



Product Data  
February 2007

## PROFIBUS DP Communication Profile

### MESANOR

**BME** *xxxx* **P**

**Basic Motion Element**

**BDE** *xxxx* **EP**

**Basic Drive Element**

## RECEIVING AND HANDLING

Upon delivery of the equipment, inspect the shipping containers and contents for indications of damages in curried in transit. If any of the items specified in the bill of lading are damaged, or the quantity is incorrect, do not accept them until the freight or express agent makes an appropriate notation on your freight bill or express receipt.

Claims for loss or damage in shipment must not be deducted from your invoice, nor should payment be withheld pending adjustment of any such claims.

Store the equipment in a clean , dry area. It is advisable to leave the equipment in its shipping container until ready fore use. Each amplifier is checked carefully before shipment. However, upon receipt, the user should make sure that the amplifier corresponds to or is properly rated in terms of rated voltage and current for the type of motor which is to be driven. The descriptive label affixed to the amplifier specifies electrical ratings.



### Safety and application information

According to the enclosure the Amplifiers Motors and Power supplies may have live, uninsulated or rotating parts or hot surfaces during operation.

The inadmissible removing of the required cover, in proper application, wrong installation or operation may lead to personal or material damages.

For further information please refer to the manual.

Only qualified personal are permitted to install or operate the equipment.

IEC 364, CENELEC HD 384, DIN VDE 0100,0105,0110 and national regulations must be observed

According to these general safety information a qualified person is someone who is familiar with installation, assembly, commissioning and operation of the equipment. These person must have the appropriate qualifications.



**Never plug in or unplug any connectors on the amplifier or open the amplifier when power is applied. A time of discharge of 3 minutes must be considered**

#### Key Features

- Compact design
- Easy installation
- DC-Supply 24-48 V
- DC-Bus coupling
- Optional analogus input
- Encoder sensor
- Direct brake control with smart switch (via Fieldbus)

#### Application

- All pick and place equipments
- Single and multi axis machinery
- Test equipments
- Feeding systems
- Wrapping machinery
- Robotics
- Textile machinery
- Spotlight-trace control systems
- Food machinery
- Medical equipments

#### YOUR ADVANTAGE

- *Wide range of applications*
- *Easy matching and setup*
- *High reliability*
- *Firmware update via RS 232*

SN: 74.02317

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## Document History

V1.1	Parameter P0510 – P-gain position loop: Default value changed from 2000 to 125 starting at firmware V1.05. Description for new scaling added.
	Parameter P0511 – D-gain position loop: Description for new scaling added.
	New cover picture



## Chapter 1 - PROFIBUS DP Communication

### 1.1 - General

PROFIBUS DP is an international, open fieldbus standard and is defined in the following standards:

- European fieldbus EN 50170 Part 2
- DIN 19245 Part 1 and 3
- IEC 61158

For PROFIBUS DP a differentiation is made between master and slave.

- **Master** (active bus nodes)

Devices, which represent a master on the bus, define the data transfer along the bus, and are therefore also designated as active bus node.

For the masters, a differentiation is made between 2 Classes:

- DP master, Class 1 (DPMC1):

This designates central master devices which exchange information with the slaves in a defined telegram cycle.

Examples: SIMATIC S5, SIMATIC S7, etc.

- DP master, Class 2 (DPMC2):

These are devices to configure, commission, control and visualise with the bus operational.

Examples: Programmers, operator control/visualisation devices (HMI)

- **Slave** (passive bus node)

These devices may only be used to receive and acknowledge messages and, when requested to do so by the master, transfer messages to it.

### 1.2 - Protocol versions

#### PROFIBUS DP-V0

DP-V0 is the basic communication protocol version. It only supports cyclic data exchange (MS0 communication) together with a basic configuration, parameterisation and a simple diagnostic mechanism.

#### PROFIBUS DP-V1

DP-V1 is an extension to DP-V0 and adds support for acyclic communication (MS1 and MS2 communication). Additionally the diagnostic function is build up and separated into status (unconfirmed) and alarm (confirmed) management.

#### PROFIBUS DP-V2

DP-V2 is an extension to DP-V0 and DP-V1 with isochron data exchange (IsoM) functionality and slave to slave communication with broadcast telegrams.

### 1.3 - Supported PROFIBUS DP functionality and properties

This PROFIBUS DP slave supports the following *DP-V0* telegram functionality:

- Set\_PRM telegram
- Get\_Cfg telegram
- Chk\_Cfg telegram
- Set\_Slave\_Address telegram
- Global\_Control telegram
- RD\_Inupt telegram
- RD\_Output telegram
- Data\_Exchange telegram

Supported properties:

Property	Supported by this slave
Baudrate 12,00 Mbit/s	Supported (with automatic detection)
Baudrate 6,00 Mbit/s	Supported (with automatic detection)
Baudrate 3,00 Mbit/s	Supported (with automatic detection)
Baudrate 1,50 Mbit/s	Supported (with automatic detection)
Baudrate 500,00 Kbit/s	Supported (with automatic detection)
Baudrate 187,50 Kbit/s	Supported (with automatic detection)
Baudrate 93,75 Kbit/s	Supported (with automatic detection)
Baudrate 45,45 Kbit/s	Supported (with automatic detection)
Baudrate 19,20 Kbit/s	Supported (with automatic detection)
Baudrate 9,60 Kbit/s	Supported (with automatic detection)
FREEZE mode	Supported
SYNC mode	Supported
DPMC2 Set Slave Address	Supported
DPMC2 No Address Change	Supported

## Chapter 2 - PROFIBUS DP Profile communication

### 2.1 - PROFIBUS DP-V0 Cyclic data exchange

With the message buffers for cyclic data exchange it is possible to exchange data between a master and the slaves. A setpoint (output) buffer is periodically send from the master to the slaves. In turn the slaves periodically send an actual values (input) buffer to the master. Both buffers are organised in a set of consecutive words (16 bit data). Each word may be freely defined with its meaning. This is done by selecting a module to be used for each slave within a PROFIBUS configuration tool together with the shipped GSD file for a slave. The configuration tool comes together with the master.

Within this slave there are more than a hundred parameters that may be accessed. Only a few of them is needed to actually work with this slave. Most of these parameters are used for configuration purposes only. Because of the limited buffer size for both buffers (setpoint and actual value buffer) two different mechanisms are needed to allow a fast and cyclic exchange of the working parameters and also give the master the ability to access all existing parameters in a acyclic (and much slower) way.

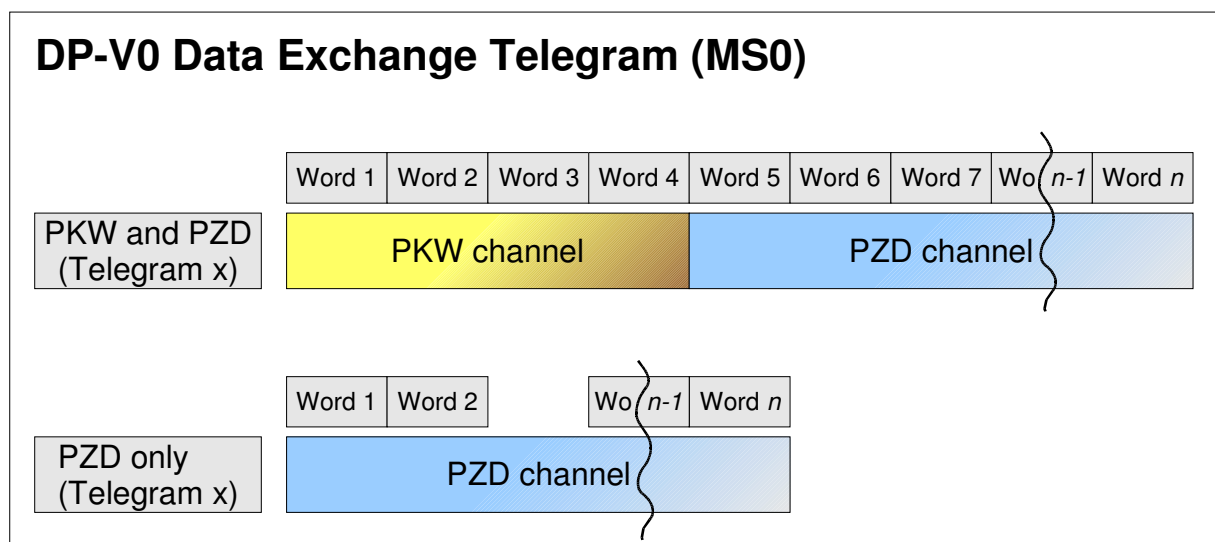
Therefore two different types of channels are defined and classified for the words of the DP-V0 cyclic data exchange buffers:

**PKW:** The PKW channel is a special communication channel for requesting and changing parameter values with a acyclic handshaking mechanism. It is always 4 words long.

**PZD:** The PZD channel is a pre configured process data area for cyclic data exchange. The available parameters (signals) are selectable by configuring a PZD standard telegram type. The length of the PZD channel depends on the selected telegram type.

The data exchange buffers can be configured within two modes:

- A) PKW and PZD channel
- B) PZD channel only



When configuring the PROFIBUS network together with the shipped GSD configuration file there are a couple of modules available. By selecting one of the modules you decide

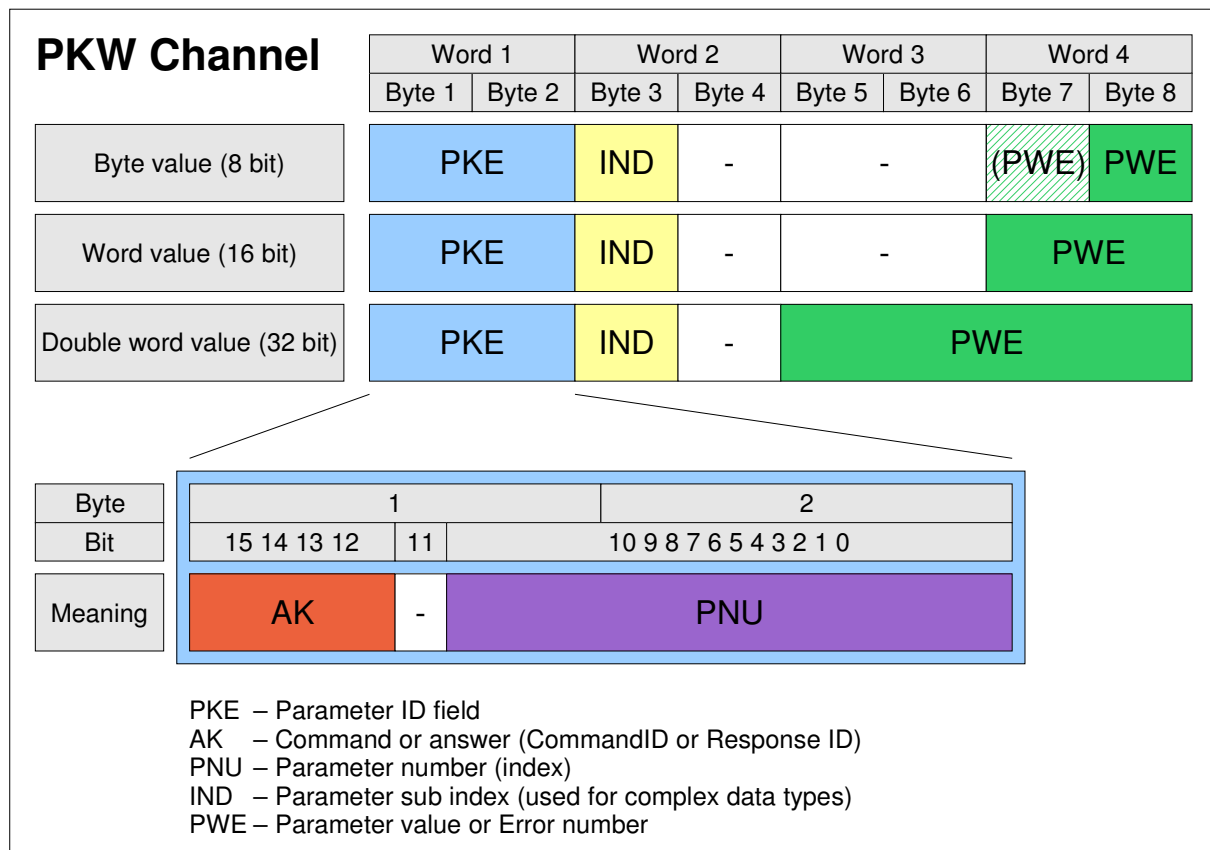
- whether or not to use the PKW channel and
- which PZD telegram is used.

