive limit switch has been found during a reference run in positive direction.

Meaning of the individual bits:

Bit 19: Referencing: Negative limit switch

Reference switch type consisting of reference and limit switch:
The negative limit switch has been found after changing the direction at the positive limit switch during a reference run in positive direction.

Reference switch type, with limit switch only:
The negative limit switch has been found after changing direction at the positive limit switch during a reference run in positive direction.

Reference switch type, with reference switch only:
The negative limit switch has been found during a reference run in negative direction.

Register 580: Warnings mask	
Function	**Description**
Read	Actual warnings mask
Write	New warnings mask (this can only be changed with an expert's access authorization, see register 576)
Value range	bit-coded, 24 bits
Value after reset	0b 00000000 00000000 00111111

In the warnings mask, a definition can be made of which warnings are to be displayed and which are not. The assignment of bits can be taken out of the description of register 581 "Warnings".

Meaning of the values:

0 : The warning will not be displayed

1 : The warning will be displayed

Register 581: Warnings	
Function	**Description**
Read	Actual Warnings
Write	Warnings are reset
Value range	bit-coded, 24 bits
Value after reset	0

Meaning of the individual bits:

Bit 0:	W00 Warning threshold for ballast
Bit 1:	W01 Warning threshold for device temp.
Bit 2:	W02 Warning threshold for motor temp.
Bit 3:	W03 Overload PFC
Bit 4:	W04 Input overcurrent
Bit 5:	W05 Warning threshold for board temp.

Register 582: AutoClear mask for warnings	
Function	**Description**
Read	Actual AutoClear mask
Write	New AutoClear mask
Value range	bit-coded, 24 bits
Value after reset	0b 00000000 00000000 00111111

Definitions to be made via AutoClear mask:

- Which warnings are to be automatically reset by the amplifier itself, as soon as they are not relevant any more
- Which warnings are to be manually reset by the user

Manual resetting is carried out by writing into the respective bit in register 581 "Warnings". The assignment of bits can be taken out of the description of register 581 "Warnings".

Meaning of the values:

0 : The warning will automatically be reset by the user

1 : The warning will automatically be reset by the amplifier

Register 585: Error 0 ... 15	
Function	**Description**
Read	Actual errors numbered 00 through 15
Write	Illegal
Value range	bit-coded, 16 bits
Value after reset	0

Meaning of the individual bits:

Bit 0:	F00 Hardware error
Bit 1:	F01 Internal voltage supply error
Bit 2:	F02 One mains phase has failed
Bit 3:	F03 Motor or cable fault
Bit 4:	F04 DC link overvoltage U_{ZK}
Bit 5:	F05 Current overload
Bit 6:	F06 Overload internal ballast resistor
Bit 7:	F07 Shutdown threshold for device temp.
Bit 8:	F08 Shutdown threshold for motor temp.
Bit 9:	F09 Encoder error
Bit 10:	F10 Overspeed
Bit 11:	F11 Current overrange
Bit 12:	F12 Earth fault
Bit 13:	F13 AVR EEPROM failure
Bit 14:	F14 AVR timeout
Bit 15:	F15 Pulse enable failure

Register 586: Error 16 ... 31	
Function	**Description**
Read	Actual errors numbered 16 through 31
Write	Illegal
Value range	bit-coded, 16 bits
Value after reset	0

Meaning of the individual bits:

Bit 0:	F16 Input overcurrent
Bit 1:	F17 Software limit switch
Bit 2:	F18 Limit switch hardware error Referencing: The same hardware limit switch is pressed twice within a short time.
Bit 3:	F19 Timeout ext. error reaction Errors
Bit 4:	F20 U_{ZK}, DC link voltage min. trip
Bit 5:	F21 U_{ZK}, DC link voltage max. trip
Bit 6:	F22 Drive blocked
Bit 7:	F23 Tracking error
Bit 8:	F24 Power supply 24 V failure
Bit 9:	F25 Power supply 15 V failure
Bit 10:	F26 Power supply 5 V failure
Bit 11:	F27 Power supply AVR failure
Bit 12:	F28 Error in power charging circuit (this is only possible with JetMove 215)

9.3 Positioning Parameters

Register 102: Target position	
Function	**Description**
Read	Actual target position
Write	New target position
Amplifier status	No specific status
Validity	At the next positioning run or at command 12
Value range	R183 ... R182 [°] or [mm]. The unit depends on the setting of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value.
Value after reset	0 [°]

Here, the target position for the next point-to-point positioning is specified. Here, the point-to-point positioning can be either absolute or relative. The register can be written into during a positioning run.

The target position is used at the following commands:

- Command 10 "Starting an absolute positioning run"
- Command 11 "Starting an absolute positioning run related to time"
- Command 12 "Changing an absolute target position"
- Command 20 "Starting a relative positioning run"
- Command 22 "Changing a relative target position"



Attention!

Positioning is not started yet by writing into the target position. Only the respective command will cause the positioning run to be started.

The target position of a positioning run that is already in process can be changed. In order to change the target position, the new target position must be written into the register; then, one of the following commands must be issued:

Point-to-point positioning - absolute

- Command 10 "Starting an absolute positioning run"
  The entire positioning will be calculated again. New general conditions can change the behaviour, e.g. speed, of the new positioning run compared to the former one.

- Command 11 "Starting an absolute positioning run related to time"
  The entire positioning will be calculated again. New general conditions can change the behaviour, e.g. speed, of the new positioning run compared to the former one.

- Command 12 "Changing an absolute target position"
  Positioning will only be newly calculated regarding the new target position. New general conditions will not be considered; speed, for example, remains unchanged.

Point-to-point positioning - relative

- Command 20 "Starting a relative positioning run"
  The entire positioning will be calculated again. New general conditions can change the behaviour, e.g. speed, of the new positioning run compared to the former one.

- Command 22 "Changing a relative target position"
  Positioning will only be newly calculated regarding the new target position. New general conditions will not be considered; speed, for example, remains unchanged.

Leading over from endless to point-to-point positioning:

- Command 10 "Starting an absolute positioning run"
  The entire positioning will be calculated again.

Yet, it is not possible for a running point-to-point positioning to be led to endless positioning.

Register 103: Target speed	
Function	**Description**
Read	Actual target speed
Write	New target speed
Amplifier status	No specific status
Validity	At the next positioning run or at command 13
Value range	0 ... R184 [°/s] or [mm/s] (The unit is dependent on the axis type)
Value after reset	0 [°/s]

Here, the target speed for all positioning runs, point-to-point positioning and endless positioning is specified. The register can be written into during a positioning run.

The target speed is used at the following commands:

- Command 10 "Starting an absolute positioning run"
- Command 13 "Changing a speed"
- Command 20 "Starting a relative positioning run"
- Command 56 "Starting endless positioning"



Attention!

If, during a positioning run, a register is written into, the new target speed will not be of any effect, unless the respective command has been issued.

The target speed of a positioning run that is already in process can be changed. For this purpose, the new target speed must be written into the register, and command 13 "Changing a speed" must be issued.

Changing a target speed value is also considered, when, during a positioning run already in process, the following commands are given:

- Command 10 "Starting an absolute positioning run"
- Command 20 "Starting a relative positioning run"
- Command 56 "Starting endless positioning"
  This is only permitted, if the running positioning is an endless positioning; during a running point-to-point positioning, this command must not be issued.

Register 104: Positioning time	
Function	**Description**
Read	Actual positioning time
Write	New (set) positioning time
Amplifier status	No specific status
Validity	Next positioning started by command 11
Value range	0 ... 32,767 [s]
Value after reset	0 [s]

Instead of issuing a speed via register 103, it is also possible to set a time for point-to-point positioning. Then, the speed will result from the actual position, the target position, the content of register 2, and the time set for this.

The amplifier will enter the calculated speed into register 103 "Target Speed"; it will be used at the following positioning run, if the contents of register 103 are not changed.

Positioning related to time is started by issuing command 11 "Starting an absolute positioning run related to time".

The target speed of a positioning run that is already in process can be changed. For this purpose, the new positioning time must be entered into the register and command 11 must be issued. It is insignificant, whether the positioning running at that moment has been started by issuing command 11 or not. Please mind, though, that the speed of the new positioning run can be different from the former one.

A positioning run started by command 11 can be influenced and altered by changing the positioning parameters and by issuing the respective commands.

Register 105: Acceleration	
Function	**Description**
Read	Actual acceleration
Write	Set acceleration
Amplifier status	No specific status
Validity	At the next positioning run or at command 15
Value range	0 ... R180 [°/s²] or [mm/s²] (The unit is dependent on the axis type)
Value after reset	500 [°/s²]

Here, the acceleration for individual positioning runs is specified. The acceleration value is used for starting a positioning run and for the change of speed during a positioning run. This means that, even if, during positioning, the speed is being decelerated, still the acceleration value is used for this deceleration. The deceleration value of register 106 will only be used for deceleration when driving towards the target position and for carrying out command 6 "Stop positioning (user ramp)".

The target speed is used at the following commands:

- Command 10 "Starting an absolute positioning run"
- Command 11 "Starting an absolute positioning run related to time"
- Command 15 "Changing an acceleration value"
- Command 20 "Starting a relative positioning run"
- Command 56 "Starting endless positioning"



Attention!

A low value results in a long ramp, while a great value results in a short ramp.

Two ramp types can be selected for acceleration:

- sine-square ramp (sine-square shaped speed profile)

or

- linear ramp (linear speed profile)

The ramp type can be selected by means of register 140 "Ramp type". The sine-square ramp has been set as the default ramp type.

A sine-square ramp guarantees a soft and jerk-free start. When driving a sine-square ramp, the specified value will be reached in the middle of the acceleration process.

If a linear ramp is driven, acceleration will remain constant; the speed will increase in linear mode during the entire acceleration process.

In the illustration below, various settings for acceleration by sine-square ramp will be shown.

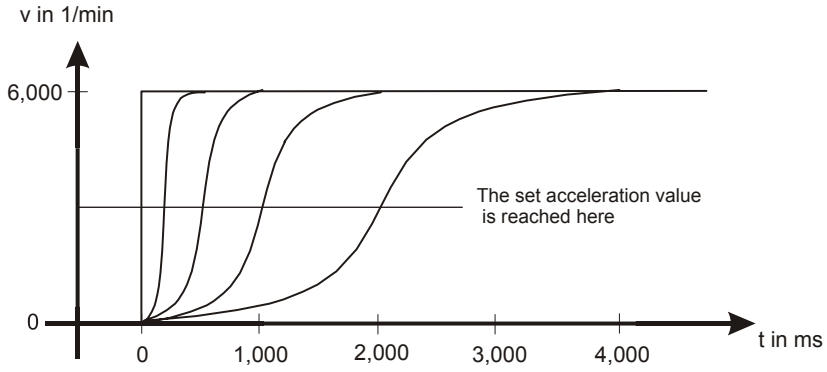


Fig. 18: Acceleration process

The acceleration rate of a positioning run that is already in process can be changed. For this purpose, the new acceleration rate must be written into the register, and command 15 "Changing a speed" must be issued. Yet, this change will not take effect on the actual acceleration ramp, but on the ramp that is to follow.

Changing an acceleration value is also considered, when, during a positioning run already in process, the following commands are given:

- Command 10 "Starting an absolute positioning run"
- Command 11 "Starting an absolute positioning run"
- Command 20 "Starting a relative positioning run"
- Command 56 "Starting endless positioning"
  This is only permitted, if the running positioning is an endless positioning; during a running point-to-point positioning, this command must not be issued.

Register 106: Deceleration	
Function	**Description**
Read	Actual delay
Write	Set delay
Amplifier status	No specific status
Validity	At the next positioning run or at command 16
Value range	0 ... R180 [°/s²] or [mm/s²] (The unit is dependent on the axis type)
Value after reset	500 [°/s²]

Here, the deceleration rate when driving towards the target for positioning runs is specified. The deceleration value will only be used for driving towards the target position and for carrying out command 6 "Stop positioning (user ramp)". For a change of speed during positioning, the acceleration value specified in register 105 will be used. This means that, even if, during positioning, the speed is being decelerated, still the acceleration value is used for this deceleration.

The deceleration for driving towards the target is used at the following commands:

- Command 6 "Stop positioning (user ramp)"
- Command 10 "Starting an absolute positioning run"
- Command 11 "Starting an absolute positioning run related to time"
- Command 16 "Changing a deceleration value"
- Command 20 "Starting a relative positioning run"



Attention!

A low value results in a long ramp, while a great value results in a short ramp.

Two ramp types can be selected for deceleration when driving towards the target:

- sine-square ramp (sine-square shaped deceleration profile)

or

- linear ramp (sine-square shaped speed profile)

The ramp type can be selected by means of register 140 "Ramp type". The sine-square ramp has been set as the default ramp type.

A sine-square ramp guarantees soft and jerk-free deceleration. When driving a sine-square ramp, the specified value will be reached in the middle of the deceleration process.

When driving a linear ramp, the deceleration when driving towards the target (not the deceleration profile) has got a sine-square-shaped speed profile. This way, soft and jerk-free deceleration will be guaranteed as well. When driving a sine-square ramp, the specified value will also be reached in the middle of the deceleration process.