Example of available modules:

- PKW + PZD1 Std. telegram 1
- PZD1 Std. telegram 1
- PKW + PZD7 Std. telegram 7
- PZD7 Std. telegram 7
- PKW + PZD100 Telegram 100
- PZD100 Telegram 100
- ...

## 2.2 - Acyclic Communication through PKW channel

### 2.2.1 - Channel structure



- PKE** is the parameter id field, with the fields **AK** (command or answer) and **PNU** parameter number (main index).
- IND** is the array field number (sub index) used only in conjunction with array parameters.
- PWE** is the value field with the value corresponding to PNU and IND.

The following commands (Task IDs) can be send from the master to the slave by using the **AK field**:

Task ID (dec./binary)	Indicated Function [M->S] = Parameter transfer from master to slave	Regular Response IDs
0 / 0000 <sub>b</sub>	No task	0
1 / 0001 <sub>b</sub>	Request a parameter value [S->M]	1, 2
2 / 0010 <sub>b</sub>	Change parameter value (word) [M->S]	1
3 / 0011 <sub>b</sub>	Change parameter value (double word) [M->S]	2
4 / 0100 <sub>b</sub>	- Not supported -	
5 / 0101 <sub>b</sub>	- Not supported -	
6 / 0110 <sub>b</sub>	Request parameter value from array [S->M]	4, 5
7 / 0111 <sub>b</sub>	Change parameter value from array (word) [M->S]	4
8 / 1000 <sub>b</sub>	Change parameter value from array (double word) [M->S]	5
9 / 1001 <sub>b</sub>	- Not supported -	
10 - 15	- Undefined -	

The slave answers with one of the following responses within the **AK field**:

Response ID (dec./binary)	Meaning
0 / 0000 <sub>b</sub>	No response / No task
1 / 0001 <sub>b</sub>	Transfer parameter value (word) [S->M]
2 / 0010 <sub>b</sub>	Transfer parameter value (double word) [S->M]
3 / 0011 <sub>b</sub>	- Not used -
4 / 0100 <sub>b</sub>	Transfer parameter value from array (word) [S->M]
5 / 0101 <sub>b</sub>	Transfer parameter value from array (double word) [S->M]
6 / 0110 <sub>b</sub>	- Not used -
7 / 0111 <sub>b</sub>	Task can not be executed (Error No within PWE)
8-15	- Undefined -

The above column “Regular Response IDs” shows the possible reactions from the slave for each indicated function. The error response id 7 (Task can not be executed) is always possible. In case of an error response (Response ID 7) one of the following **error no.** is given within the PWE field:

Error No.	Meaning
0	Illegal PNU
1	Parameter value can not be changed (no change permission)
2	Lower or upper limit violated (value out of range)
3	Erroneous sub index (array sub index does not exist)
4	- Not used -
5	Incorrect data type (on change request)
6 – 17	- Not used -
18	Other error (not specified)

## 2.2.2 - Accessing Parameters

The PROFIBUS slave has a set of parameters that can be accessed by the master. A parameter is a single variable or an array of variables. Each parameter is identified with a parameter number, called PNU or index. If a parameter is an array of variables, each variable is identified with a sub index number, called IND. The sub index (IND) starts from 1 to the number of variables. For single variables the sub index (IND) is always 0.

To **read a parameter**, the parameter number and sub index 0 have to be written into the PNU and IND fields together with Task-ID AK = 1. The slave will answer with Response-ID AK = 1 or 2 according to the data type or AK = 7 for an error. The parameter value or an error number can be read from the PWE field.

After reading is finished the AK field should be set to 0 (No Task) to prepare for the next access (the slave also answers with AK = 0).

To **write a parameter**, the parameter number, sub index 0 and the new parameter value have to be written into the PNU, IND and PWE fields together with Task-ID AK = 2 or 3. The slave will answer with AK = 1 or 2 according to the data type or AK = 7 for an error. The echoed parameter value or an error number can be read from the PWE field.

After writing is finished the AK field should be set to 0 (No Task) to prepare for the next access (slave also answers with AK = 0).

To access array values instead of single values the only difference is to set the according sub index (IND) and use the AK commands 6, 7 and 8. The slave answers with AK responses 4 and 5.

When using 8 bit parameters they are expanded to 16 bit and transferred as a word, so the regular Task IDs 2, 7 and Response IDs 1, 4 are used.

Tip: Setting the AK field on master side will start the task inside the slave. At first a snapshot from PKE, IND and PWE field is made. Therefore the AK field has to be the last field set to prevent unintentional slave reactions.

### 2.3 - Parameter mapping for PZD channel - Signals

The PZD area is a pre configured process data area for cyclic data exchange. Depending on the used functionality within the drive there are different parameters (signals) that need to be transferred between the master and the slave. All parameters that are able to be mapped into the PZD channel are included into a special signal list. This list gives a reference between the signal and the corresponding PNU number for parameter access (through PKW channel).

This list is also readable from the slave as P0923 – List of parameters.

The following list shows the parameters (signals) that are mapped into the different telegrams:

Signal No.	Abbreviation	Short Description	Data Type	PNU
1	STW1	Control word 1	V2 (16 single bits)	P0967
2	ZSW1	Status word 1	V2 (16 single bits)	P0968
...	-	-	-	-
5	NSOLL_A	Speed setpoint A	Integer16 (16 bit signed)	P0600
6	NIST_A	Speed actual value A	Integer16 (16 bit signed)	P0481
...	-	-	-	-
8	NIST_B	Speed actual value B	Integer32 (32 bit signed)	P0482
...	-	-	-	-
21	E_DIGITAL	Digital inputs	V2 (16 single bits)	P0325
22	A_DIGITAL	Digital outputs	V2 (16 single bits)	P0326
...	-	-	-	-
28	XISTA	Position actual value A	Integer32 (32 bit signed)	P0521
...	-	-	-	-
32	SATZANW	Sequence selection	Unsigned16 (16 bit unsigned)	P0840
33	AKTSATZ	Actual traversing block	Unsigned16 (16 bit unsigned)	P0841
34	TARPOS_A	Target position	Integer32 (32 bit signed)	P0630
35	VELOCITY_A	Velocity	Unsigned32 (32 bit unsigned)	P0631
...	-	-	-	-
100	E_DIGITAL2	Digital inputs (L)	V2 (16 single bits)	P0327
101	A_DIGITAL2	Digital outputs (L)	V2 (16 single bits)	P0328

## 2.4 - PZD Telegram types

Depending on the used functionality within the drive a couple of PZD standard telegram types are available. Every telegram type has a list of parameters (signals) mapped into it. Selecting a standard telegram type at the PROFIBUS configuration tool from the GSD file defines the used signals and their position within the PZD channel.

The drive supports the following standard and device specific telegrams to be mapped into the PZD channel:

**Standard telegram 1:** Simple Speed Mode (16 bit speed operations)

**Standard telegram 7:** Position operations with sequence blocks

**Standard telegram 100:** Position operations with sequence blocks (additional digital in/out)

**Standard telegram 101:** Position operations with sequence blocks (additional digital in/out)

**Standard telegram 102:** Position operations with sequence blocks (extended position functions)

**Standard telegram 103:** Position operations with sequence blocks (extended position functions)

**Standard telegram 110:** Position operations

**Standard telegram 111:** Position operations (extended position functions)

**Standard telegram 112:** Position operations (additional digital in/out)

**Standard telegram 113:** Position operations (additional digital in/out)

Telegram	PZD															
	Word 1		Word 2		Word 3		Word 4		Word 5		Word 6		Word 7		Word 8	
	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11	Byte 12	Byte 13	Byte 14	Byte 15	Byte 16
1	Setpoints (out)	STW1		NSOLL_A												
	Actual values (in)	ZSW1		NIST_A												
Simple Speed Mode																
7	Setpoints (out)	STW1		SATZANW												
	Actual values (in)	ZSW1		AKTSATZ												
Position Mode - Sequences																
100	Setpoints (out)	STW1		SATZANW		A_DIGITAL										
	Actual values (in)	ZSW1		AKTSATZ		E_DIGITAL										
101	Setpoints (out)	STW1		SATZANW		A_DIGITAL		A_DIGITAL2								
	Actual values (in)	ZSW1		AKTSATZ		E_DIGITAL		E_DIGITAL2								
102	Setpoints (out)	STW1		SATZANW		A_DIGITAL		A_DIGITAL2		TARPOS_A						
	Actual values (in)	ZSW1		AKTSATZ		E_DIGITAL		E_DIGITAL2		XISTA						
103	Setpoints (out)	STW1		SATZANW		A_DIGITAL		A_DIGITAL2		TARPOS_A		VELOCITY_A				
	Actual values (in)	ZSW1		AKTSATZ		E_DIGITAL		E_DIGITAL2		XISTA		NIST_B				
Position Mode – Profile Move																
110	Setpoints (out)	STW1		TARPOS_A												
	Actual values (in)	ZSW1		XISTA												
111	Setpoints (out)	STW1		TARPOS_A		VELOCITY_A										
	Actual values (in)	ZSW1		XISTA		NIST_B										
112	Setpoints (out)	STW1		TARPOS_A		VELOCITY_A		A_DIGITAL								
	Actual values (in)	ZSW1		XISTA		NIST_B		E_DIGITAL								
113	Setpoints (out)	STW1		TARPOS_A		VELOCITY_A		A_DIGITAL		A_DIGITAL2						
	Actual values (in)	ZSW1		XISTA		NIST_B		E_DIGITAL		E_DIGITAL2						

All telegrams have the parameters P0967 – ControlWord STW1 and P0968 –StatusWord ZSW1 within the first word. All following signal to word associations differ from telegram to telegram.

**Attention:**

**Because of the missing choice to enable or disable the PZD communication during normal operation all signals (parameters) within the selected PZD standard telegram are written periodically. This makes it impossible for any other mechanism to take over control and write values to these signals as long as the PROFIBUS data exchange is running.**

**Therefore the whole PZD standard telegram is controlled by the value of bit 10 from the P0967 – ControlWord STW1 (Control Request):**

<b>P0967 – ControlWord STW1</b>	
Bit 10 = 1	PZD standard telegram accepted and signals set
Bit 10 = 0	PZD standard telegram is ignored and no signals set

Selecting a PZD standard telegram type to be used will appoint the used signals. The appropriate operation mode will be set automatically whenever the fieldbus PLC is granted the control priority. It is also possible to have an operation mode different to the selected telegram type. So, selecting standard telegram 7 (only useful for operating sequences) together with a simple speed mode is definitely possible, as the drive may be under control of the configuration software.

A detailed description about the signals of each telegram can be found within the sections about the parameter descriptions.



## Chapter 3 - Parameter model

A parameter is a variable in a common way. The describing word “parameter” is the common naming for PROFIBUS systems. It’s equal to an “object” at CANopen or a datapoint in other systems.

The drive contains a large list of variables for configuration, information and process handling. The following chapter gives a short introduction in what kind of information belongs to the variables and describes how they are organised.

When talking about PZD standard telegrams (DP-V0 cyclic data exchange) the exchanged variables are called “signals”. They are identical to the parameters. A few parameters can be accessed within the cyclic transfer. They are listed in a signal list. This list holds a reference to the parameter.

A parameter represents an information element with the following elements:

- A unique parameter number (called PNU)
- The parameter value (called PWE)
- A description (called PBE)
- Optional: additional text

All parameters are organised in a list of parameters. Each parameter is given a **parameter number** for identification purposes. This index is called the PNU.

PNU range	Content
1 – 899	Drive specific parameters
900 – 999	Common parameters used from a large range of drive manufacturers
1000 – 59999	Drive specific parameters (extended range)
60000 – 65535	Common parameters used from a large range of drive manufacturers (extended range)

The **parameter value** may be a single variable value (simple variable) or a composition of variable values (array of variables). When accessing arrays each variable of the element is identified with a sub-index (called IND).

The **description** of a parameter holds a list of attributes:

Name	The name of the parameter
Number of sub elements	Arrays consist of more than one element
Object type	The kind parameter like variable or array
Access type	What type of access is possible, read/write or read-only
Value range	The lower and upper limit
Data type	How is this parameter organised
Attributes	Special attributes
Default value	The factory default value
Actual value	The value at runtime

### 3.1 - Structure of the parameter descriptions

Example:

#### P0967 - Control word

-> PNU number and name

Object Type	VAR	-> VAR or ARRAY
Access Type	Read/Write	-> Read/Write, Read only or Constant
Signal	1	-> Signal number 1 for PZD Telegram
Data Type	UNSIGNED16	-> see data types section below
Value Range	0x0 ... 0xFFFF	-> Lower and upper limit
Default Value	0x0	-> The factory default value
NVMem	-	-> Segment within NVMem
Restriction	-	-> ,Read only' when operational -> ,Read only' when not operational

The controlword is used to ...

-> describing text

### 3.2 - Used data types

The following list shows all used data types for this drive:

Data type	Short description	Value range
INTEGER8	A 8 bit integer value with sign	-128 ... +127
INTEGER16	A 16 bit integer value with sign	-32768 ... +32767
INTEGER32	A 32 bit integer value with sign	-2147483648 ... 2147483647
UNSIGNED8	A 8 bit integer value without sign	0 ... 255
UNSIGNED16	A 16 bit integer value without sign	0 ... 65535
UNSIGNED32	A 32 bit integer value without sign	0 ... 4294967295
V2	Bit sequence with 16 bits	0 ... 65535 (Hex: 0x0000 ... 0xFFFF)

Complex data types:

Data type	Short description
ARRAY	An array of parameters with the same data type. Each parameter can be accessed with the IND number of the PKW channel. IND value range: 1 ... 254

## Chapter 4 - Communication Parameter

### 4.1 - Parameter

PNU	Name	Object	Type	Attr.
P0915	Selection PZD output	ARRAY	UNSIGNED16	rw
P0916	Selection PZD input	ARRAY	UNSIGNED16	rw
P0918	PROFIBUS Node address	VAR	UNSIGNED16	rw
P0922	Telegram selection	VAR	UNSIGNED16	rw
P0923	List of parameters	ARRAY	UNSIGNED16	ro
P0963	PROFIBUS Actual baud rate	VAR	UNSIGNED16	ro
P0964	Drive Identification	ARRAY	UNSIGNED16	ro
P0970	Load factory default parameter set	VAR	UNSIGNED16	rw
P0971	Transfer into non-volatile memory	VAR	UNSIGNED16	rw
P0980	Number list of supported parameter	ARRAY	UNSIGNED16	ro
P0010	Fieldbus status bits	VAR	UNSIGNED16	ro
P0011	Fieldbus error bits	VAR	UNSIGNED16	ro
P0012	Fieldbus error bit mask	VAR	UNSIGNED16	rw
P0013	Fieldbus state	VAR	UNSIGNED16	ro
P0045	RS 232 Baudrate	VAR	UNSIGNED16	rw

## 4.2 - Standard Communication Parameter

PNU	Name	Object	Type	Attr.
P0915	Selection PZD output	ARRAY	UNSIGNED16	rw
P0916	Selection PZD input	ARRAY	UNSIGNED16	rw
P0922	Telegram selection	VAR	UNSIGNED16	rw
P0923	List of parameters	ARRAY	UNSIGNED16	ro
P0963	PROFIBUS Actual baud rate	VAR	UNSIGNED16	ro
P0964	Drive Identification	ARRAY	UNSIGNED16	ro
P0980	Number list of supported parameter	ARRAY	UNSIGNED16	ro

### 4.2.1 - P0915 - Selection PZD output

Object Type	ARRAY
Sub Range	1 - 6

This parameter shows the PNU mapping of the selected pzd telegram. The parameters are mapped to the setpoint telegram in the same order.

#### 4.2.1.1 - Sub Index 1 - mapping entry 1

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	967
NVMem	Communication-Segment
Restriction	'Read only' when operational

PNU number of the first parameter.

#### 4.2.1.2 - Sub Index 2 - mapping entry 2

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	840
NVMem	Communication-Segment
Restriction	'Read only' when operational

PNU number of the second parameter.

#### 4.2.1.3 - Sub Index 3 - mapping entry 3

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	Communication-Segment
Restriction	'Read only' when operational

PNU number of the third parameter.

#### 4.2.1.4 - Sub Index 4 - mapping entry 4

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	Communication-Segment
Restriction	'Read only' when operational

PNU number of the fourth parameter.

#### 4.2.1.5 - Sub Index 5 - mapping entry 5

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	Communication-Segment
Restriction	'Read only' when operational

PNU number of the fifth parameter.

#### 4.2.1.6 - Sub Index 6 - mapping entry 6

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	Communication-Segment
Restriction	'Read only' when operational

PNU number of the 6th parameter.

### 4.2.2 - P0916 - Selection PZD input

Object Type	ARRAY
Sub Range	1 - 6

This parameter shows the PNU mapping of the selected pzd telegram.  
 The parameters are mapped to the actual value telegram in the same order.

#### 4.2.2.1 - Sub Index 1 - mapping entry 1

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	968
NVMem	Communication-Segment
Restriction	'Read only' when operational

PNU number of the first parameter.

#### 4.2.2.2 - Sub Index 2 - mapping entry 2

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	841
NVMem	Communication-Segment
Restriction	'Read only' when operational

PNU number of the second parameter.

#### 4.2.2.3 - Sub Index 3 - mapping entry 3

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	Communication-Segment
Restriction	'Read only' when operational

PNU number of the third parameter.

#### 4.2.2.4 - Sub Index 4 - mapping entry 4

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	Communication-Segment
Restriction	'Read only' when operational

PNU number of the fourth parameter.

#### 4.2.2.5 - Sub Index 5 - mapping entry 5

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	Communication-Segment
Restriction	'Read only' when operational

PNU number of the fifth parameter.

#### 4.2.2.6 - Sub Index 6 - mapping entry 6

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	Communication-Segment
Restriction	'Read only' when operational

PNU number of the 6th parameter.

### 4.2.3 - P0922 - Telegram selection

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	7
NVMem	Communication-Segment
Restriction	'Read only' when operational

This parameter shows the selected PZD standard telegram number. The telegram is selected during configuration phase.

#### 4.2.4 - P0923 - List of parameters

Object Type	ARRAY
Sub Range	1 - 101

List of signals with their PNU numbers.

##### 4.2.4.1 - First Sub Index 1 - Parameter 1

Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	967
NVMem	-
Restriction	-

PNU number from this signal number.

##### 4.2.4.2 - Last Sub Index 101 - Parameter 101

Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	328
NVMem	-
Restriction	-

PNU number from this signal number.

#### 4.2.5 - P0963 - PROFIBUS Actual baud rate

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0xFFFF
NVMem	-
Restriction	-

This parameter holds the actual baudrate of the PROFIBUS interface.

0 = 9.6 kbit/s

1 = 19.2 kbit/s

2 = 93.75 kbit/s



3 = 187.5 kbit/s  
 4 = 500 kbit/s  
 5 = not used/undefined  
 6 = 1500 kbit/s  
 7 = 3000 kbit/s  
 8 = 6000 kbit/s  
 9 = 12000 kbit/s  
 10 = not used  
 11 = 45.45 kbit/s  
 > 11 = no baudrate selected / baudrate search

#### 4.2.6 - P0964 - Drive Identification

Object Type	ARRAY
Sub Range	1 - 6

This parameter provides identity information.

##### 4.2.6.1 - Sub Index 1 - Manufacturer

Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0 ... 0xFFFF
Default Value	0
NVMem	-
Restriction	-

The manufacturer identification number.

##### 4.2.6.2 - Sub Index 2 - Device type

Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0 ... 0xFFFF
Default Value	0x0962
NVMem	-
Restriction	-

The kind of drive.

#### 4.2.6.3 - Sub Index 3 - Firmware version

Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0 ... 0xFFFF
Default Value	102
NVMem	-
Restriction	-

The software version number (xxyy with xx=Major yy=Minor).

#### 4.2.6.4 - Sub Index 4 - Firmware date - year

Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0 ... 0xFFFF
Default Value	2006
NVMem	-
Restriction	-

The year of the official firmware release (YYYY).

#### 4.2.6.5 - Sub Index 5 - Firmware date - day month

Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0 ... 0xFFFF
Default Value	1207
NVMem	-
Restriction	-

The day and month of the official firmware release (DDMM).

#### 4.2.6.6 - Sub Index 6 - Number of axes

Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0 ... 0xFFFF
Default Value	1
NVMem	-
Restriction	-

The number of axes running on that drive (always 1).

#### 4.2.7 - P0980 - Number list of supported parameter

Object Type	ARRAY
Sub Range	1 - 169

List of the supported PNU numbers in increasing order.

##### 4.2.7.1 - First Sub Index 1 - Parameter 1

Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	10
NVMem	-
Restriction	-

PNU number from supported parameter or 0 for last entry.