In the illustration below, various settings for deceleration by sine-square ramp when driving towards the target will be shown.

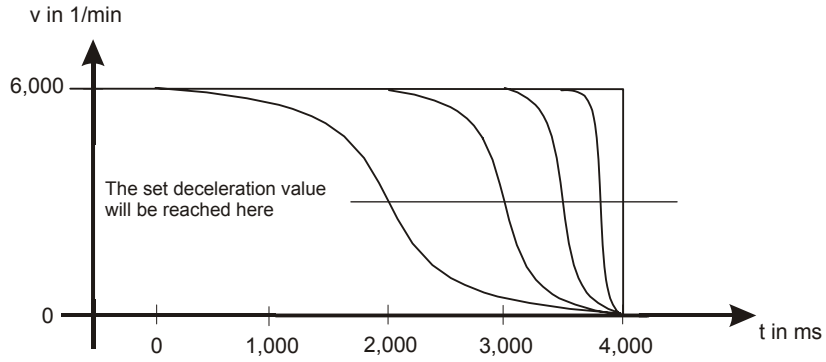


Fig. 19: Deceleration process when driving towards the target

Register 107: Destination window	
Function	**Description**
Read	Present destination window
Write	New destination window
Amplifier status	No specific status
Validity	At the next positioning run or after changing the target position
Value range	0 ... 8,388,607 [°] or [mm] (the unit is dependent on the settings of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value.
Value after reset	1 [°]

Here, the destination window for the target area of a point-to-point positioning can be set. If , after positioning, the axis has reached the destination window, bit 2 "Destination window" will be set in register 100 "Status". The bit will not be reset, unless a new positioning (point-to-point positioning) has been started.

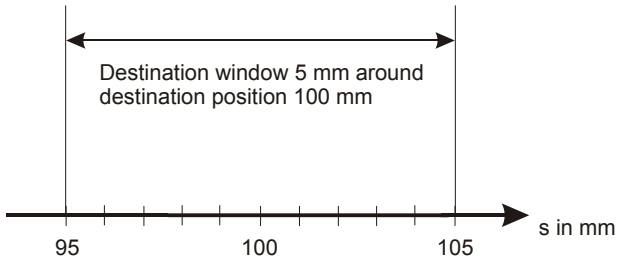


Fig. 20: Example of a destination window



Attention!

If a point-to-point positioning is stopped before the axis has reached the destination window, the destination window bit will not be set. In this case, bit 1 "Stopped" can be used in register 100 "Status".

Faster program flow can be achieved by using the destination window range. The program can be continued, as soon as the axis has reached the destination window.

The general progression condition would be as follows:

```
...
REGISTER_LOAD (rmTargetPosition, 90000)  // Target position 90000
                                         // (° or mm)
REGISTER_LOAD (rmCommand, 10)            // Start ptp positioning

WHEN BIT_CLEAR (rmStatus, 13) THEN       // Wait, until busy-bit
                                         // has been reset
WHEN BIT_SET (rmStatus, 2) THEN          // Wait, till dest. wind. bit
                                         // has been set
...
```

Difference between destination window bit and "Stopped" bit

The destination window bit is set, as soon as the actual position of the axis has reached the destination window. The "Stopped" bit will be set, as soon as the internal set position (not the actual position) has reached the target position. The settings of the destination window take no effect on the "Stopped" bit.

Register 109: Actual position	
Function	**Description**
Read	Actual position
Write	Illegal
Value range	R183 ... R182 [°] or [mm] (The unit depends on the setting of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value.
Value after reset	0 [°]

From here, the actual axis position can be read out. This parameter is often used as a progression condition.

Example:

```
...
WHEN REG rmActPosition > 10000 THEN      // Wait, until the actual
                                         // pos. is greater than 10000
                                         // (° or mm)
OUT 101                                  // Set output 101
...
```

If the axis has not been set to modulo mode in register 192 "Modulo axis", the actual position will not exceed the travel range, which has been set via register 182 "Travel range limit positive" and register 183 "Travel range limit negative". Neither will there be an overflow. At the limits of the travel range, the axis will be stopped automatically. Endless positioning is not permitted here.

If the axis has been set to modulo mode in register 192 "Modulo axis", there will be an overflow of the actual position, when the travel range limits have been exceeded; the actual position will be continued at the value of the other travel range limit. The axis will continue travelling as before. Endless positioning is only permitted for a modulo axis.

Register 129: Actual speed	
Function	**Description**
Read	Actual mechanical speed
Write	Illegal
Value range	-R184 ... R184 [°/s] or [mm/s] (The unit is dependent on the axis type)
Value after reset	0 [°/s]

From here, the actual axis speed can be read out.

Register 131: Setup mode - delay	
Function	**Description**
Read	Present delay value
Write	New delay value
Amplifier status	No specific status
Validity	Immediately
Value range	1 ... 65,535 [ms]
Value after reset	1,000 [ms]

Here, the delay time for setup mode will be specified. The delay time is the duration of waiting at every target position in setup mode, until the next point-to-point positioning towards the other target position is started.

Register 132: Setup mode - position 1	
Function	**Description**
Read	Actual position 1
Write	New position 1
Amplifier status	No specific status
Validity	At the next start into the direction of position 1
Value range	R183 ... R133 [°] or [mm] (The unit depends on the setting of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value.
Value after reset	0 [°]

Here, position 1 (left position) is specified for the setup mode.

Register 133: Setup mode - position 2	
Function	**Description**
Read	Actual position 2
Write	New position 2
Amplifier status	No specific status
Validity	At the next start into the direction of position 2
Value range	R132 ... R182 [°] or [mm] (The unit depends on the setting of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value.
Value after reset	100 [°]

Here, position 2 (right position) is specified for the setup mode.

Register 140: Accel / decel ramp type	
Function	**Description**
Read	Actual ramp type
Write	New ramp type
Amplifier status	No specific status
Validity	At the next positioning run
Value range	0, 1
Value after reset	1

Here, the ramp type will be set for all positioning runs. The ramp type will only be considered when a new positioning run is started; then, it will be valid during the entire positioning process.

Meaning of the values:

0 : Linear ramps

1 : Sine-square ramps

Register 141: Positioning mode	
Function	**Description**
Read	Actual positioning mode
Write	New positioning mode
Amplifier status	No specific status
Validity	At the next positioning run or after changing the target position
Value range	1 ... 4
Value after reset	1

The following only applies to modulo axis:
Here it is specified, from which direction the target position is to be approached.

Meaning of the values:

1 : **Absolute**

The axis will never exceed the travel range; it can be operated and positioned like a standard axis

2 : **Modulo positive**

The axis will always approach the target position from positive direction

3 : **Modulo negative**

The axis will always approach the target position from negative direction

4 : **Modulo auto**

The axis will always approach the target position over the shortest possible distance

Register 142: Motion direction	
Function	**Description**
Read	Actual direction of movement
Write	New direction of movement
Amplifier status	No specific status
Validity	When the next endless positioning is started
Value range	0, 1
Value after reset	0

This only applies to an endless positioning run:
Here, the direction of movement is specified for an endless positioning run.

Meaning of the values:

0 : positive direction

1 : negative direction

Register 143: Basic type	
Function	**Description**
Read	Actual basic type
Write	New basic type
Amplifier status	No specific status
Validity	When the next relative positioning run is started, or when the target position of a relative positioning is changed
Value range	0, 1
Value after reset	0

This only applies to relative positioning:
Here, the basic position (the position, in relation to which values are counted further) is specified for the next relative positioning run.

Meaning of the values:

0 : Latest target position

1 : Actual position

9.4 Referencing - Parameters

Register 160: Direction of referencing	
Function	**Description**
Read	Actual direction of referencing
Write	New direction of referencing
Amplifier status	No specific status
Validity	Next referencing
Value range	0, 1
Value after reset	0

Here, the direction of referencing will be specified. Referencing will then be started by issuing command 9.

Meaning of the values:

0 : Positive direction

1 : Negative direction

For this, please also read chapter 6 "Referencing", page 23.

Register 161: Switch type	
Function	**Description**
Read	Actual switch type
Write	New switch type
Amplifier status	No specific status
Validity	Next referencing
Value range	0 ... 3
Value after reset	1

Here it is specified, which hardware switches are to be used for referencing.

Meaning of the values:

0 : No switches, only zero pulse of the encoder

1 : Reference and limit switches

2 : Only limit switches

3 : Only reference switches

For this, please also read chapter 6 "Referencing", page 23.

Register 162: Speed switch search	
Function	**Description**
Read	Actual search speed
Write	New search speed
Amplifier status	No specific status
Validity	Next referencing
Value range	0 ... R184 [°/s] or [mm/s] (the unit depends on the setting of the axis type)
Value after reset	500 [°/s]

Here the speed is specified, by which the axis starts referencing by switch search. When the switch has been found, the "reference mark" will be searched for. For searching the "reference mark", a specific speed will be set in register 166 "Speed reference search".

Which switch is to be used for referencing (reference switch, limit switch, zero pulse) is defined in register 161 "Switch".

For this, please also read chapter 6 "Referencing", page 23.

Register 163: Acceleration at referencing	
Function	**Description**
Read	Actual acceleration
Write	Set acceleration
Amplifier status	No specific status
Validity	Next referencing
Value range	0 ... R180 [°/s²] or [mm/s²] (the unit depends on the settings of the axis type)
Value after reset	1,000 [°/s²]

Here, the acceleration for referencing is specified. This acceleration value applies to starting and stopping the reference run and to changes of speed. The changes of speed result from various speed settings for the switch search, see register 162 "Speed switch search", and to the search for the "reference mark", see register 166 "Speed reference search".



Attention!

If referencing has been interrupted by issuing command 6, the axis will be brought to a standstill by the deceleration defined in register 106 "Deceleration".

For this, please also read chapter 6 "Referencing", page 23.

Register 164: Max. distance switch search	
Function	**Description**
Read	Actual maximum distance
Write	New maximum distance
Amplifier status	No specific status
Validity	Next referencing
Value range	-8,388,708 ... 8,388,607 [°] or [mm] (the unit is dependent on the settings of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value.
Value after reset	100,000 [°]

Hier wird der maximale Weg angegeben, innerhalb der das Auftreten des Schaltersignals erfolgen muss. The distance will be measured from the starting position of the reference run. If the maximum distance is exceeded, the axis will be stopped and the error "Max. distance switch search" of bit 17 in register 170 "Error positioning" will be output.

For this, please also read chapter 6 "Referencing", page 23.

Register 165: Reference mark	
Function	**Description**
Read	Actual reference mark
Write	New reference mark
Amplifier status	No specific status
Validity	Next referencing
Value range	1, 2
Value after reset	1

Meaning of the values:

1 : Referencing by means of zero pulse

2 : Referencing without zero pulse (this means the reference position will only be the switch flank of the reference switch, respectively of the limit switch)

For this, please also read chapter 6 "Referencing", page 23.

Register 166: Speed reference search	
Function	**Description**
Read	Actual search speed
Write	New search speed
Amplifier status	No specific status
Validity	Next referencing
Value range	0 ... R184 [°/s] or [mm/s] (the unit depends on the setting of the axis type)
Value after reset	100 [°/s]

Here, the speed will be specified, by which the axis approaches the reference position. When the switch signal has been recognized, the reference position will be searched for. The reference position can either be the position of the zero pulse ("zero mark") or the position of the switch flank, if referencing is being carried out without zero pulse.

The switch is searched for by the speed, which has been set in register 162 "Speed of switch search".

For this, please also read chapter 6 "Referencing", page 23.

Register 167: Max. distance reference search	
Function	**Description**
Read	Actual max. distance reference search
Write	New max. distance reference search
Amplifier status	No specific status
Validity	Next referencing
Value range	-8,388,608 ... 8,388,607 [°] or [mm] (the unit is dependent on the settings of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value.
Value after reset	1,000 [°]

Within this maximum distance, the reference mark must be active. The distance will be measured from the starting position of the reference search. If the maximum distance is exceeded, the axis will be stopped and the error "Max. distance reference search" of bit 17 in register 170 "Error positioning" will be output.

For this, please also read chapter 6 "Referencing", page 23.

Register 168: Normal position: distance	
Function	**Description**
Read	Actual acceleration
Write	Set acceleration
Amplifier status	No specific status
Validity	Next referencing
Value range	-8,388,608 ... 8,388,607 [°] or [mm] (the unit is dependent on the settings of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value.
Value after reset	0 [°]

Here, the distance between the virtual normal position and the found reference position is specified. After a successfully completed reference run, the axis is to come to a standstill at the so-called normal position. By "distance", the space is specified, which the axis, after having got to the reference position, must still cover in order to reach "normal position".

For this, please also read chapter 6 "Referencing", page 23.

Register 169: Normal position	
Function	**Description**
Read	Present virtual position
Write	New virtual position
Amplifier status	No specific status
Validity	Next referencing
Value range	-8,388,608 ... 8,388,607 [°] or [mm] (the unit is dependent on the settings of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value.
Value after reset	0 [°]

Here, the position is specified, which, at "normal position" is to be set in register 109 as virtual position.

After a successfully completed reference run, the axis comes to a standstill at the so-called "normal position". For this, please also refer to the description of register 168 "Normal position: distance".

Please also read chapter 6 "Referencing", page 23.

9.5 Axis Parameters

Register 114: Software limit positive	
Function	**Description**
Read	Present value of the virtual software limit switch
Write	New value of the software limit switch
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	-8,388,608 ... 8,388,607 [°] or [mm] (the unit is dependent on the settings of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value.
Value after reset	100,000 [°]

This parameter contains the position at which the software limit switch in positive direction becomes active. When the limit switch is activated, the axis will be stopped and error F17 will be displayed. Further, bit 8 is set in register 100 "Status".

The software limit switch monitoring can be activated, respectively deactivated, via register 540 "Operating mode 1", bit 6. The software limit switch monitoring should be active in any case, though, especially when axes are driven in manual mode.



Attention!

The software limit switch monitoring is deactivated by default.

The following figure shows the positions of the software limit switches:

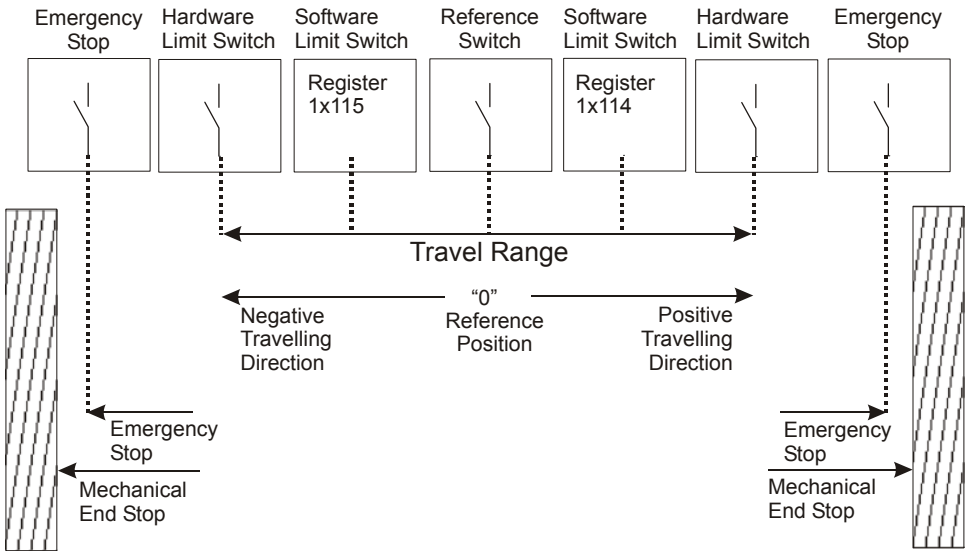


Fig. 21: Position of the software limit switches

Register 115: Software limit negative	
Function	**Description**
Read	Present value of the virtual software limit switch
Write	New value of the software limit switch
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	-8.388,608 ... 8,388,607 [°] or [mm] (the unit is dependent on the settings of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value.
Value after reset	-100,000 [°]

This parameter contains the position at which the software limit switch in negative direction becomes active. When the limit switch is activated, the axis will be stopped and error F17 will be displayed. Further, bit 7 is set in register 100 "Status".

The software limit switch monitoring can be activated, respectively deactivated, via register 540 "Operating mode 1", bit 6. The software limit switch monitoring should be active in any case, though, especially when axes are driven in manual mode.



Attention!

The software limit switch monitoring is deactivated by default.

The figure regarding register 114 "Position of the software limit switch" illustrates the positions of the respective software limit switches.

Register 180: Maximum acceleration	
Function	**Description**
Read	Actual acceleration value
Write	New acceleration value
Amplifier status	The amplifier must be deactivated
Validity	Wait for the busy-bit in the status to be reset
Value range	0 ... 8,388,607 [°/s²] or [mm/s²] (the unit depends on the settings of the axis type)
Value after reset	100,000 [°/s²]

Here, the maximum acceleration / deceleration of an axis is specifed. The amplifier will limit each acceleration, respectively deceleration, to the specified value, even if a greater value has been specified for positioning purposes. Acceleration / deceleration will only be limited for positioning by means of position control.

The axis will also be decelerated according to this parameter, if you issue command 5.

Register 181: Maximum jerk	
Function	**Description**
Read	Value of the actual jerk
Write	New value of the jerk
Amplifier status	The amplifier must be deactivated
Validity	Wait for the busy-bit in the status to be reset
Value range	0 ... 8,388,607 [°/s³] or [mm/s³] (the unit depends on the settings of the axis type)
Value after reset	1,000,000 [°/s³]

Here, the maximum permitted jerk for the specific axis is specified. The amplifier will limit the jerk to this value when one kind of motion follows the other one. Jerk limiting is important, especially when linear ramps are applied. The jerk will only be limited for positioning by means of position control.

Register 182: Travel limit positive	
Function	**Description**
Read	Value of the present limit
Write	New value of travel limit
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	-8,388,608 ... 8,388,607 [°] or [mm] (the unit is dependent on the settings of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value.
Value after reset	100,000 [°]

Here, the positive modulo travel range limit of a modulo axis will be specified. The modulo travel range defined in register 193 "Modulo travel range" will automatically be calculated as the difference between the positive and the negative travel range.

If your axis is not a modulo axis, this parameter will limit the absolute axis motion in positive direction. This means that, at a positioning run, the target position will always be limited to this value, even if a higher value is entered.

Via register 192 "Modulo axis", the axis will be set to modulo axis.

Register 183: Travel limit negative	
Function	**Description**
Read	Value of the present limit
Write	New value of travel limit
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	-8,388,608 ... 8,388,607 [°] or [mm] (the unit is dependent on the settings of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value.
Value after reset	-100,000 [°]

Here, the negative modulo travel range limit of a modulo axis will be specified. The modulo travel range defined in register 193 "Modulo travel range" will automatically be calculated as the difference between the positive and the negative travel range.

If your axis is not a modulo axis, this parameter will limit the absolute axis motion in negative direction. This means that, at a positioning run, the target position will always be limited to this value, even if a higher value is entered.

Via register 192 "Modulo axis", the axis will be set to modulo axis.

Register 184: Maximum speed	
Function	**Description**
Read	Value of the actual maximum speed
Write	New value of the maximum speed
Amplifier status	The amplifier must be deactivated
Validity	Wait for the busy-bit in the status to be reset
Value range	0 ... 8,388,607 [°/s] or [mm/s] (the unit depends on the setting of the axis type)
Value after reset	18,000 [°/s]

Here, the maximum speed of the mechanic axis is specified. The amplifier limits the speed to this value, even if a higher speed has been set for positioning. Further, this value is necessary for monitoring the maximum acceleration / deceleration and the maximum jerk.

The greatest value that can be input here, is limited by the value in register 118 "Maximum motor speed" and by the values of the registers for setting the gearbox factors: Register 194 "Transmission ratio - motor", register 195 "Transmission ratio - mechanics, and register 196 "Transmission ratio - linear / rotatory".

The value must not be greater than the result of the following formula:

greatest value R184 = R118 * R196 * R195 / (R194 * 60)

Register 191: Axis type	
Function	**Description**
Read	Actual value of the virtual axis type
Write	New value of the virtual axis type
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	1, 2
Value after reset	2 (rotatory)

Here, the motion of the axis is defined: either linear or rotatory.

Meaning of the values:

1 : Linear

2 : Rotatory

Usually, a machine consists of two kinds of axes:

- Linear axes
- Rotatory axes

In case of a linear axis, the load is moved in linear direction; all positioning parameters have been specified in the [mm] unit. In case of a rotatory axis, the load will be moved on a circular path; for this reason, all positioning parameters have been specified in the [°] unit.

These are the positioning parameters:
- Positioning parameter
- Speed parameter
- Acceleration / Deceleration parameter
- Parameter for jerk limitation

The units for a linear axis shown in detail:

- Unit defining a position: [mm]
- Unit defining speed: [mm/s]

- Unit defining acceleration / deceleration: [mm/s²]
- Unit defining jerk: [mm/s³]

The units for a rotatory axis shown in detail:

- Unit defining a position: [°]
- Unit defining speed: [°/s]
- Unit defining acceleration / deceleration: [°/s²]
- Unit defining jerk: [°/s³]

If in register 192 "Modulo axis" the axis type is set to modulo axis, a linear axis cannot be selected out of this register.

Register 192: Modulo axis	
Function	**Description**
Read	Present setting
Write	New value
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	0, 1
Value after reset	0

Here it is defined, whether the axis is a modulo axis or not.

Meaning of the values:

0 : No modulo axis

1 : Modulo axis

What is a modulo axis?

The positioning values of a modulo axis are always within a defined modulo travel range (in order to make possible endless positioning, for example), see register 193 "Modulo travel range".

If the axis moves in positive direction and reaches the positive travel limit, the position will be set back to the value of the negative travel limit. This means the axis can continue with new positioning values starting from the negative travel range.

If the axis moves in negative direction and reaches the negative travel limit, the position will be set back to the value of the positive travel limit. This means the axis can continue with new positioning values starting from the positive travel range.

Consequently, modulo axis haven't got any hardware or software limit switches.

The following figure will illustrate an endless axis motion in positive direction by a modulo travel range of 200,000 ° (negative travel limit = 0 °, positive travel limit = 200,000 °).

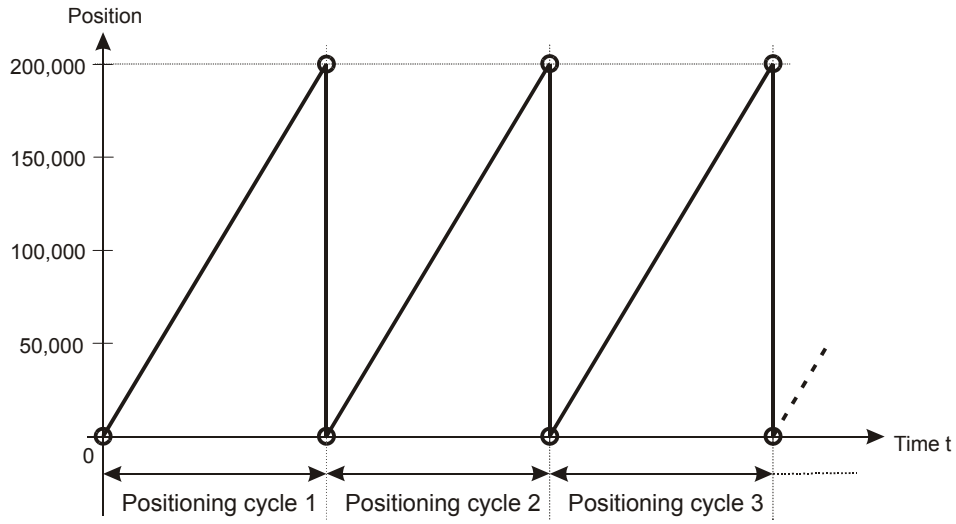


Fig. 22: Example of a modulo axis motion

Register 193: Modulo travel range	
Function	**Description**
Read	Actual value of the virtual travel range
Write	Illegal
Value range	-8,388,608 ... 8,388,607 [°] or [mm] (the unit is dependent on the settings of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value).
Value after reset	360 [°]

The modulo travel range will automatically be calculated as the difference between the positive travel range, register 182, and the negative travel range, register 183.



Attention!

If no modulo axis has been set in register 192, the modulo mode is deactivated; this means that the value of this register is not valid and will thus not be calculated as the difference between the values of the travel ranges.

Register 194: Transmission ratio - motor	
Function	**Description**
Read	Actual number of motor revolutions
Write	New number of motor revolutions
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	1 ... 8,388,607 [rev]
Value after reset	1 [rev]

In case of a rotatory axis, the following parameter will be used for calculating the gear ratio:

$$i = \frac{\text{Number of motor revolutions (R194)}}{\text{Number of mechanics/load revolutions (R195)}}$$

If, for example, the mechanics rotate once, while the motor rotates ten times, the number of motor revolutions must also be set to 10, while the number of load revolutions is set to 1.

In case of a linear axis, the gear ratio, and the additional parameter "Transmission ratio - linear / rotatory" written in register 196, must be specified. "Transmission ratio linear / rotatory" defines the transition from rotatory to linear mode.

Register 195: Transmission ratio - mechanics	
Function	**Description**
Read	Actual number of load revolutions
Write	New number of load revolutions
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	1 ... 8,388,607 [rev]
Value after reset	1 [rev]

Here, the latest rotatory transmission unit must be specified; see description of register 194 "Transmission ratio - motor".

Register 196: Transmission ratio - linear / rotatory	
Function	**Description**
Read	Actual transmission ratio
Write	New transmission ratio
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	1 ... 8,388,607 [° * 1,000/Umdr.] or [µm/rev.]
Value after reset	360,000 [°*1,000/rev]

The transmission ratio linear /rotatory is only needed for a linear axis; it describes the linear motion of the axis related to a rotation of the latest rotatory transmission unit written in register 195 "Transmission ratio - mechanics".