##### 4.2.7.2 - Last Sub Index 169 - Parameter 169

Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0
NVMem	-
Restriction	-

PNU number from supported parameter or 0 for last entry.

### 4.3 - PROFIBUS DP Address

PNU	Name	Object	Type	Attr.
P0918	PROFIBUS Node address	VAR	UNSIGNED16	rw

On a PROFIBUS DP network each master and each slave has a unique bus address between 0 and 125.

The PROFIBUS address can be changed through the configuration software or over PROFIBUS network. The factory default setting should only be used for the first initialisation phase to readdress the slave to its final destination.

#### 4.3.1 - P0918 - PROFIBUS Node address

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 126
Default Value	125
NVMem	Communication-Segment
Restriction	'Read only' when operational

This parameter holds the PROFIBUS node address.

The PROFIBUS address can be changed through the configuration software or over PROFIBUS network. Writing a new value to P918 will allow to set a new slave network address for the next startup.

The parameter list has to be transferred from volatile into non volatile memory (P971 - 'Transfer into non-volatile memory' with "store complete list") to set guilty and store it for next startup.

#### 4.3.2 - Address change with PKW channel

The slaves network address can be read with parameter P918 – PROFIBUS Node address.

Writing a new value to P918 will allow to set a new slave network address for the **next startup**.

The parameter list has to be transferred from volatile into non volatile memory (with P971 - Write into EEPROM) to set guilty and store it for next startup.

#### 4.3.3 - Address change with DPMC2 master

It is also possible to set a new address with a PROFIBUS DPMC2 master. Therefore the slave has to be within the configuration phase (no cyclic data exchange running with a DPMC1 master).

When sending a SSA telegram (Set Slave Address) to the slave the new address is stored within the parameter P918. The slave will change its PROFIBUS address **immediately** after reception.

The parameter list has to be transferred from volatile into non volatile memory (with P971 - Write into EEPROM) to store it for next startup.

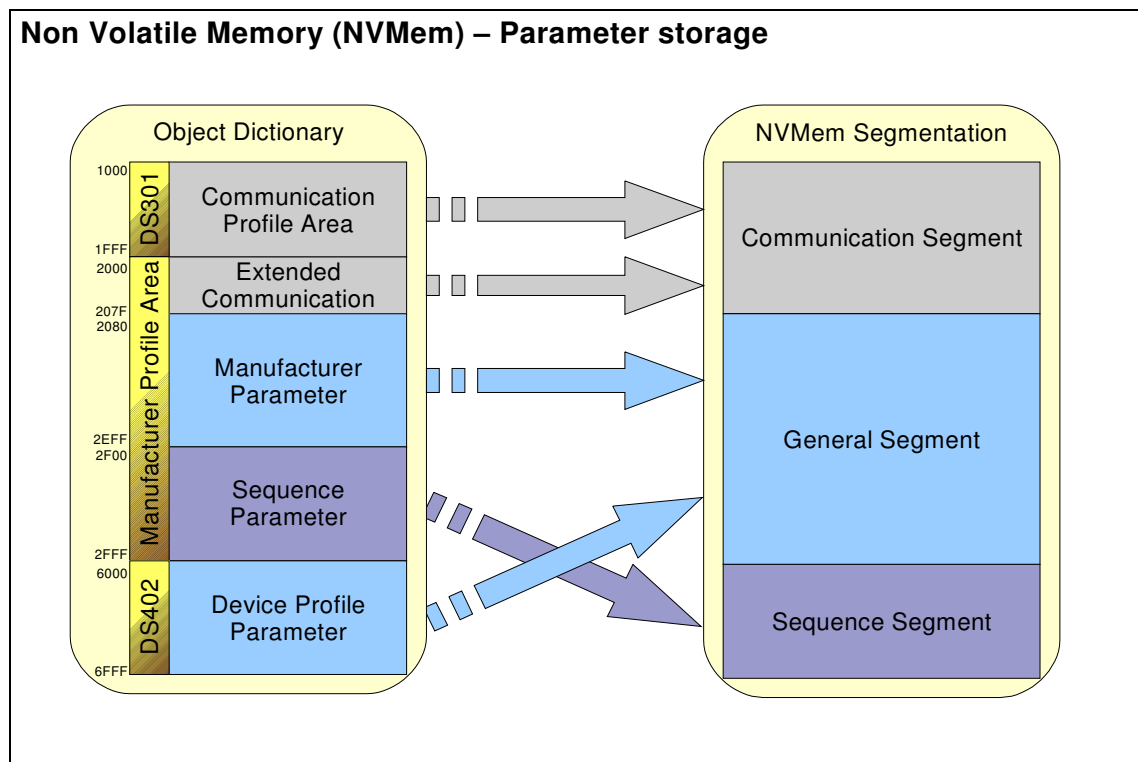
Notice: It is possible to use the "No Address Change" feature of the SSA telegram to disable any further address change over PROFIBUS. This feature is also stored within the non volatile memory. To change the address after disabling it is necessary to reset the communication part of the parameters (P900 to P999) to the factory defaults (with P970 – Load factory default parameter set).

### 4.4 - Parameter storage

PNU	Name	Object	Type	Attr.
P0970	Load factory default parameter set	VAR	UNSIGNED16	rw
P0971	Transfer into non-volatile memory	VAR	UNSIGNED16	rw

This drive includes a non volatile memory for storing user specific parameter values.

It is divided into 3 different segments to allow specific parameter saving only. Therefore it is possible only to store new communication parameters while leaving all control loop parameters unattended.



#### 4.4.1 - P0970 - Load factory default parameter set

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 6
Default Value	0
NVMem	-
Restriction	'Read only' when operational

This parameter is used to reset the parameter list to the factory default settings. Writing a value to this parameter activates the corresponding functionality. The parameters are reset within the non-volatile memory only. The factory defaults are used upon next startup of the drive.

Reading the parameter shows the status of this operation. A value other than 0 shows that work is still in progress. This function is only available when no operation is performed (Device Control: SwitchOnDisabled).

Value = 0: default; no operation in progress

Value = 1: load complete factory defaults for all parameters

Value = 2: load defaults for profile parameters (P900 - P999) and (P001 - P049)

Value = 3: load defaults for all custom parameters (P050 - P899)

Value = 4: load defaults for general parameters (P050 - P799)

Value = 5: load defaults for sequence parameters (P800 - P899)

Value = 6: load defaults for internal special parameters (dont't use)

#### 4.4.2 - P0971 - Transfer into non-volatile memory

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 6
Default Value	0
NVMem	-
Restriction	'Read only' when operational

This parameter is used to store the actual parameter list to the non-volatile memory. Writing a value to this parameter activates the corresponding functionality. The parameters are written into the non-volatile memory. Upon next startup the drive will start with this set of parameter values.

Reading the parameter shows the status of this operation. A value other than 0 shows that work is still in progress. This function is only available when no operation is performed (Device Control: SwitchOnDisabled).

Value = 0: default; no operation in progress

Value = 1: store complete list of all writable parameters

Value = 2: store profile parameters (P900 - P999) and (P001 - P049)

Value = 3: store all custom parameters (P050 - P899)

Value = 4: store general parameters (P050 - P799)

Value = 5: store sequence parameters (P800 - P899)

Value = 6: store internal special parameters only (dont't use)

## 4.5 - Manufacturer Communication Parameter

PNU	Name	Object	Type	Attr.
P0010	Fieldbus status bits	VAR	UNSIGNED16	ro
P0011	Fieldbus error bits	VAR	UNSIGNED16	ro
P0012	Fieldbus error bit mask	VAR	UNSIGNED16	rw
P0013	Fieldbus state	VAR	UNSIGNED16	ro

### 4.5.1 - P0010 - Fieldbus status bits

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0
NVMem	-
Restriction	-

This parameter shows the actual fieldbus states.

The states are bit coded.

0x0001: CAN bus off

0x0002: CAN bus passive

0x0004: CAN receive buffer overflow

0x0008: CAN transmit buffer overflow

0x0100: Not in OPERATIONAL state when operation is running

0x0200: SYNC error; Missing sync telegrams, timer exceeds timeout

0x0400: RPDO error; Missing RPDO telegrams, counter above level

### 4.5.2 - P0011 - Fieldbus error bits

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0
NVMem	-
Restriction	-

This parameter shows the actual fieldbus error.

The error states are bit coded. Note that some bits set do not implicitly throw error conditions.

0x0001: PROFIBUS PRM data configuration error

0x0002: PROFIBUS CFG data configuration error

0x0004: PROFIBUS EXT\_PRM data configuration error

0x0008: PROFIBUS fail save mode

0x0100: Not in DATA EXCHANGE mode when operation is running

### 4.5.3 - P0012 - Fieldbus error bit mask

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0xFFFF
NVMem	Communication-Segment
Restriction	-

This parameter holds the fieldbus error bit mask.

The error states are bit coded. If mask bit is set, the error is unmasked and will generate an error in case of occurrence.

0 - Mask unset; no error

1 - Mask set; error bit set when occurs.

### 4.5.4 - P0013 - Fieldbus state

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0
NVMem	-
Restriction	-

This parameter shows the actual fieldbus state.

State coding:

0x0000: Wait PRM

0x0010: Wait CFG

0x0020: Data Exchange

### 4.5.5 - P0045 - RS 232 Baudrate

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	900 ... 19200
Default Value	19200
NVMem	Communication-Segment
Restriction	'Read only' when operational

Sets the baudrate of the RS 232 interface.



## Chapter 5 - Common Drive Parameter

### 5.1 - Parameter

PNU	Name	Object	Type	Attr.
P0050	Bootloader ident string	VAR	VIS_STRING_T	co
P0051	Bootloader revision	VAR	UNSIGNED32	ro
P0060	Drive serial number	VAR	UNSIGNED32	ro
P0061	Hardware version	VAR	UNSIGNED32	ro
P0062	Software version	VAR	UNSIGNED32	ro
P0064	PLD version	VAR	UNSIGNED16	ro
P0066	Drive Manufacturer	VAR	VIS_STRING_T	co

## 5.2 - Parameter

### 5.2.1 - P0050 - Bootloader ident string

Object Type	VAR
Access Type	Constant
Signal	-
Data Type	VIS_STRING_T
Value Range	0 ... 0
Default Value	!Unknown!
NVMem	-
Restriction	-

Contains the bootloader ident string.

### 5.2.2 - P0051 - Bootloader revision

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	-
Restriction	-

Version of the bootlader.

Bit 31-16 is the major revision number and Bit 15-0 the minor revision number.

### 5.2.3 - P0060 - Drive serial number

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	-
Restriction	-

The serial number of the drive.

### 5.2.4 - P0061 - Hardware version

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED32
Value Range	0x00000000 ... 0xFFFFFFFF
Default Value	0x00004400
NVMem	-
Restriction	-

The hardware version number of the drive.

### 5.2.5 - P0062 - Software version

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	102
NVMem	-
Restriction	-

The software version number of the drive.  
 The version will have the decimal format 'MMmm'.  
 MM - Major release version  
 mm - Minor release version

### 5.2.6 - P0064 - PLD version

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	-
Restriction	-

Allows to read the actual PLD circuit version number.