The parameters "Transmission ratio - mechanics", register 195, and "Transmission ratio - motor", register 194, must also be specified.

Register 510: Dig. Inputs: Input polarity	
Function	**Description**
Read	Value of the actual input polarity
Write	New value of the input polarity
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	bit-coded, 16 bits
Value after reset	0b 00000001 00001111

Here, the polarity of the digital inputs can be specified.

Meaning of the values:

0 : 0 V active

1 : 24 V active

Meaning of the individual bits:

Bit 0:	Enable (cannot be altered)
Bit 1:	Positive hardware limit switch
Bit 2:	Negative hardware limit switch
Bit 3:	Reference switch
Bit 8:	Interrupt (special applications)

Register 511: Dig. Inputs: Input circuit state	
Function	**Description**
Read	Value of the actual input circuit state
Write	Illegal
Value range	bit-coded, 16 bits
Value after reset	0

The actual input circuit state of the digital inputs can be read out here. The input circuit state depends on the polarity settings of the digital inputs specified in register 1x510.

Meaning of the values:

0 : Not active

1 : Activated

Meaning of the individual bits:

Bit 0:	Enable (cannot be altered)
Bit 1:	Positive hardware limit switch
Bit 2:	Negative hardware limit switch
Bit 3:	Reference switch
Bit 8:	Interrupt (special applications)

Register 870: Decimal places for position values	
Function	**Description**
Read	Values of the actual decimal positions
Write	New values of the decimal positions
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	0 ... 3
Value after reset	0

Here, the decimal positions for all positioning parameters will be set. This should be done during axis setup and not be changed after this any more.

0 = No decimal positions

The position values contain a decimal factor of 1, which means that the internal unit [°] or [mm] will directly be displayed and written.

1 = 1 decimal position

The position values contain a decimal factor of 10, which means that the least significant decimal position of the integer value is the decimal position for standardizing the value to have the internal unit [°] or [mm].

2 = 2 decimal positions

The position values contain a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [°] or [mm].

3 = 3 decimal positions

The position values contain a decimal factor of 1,000, which means that the three least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [°] or [mm].



Attention!

If decimal positions are altered after setup of the axis, there might occur the danger of position details not being displayed correctly. This could happen, if a parameter of 0 decimal positions, for example, already causes 8,000,000 to be displayed. If the decimal positions are increased then, a negative value will be displayed, as the maximum positive limit of the value range, which is 8,388,607, will have been exceeded.

The settings of the decimal positions relate to the following registers:

- Register 102 "Target position"
- Register 107 "Destination window"
- Register 109 "Actual position"
- Register 114 "Pos. software limit switch"
- Register 115 "Neg. software limit switch"
- Register 119 "Actual tracking error"
- Register 120 "Tracking error limit"
- Register 130 "Set position value"
- Register 132 "Setup mode - position 1"
- Register 133 "Setup mode - position 2"
- Register 164 "Max. distance switch search"
- Register 167 "Max. distance reference search"
- Register 168 "Normal position - distance"
- Register 169 "Normal position"
- Register 182 "Travel limit positive"
- Register 183 "Travel limit negative"
- Register 193 "Modulo travel range"

9.6 Amplifier Parameters

Register 199: Software version	
Function	**Description**
Read	Value of the latest version
Write	Illegal
Value range	0 ... 9,999
Value after reset	Dependent on the software version

Here, the latest software version can be read. Interpreting the value:

290 = Version 2.90



Attention!

When submitting technical support queries the number of the software version must be quoted.

In connection with register 999 "Revision status of the operating system", it can be specified, whether the software version is a beta version or not.

Register 500: Rated voltage	
Function	**Description**
Read	Value of the actual rated voltage
Write	Illegal
Value range	230 ... 400 [V]
Value after reset	Dependent on the amplifier type (particulars can be found on the identification plate of the respective device)

From here, the rated voltage of the device can be read out.

Register 501: Rated current	
Function	**Description**
Read	Value of the actual rated voltage of the device
Write	Illegal
Value range	300 ... 1,500 [Aeff*100] (The respective value contains a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [Aeff]).
Value after reset	Dependent on the amplifier type (particulars can be found on the identification plate of the respective device)

From here, the continuous rated current of the device can be read out.

Register 508: PWM frequency	
Function	**Description**
Read	Value of the actual PWM frequency
Write	New value of the PWM frequency
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	8, 16 [kHz]
Value after reset	16 [kHz] for JetMove 203-206 8 [kHz] for JetMove 215

Here, the frequency of the output pulse can be altered.



Attention!

Only instructed personnel is to make alterations on the register value.

Register 560: DC link voltage	
Function	**Description**
Read	Actual DC link voltage
Write	Illegal
Value range	0 ... 640 [V]
Value after reset	0 [V]

Here, the latest DC link voltage can be read.

Register 563: Temperature	
Function	**Description**
Read	Actual value of the device temperature
Write	Illegal
Value range	1 ... 95 [°C]
Value after reset	0 [°C]

Here, the actual internal temperature of the device can be read.

Register 564: Ballast load, internal	
Function	**Description**
Read	Actual value of the ballast load
Write	Illegal
Value range	0 ... 100 [%]
Value after reset	0 [%]

Here, the actual load of the internal ballast resistor can be read.

Register 566: Input current of the device	
Function	**Description**
Read	Actual input current
Write	Illegal
Value range	0 ... 2,550 [Aeff*100] (The value has got a decimal factor of 100, which meanst that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [Aeff])
Value after reset	0 [Aeff*100]

The actual input current value of the supply feed can be read out here.

Register 567: Mains voltage	
Function	**Description**
Read	Actual mains voltage
Write	Illegal
Value range	0 ... 460 [Veff]
Value after reset	0 [Veff]

The actual input current value of the supply feed can be read out here.

Register 568: Temperature	
Function	**Description**
Read	Actual value of the board temperature
Write	Illegal
Value range	20 ... 75 [°C]
Value after reset	0 [°C]

Here, the actual temperature of the controller board can be read.

Register 576: Interface access authorization	
Function	**Description**
Read	Actual access authorization
Write	Specify new access authorization
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	0 ... 65,535
Value after reset	0

In this register, access authorization for the register interface is defined. There are two kinds of access authorization:

0 = Standard user access authorization
1 = Expert user access authorization

In order to specify expert user access authorization, a respective code must be written into this register. If a new user access authorization has been specified successfully, the respective number, as quoted above, will be read out. Certain registers can only be modified, if the user has got the expert access authorization. If for changing the value of a register expert user access authorization is needed, this will be pointed out in the register description.

Assigning access authorization is a safety precaution for the protection of persons and assets.

Register 999: The revision state of the operating system	
Function	**Description**
Read	Value of the actual revision state
Write	Illegal
Value range	0 ... 9,999
Value after reset	Dependent on the revision state

From here, the new number of the operating system software revision can be read out. Interpreting the value:

0 = The revision has been released officially

1 ... 9,999 = Beta revision 1 ... 9,999

9.7 Motor Parameters

Register 116: Commutation offset	
Function	**Description**
Read	Value of the actual offset
Write	New value of the offset
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	-18,000 ... 18,000 [°*100] (The value has got a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [°])
Value after reset	0 [°*100]

Here, the commutating offset of the motor will be specified. This machine parameter has been reserved for special applications. If required, the parameter is defined by the manufacturer.

Register 117: Encoder resolution	
Function	**Description**
Read	Value of the present resolution
Write	Illegal
Value range	4,096 ... 32,768 [Incr./rev.]
Value after reset	Dependent on the connected encoder

This register specifies the internal resolution of a revolution in increments per revolution. This value is dependent on the connected encoder. See register 577 "Encoder type"

Register 123: Pole pair number	
Function	**Description**
Read	Actual pole pair number
Write	New pole pair number
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	1 ... 12
Value after reset	3

Here, the pole pair number of the motor is entered. This can be taken from the motor parameters. For Jetter motors, the pole pair number usually is 3. This is also the default value.

Register 505: Motor voltage constant	
Function	**Description**
Read	Value of the actual voltage constant
Write	New value of the voltage constant
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	0 ... 120 [V*min/1,000]
Value after reset	0 [V*min/1,000]

Here, the voltage constant of the motor is entered. The value of the voltage constant can be taken from the motor parameters.
The voltage constant of the Jetter motor has also been specified on the nameplate: Jetter motors of the type JL3-300-**25**-3 have got a voltage constant of **25** V*min/1,000.

If highly dynamic drives are used, this parameter should be adjusted.

Register 547: Delay after release brake	
Function	**Description**
Read	Actual delay time
Write	New delay time
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	0 ... 65,535 [ms]
Value after reset	0 [ms]

Only for motors equipped with a brake. Here, the delay time is specified which passes (after issuing a command, e.g. command 1 "Activate output stage"), until the brake has really been released. When this time has passed, the brake is in the "Brake has been released" state. Not before this time has expired, the axis will be controlled. The delay time can differ between various manufacturers or motor types.



Attention!

The predefined value of this parameter may only be altered by experienced users.

The following commands have an impact on releasing the brake:
- Issuing command 1 - The brake is released.
- Setting bit 0 in register 574 "Control word 2" - brake is released.

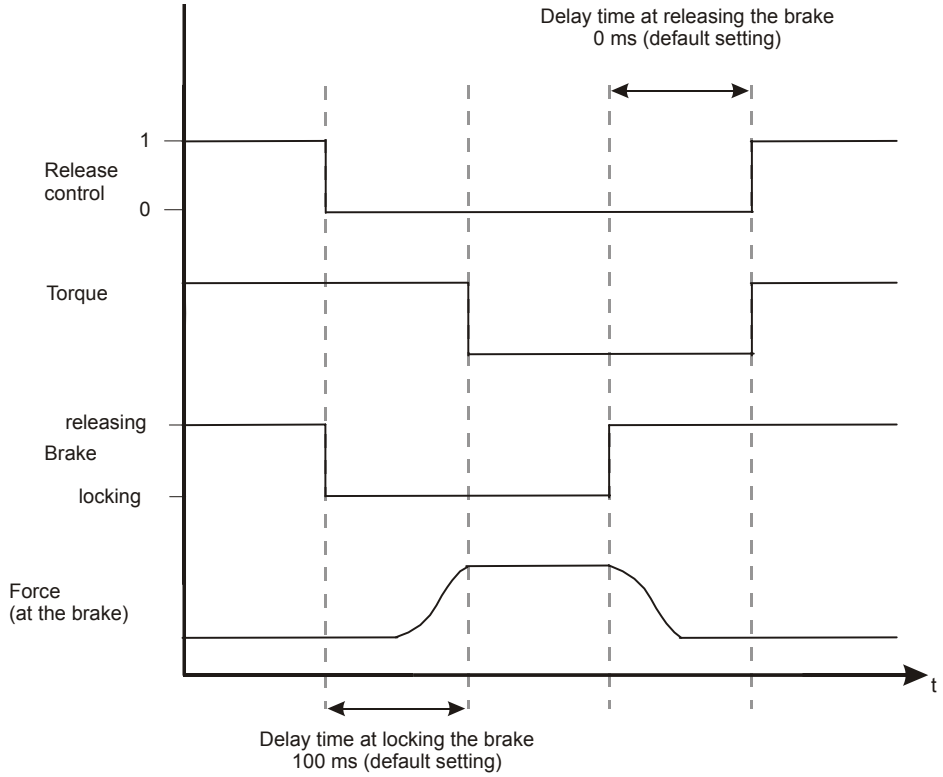


Fig. 23: Delay time of the motor brake control

Register 548: Delay after locking the brake	
Function	**Description**
Read	Actual delay time
Write	New delay time
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	0 ... 65,535 [ms]
Value after reset	100 [ms]

Only for motors equipped with a brake:

Here, the delay time is specified which passes (after issuing a command, e.g. command 2 "Deactivate output stage"), until the brake has really been locked. When this time has passed, the brake is in the "Brake has been locked" state.
Up to then, the axis will still be controlled.
The delay time can differ between various manufacturers or motor types.

The following commands have an impact on locking the brake:

- Issuing command 2 - The brake is locked
- Resetting bit 0 in register 574 "Control word 2" - the brake is locked

Please also see the time diagram in the manual referring to register 547 "Delay time at releasing the motor brake".

Register 562: Temperature	
Function	**Description**
Read	Actual motor temperature
Write	Illegal
Value range	1 ... 155 [°C]
Value after reset	0 [°C]

If a motor with temperature switch is used, 1 °C is displayed for the "locked" state, while 155 °C is displayed for the "released" state.

Register 565: Shaft position	
Function	**Description**
Read	Actual position of the shaft
Write	Illegal
Value range	-18,000 ... 18,000 [°*100] (The value has got a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [°])
Value after reset	0 [°*100]

The present position of the motor shaft can be read out by means of this parameter.

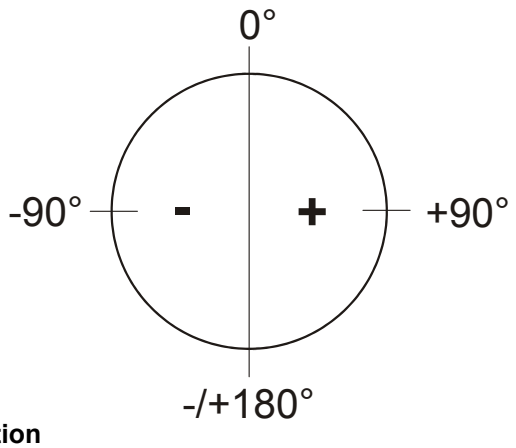


Fig. 24: Shaft position

Register 577: Encoder type	
Function	**Description**
Read	Actual encoder type
Write	Illegal
Value range	1 ... 3
Value after reset	Dependent on the connected encoder

By means of this parameter, the encoder type of the connected motor can be specified:

1 = Resolver
2 = HIPERFACE SRS50 (Singleturn)
3 = HIPERFACE SRM50 (Multiturn)

Register 616: Torque constant Kt	
Function	**Description**
Read	Actual torque constant
Write	New torque constant
Amplifier status	No specific status
Validity	Immediately
Value range	0 ... 255 [Nm/A*100] (The value has got a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [Nm/A*100])
Value after reset	0 [Nm/A*100]

Here, the torque constant of the motor will be specified. Specifying the torque constant is necessary for displaying the actual torque in register 621 "Actual torque". If the torque constant is 0, 0 will also be displayed for the actual torque.

9.8 Monitoring Parameters

Register 544: DC link voltage - max. trip	
Function	**Description**
Read	Actual max. trip
Write	New value of the max. trip
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	0 ... 470 [V] for JetMove 203, 206 0 ... 850 [V] for JetMove 215
Value after reset	450 [V] for JetMove 203, 206 850 [V] for JetMove 215

Here, the error limit for the maximum DC link voltage is entered. If the DC link voltage exceeds the error limit, error 21 "Overvoltage U_{zk}" will be triggered.

Register 545: DC link voltage - min. trip	
Function	**Description**
Read	Actual max. trip
Write	New value of the max. trip
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	0 ... 470 [V] for JetMove 203, 206 0 ... 850 [V] for JetMove 215
Value after reset	250 [V] for JetMove 203, 206 400 [V] for JetMove 215

Here, the error limit for the minimum DC link voltage is entered.
If the DC link voltage exceeds the error limit, error 20 "Undervoltage U_{zk}" will be triggered.

Register 546: Blocking-tripping time	
Function	**Description**
Read	Actual response time
Write	New response time
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	0 ... 65,535 [ms]
Value after reset	5,000 [ms]

The tripping time for blocking supervision of the motor brake can be set by defining a time in this parameter. If the motor speed is still lower than 0.5 % after reaching the maximum output current, error F22 "Drive blocked" will be triggered.

Register 549: Emergency stop ramp time	
Function	**Description**
Read	Value of the actual ramp
Write	Value of the new ramp
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	0 ... 65,535 [ms]
Value after reset	500 [ms]

The deceleration ramp, which is to be active in case of emergency stop (e.g. reaction to an error or after issuing command 7), can be defined by this parameter. The speed of the axis is decreased in relation to this deceleration ramp.
Under fault conditions, which still allow the axis to function (e.g. overtemperature), the axis will be brought to a standstill by this deceleration ramp. If the maximum output current for the deceleration ramp is not sufficient, the ramping time will be increased.

Register 600: Device temp. warning	
Function	**Description**
Read	Actual device temperature warning threshold
Write	Illegal
Value range	0 ... 255 [°C]
Value after reset	70 [°C]

Here, the device temperature warning threshold can be read out. If the device temperature exceeds this value, warning W01 "Warning threshold for device temp." will be triggered.

Register 601: Shutdown threshold for device temp.	
Function	**Description**
Read	Actual shutdown threshold for device temp.
Write	Illegal
Value range	0 ... 255 [°C]
Value after reset	80 [°C]

Here, the shutdown threshold for device temperature can be read out. If the device temperature exceeds this value, error report F07 "Shutdown threshold for device temp." will be triggered.

Register 602: Motor temp. warning	
Function	**Description**
Read	Actual motor temperature warning threshold
Write	Illegal
Value range	0 ... 255 [°C]
Value after reset	110 [°C]

Here, the motor temperature warning threshold can be read out. If the motor temperature exceeds this value, warning W02 "Warning threshold for motor temp." will be triggered.

Register 603: Motor temp. error	
Function	**Description**
Read	Actual motor temperature error threshold
Write	Illegal
Value range	0 ... 255 [°C]
Value after reset	135 [°C]

Here, the shutdown threshold for motor temperature can be read out. If the motor temperature exceeds this value, error report F08 "Shutdown threshold for motor temp." will be triggered.

Register 604: Warning threshold for ballast	
Function	**Description**
Read	Actual warning threshold for ballast
Write	Illegal
Value range	0 ... 100 [%]
Value after reset	80 [%]

Here, the warning threshold for ballast can be read out. If the load of the ballast resistor exceeds this value, warning W00 "Warning threshold for ballast" will be triggered.

Register 605: Overload internal ballast resistor - error	
Function	**Description**
Read	Actual load error threshold
Write	Illegal
Value range	0 ... 100 [%]
Value after reset	100 [%]

Here, the shutdown threshold for the ballast resistor load error can be read out. If the load of the ballast resistor exceeds this value, error report F06 "Overload internal ballast resistor" will be triggered.

9.9 Position Control Parameters

Register 110: Position feedback controller K_V	
Function	**Description**
Read	Actual value of the K_v
Write	New value of the K_v
Amplifier status	No specific status
Validity	Immediately
Value range	0 ... 204,700 [1/s * 100] (The value has got a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [1/s])
Value after reset	1,000 [1/s * 100]

Here, the P-gain K_v of the position feedback controller will be set.

Register 119: Actual tracking error	
Function	**Description**
Read	Actual tracking error
Write	Illegal
Value range	-8,388,608 ... 8,388,607 [°] or [mm] (the unit is dependent on the settings of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value).
Value after reset	0 [°]

This parameter specifies the difference between set and actual values of the axis motion, i.e. by how many increments the actual position of the axis deviates from the set position.

If the actual tracking error is too great, the concerned system must be checked. The reason might be e.g. an encoder problem, or the dimensioning of the motor was not calculated correctly.

The actual tracking error should be as small as possible to ensure high accuracy of axis motion. It should be maintained around 0, i.e. should never be only negative or only positive.

Via register 120 "Tracking error limit" and register 542 "Tracking error window time", tracking error monitoring can be adjusted.

Register 120: Tracking error limit	
Function	**Description**
Read	Actual tracking error limit
Write	New tracking error limit
Amplifier status	No specific status
Validity	Immediately
Value range	0 ... 8,388,607 [°] or [mm] (the unit is dependent on the settings of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value).
Value after reset	10,000 [°]

Here, the tracking error limit is specified. This parameter defines, from which tracking error the amplifier should react. If the actual tracking error exceeds this value, error 23 "Tracking error" will be triggered. Regarding the reaction to the error report, the tracking error window time written in register 542 must also be considered.

Register 130: Position setpoint	
Function	**Description**
Read	Actual position setpoint
Write	Illegal
Value range	-8,388,608 ... 8,388,607 [°] or [mm] (the unit is dependent on the settings of the axis type. The value contains an adjustable decimal factor between 1 and 1,000; this means that the least significant decimal positions serve as decimal positions when the internal unit [°] or [mm] is assigned to the value).
Value after reset	0 [°]

From here, the position setpoint can be read. For this, the controller operating mode must have been set to position control via register 572 "JetMove set operating mode".

Register 542: Tracking window time	
Function	**Description**
Read	Actual tracking window time
Write	New tracking window time
Amplifier status	No specific status
Validity	Immediately
Value range	0 ... 65,535 [ms]
Value after reset	5 [ms]

Here, tracking error monitoring can be made dependent on a certain time. Tracking error monitoring will not be active before the actual tracking error (register 119) has exceeded the tracking error limit (register 120) for at least the tracking error window time. In this case, error report F23 "Tracking error" will be triggered.

The tracking error window time serves for filtering out the tracking error peaks.



Attention!

Tracking error monitoring will be deactivated at a tracking error window time of 65,535.

Register 550: Speed feed forward	
Function	**Description**
Read	Actual speed feed forward
Write	New speed feed forward
Amplifier status	No specific status
Validity	Immediately
Value range	0 ... 199 [%]
Value after reset	100 [%]

Here, the speed feed forward for the position controller with P-gain is specified. Due to the P-gain for the position controller, a constant tracking error, caused by the controller, will remain during position controlling. This tracking error will be compensated y the speed feed-forward.

The speed feed-forward will add increase the actual set speed by a desired part of it. Then, the position controller with P-gain will ideally only have to control the tracking error by the mechanically caused set value.

9.10 Speed Control Parameters

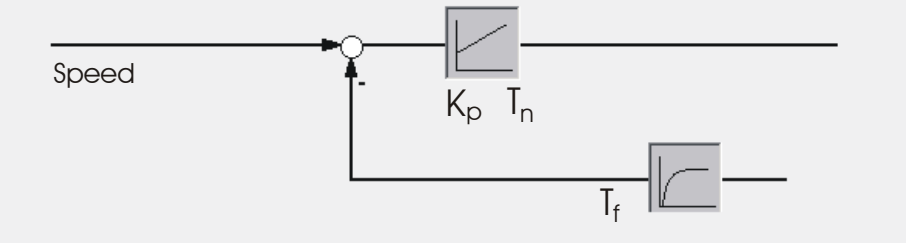


Fig. 25: Speed

Register 111: Speed reference	
Function	**Description**
Read	Actual speed reference
Write	New speed reference
Amplifier status	No specific status
Validity	Immediately
Value range	-12,000 ... 12,000 [1/min]
Value after reset	0 [1/min]

From here, the speed reference of the speed controller can be read out. When the operating mode of the controller has been set to speed control, see register 572 "JetMove - set operating mode", the set speed value can be specified here. In the operating mode "speed control", only the speed controller and the current controller are active. In all other operating modes, the register must not be written into.

Register 112: Actual motor speed	
Function	**Description**
Read	Actual speed
Write	Illegal
Value range	-12,000 ... 12,000 [1/min]
Value after reset	0 [1/min]

Here, the actual motor speed can be read.

Register 113: Time constant of smoothing capacitor T_f	
Function	**Description**
Read	Actual time constant of the smoothing capacitor
Write	New time constant of the smoothing capacitor
Amplifier status	No specific status
Validity	Immediately
Value range	1 ... 32 [ms]
Value after reset	2 [ms]

.



Attention!

This parameter is not the T_n for the speed controller, which will be specified in register 126.

Register 118: Maximum motor speed	
Function	**Description**
Read	Actual maximum speed
Write	New maximum speed
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	120 ... 12,000 [1/min]
Value after reset	3,000 [1/min]

Here, the maximum motor speed is entered. This value is the absolute speed limit of the motor. Dependent on the maximum motor speed and the gearbox, the speed of the mechanic axis will be limited.

Register 124: Speed controller K_p	
Function	**Description**
Read	Actual value of the K_p
Write	New value of the K_p
Amplifier status	No specific status
Validity	Immediately
Value range	0 ... 7,999 (The respective value contains a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [Aeff])
Value after reset	1,000

Here, the P-gain K_p of the digital speed controller will be set.

The following illustration shows a value range useful for K_p and T_n. The K_P and T_n values shown in the illustration are of internal effect; this means they have not got the decimal factor, which must be considered at displaying the values, respectively at writing them into the registers:

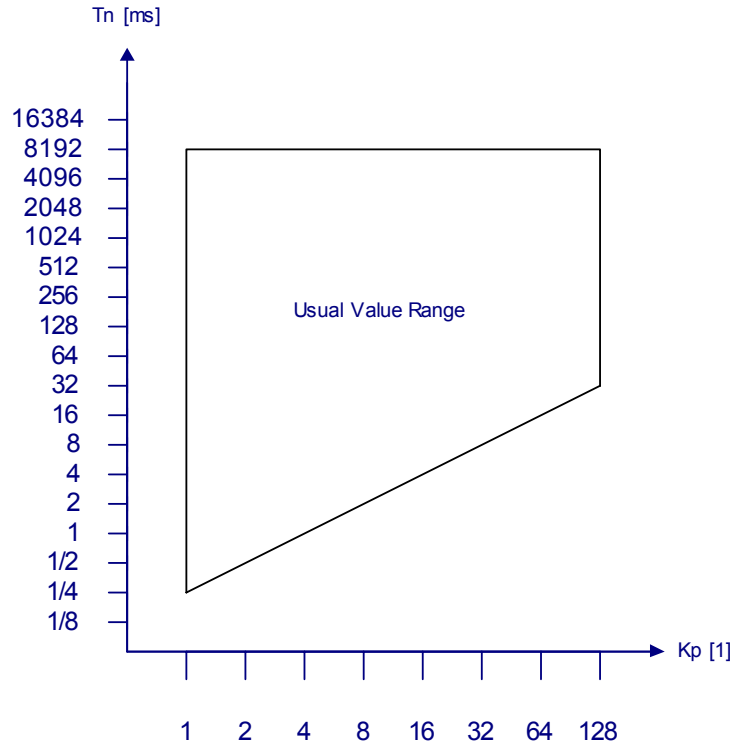


Fig. 26: Value range for K_p and T_n of the speed controller

Register 126: Speed controller T_n	
Function	**Description**
Read	Actual value of the T_n
Write	New value of the T_n
Amplifier status	No specific status
Validity	Immediately
Value range	30 ... 6,500,000 [ms*100] (The value has got a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [ms])
Value after reset	2000 [ms*100]

This parameter serves for calculating the I-factor of the speed controller by means of the following formula:

$K_I = K_P / T_n$

For further information on setting the speed controller, please refer to “Register 124: Speed controller K_p" on page 112.