### 5.2.7 - P0066 - Drive Manufacturer

Object Type	VAR
Access Type	Constant
Signal	-
Data Type	VIS_STRING_T
Value Range	0 ... 0
Default Value	MESA Automation GmbH
NVMem	-
Restriction	-

Contains the manufacturer device name.

## Chapter 6 - Drive Parameter

### 6.1 - Parameter

PNU	Name	Object	Type	Attr.
P0200	Undervoltage function: error/ warning	VAR	UNSIGNED16	rw
P0201	Undervoltage error: DC voltage minimum value	VAR	UNSIGNED16	rw
P0202	Overvoltage error: DC voltage maximum value	VAR	UNSIGNED16	rw
P0203	DC voltage actual value	VAR	UNSIGNED16	ro
P0211	Drive temperature limit value	VAR	UNSIGNED16	rw
P0212	Drive temperature actual value	VAR	UNSIGNED16	ro
P0213	Drive temperature error time constant	VAR	UNSIGNED16	rw
P0250	Motor type	VAR	UNSIGNED16	rw
P0251	Motor data	ARRAY	UNSIGNED16	rw
P0255	Max. motor speed	VAR	UNSIGNED32	rw
P0260	Motor temperature sensor type (NTC/ PTC)	VAR	UNSIGNED16	rw
P0261	Motor temperature limit value	VAR	UNSIGNED16	rw
P0262	Motor temperature actual value	VAR	UNSIGNED16	ro
P0263	Motor temperature error time constant	VAR	UNSIGNED16	rw
P0265	Braking function time constant 1	VAR	UNSIGNED16	rw
P0300	Motor encoder resolution	VAR	UNSIGNED16	rw
P0325	Digital inputs (H)	VAR	UNSIGNED16	ro
P0326	Digital outputs (H)	VAR	UNSIGNED16	rw
P0327	Digital inputs (L)	VAR	UNSIGNED16	ro
P0328	Digital outputs (L)	VAR	UNSIGNED16	rw
P0329	Digital inputs	VAR	UNSIGNED32	ro
P0330	Digital outputs	ARRAY	UNSIGNED32	rw
P0331	Analog input 1 voltage	VAR	INTEGER16	ro
P0350	Position unit	VAR	UNSIGNED16	rw
P0352	Velocity unit	VAR	UNSIGNED16	rw
P0354	Acceleration unit	VAR	UNSIGNED16	rw
P0360	Position encoder resolution	ARRAY	UNSIGNED32	rw
P0361	Velocity encoder resolution	ARRAY	UNSIGNED32	rw
P0362	Gear ratio	ARRAY	UNSIGNED32	rw
P0363	Feed constant	ARRAY	UNSIGNED32	rw
P0364	Polarity	VAR	UNSIGNED8	rw
P0365	Position factor	ARRAY	UNSIGNED32	rw
P0366	Velocity encoder factor	ARRAY	UNSIGNED32	rw
P0369	Acceleration factor	ARRAY	UNSIGNED32	rw
P0400	Filter function selection	VAR	UNSIGNED16	rw
P0410	P-gain current loop	VAR	UNSIGNED16	rw
P0411	I-gain current loop	VAR	UNSIGNED16	rw
P0413	Maximum current	VAR	UNSIGNED16	rw
P0414	Nominal current	VAR	UNSIGNED16	rw
P0415	I2t function: limiting/ fusing	VAR	UNSIGNED16	rw
P0416	I2t function: time constant 1	VAR	UNSIGNED16	rw
P0417	I2t function: time constant 2	VAR	UNSIGNED16	rw
P0418	I2t function: limiting constant 1	VAR	UNSIGNED16	rw
P0419	I2t function: limiting constant 2	VAR	UNSIGNED16	rw
P0420	Current reference low-pass filter parameter (b0)	VAR	INTEGER16	rw
P0421	Current reference low-pass filter parameter (a0)	VAR	INTEGER16	rw
P0422	Current reference low-pass filter parameter (a1)	VAR	INTEGER16	rw
P0423	Current reference average filter: cell number	VAR	INTEGER16	rw

P0427	Current monitor	VAR	INTEGER16	ro
P0460	P-gain speed loop	VAR	UNSIGNED16	rw
P0461	I-gain speed loop	VAR	UNSIGNED16	rw
P0462	D-gain speed loop	VAR	UNSIGNED16	rw
P0463	Feedforward speed loop	VAR	UNSIGNED16	rw
P0464	Speed loop type (P/PID + FF)	VAR	UNSIGNED16	rw
P0468	Speed reference low-pass filter parameter (b0)	VAR	INTEGER16	rw
P0469	Speed reference low-pass filter parameter (a0)	VAR	INTEGER16	rw
P0470	Speed reference low-pass filter parameter (a1)	VAR	INTEGER16	rw
P0471	Speed reference average filter: cell number	VAR	INTEGER16	rw
P0472	Speed feedback low-pass filter parameter (b0)	VAR	INTEGER16	rw
P0473	Speed feedback low-pass filter parameter (a0)	VAR	INTEGER16	rw
P0474	Speed feedback low-pass filter parameter (a1)	VAR	INTEGER16	rw
P0475	Speed feedback average filter: cell number	VAR	INTEGER16	rw
P0480	Max. profile velocity	VAR	UNSIGNED32	rw
P0481	Actual drive speed	VAR	INTEGER16	ro
P0482	Velocity actual value	VAR	INTEGER32	ro
P0510	P-gain position loop	VAR	UNSIGNED16	rw
P0511	D-gain position loop	VAR	UNSIGNED16	rw
P0512	In position window value	VAR	UNSIGNED32	rw
P0513	Maximum position following error	VAR	UNSIGNED32	rw
P0515	Software position limit	ARRAY	INTEGER32	rw
P0517	Position loop internal error input	VAR	INTEGER32	ro
P0518	Position internal setpoint	VAR	INTEGER32	ro
P0520	Position actual value*	VAR	INTEGER32	ro
P0521	Position actual value	VAR	INTEGER32	ro
P0555	Quick stop option code	VAR	INTEGER16	rw
P0556	Shutdown option code	VAR	INTEGER16	rw
P0557	Disable option code	VAR	INTEGER16	rw
P0558	Halt option code	VAR	INTEGER16	rw
P0560	Quick stop deceleration	VAR	UNSIGNED32	rw
P0561	Hardware limit, stop and Software limit switches function	VAR	UNSIGNED16	rw
P0562	Drive error word	VAR	UNSIGNED32	ro
P0563	Drive error mask	VAR	UNSIGNED32	rw
P0564	Drive warning	VAR	UNSIGNED32	ro
P0565	Drive status word	VAR	UNSIGNED16	ro
P0566	Procedure status word	VAR	UNSIGNED16	ro
P0600	Digital speed reference value	VAR	INTEGER16	rw
P0601	Digital speed ramp generator time constant	VAR	INTEGER32	rw
P0610	Digital current reference value	VAR	INTEGER16	rw
P0630	Target position	VAR	INTEGER32	rw
P0631	Profile velocity	VAR	UNSIGNED32	rw
P0633	Profile acceleration	VAR	UNSIGNED32	rw
P0634	Profile deceleration	VAR	UNSIGNED32	rw
P0635	Motion profile type	VAR	INTEGER16	rw
P0636	Profile delay	VAR	UNSIGNED16	rw
P0637	Jerk time constant	VAR	UNSIGNED16	rw
P0638	Jogging1 speed	VAR	INTEGER16	rw
P0639	Jogging2 speed	VAR	INTEGER16	rw
P0650	Home offset	VAR	INTEGER32	rw
P0651	Homing method	VAR	INTEGER8	rw
P0652	Homing speeds	ARRAY	UNSIGNED32	rw
P0653	Homing acceleration	VAR	UNSIGNED32	rw
P0654	Homing timeout	VAR	UNSIGNED16	rw

P0655	Mechanical limit current ratio	VAR	UNSIGNED16	rw
P0656	Mechanical limit speed	VAR	UNSIGNED32	rw
P0800	Program control word	ARRAY	UNSIGNED16	rw
P0801	Target position	ARRAY	INTEGER32	rw
P0802	Velocity or speed	ARRAY	UNSIGNED32	rw
P0803	Acceleration	ARRAY	UNSIGNED32	rw
P0804	Deceleration	ARRAY	UNSIGNED32	rw
P0805	Timer value	ARRAY	UNSIGNED16	rw
P0806	Trigger Position	ARRAY	INTEGER32	rw
P0807	Link Sequence	ARRAY	INTEGER16	rw
P0808	Loop Counter	ARRAY	INTEGER16	rw
P0809	Counter Link	ARRAY	INTEGER16	rw
P0810	Start Conditions	ARRAY	UNSIGNED16	rw
P0811	Logic Outputs	ARRAY	UNSIGNED16	rw
P0830	Sequence homing speed (zero)	VAR	UNSIGNED32	rw
P0835	Sequence input selection	VAR	UNSIGNED16	rw
P0840	Select sequence number and virtual inputs	VAR	UNSIGNED16	rw
P0841	Actual sequence number and virtual outputs	VAR	UNSIGNED16	ro
P0842	Sequence status	VAR	UNSIGNED16	ro

## 6.2 - Power stage

PNU	Name	Object	Type	Attr.
P0200	Undervoltage function: error/ warning	VAR	UNSIGNED16	rw
P0201	Undervoltage error: DC voltage minimum value	VAR	UNSIGNED16	rw
P0202	Oversvoltage error: DC voltage maximum value	VAR	UNSIGNED16	rw
P0203	DC voltage actual value	VAR	UNSIGNED16	ro
P0211	Drive temperature limit value	VAR	UNSIGNED16	rw
P0212	Drive temperature actual value	VAR	UNSIGNED16	ro
P0213	Drive temperature error time constant	VAR	UNSIGNED16	rw

### 6.2.1 - P0200 - Undervoltage function: error/ warning

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 1
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the drive reaction in case of the DC bus undervoltage condition. In case that the voltage is below the minimum value the drive reacts with undervoltage error (if the parameter value is zero) or undervoltage warning (if the parameter value is one).

- = 0: error;
- = 1: warning

### 6.2.2 - P0201 - Undervoltage error: DC voltage minimum value

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	3172 ... 32767
Default Value	4096
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the voltage value for the undervoltage function.  
 This value must be converted in real DC bus voltage value, which is depending on the drive type.  
 Scaling for all drives types 03xx to 06xx (0V to 60V):  
 103,3 V = 0x7FFF (32767)



### 6.2.3 - P0202 - Overvoltage error: DC voltage maximum value

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	30477
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the DC bus voltage value for the overvoltage error.

This value must be converted in real DC bus voltage value, which is depending on the drive type.

WARNING: This value may never be set above the physical hardware limit (See manual for details) !

Scaling for all drives types 03xx to 06xx (0V to 60V):

103,3 V = 0x7FFF (32767)

### 6.2.4 - P0203 - DC voltage actual value

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	0
NVMem	-
Restriction	-

Read the actual value of the DC bus voltage.

This value must be converted in real DC bus voltage value, which is depending on the drive type.

Scaling for all drives types 03xx to 06xx (0V to 60V)

103,3 V = 0x7FFF (32767)

### 6.2.5 - P0211 - Drive temperature limit value

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	9331
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the limit value of the drive temperature.