Register 506: Speed controller preset	
Function	**Description**
Read	Actual preset value
Write	New preset value
Amplifier status	No specific status
Validity	Immediately
Value range	0 ... Register 502 [Aeff*100] (The value has got a decimal factor of 100, which meanst that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [Aeff])
Value after reset	0 [Aeff*100]

This parameter is for compensating the load torque of a suspended load (vertical axis). If the brake is released for an axis, the following effect usually occurs: The load drops until the I-component of the speed controller has been increased to reach the respective value.

This undesired effect can be avoided by parameterizing the speed controller with a preset value. The preset value is determined empirically and contains the connection of static load torque and current setpoint (when the load is at stillstand and the controller is enabled, read the current setpoint from the parameter "current set point" and use it as preset value). The load can be prevented from dropping by correctly setting this value.

9.11 Current Control Parameters

Register 125: Current set point	
Function	**Description**
Read	Actual current setpoint
Write	New current setpoint
Amplifier status	No specific status
Validity	Immediately
Value range	-R502 ... Register 502 [Aeff*100] (The value has got a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [Aeff])
Value after reset	0 [Aeff*100]

The current setpoint of the digital speed controller can be read here. When the controller operating mode current control has been preset (in this case, only the current control is active), the current setpoint can also be specified via this register. In case of all other controller operating modes, the parameter must not be written into.

Register 127: Current limitation	
Function	**Description**
Read	Value of the present current limiting
Write	New current limiting value
Amplifier status	No specific status
Validity	Immediately
Value range	0 ... Register 502 [Aeff*100] (The value has got a decimal factor of 100, which meanst that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [Aeff])
Value after reset	R502 [Aeff*100]

Besides registers 618 "Rated current" and register 619 "Overload factor", an additional limitation of the amplifier output current can be defined by means of this parameter. It serves for dynamically adjusting to temporary conditions.

Register 502: Maximum output current	
Function	**Description**
Read	Peak value of the output current
Write	Illegal
Value range	0,5 * R501 ... 2 * R501 [Aeff*100] (The value has got a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [Aeff])
Value after reset	2*R501 [Aeff*100]

The value of this register is the product of the values of register 618 "Rated current" and register 619 "Overload factor". For calculation, the respective internally effective rated current and overload factor values will be applied. The maximum output current can range between 200 % and 50 % of the continuous rated current of the device.

Register 503: Current control K_p	
Function	**Description**
Read	Actual value of the K_p
Write	New value of the K_p
Amplifier status	No specific status
Validity	Immediately
Value range	0 ... 2,299 (The respective value contains a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [Aeff])
Value after reset	70

Proportional amplification of the current control will be parameterized here. The parameter is calculated according to the following formula:

- $K_p = (I_{effMotor} * L_{Motor}) / (2 * T_s * U_{DC})$

The following applies to the operands:

- T_s = 41.25 µs
- $I_{effMotor} = I_{Neff}$ * Overload factor

I_{Neff} = Nominal motor current of the unit [Aeff]
L_{Motor} = Inductivity of the motor in the unit [mH]

The values for I_{Neff} and L_{Motor} have been specified on the nameplate.

Overload factor = R619 "Overload factor" (internally effective value)
U_{DC} = DC link voltage of the amplifier in the unit [V]

For the DC link voltage U_{DC} the following values have got to be considered:

Module	Type of termination	DC link voltage
JM2xx / 230	3-phase	325 V
JM2xx / 230	1-phase	380 V (PFC)
JM2xx / 400	3-phase	560 V

The K_P value calculated by the formula above is a suggested value and must be adjusted to the requirements of the application together with “Register 504: Current control T_n" on page 118.

Below, a value range useful for K_P and T_n will be illustrated. The K_P and T_n values shown in the illustration are of internal effect; this means they have not got the decimal factor, which must be considered at displaying the values, respectively at writing them into the registers:

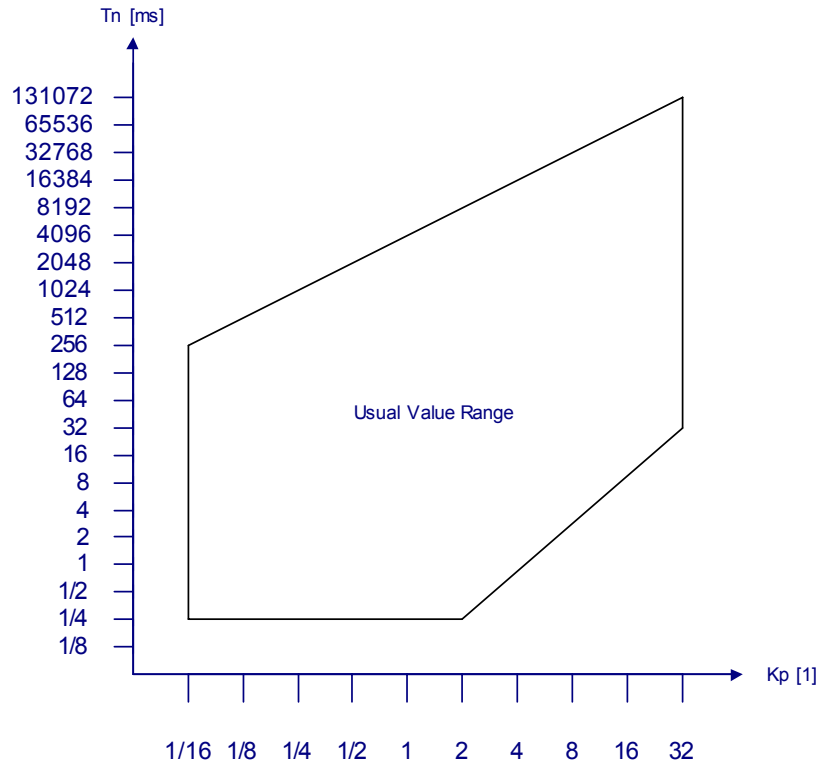


Fig. 27: Value range for K_p and T_n of the current control

Register 504: Current control T_n	
Function	**Description**
Read	Actual value of the T_n
Write	New value of the T_n
Amplifier status	No specific status
Validity	Immediately
Value range	10 ... 800,000 [ms*100] (The value has got a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [ms])
Value after reset	300 [ms*100]

This parameter serves for calculating the I-factor of the current control by means of the following formula:

$K_I = K_P / T_n$

The following applies to the operands:

- $T_n = L_{Motor} / R_{Motor}$

R_{Motor} = Motor resistance, unit: [Ohm]
L_{Motor} = Inductivity of the motor in the unit [mH]

The values for L_{Motor} and R_{Motor} have been specified in the data sheet.

For further information on setting the speed controller, please refer to “Register 503: Current control K_p" on page 116.

Register 561: Actual current	
Function	**Description**
Read	Virtual actual current value
Write	Illegal
Value range	-R502 ... Register 502 [Aeff*100] (The value has got a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [Aeff])
Value after reset	0 [Aeff*100]

Register 618: Continuous rated current	
Function	**Description**
Read	Actual rated current
Write	New rated current, new maximum output current will be calculated
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	0.5 * R501 ... R501 [Aeff*100] (The value has got a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [Aeff])
Value after reset	R501 [Aeff*100]

By means of this parameter, the maximum output current of the amplifier is set. This parameter is usually set once during axis setup. The maximum output current is displayed in “Register 502: Maximum output current" on page 116. It can range between 200 % and 50 % of the continuous rated current of the device.

The maximum output current is the product of the values of register 618 "Rated current" and register 619 "Overload factor". For calculation, the respective internally effective rated current and overload factor values will be applied. The output current is newly calculated, if a new value is written into register 618 "Rated current" or into register 619 "Overload factor".

Register 619: Overload factor	
Function	**Description**
Read	Actual overload factor
Write	New overload factor
Amplifier status	The amplifier must be deactivated
Validity	Immediately
Value range	10 ... 1,000 (The respective value contains a decimal factor of 100, which means that the two least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [Aeff])
Value after reset	200

By means of this parameter, the maximum output current of the amplifier is set. This parameter is usually set once during axis setup. The maximum output current can be read in register 502 "Maximum output current". It can range between 200 % and 50 % of the continuous rated current of the device.

The maximum output current is the product of the values of register 618 "Rated current" and register 619 "Overload factor". For calculation, the respective internally effective rated current and overload factor values will be applied. The output current is newly calculated, if a new value is written into register 618 "Rated current" or into register 619 "Overload factor".

Register 620: Actual current (%)	
Function	**Description**
Read	Actual current in %
Write	Illegal
Value range	0 ... 100 [%]
Value after reset	0 [%]

The percentage is related to the maximum output current, which can be read in register 502 "Maximum output current". The maximum output current is the product of the values of register 618 "Rated current" and register 619 "Overload factor".

Register 621: Actual torque	
Function	**Description**
Read	Actual torque
Write	Illegal
Value range	0 ... 32,767 [Nm*1,000] (the value has got a decimal factor of 1,000, which means that the three least significant decimal positions of the integer value are the decimal positions for standardizing the value to have the internal unit [Nm])
Value after reset	0 [Nm * 1,000]

The display of a valid torque depends on the torque constant of the motor. The torque constant must be written into register 616 "Torque constant Kt". If the torque constant equals zero, the displayed actual torque equals zero as well.

Appendices

Appendix A: Recent Revisions

There have been no revisions so far, as this is the first edition of the user information JetMove 2xx-480 operator's manual.

Appendix B: List of Abbreviations

AC	**A**lternating **C**urrent
DC V	**D**irect **C**urrent **V**oltage
EMC	**E**lectro **M**agnetic **C**ompatibility
E.L.C.B.	**E**arth **L**eakage Current Breaker
Gnd	**G**rou**nd**
Hiperface	**Hi**gh **Per**formance Inter**face**
Hz	Hertz
IEC	**I**nternational **E**lectrotechnical **C**ommission
IP	**I**nternational **P**rotection
JX2-SBK1	**J**etter E**x**tended Module **2** - **S**ystem Bus**C**able **1. 2** stands for PROCESS-PLC NANO and JetControl 200
LED	**L**ight - **E**mitting **D**iode: "Light-emitting diode"
n	Speed
NN	**N**ormal **N**ull = Sea Level
PE	**P**rotective **E**arth
PELV	**P**rotective **E**xtra **L**ow **V**oltage
PFC	**P**ower **F**actor **C**ontrol: "Leitungsfaktor Regelung"
P_V	**V**erlustleistung [Leistung engl. **P**ower]: Power Dissipation
PWM	**P**ulse **W**idth **M**odulation
RS 485	**RS**: **R**ecommended **S**tandard; an accepted industry standard for serial data transmission. RS 485 is used for transmission distances over 15 m, two lines for differential mode evaluation; transmitting and sending on the same line.
SELV	**S**afe **E**xtremly **L**ow **V**oltage: Voltage up to 60 V, galvanically separated from the network.
SUB-D	Type name of a plug-in connector
Temp	**Temp**erature
U	Electric voltage (potential difference)
cf.	**c**on**f**er: "see", "refer to"
e.g.	**e**xempli **g**ratia (lat.): "for example"

Appendix C: Register Survey - Numerical Sequence

In the column "R/W", the possibility of access to the parameter has been defined:

R = Read
W = Write

Register Number	Name	R/W	Description
100	Status	R	Group of Functions: Diagnose Unit: - Default Value: 0 page 50
101	Command	R/W	Group of Functions: Control Unit: - Default Value: 0 page 41
102	Target position	R/W	Group of Functions: Positioning Unit: [°] or [mm] Default Value: 0 [°] page 56
103	Target speed	R/W	Group of Functions: Positioning Unit: [°/s] or [mm/s] Default Value: 0 [°/s] page 58
104	Positioning time	R/W	Group of Functions: Positioning Unit: [s] Default Value: 0 page 59
105	Acceleration	R/W	Group of Functions: Positioning Unit: [°/s²] or [mm/s²] Default Value: 500 [°/s²] page 60
106	Deceleration	R/W	Group of Functions: Positioning Unit: [°/s²] or [mm/s²] Default Value: 500 [°/s²] page 62
107	Destination window	R/W	Group of Functions: Positioning Unit: [°] or [mm] Default Value: 1 [°] page 63
109	Actual position	R	Group of Functions: Positioning Unit: [°] or [mm] Default Value: 0 [°] page 65

Register Number	Name	R/ W	Description
110	Position feedback controller Kv	R/ W	Group of Functions: Position Unit: [1/s * 100] Default Value: 1.000 page 106
111	Speed Reference	R/ W	Group of Functions: Speed Unit: [rpm] Default Value: 0 page 110
112	Actual motor speed	R	Group of Functions: Speed Unit: [rpm] Default Value: 0 page 110
113	Time constant of smoothing capacitor T_f	R/ W	Group of Functions: Speed Unit: [ms] Default Value: 2 page 111
114	Software limit positive	R/ W	Group of Functions: Axis Unit: [°] or [mm] Default Value: 100.000 [°] page 77
115	Software limit negative	R/ W	Group of Functions: Axis Unit: [°] or [mm] Default Value: -100.000 [°] page 78
116	Commutation offset	R/ W	Group of Functions: Motor Unit: [°*100] Default Value: 0 page 95
117	Encoder resolution	R	Group of Functions: Motor Unit: [Increments/Revolution] Default Value: Dependent on the encoder page 95
118	Maximum motor speed	R/ W	Group of Functions: Speed Unit: [rpm] Default Value: 3.000 page 111
119	Tracking error	R	Group of Functions: Position Unit: [°] or [mm] Default Value: 0 [°] page 106
120	Tracking error limit	R/ W	Group of Functions: Position Unit: [°] or [mm] Default Value: 10.000 [°] page 107

Register Number	Name	R/ W	Description
123	Pole pair number	R/ W	Group of Functions: Motor Unit: - Default Value: 3 page 96
124	Speed controller Kp	R/ W	Group of Functions: Speed Unit: - Default Value: 1.000 page 112
125	Current set point	R/ W	Group of Functions: Current Unit: [Aeff*100] Default Value: 0 page 115 Current setpoint of the digital speed controller
126	Speed controller Tn	R/ W	Group of Functions: Speed Unit: [ms*100] Default Value: 2.000 page 113
127	Current limitation	R/ W	Group of Functions: Current Unit: [Aeff*100] Default Value: R502 [Aeff*100] page 115
129	Actual speed	R	Group of Functions: Positioning Unit: [°/s] or [mm/s] Default Value: 0 [°/s] page 66
130	Position set point	R/ W	Group of Functions: Position Unit: [°] or [mm] Default Value: 0 [°] page 107
131	Setup mode - delay	R/ W	Group of Functions: Positioning Unit: [ms] Default Value: 1,000 [ms] page 66
132	Setup mode - position 1	R/ W	Group of Functions: Positioning Unit: [°] or [mm] Default Value: 0 [°] page 67
133	Setup mode - position 2	R/ W	Group of Functions: Positioning Unit: [°] or [mm] Default Value: 100 [°] page 67
140	Accel/decel ramp type	R/ W	Group of Functions: Positioning Unit: - Default Value: 1 (Sine square ramps) page 68

Register Number	Name	R/W	Description
141	Positioning mode	R/W	Group of Functions: Positioning Unit: - Default Value: 1 (absolute) page 68
142	Motion direction	R/W	Group of Functions: Positioning Unit: - Default Value: 0 (positive direction) page 69
143	Basic type	R/W	Group of Functions: Positioning Unit: - Default Value: 0 (latest target position) page 70
160	Direction of referencing	R/W	Group of Functions: Referencing Unit: - Default Value: 0 (positive direction) page 71
161	Switch type	R/W	Group of Functions: Referencing Unit: - Default Value: 1 (Reference switch and limit switch) page 71
162	Speed switch search	R/W	Group of Functions: Referencing Unit: [°/s] or [mm/s] Default Value: 500 [°/s] page 72
163	Acceleration at referencing	R/W	Group of Functions: Referencing Unit: [°/s²] or [mm/s²] Default Value: 1,000 [°/s²] page 73
164	Max. distance switch search	R/W	Group of Functions: Referencing Unit: [°] or [mm] Default Value: 100.000 [°] page 73
165	Reference mark	R/W	Group of Functions: Referencing Unit: - Default Value: 1 (Referencing by zero pulse) page 74
166	Speed reference search	R/W	Group of Functions: Referencing Unit: [°/s] or [mm/s] Default Value: 100 [°/s] page 74
167	Max. distance reference search	R/W	Group of Functions: Referencing Unit: [°] or [mm] Default Value: 100.000 [°] page 75

Register Number	Name	R/ W	Description
168	Normal position: distance	R/ W	Group of Functions: Referencing Unit: [°] or [mm] Default Value: 0 [°] page 76
169	Normal position	R/ W	Group of Functions: Referencing Unit: [°] or [mm] Default Value: 0 [°] page 76
170	Referencing / positioning error	R	Group of Functions: Referencing Unit: - Default Value: 0 page 51
180	Maximum acceleration	R/ W	Group of Functions: Axis Unit: [°/s²] or [mm/s²] Default Value: 100,000 [°/s²] page 79
181	Maximum jerk	R/ W	Group of Functions: Axis Unit: [°/s³] or [mm/s³] Default Value: 1,000,000 [°/s³] page 79
182	Travel limit positive	R/ W	Group of Functions: Axis Unit: [°] or [mm] Default Value: 100.000 [°] page 80
183	Travel limit negative	R/ W	Group of Functions: Axis Unit: [°] or [mm] Default Value: -100.000 [°] page 81
184	Maximum speed	R/ W	Group of Functions: Axis Unit: [°/s] Default Value: 18.000 page 81
191	Axis type	R/ W	Group of Functions: Axis Unit: - Default Value: 2 (rotatory) page 82
192	Modulo axis	R/ W	Group of Functions: Axis Unit: - Default Value: 0 (no Modulo axis) page 83
193	Modulo travel range	R/ W	Group of Functions: Axis Unit: [°] or [mm] Default Value: 360 [°] page 84

Register Number	Name	R/ W	Description
194	Gear ratio, motor	R/ W	Group of Functions: Axis Unit: [rev] Default Value: 1 [rev] page 85
195	Gear ratio, mechanism	R/ W	Group of Functions: Axis Unit: [rev] Default Value: 1 [rev] page 86
196	Linear / rotation ratio	R/ W	Group of Functions: Axis Unit: [°*1,000/rev] or [µm/rev] Default Value: 360,000 [°*1,000/rev] page 86
199	Software version	R	Group of Functions: Amplifier Unit: - Default Value: Dependent on the software version page 90
500	Rated voltage	R	Group of Functions: Amplifier Unit: [V] Default Value: Dependent on the amplifyer type page 90
501	Rated current	R	Group of Functions: Amplifier Unit: [Aeff*100] Default Value: Dependent on the amplifyer type page 91
502	Maximum output current	R	Group of Functions: Current Unit: [Aeff*100] Default Value: 2*R501 [Aeff*100] page 116
503	Current control Kp	R/ W	Group of Functions: Current Unit: - Default Value: 70 page 116
504	Current control Tn	R/ W	Group of Functions: Current Unit: [ms*100] Default Value: 300 page 118
505	Motor voltage constant	R/ W	Group of Functions: Motor Unit: [V*min/1,000] Default Value: 0 page 96

Register Number	Name	R/ W	Description
506	Speed controller preset	R/ W	Group of Functions: Speed Unit: [Aeff*100] Default Value: 0 page 113
508	PWM frequency	R/ W	Group of Functions: Amplifier Unit: [kHz] Default Value: Dependent on the amplifyer type page 91
510	Dig. Inputs: Input polarity	R/ W	Group of Functions: Axis Unit: - Default Value: 0b 00000001 00001111 page 87
511	Dig. Inputs: Input circuit state	R	Group of Functions: Axis Unit: - Default Value: 0b 00000000 00000000 page 87
540	Operating mode 1	R/ W	Group of Functions: Control Unit: - Default Value: 0b 00000010 1001x011 page 44
541	Operating mode of the 7-segment display	R/ W	Group of Functions: Control Unit: - Default Value: 0 page 47
542	Tracking window time	R/ W	Group of Functions: Position Unit: [ms] Default Value: 5 page 108
544	DC Link voltage-max. trip	R/ W	Group of Functions: Monitoring Unit: [V] Default Value: Dependent on the amplifyer type page 102
545	DC Link voltage-min. trip	R/ W	Group of Functions: Monitoring Unit: [V] Default Value: Dependent on the amplifyer type page 102
546	Blocking-tripping time	R/ W	Group of Functions: Monitoring Unit: [ms] Default Value: 5.000 page 103

Register Number	Name	R/ W	Description
547	Delay after release brake	R/ W	Group of Functions: Motor Unit: [ms] Default Value: 0 page 97
548	Delay after locking brake	R/ W	Group of Functions: Motor Unit: [ms] Default Value: 100 page 98
549	Emergency stop ramp time	R/ W	Group of Functions: Monitoring Unit: [ms] Default Value: 500 page 103
550	Speed feed forward	R/ W	Group of Functions: Position Unit: [%] Default Value: 100 page 109
560	DC link voltage	R	Group of Functions: Amplifier Unit: [V] Default Value: 0 page 92
561	Actual current	R	Group of Functions: Current Unit: [Aeff*100] Default Value: 0 page 118
562	Temperature	R	Group of Functions: Motor Unit: [°C] Default Value: 0 page 99
563	Temperature	R	Group of Functions: Amplifier Unit: [°C] Default Value: 0 page 92
564	Ballast load, internal	R	Group of Functions: Amplifier Unit: [%] Default Value: 0 page 92
565	Shaft position	R	Group of Functions: Motor Unit: [°*100] Default Value: 0 page 100
566	Input current	R	Group of Functions: Amplifier Unit: [Aeff*100] Default Value: 0 page 93

Register Number	Name	R/W	Description
567	Mains voltage	R	Group of Functions: Amplifier Unit: [Veff] Default Value: 0 page 93
568	Temperature	R	Group of Functions: Amplifier Unit: [°C] Default Value: 0 page 93
572	Set operating mode	R/W	Group of Functions: Control Unit: - Default Value: 103 page 47
573	Actual mode of operation	R	Group of Functions: Control Unit: - Default Value: 3 page 48
574	Control word 2	R/W	Group of Functions: Control Unit: - Default Value: 0 page 48
575	Status word 2	R	Group of Functions: Control Unit: - Default Value: 0 page 49
576	Interface access authorization	R/W	Group of Functions: Amplifier Unit: - Default Value: 0 page 94
577	Encoder type	R	Group of Functions: Motor Unit: - Default Value: Dependent on the encoder page 100
580	Warnings mask	R/W	Group of Functions: Diagnose Unit: - Default Value: 0 page 52
581	Warnings	R/W	Group of Functions: Diagnose Unit: - Default Value: page 53
582	AutoClear mask for warnings	R/W	Group of Functions: Diagnose Unit: - Default Value: 0b 00000000 00001100 11111111 page 53

Register Number	Name	R/ W	Description
585	Error 0 ... 15	R	Group of Functions: Diagnose Unit: - Default Value: 0 page 54
586	Error 16 ... 31	R	Group of Functions: Diagnose Unit: - Default Value: 0 page 55
600	Device temp. warning	R	Group of Functions: Monitoring Unit: [°C] Default Value: 70 page 104
601	Device temp. error	R	Group of Functions: Monitoring Unit: [°C] Default Value: 80 page 104
602	Motor temp. - warning	R	Group of Functions: Monitoring Unit: [°C] Default Value: 110 page 104
603	Motor temp. error	R	Group of Functions: Monitoring Unit: [°C] Default Value: 135 page 105
604	Ballast load warning	R	Group of Functions: Monitoring Unit: [%] Default Value: 180 page 105
605	Ballast load error	R	Group of Functions: Monitoring Unit: [%] Default Value: 100 page 105
616	Motor torque const. Kt	R/ W	Group of Functions: Motor Unit: [Nm/A*100] Default Value: 0 page 101
618	Continuous rated current	R/ W	Group of Functions: Current Unit: [Aeff*100] Default Value: R501 page 119
619	Overload factor	R/ W	Group of Functions: Current Unit: Default Value: 200 page 119

Register Number	Name	R/ W	Description
620	Actual current (%)	R	Group of Functions: Current Unit: [%] Default Value: 0 page 120
621	Actual torque	R	Group of Functions: Current Unit: [Nm*1000] Default Value: 0 page 120
870	Decimal places for position values	R/ W	Group of Functions: Axis Unit: - Default Value: 0 page 88
999	The revision state of the operating system	R	Group of Functions: Amplifier Unit: - Default Value: Dependent on the software version page 94

Appendix D: Register Survey - Functional Sequence

In the column "R/W", the possibility of access to the parameter has been defined:

R = Read
W = Write

Register Number	Name	R/W	Description
Control			
101	Command	R/W	Group of Functions: Control Unit: - Default Value: 0 page 41
540	Operating mode 1	R/W	Group of Functions: Control Unit: - Default Value: 0b 00000010 1001x011 page 44
541	Operating mode of the 7-segment display	R/W	Group of Functions: Control Unit: - Default Value: 0 page 47
572	Set operating mode	R/W	Group of Functions: Control Unit: - Default Value: 103 page 47
573	Actual mode of operation	R	Group of Functions: Control Unit: - Default Value: 3 page 48
574	Control word 2	R/W	Group of Functions: Control Unit: - Default Value: 0 page 48
575	Status word 2	R	Group of Functions: Control Unit: - Default Value: 0 page 49
Diagnose			
100	Status	R	Group of Functions: Diagnose Unit: - Default Value: 0 page 50