This value must converted in a temperature value depending on the temperature sensor type and the interface circuit used.

WARNING: This value may never be set above the physical hardware limit (See manual for details) !

The most used characteristic curves are enclosed within the appendix.

### 6.2.6 - P0212 - Drive temperature actual value

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	0
NVMem	-
Restriction	-

Read the actual value of the drive temperature.

This value must be converted into a temperature value depending on the temperature sensor type and the interface circuit used.

The most used characteristic curves are enclosed within the appendix.

### 6.2.7 - P0213 - Drive temperature error time constant

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	1000
NVMem	General-Segment
Restriction	'Read only' when operational

Time constant for the drive temperature. If the time below the time constant a warning is generated. If the time constant is reached a drive overtemperature error is generated and the drive is disabled.

Time [ms] = Parameter \* 8

## 6.3 - Motor

PNU	Name	Object	Type	Attr.
P0250	Motor type	VAR	UNSIGNED16	rw
P0251	Motor data	ARRAY	UNSIGNED16	rw
P0255	Max. motor speed	VAR	UNSIGNED32	rw
P0260	Motor temperature sensor type (NTC/ PTC)	VAR	UNSIGNED16	rw
P0261	Motor temperature limit value	VAR	UNSIGNED16	rw
P0262	Motor temperature actual value	VAR	UNSIGNED16	ro
P0263	Motor temperature error time constant	VAR	UNSIGNED16	rw
P0265	Braking function time constant 1	VAR	UNSIGNED16	rw

### 6.3.1 - P0250 - Motor type

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

The type of motor driven by the controller. This parameter is not used within the firmware.

### 6.3.2 - P0251 - Motor data

Object Type	ARRAY
Sub Range	1 - 2

This object contains information about the connected motor.  
This parameter is not used within the firmware.

#### 6.3.2.1 - Sub Index 1 - Motor identification number

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

The motor id from the motor list.

### 6.3.2.2 - Sub Index 2 - Number of pole pairs

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	1 ... 12
Default Value	4
NVMem	General-Segment
Restriction	'Read only' when operational

The number of pole pairs. This parameter is currently unused within the drive.

### 6.3.3 - P0255 - Max. motor speed

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 16000
Default Value	16000
NVMem	General-Segment
Restriction	'Read only' when operational

The max motor speed is the maximum allowable speed for the motor in either direction and is given in rpm.

This is used to protect the motor and can be taken from the motor data sheet.

### 6.3.4 - P0260 - Motor temperature sensor type (NTC/ PTC)

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 1
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the motor temperature sensor type.

= 0: NTC,

= 1: PTC

### 6.3.5 - P0261 - Motor temperature limit value

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	10685
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the limit value of the motor temperature.

This value must be converted in a temperature value depending on the temperature sensor type and the interface circuit used.

The most used characteristic curves are enclosed within the appendix.

### 6.3.6 - P0262 - Motor temperature actual value

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	0
NVMem	-
Restriction	-

Read the actual value of the motor temperature.

This value must be converted in a temperature value depending on the temperature sensor type and the interface circuit used.

The most used characteristic curves are enclosed within the appendix.

### 6.3.7 - P0263 - Motor temperature error time constant

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	1000
NVMem	General-Segment
Restriction	'Read only' when operational

Time constant for the motor temperature. If the time below the time constant a warning is generated. If the time constant is reached a motor overtemperature error is generated and the drive is disabled.

Time [ms] = Parameter \* 8

### 6.3.8 - P0265 - Braking function time constant 1

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the value of the braking time constant. The time constant is defining the delay of the enabling function after the activating of the brake control output, or the time delay between the activating of the brake control output and the disabling of the drive.

Time [ms] = Parameter \* 8

## 6.4 - Feedback device

PNU	Name	Object	Type	Attr.
P0300	Motor encoder resolution	VAR	UNSIGNED16	rw

### 6.4.1 - P0300 - Motor encoder resolution

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	2048
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the motor encoder resolution of the drive. This value must match the used encoder resolution in order to have the right speed of the drive.

The encoder resolution is given in 'pulses per revolution' PPR (also called 'counts per revolution' CPR). Allowed values: 250, 256, 500, 512, 1000, 1024, 2000, 2048, 4000, 4096, 5000

## 6.5 - Inputs and Outputs

PNU	Name	Object	Type	Attr.
P0325	Digital inputs (H)	VAR	UNSIGNED16	ro
P0326	Digital outputs (H)	VAR	UNSIGNED16	rw
P0327	Digital inputs (L)	VAR	UNSIGNED16	ro
P0328	Digital outputs (L)	VAR	UNSIGNED16	rw
P0329	Digital inputs	VAR	UNSIGNED32	ro
P0330	Digital outputs	ARRAY	UNSIGNED32	rw
P0331	Analog input 1 voltage	VAR	INTEGER16	ro

### 6.5.1 - P0325 - Digital inputs (H)

Object Type	VAR
Access Type	Read only
Signal	21
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0x0000
NVMem	-
Restriction	-

Digital inputs (upper word)

0x0001: Rapid stop switch

0x0002: IN1

0x0004: IN2

0x0008: IN3

0x0010: Not used

...

0x8000: Not used

### 6.5.2 - P0326 - Digital outputs (H)

Object Type	VAR
Access Type	Read/Write
Signal	22
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0x0000
NVMem	General-Segment
Restriction	-

Digital outputs (upper word)

0x0001: OUT1

0x0002: OUT2

0x0004: Not used

...

0x8000: Not used



### 6.5.3 - P0327 - Digital inputs (L)

Object Type	VAR
Access Type	Read only
Signal	100
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0x0000
NVMem	-
Restriction	-

Digital inputs (lower word)  
 0x0001: Negative limit switch  
 0x0002: Positive limit switch  
 0x0004: Home switch  
 0x0008: Hardware enable switch  
 0x0010: Not used  
 ...  
 0x8000: Not used

### 6.5.4 - P0328 - Digital outputs (L)

Object Type	VAR
Access Type	Read/Write
Signal	101
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0x0000
NVMem	General-Segment
Restriction	-

Digital outputs (lower word)  
 0x0001: Brake output  
 0x0002: Not used  
 ...  
 0x8000: Not used

### 6.5.5 - P0329 - Digital inputs

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED32
Value Range	0x00000000 ... 0xFFFFFFFF
Default Value	0x00000000
NVMem	-
Restriction	-

Digital inputs  
 0x00000001: Negative limit switch

0x00000002: Positive limit switch  
 0x00000004: Home switch  
 0x00000008: Hardware enable switch  
 0x00000010: Not used  
 ...  
 0x00008000: Not used  
 0x00010000: Rapid stop switch  
 0x00020000: IN1  
 0x00040000: IN2  
 0x00080000: IN3  
 0x00100000: Not used  
 ...  
 0x80000000: Not used

**6.5.6 - P0330 - Digital outputs**

Object Type	ARRAY
Sub Range	1 - 2

*6.5.6.1 - First Sub Index 1 - Physical outputs*

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0x00000000 ... 0xFFFFFFFF
Default Value	0x00000000
NVMem	General-Segment
Restriction	-

Digital outputs  
 0x00000001: Brake output  
 0x00000002: Not used  
 ...  
 0x00008000: Not used  
 0x00010000: OUT1  
 0x00020000: OUT2  
 0x00040000: Not used  
 ...  
 0x80000000: Not used

*6.5.6.2 - Last Sub Index 2 - Bit mask*

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0x00000000 ... 0xFFFFFFFF
Default Value	0x00000000
NVMem	General-Segment
Restriction	-

Digital outputs mask

This parameter describes a mask to specify which of the outputs shall be used internal or external by the corresponding bit of fieldbus object 'Physical outputs' within sub index 1 (alternatively the 16 bit objects).

0 - Output disabled (Internal control by the drive)

1 - Output enabled (Output controlled by fieldbus object)

### 6.5.7 - P0331 - Analog input 1 voltage

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	INTEGER16
Value Range	-32768 ... 32767
Default Value	0
NVMem	-
Restriction	-

Shows the analog input 1 voltage value.

Scaling: +/- 21646 = +/- 10 V

## 6.6 - Factor Group

PNU	Name	Object	Type	Attr.
P0350	Position unit	VAR	UNSIGNED16	rw
P0352	Velocity unit	VAR	UNSIGNED16	rw
P0354	Acceleration unit	VAR	UNSIGNED16	rw
P0360	Position encoder resolution	ARRAY	UNSIGNED32	rw
P0361	Velocity encoder resolution	ARRAY	UNSIGNED32	rw
P0362	Gear ratio	ARRAY	UNSIGNED32	rw
P0363	Feed constant	ARRAY	UNSIGNED32	rw
P0364	Polarity	VAR	UNSIGNED8	rw
P0365	Position factor	ARRAY	UNSIGNED32	rw
P0366	Velocity encoder factor	ARRAY	UNSIGNED32	rw
P0369	Acceleration factor	ARRAY	UNSIGNED32	rw

### 6.6.1 - P0350 - Position unit

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0xFE00
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the physical dimension of the position values.

This parameter is used as a storage only parameter and is not used within the drive.

The parameter is formatted according to the PROFIBUS PROFIdrive profile V3.1.

Unit: Variable index and Conversion index

### 6.6.2 - P0352 - Velocity unit

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0x0B43
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the physical dimension of the velocity values.

This parameter is used as a storage only parameter and is not used within the drive.

The parameter is formatted according to the PROFIBUS PROFIdrive profile V3.1.

Unit: Variable index and Conversion index

### 6.6.3 - P0354 - Acceleration unit

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0x0000
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the physical dimension of the acceleration values.  
 This parameter is used as a storage only parameter and is not used within the drive.  
 The parameter is formatted according to the PROFIBUS PROFIdrive profile V3.1.  
 Unit: Variable index and Conversion index

### 6.6.4 - P0360 - Position encoder resolution

Object Type	ARRAY
Sub Range	1 - 2

The position encoder resolution defines the ratio of encoder increments per motor revolution.  
 The parameter is not used within the drive and for information storage only.  
 Position encoder resolution = Encoder increments / Motor revolutions

#### 6.6.4.1 - First Sub Index 1 - Encoder increments

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	1
NVMem	General-Segment
Restriction	'Read only' when operational

#### 6.6.4.2 - Last Sub Index 2 - Motor revolutions

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	1
NVMem	General-Segment
Restriction	'Read only' when operational

### 6.6.5 - P0361 - Velocity encoder resolution

Object Type	ARRAY
Sub Range	1 - 2

The velocity encoder resolution defines the ratio of encoder increments/sec. per motor revolutions/sec. The parameter is not used within the drive and for information storage only.  
 Velocity encoder resolution = (Encoder increments / second) / (Motor revolutions / second)

#### 6.6.5.1 - First Sub Index 1 - Encoder increments per second

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	8192
NVMem	General-Segment
Restriction	'Read only' when operational

#### 6.6.5.2 - Last Sub Index 2 - Motor revolutions per second

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	1
NVMem	General-Segment
Restriction	'Read only' when operational

### 6.6.6 - P0362 - Gear ratio

Object Type	ARRAY
Sub Range	1 - 2

The gear ratio defines the ratio of feed in position units per driving shaft revolutions. This includes the gear if present.  
 The parameter is not used within the drive and for information storage only.  
 Gear ratio = Motor shaft revolutions / Driving shaft revolutions

### 6.6.6.1 - First Sub Index 1 - Motor revolutions

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	1
NVMem	General-Segment
Restriction	'Read only' when operational

### 6.6.6.2 - Last Sub Index 2 - Shaft revolutions

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	1
NVMem	General-Segment
Restriction	'Read only' when operational

## 6.6.7 - P0363 - Feed constant

Object Type	ARRAY
Sub Range	1 - 2

The feed constant defines the ratio of feed in position units per driving shaft revolutions. This includes the gear if present.

The parameter is not used within the drive and for information storage only.

Feed constant = Feed / Driving shaft revolutions

### 6.6.7.1 - First Sub Index 1 - Feed

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	1
NVMem	General-Segment
Restriction	'Read only' when operational

### 6.6.7.2 - Last Sub Index 2 - Shaft revolutions

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	1
NVMem	General-Segment
Restriction	'Read only' when operational

### 6.6.8 - P0364 - Polarity

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED8
Value Range	0 ... 192
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Position demand value and position actual value are multiplied by 1 or -1 depending on the value of the polarity flag.

(Bit 7 - Position polarity) - not supported

Bit 6 - Velocity polarity

### 6.6.9 - P0365 - Position factor

Object Type	ARRAY
Sub Range	1 - 2

The position factor converts the desired position (in position units) into the internal format (in increments).  
 Position factor = (Position encoder resolution \* Gear ratio) / Feed constant

#### 6.6.9.1 - First Sub Index 1 - Numerator

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	1 ... 4294967295
Default Value	1
NVMem	General-Segment
Restriction	'Read only' when operational

Numerator = Position encoder resolution \* Gear ratio



### 6.6.9.2 - Last Sub Index 2 - Feed constant

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	1 ... 4294967295
Default Value	1
NVMem	General-Segment
Restriction	'Read only' when operational

### 6.6.10 - P0366 - Velocity encoder factor

Object Type	ARRAY
Sub Range	1 - 2

The velocity encoder factor converts the desired velocity (in velocity units) into the internal format (in increments).

Velocity encoder factor = (Velocity encoder resolution \* Gear ratio \* Position unit \* F\_velocity [notation index]) / (Feed constant \* Velocity unit \* second \* F\_position [notation index])

#### 6.6.10.1 - First Sub Index 1 - Numerator

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	1 ... 4294967295
Default Value	2048
NVMem	General-Segment
Restriction	'Read only' when operational

Numerator = Velocity encoder resolution \* Gear ratio \* Position unit \* F\_velocity [notation index]

#### 6.6.10.2 - Last Sub Index 2 - Divisor

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	1 ... 4294967295
Default Value	15
NVMem	General-Segment
Restriction	'Read only' when operational

Divisor = Feed constant \* Velocity unit \* second \* F\_position [notation index]

### 6.6.11 - P0369 - Acceleration factor

Object Type	ARRAY
Sub Range	1 - 2

The acceleration factor converts the acceleration (in acceleration unit / s) into the internal format (in increments / s).

Acceleration factor = (Velocity unit \* Velocity encoder factor) / (Acceleration unit \* second)

#### 6.6.11.1 - First Sub Index 1 - Numerator

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	1 ... 4294967295
Default Value	2048
NVMem	General-Segment
Restriction	'Read only' when operational

Numerator = Velocity unit \* Velocity encoder factor

#### 6.6.11.2 - Last Sub Index 2 - Divisor

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	1 ... 4294967295
Default Value	15
NVMem	General-Segment
Restriction	'Read only' when operational

Divisor = Acceleration unit \* second

## 6.7 - Control Function

PNU	Name	Object	Type	Attr.
P0400	Filter function selection	VAR	UNSIGNED16	rw

### 6.7.1 - P0400 - Filter function selection

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	1
NVMem	General-Segment
Restriction	'Read only' when operational

Allows the selection of the desired filter function on the specified signal. Only one filter type can be selected on a signal!

Bit Function

- 0: Speed feedback: Average;
- 1: Speed feedback: Low-pass;
- 2: Res.;
- 3: Res.;
- 4: Speed reference: Average;
- 5: Speed reference: Low-pass;
- 6: Res.;
- 7: Res.;
- 8: Res.;
- 9: Current reference: Average;
- 10: Current reference: Low-pass;
- 11: Res.;
- 12: Res.;
- 13: Res.;
- 14: Res.;
- 15: Res.

## 6.8 - Current Control Function

PNU	Name	Object	Type	Attr.
P0410	P-gain current loop	VAR	UNSIGNED16	rw
P0411	I-gain current loop	VAR	UNSIGNED16	rw
P0413	Maximum current	VAR	UNSIGNED16	rw
P0414	Nominal current	VAR	UNSIGNED16	rw
P0415	I2t function: limiting/ fusing	VAR	UNSIGNED16	rw
P0416	I2t function: time constant 1	VAR	UNSIGNED16	rw
P0417	I2t function: time constant 2	VAR	UNSIGNED16	rw
P0418	I2t function: limiting constant 1	VAR	UNSIGNED16	rw
P0419	I2t function: limiting constant 2	VAR	UNSIGNED16	rw
P0420	Current reference low-pass filter parameter (b0)	VAR	INTEGER16	rw
P0421	Current reference low-pass filter parameter (a0)	VAR	INTEGER16	rw
P0422	Current reference low-pass filter parameter (a1)	VAR	INTEGER16	rw
P0423	Current reference average filter: cell number	VAR	INTEGER16	rw
P0427	Current monitor	VAR	INTEGER16	ro

### 6.8.1 - P0410 - P-gain current loop

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	4500
NVMem	General-Segment
Restriction	-

Defines the P-gain of the current loop.

### 6.8.2 - P0411 - I-gain current loop

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	500
NVMem	General-Segment
Restriction	-

Defines the I-gain of the current loop.

### 6.8.3 - P0413 - Maximum current

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 25558
Default Value	25558
NVMem	General-Segment
Restriction	'Read only' when operational

Set the maximum current of the drive.  
 This value must be scaled into an internal value.  
 25558 = 100 % of  $I_m$

### 6.8.4 - P0414 - Nominal current

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 12779
Default Value	12779
NVMem	General-Segment
Restriction	'Read only' when operational

Set the nominal current of the drive.  
 This value must be scaled into an internal value.  
 25558 = 100 % of  $I_m$   
 (12779 = 50 % of  $I_m$ )

### 6.8.5 - P0415 - I2t function: limiting/ fusing

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 1
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the i2t function of the drive: limiting (the drive current is limited to the nominal value when the i2t limit is reached)/ fusing (the drive is disabled when the i2t limit is reached).  
 = 0 limiting,  
 = 1: fusing

### 6.8.6 - P0416 - I2t function: time constant 1

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	32738
NVMem	General-Segment
Restriction	'Read only' when operational

Time constant for the i2t function.

$$\text{time constant1} = e^{(-t/T \cdot \ln(k^2/(k^2-1)))} \cdot 2^{15};$$

$$t = 0,008[\text{s}];$$

$$T = \text{time} [\text{s}];$$

$$k = I_m / I_n$$

Note: All corresponding time constant values have to be written after recalculation.

### 6.8.7 - P0417 - I2t function: time constant 2

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	30
NVMem	General-Segment
Restriction	'Read only' when operational

Time constant for the i2t function.

$$\text{time constant2} = 2^{15} - \text{time constant1}$$

Note: All corresponding time constant values have to be written after recalculation.

### 6.8.8 - P0418 - I2t function: limiting constant 1

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	8192
NVMem	General-Segment
Restriction	'Read only' when operational

Limiting constant for the i2t function.

$$\text{limiting constant1} = (\ln[\%] / 100 \cdot 32767)^2 / 2^{15}$$

Note: All corresponding limiting constant values have to be written after recalculation.

### 6.8.9 - P0419 - I2t function: limiting constant 2

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	5161
NVMem	General-Segment
Restriction	'Read only' when operational

Limiting constant for the i2t function.

limiting constant2 = limiting constant1 \* 0,63

Note: All corresponding limiting constant values have to be written after recalculation.

### 6.8.10 - P0420 - Current reference low-pass filter parameter (b0)

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-32768 ... 32767
Default Value	13572
NVMem	General-Segment
Restriction	'Read only' when operational

Filter parameter b0 for the current reference value.

Calculation of the filter parameters:

$T = 0,0000625$  s;

$f = 10...4000$  Hz;

$A = \tan(2 * \pi * f * T / 2)$ ;

$b0 = 32768 * (1 - A) / (1 + A)$ ;

$a0 = 32768 * A / (1 + A)$ ;

$a1 = a0$

Note: All corresponding filter parameter values have to be written after recalculation.

### 6.8.11 - P0421 - Current reference low-pass filter parameter (a0)

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-32768 ... 32767
Default Value	9597
NVMem	General-Segment
Restriction	'Read only' when operational

Filter parameter a0 for the current reference value.

Calculation of the filter parameters:

$T = 0,0000625$  s;

$f = 10 \dots 4000 \text{ Hz};$   
 $A = \tan(2 * \pi * f * T / 2);$   
 $b0 = 32768 * (1 - A) / (1 + A);$   
 $a0 = 32768 * A / (1 + A);$   
 $a1 = a0$

Note: All corresponding filter parameter values have to be written after recalculation.

### 6.8.12 - P0422 - Current reference low-pass filter parameter (a1)

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-32768 ... 32767
Default Value	9597
NVMem	General-Segment
Restriction	'Read only' when operational

Filter parameter a1 for the current reference value.

Calculation of the filter parameters:

$T = 0,0000625 \text{ s};$

$f = 10 \dots 4000 \text{ Hz};$

$A = \tan(2 * \pi * f * T / 2);$

$b0 = 32768 * (1 - A) / (1 + A);$

$a0 = 32768 * A / (1 + A);$

$a1 = a0$

Note: All corresponding filter parameter values have to be written after recalculation.

### 6.8.13 - P0423 - Current reference average filter: cell number

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	2048 ... 16384
Default Value	16384
NVMem	General-Segment
Restriction	'Read only' when operational

Specifies the filter cell numbers of the average filter.

Calculation of the filter parameter:

Parameter = 32768 / Filter cell number.