Register Number	Name	R/ W	Description
580	Warnings mask	R/ W	Group of Functions: Diagnose Unit: - Default Value: 0 page 52
581	Warnings	R/ W	Group of Functions: Diagnose Unit: - Default Value: page 53
582	AutoClear mask for warnings	R/ W	Group of Functions: Diagnose Unit: - Default Value: 0b 00000000 00001100 11111111 page 53
585	Error 0 ... 15	R	Group of Functions: Diagnose Unit: - Default Value: 0 page 54
586	Error 16 ... 31	R	Group of Functions: Diagnose Unit: - Default Value: 0 page 55
Positioning			
102	Target position	R/ W	Group of Functions: Positioning Unit: [°] or [mm] Default Value: 0 [°] page 56
103	Target speed	R/ W	Group of Functions: Positioning Unit: [°/s] or [mm/s] Default Value: 0 [°/s] page 58
104	Positioning time	R/ W	Group of Functions: Positioning Unit: [s] Default Value: 0 page 59
105	Acceleration	R/ W	Group of Functions: Positioning Unit: [°/s^2] or [mm/s^2] Default Value: 500 [°/s^2] page 60
106	Deceleration	R/ W	Group of Functions: Positioning Unit: [°/s^2] or [mm/s^2] Default Value: 500 [°/s^2] page 62
107	Destination window	R/ W	Group of Functions: Positioning Unit: [°] or [mm] Default Value: 1 [°] page 63

Register Number	Name	R/ W	Description
109	Actual position	R	Group of Functions: Positioning Unit: [°] or [mm] Default Value: 0 [°] page 65
129	Actual speed	R	Group of Functions: Positioning Unit: [°/s] or [mm/s] Default Value: 0 [°/s] page 66
131	Setup mode - delay	R/ W	Group of Functions: Positioning Unit: [ms] Default Value: 1,000 [ms] page 66
132	Setup mode - position 1	R/ W	Group of Functions: Positioning Unit: [°] or [mm] Default Value: 0 [°] page 67
133	Setup mode - position 2	R/ W	Group of Functions: Positioning Unit: [°] or [mm] Default Value: 100 [°] page 67
140	Accel/decel ramp type	R/ W	Group of Functions: Positioning Unit: - Default Value: 1 (sine^2 ramps) page 68
141	Positioning mode	R/ W	Group of Functions: Positioning Unit: - Default Value: 1 (absolute) page 68
142	Motion direction	R/ W	Group of Functions: Positioning Unit: - Default Value: 0 (positive direction) page 69
143	Basic type	R/ W	Group of Functions: Positioning Unit: - Default Value: 0 (latest target position) page 70
Referencing			
160	Direction of referencing	R/ W	Group of Functions: Referencing Unit: - Default Value: 0 (positive direction) page 71
161	Switch type	R/ W	Group of Functions: Referencing Unit: - Default Value: 1 (Reference switch and limit switch) page 71

Register Number	Name	R/ W	Description
162	Speed switch search	R/ W	Group of Functions: Referencing Unit: [°/s] or [mm/s] Default Value: 500 [°/s] page 72
163	Acceleration at referencing	R/ W	Group of Functions: Referencing Unit: [°/s^2] or [mm/s^2] Default Value: 1,000 [°/s^2] page 73
164	Max. distance switch search	R/ W	Group of Functions: Referencing Unit: [°] or [mm] Default Value: 100.000 [°] page 73
165	Reference mark	R/ W	Group of Functions: Referencing Unit: - Default Value: 1 (Referencing by zero pulse) page 74
166	Speed reference search	R/ W	Group of Functions: Referencing Unit: [°/s] or [mm/s] Default Value: 100 [°/s] page 74
167	Max. distance reference search	R/ W	Group of Functions: Referencing Unit: [°] or [mm] Default Value: 100.000 [°] page 75
168	Normal position: distance	R/ W	Group of Functions: Referencing Unit: [°] or [mm] Default Value: 0 [°] page 76
169	Normal position	R/ W	Group of Functions: Referencing Unit: [°] or [mm] Default Value: 0 [°] page 76
170	Referencing / positioning error	R	Group of Functions: Referencing Unit: - Default Value: 0 page 51

Register Number	Name	R/ W	Description
Axis			
114	Software limit positive	R/ W	Group of Functions: Axis Unit: [°] or [mm] Default Value: 100.000 [°] page 77
115	Software limit negative	R/ W	Group of Functions: Axis Unit: [°] or [mm] Default Value: -100.000 [°] page 78
180	Maximum acceleration	R/ W	Group of Functions: Axis Unit: [°/s^2] or [mm/s^2] Default Value: 100,000 [°/s^2] page 79
181	Maximum jerk	R/ W	Group of Functions: Axis Unit: [°/s^3] or [mm/s^3] Default Value: 1,000,000 [°/s^3] page 79
182	Travel limit positive	R/ W	Group of Functions: Axis Unit: [°] or [mm] Default Value: 100.000 [°] page 80
183	Travel limit negative	R/ W	Group of Functions: Axis Unit: [°] or [mm] Default Value: -100.000 [°] page 81
184	Maximum speed	R/ W	Group of Functions: Axis Unit: [°/s] Default Value: 18.000 page 81
191	Axis type	R/ W	Group of Functions: Axis Unit: - Default Value: 2 (rotatory) page 82
192	Modulo axis	R/ W	Group of Functions: Axis Unit: - Default Value: 0 (no modulo axis) page 83
193	Modulo travel range	R/ W	Group of Functions: Axis Unit: [°] or [mm] Default Value: 360 [°] page 84
194	Gear ratio, motor	R/ W	Group of Functions: Axis Unit: [rev] Default Value: 1 [rev] page 85

Register Number	Name	R/ W	Description
195	Gear ratio, mechanism	R/ W	Group of Functions: Axis Unit: [rev] Default Value: 1 [rev] page 86
196	Linear / rotation ratio	R/ W	Group of Functions: Axis Unit: [°*1,000/rev] or [µm/rev] Default Value: 360,000 [°*1,000/rev] page 86
510	Dig. Inputs: Input polarity	R/ W	Group of Functions: Axis Unit: - Default Value: 0b 00000001 00001111 page 87
511	Dig. Inputs: Input circuit state	R	Group of Functions: Axis Unit: - Default Value: 0 page 87
870	Decimal places for position values	R/ W	Group of Functions: Axis Unit: - Default Value: 0 page 88
Amplifier			
199	Software version	R	Group of Functions: Amplifier Unit: - Default Value: Dependent on the software version page 90
500	Rated voltage	R	Group of Functions: Amplifier Unit: [V] Default Value: Dependent on the amplifyer type page 90
501	Rated current	R	Group of Functions: Amplifier Unit: [Aeff*100] Default Value: Dependent on the amplifyer type page 91
508	PWM frequency	R/ W	Group of Functions: Amplifier Unit: [kHz] Default Value: Dependent on the amplifyer type page 91

Register Number	Name	R/ W	Description
560	DC link voltage	R	Group of Functions: Amplifier Unit: [V] Default Value: 0 page 92
563	Temperature	R	Group of Functions: Amplifier Unit: [°C] Default Value: 0 page 92
564	Ballast load, internal	R	Group of Functions: Amplifier Unit: [%] Default Value: 0 page 92
566	Input current	R	Group of Functions: Amplifier Unit: [Aeff*100] Default Value: 0 page 93
567	Mains voltage	R	Group of Functions: Amplifier Unit: [Veff] Default Value: 0 page 93
568	Temperature	R	Group of Functions: Amplifier Unit: [°C] Default Value: 0 page 93
576	Interface access authorization	R/ W	Group of Functions: Amplifier Unit: - Default Value: 0 page 94
999	The revision state of the operating system	R	Group of Functions: Amplifier Unit: - Default Value: Dependent on the software version page 94
Motor			
116	Commutation offset	R/ W	Group of Functions: Motor Unit: [°*100] Default Value: 0 page 95
117	Encoder resolution	R	Group of Functions: Motor Unit: [Increments/Revolution] Default Value: Dependent on the encoder page 95

Register Number	Name	R/ W	Description
123	Pole pair number	R/ W	Group of Functions: Motor Unit: - Default Value: 3 page 96
505	Motor voltage constant	R/ W	Group of Functions: Motor Unit: [V*min/1000] Default Value: 0 page 96
547	Delay after release brake	R/ W	Group of Functions: Motor Unit: [ms] Default Value: 0 page 97
548	Delay after locking brake	R/ W	Group of Functions: Motor Unit: [ms] Default Value: 100 page 98
562	Temperature	R	Group of Functions: Motor Unit: [°C] Default Value: 0 page 99
565	Shaft position	R	Group of Functions: Motor Unit: [°*100] Default Value: 0 page 100
577	Encoder type	R	Group of Functions: Motor Unit: - Default Value: Dependent on the encoder page 100
616	Motor torque const. Kt	R/ W	Group of Functions: Motor Unit: [Nm/A*100] Default Value: 0 page 101
Monitoring			
544	DC Link voltage-max. trip	R/ W	Group of Functions: Monitoring Unit: [V] Default Value: Dependent on the amplifyer type page 102
545	DC Link voltage-min. trip	R/ W	Group of Functions: Monitoring Unit: [V] Default Value: Dependent on the amplifyer type page 102

Register Number	Name	R/ W	Description
546	Blocking-tripping time	R/ W	Group of Functions: Monitoring Unit: [ms] Default Value: 5.000 page 103
549	Emergency stop ramp time	R/ W	Group of Functions: Monitoring Unit: [ms] Default Value: 500 page 103
600	Device temp. warning	R	Group of Functions: Monitoring Unit: [°C] Default Value: 70 page 104
601	Device temp. error	R	Group of Functions: Monitoring Unit: [°C] Default Value: 80 page 104
602	Motor temp. warning	R	Group of Functions: Monitoring Unit: [°C] Default Value: 110 page 104
603	Motor temp. error	R	Group of Functions: Monitoring Unit: [°C] Default Value: 135 page 105
604	Ballast load warning	R	Group of Functions: Monitoring Unit: [%] Default Value: 180 page 105
605	Ballast load error	R	Group of Functions: Monitoring Unit: [%] Default Value: 100 page 105
Position			
110	Position feedback controller Kv	R/ W	Group of Functions: Position Unit: [1/s * 100] Default Value: 1.000 page 106
119	Tracking error	R	Group of Functions: Position Unit: [°] or [mm] Default Value: 0 [°] page 106
120	Tracking error limit	R/ W	Group of Functions: Position Unit: [°] or [mm] Default Value: 10.000 [°] page 107

Register Number	Name	R/ W	Description
130	Position set point	R/ W	Group of Functions: Position Unit: [°] or [mm] Default Value: 0 [°] page 107
542	Tracking window time	R/ W	Group of Functions: Position Unit: [ms] Default Value: 5 page 108
550	Speed feed forward	R/ W	Group of Functions: Position Unit: [%] Default Value: 100 page 109
Speed			
111	Speed Reference	R/ W	Group of Functions: Speed Unit: [rpm] Default Value: 0 page 110
112	Actual motor speed	R	Group of Functions: Speed Unit: [rpm] Default Value: 0 page 110
113	Time constant of smoothing capacitor T_f	R/ W	Group of Functions: Speed Unit: [ms] Default Value: 2 page 111
118	Maximum motor speed	R/ W	Group of Functions: Speed Unit: [rpm] Default Value: 3.000 page 111
124	Speed controller Kp	R/ W	Group of Functions: Speed Unit: - Default Value: 1.000 page 112
126	Speed controller Tn	R/ W	Group of Functions: Speed Unit: [ms*100] Default Value: 2.000 page 113
506	Speed controller preset	R/ W	Group of Functions: Speed Unit: [Aeff*100] Default Value: 0 page 113

Register Number	Name	R/W	Description
Current			
125	Current set point	R/W	Group of Functions: Current Unit: [Aeff*100] Default Value: 0 page 115
127	Current limitation	R/W	Group of Functions: Current Unit: [Aeff*100] Default Value: R502 [Aeff*100] page 115
502	Maximum output current	R	Group of Functions: Current Unit: [Aeff*100] Default Value: 2*R501 [Aeff*100] page 116
503	Current control Kp	R/W	Group of Functions: Current Unit: - Default Value: 70 page 116
504	Current control Tn	R/W	Group of Functions: Current Unit: [ms*100] Default Value: 300 page 118
561	Actual current	R	Group of Functions: Current Unit: [Aeff*100] Default Value: 0 page 118
618	Continuous rated current	R/W	Group of Functions: Current Unit: [Aeff*100] Default Value: R501 page 119
619	Overload factor	R/W	Group of Functions: Current Unit: Default Value: 200 page 119
620	Actual current (%)	R	Group of Functions: Current Unit: [%] Default Value: 0 page 120
621	Actual torque	R	Group of Functions: Current Unit: [Nm*1000] Default Value: 0 page 120

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