### 6.8.14 - P0427 - Current monitor

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	INTEGER16
Value Range	-32768 ... 32767
Default Value	0
NVMem	-
Restriction	-

Read the instant value of the drive current.  
+/- 32767 = +/- I<sub>m</sub>

## 6.9 - Speed Control Function

PNU	Name	Object	Type	Attr.
P0460	P-gain speed loop	VAR	UNSIGNED16	rw
P0461	I-gain speed loop	VAR	UNSIGNED16	rw
P0462	D-gain speed loop	VAR	UNSIGNED16	rw
P0463	Feedforward speed loop	VAR	UNSIGNED16	rw
P0464	Speed loop type (P/PID + FF)	VAR	UNSIGNED16	rw
P0468	Speed reference low-pass filter parameter (b0)	VAR	INTEGER16	rw
P0469	Speed reference low-pass filter parameter (a0)	VAR	INTEGER16	rw
P0470	Speed reference low-pass filter parameter (a1)	VAR	INTEGER16	rw
P0471	Speed reference average filter: cell number	VAR	INTEGER16	rw
P0472	Speed feedback low-pass filter parameter (b0)	VAR	INTEGER16	rw
P0473	Speed feedback low-pass filter parameter (a0)	VAR	INTEGER16	rw
P0474	Speed feedback low-pass filter parameter (a1)	VAR	INTEGER16	rw
P0475	Speed feedback average filter: cell number	VAR	INTEGER16	rw
P0480	Max. profile velocity	VAR	UNSIGNED32	rw
P0481	Actual drive speed	VAR	INTEGER16	ro
P0482	Velocity actual value	VAR	INTEGER32	ro

### 6.9.1 - P0460 - P-gain speed loop

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	15000
NVMem	General-Segment
Restriction	-

Defines the P-gain of the speed loop.

### 6.9.2 - P0461 - I-gain speed loop

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	100
NVMem	General-Segment
Restriction	-

Defines the I-gain of the speed loop.

### 6.9.3 - P0462 - D-gain speed loop

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	0
NVMem	General-Segment
Restriction	-

Defines the D-gain of the speed loop.

### 6.9.4 - P0463 - Feedforward speed loop

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	0
NVMem	General-Segment
Restriction	-

Defines the feedforward-gain of the speed loop.

### 6.9.5 - P0464 - Speed loop type (P/PID + FF)

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 1
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Select the type of the speed loop.

= 0: PID+FF speed loop

= 1: P speed loop

### 6.9.6 - P0468 - Speed reference low-pass filter parameter (b0)

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-32768 ... 32767
Default Value	-13572
NVMem	General-Segment
Restriction	'Read only' when operational

Filter parameter b0 for the speed reference value.

Calculation of the filter parameters:

$$T = 0,00025 \text{ s};$$

$$f = 10 \dots 1500 \text{ Hz};$$

$$A = \tan(2 * \pi * f * T / 2);$$

$$b0 = 32768 * (1 - A) / (1 + A);$$

$$a0 = 32768 * A / (1 + A);$$

$$a1 = a0$$

Note: All corresponding filter parameter values have to be written after recalculation.

### 6.9.7 - P0469 - Speed reference low-pass filter parameter (a0)

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-32768 ... 32767
Default Value	23170
NVMem	General-Segment
Restriction	'Read only' when operational

Filter parameter a0 for the speed reference value.

Calculation of the filter parameters:

$$T = 0,00025 \text{ s};$$

$$f = 10 \dots 1500 \text{ Hz};$$

$$A = \tan(2 * \pi * f * T / 2);$$

$$b0 = 32768 * (1 - A) / (1 + A);$$

$$a0 = 32768 * A / (1 + A);$$

$$a1 = a0$$

Note: All corresponding filter parameter values have to be written after recalculation.

### 6.9.8 - P0470 - Speed reference low-pass filter parameter (a1)

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-32768 ... 32767
Default Value	23170
NVMem	General-Segment
Restriction	'Read only' when operational

Filter parameter a1 for the speed reference value.

Calculation of the filter parameters:

$T = 0,00025 \text{ s};$

$f = 10 \dots 1500 \text{ Hz};$

$A = \tan(2 * \pi * f * T / 2);$

$b0 = 32768 * (1 - A) / (1 + A);$

$a0 = 32768 * A / (1 + A);$

$a1 = a0$

Note: All corresponding filter parameter values have to be written after recalculation.

### 6.9.9 - P0471 - Speed reference average filter: cell number

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	2048 ... 16384
Default Value	16384
NVMem	General-Segment
Restriction	'Read only' when operational

Specifies the filter cell numbers of the average filter.

Calculation of the filter parameter:

Parameter =  $32768 / \text{Filter cell number}.$

### 6.9.10 - P0472 - Speed feedback low-pass filter parameter (b0)

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-32768 ... 32767
Default Value	-13572
NVMem	General-Segment
Restriction	'Read only' when operational

Filter parameter b0 for the speed feedback value.

Calculation of the filter parameters:

$T = 0,00025 \text{ s};$

$f = 10 \dots 1500 \text{ Hz};$   
 $A = \tan(2 * \pi * f * T / 2);$   
 $b0 = 32768 * (1 - A) / (1 + A);$   
 $a0 = 32768 * A / (1 + A);$   
 $a1 = a0$

Note: All corresponding filter parameter values have to be written after recalculation.

### 6.9.11 - P0473 - Speed feedback low-pass filter parameter (a0)

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-32768 ... 32767
Default Value	23170
NVMem	General-Segment
Restriction	'Read only' when operational

Filter parameter a0 for the speed feedback value.

Calculation of the filter parameters:

$T = 0,00025 \text{ s};$   
 $f = 10 \dots 1500 \text{ Hz};$   
 $A = \tan(2 * \pi * f * T / 2);$   
 $b0 = 32768 * (1 - A) / (1 + A);$   
 $a0 = 32768 * A / (1 + A);$   
 $a1 = a0$

Note: All corresponding filter parameter values have to be written after recalculation.

### 6.9.12 - P0474 - Speed feedback low-pass filter parameter (a1)

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-32768 ... 32767
Default Value	23170
NVMem	General-Segment
Restriction	'Read only' when operational

Filter parameter a1 for the speed feedback value.

Calculation of the filter parameters:

$T = 0,00025 \text{ s};$   
 $f = 10 \dots 1500 \text{ Hz};$   
 $A = \tan(2 * \pi * f * T / 2);$   
 $b0 = 32768 * (1 - A) / (1 + A);$   
 $a0 = 32768 * A / (1 + A);$   
 $a1 = a0$

Note: All corresponding filter parameter values have to be written after recalculation.

### 6.9.13 - P0475 - Speed feedback average filter: cell number

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	2048 ... 16384
Default Value	16384
NVMem	General-Segment
Restriction	'Read only' when operational

Specifies the filter cell numbers of the average filter.

Calculation of the filter parameter:

Parameter = 32768 / Filter cell number.

### 6.9.14 - P0480 - Max. profile velocity

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	14000
NVMem	General-Segment
Restriction	'Read only' when operational

The max. profile velocity is the maximum allowed speed in either direction during a profiled move. It is given in the same units as the profile velocity.

### 6.9.15 - P0481 - Actual drive speed

Object Type	VAR
Access Type	Read only
Signal	6
Data Type	INTEGER16
Value Range	-32767 ... 32767
Default Value	0
NVMem	-
Restriction	-

Read the actual drive speed. This value is given in RPM.

Actual drive speed = Parameter / 2

### 6.9.16 - P0482 - Velocity actual value

Object Type	VAR
Access Type	Read only
Signal	8
Data Type	INTEGER32
Value Range	-2147483648 ... 2147483647
Default Value	0
NVMem	-
Restriction	-

The velocity actual value is represented in velocity units.



## 6.10 - Position Control Function

PNU	Name	Object	Type	Attr.
P0510	P-gain position loop	VAR	UNSIGNED16	rw
P0511	D-gain position loop	VAR	UNSIGNED16	rw
P0512	In position window value	VAR	UNSIGNED32	rw
P0513	Maximum position following error	VAR	UNSIGNED32	rw
P0515	Software position limit	ARRAY	INTEGER32	rw
P0517	Position loop internal error input	VAR	INTEGER32	ro
P0518	Position internal setpoint	VAR	INTEGER32	ro
P0520	Position actual value*	VAR	INTEGER32	ro
P0521	Position actual value	VAR	INTEGER32	ro

### 6.10.1 - P0510 - P-gain position loop

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	125 (V1.00 – V1.04: 2000)
NVMem	General-Segment
Restriction	-

Defines the P-gain of the position loop.

New scaling since firmware version V1.05. Scaling: New value / old value = 1/16.

### 6.10.2 - P0511 - D-gain position loop

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	0
NVMem	General-Segment
Restriction	-

Defines the D-gain of the position loop.

New scaling since firmware version V1.05. Scaling: New value / old value = 1/16.

### 6.10.3 - P0512 - In position window value

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 2147483647
Default Value	2147483647
NVMem	General-Segment
Restriction	'Read only' when operational

The position window defines a symmetrical range of accepted positions relatively to the target position as a source for the status word 'position reached' bit.  
The position window is specified in position units.

### 6.10.4 - P0513 - Maximum position following error

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 2147483647
Default Value	2147483647
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the maximum following error limit in position units.  
The following error window defines a range of tolerated position values symmetrically to the position demand value.  
If the position actual value is out of the following error window, a following error occurs.  
It also acts as a source for the status word 'following error' bit.  
The following error can be masked with the 'Position following error' bit within the Drive error mask object.

### 6.10.5 - P0515 - Software position limit

Object Type	ARRAY
Sub Range	1 - 2

Software position limit contains the sub-parameters negative (min.) position limit and positive (max.) position limit.

#### 6.10.5.1 - First Sub Index 1 - Negative software limit switch

Access Type	Read/Write
Signal	-
Data Type	INTEGER32
Value Range	-2147483648 ... 2147483647
Default Value	-2147483648
NVMem	General-Segment
Restriction	'Read only' when operational

This parameter defines the negative absolute position limit for the position demand value and the position actual value. Every new target position is checked against this limit.

The negative limit position is specified in position units.

The software limit switch can be masked within the drive error mask object.

It is always relative to the machine home position. Before being compared with the target position it is corrected internally by the home offset as follows:

corrected negative position limit = negative position limit - home offset

#### 6.10.5.2 - Last Sub Index 2 - Positive software limit switch

Access Type	Read/Write
Signal	-
Data Type	INTEGER32
Value Range	-2147483648 ... 2147483647
Default Value	2147483647
NVMem	General-Segment
Restriction	'Read only' when operational

This parameter defines the positive absolute position limit for the position demand value and the position actual value. Every new target position is checked against this limit.

The positive limit position is specified in position units.

The software limit switch can be masked within the drive error mask object.

It is always relative to the machine home position. Before being compared with the target position it is corrected internally by the home offset as follows:

corrected positive position limit = positive position limit - home offset

#### 6.10.6 - P0517 - Position loop internal error input

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	INTEGER32
Value Range	-2147483647 ... 2147483647
Default Value	0
NVMem	-
Restriction	-

Error input value applied to the position loop (actual internal following error).

The data unit is defined as internal increments.

### 6.10.7 - P0518 - Position internal setpoint

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	INTEGER32
Value Range	-2147483648 ... 2147483647
Default Value	0
NVMem	-
Restriction	-

This value holds the internal position demand value.

### 6.10.8 - P0520 - Position actual value\*

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	INTEGER32
Value Range	-2147483648 ... 2147483647
Default Value	0
NVMem	-
Restriction	-

The actual value of the position measurement device is one of the two input values of the closed loop position control. The data unit is defined as internal increments.

### 6.10.9 - P0521 - Position actual value

Object Type	VAR
Access Type	Read only
Signal	28
Data Type	INTEGER32
Value Range	-2147483648 ... 2147483647
Default Value	0
NVMem	-
Restriction	-

This object represents the actual value of the position measurement device in user defined units.

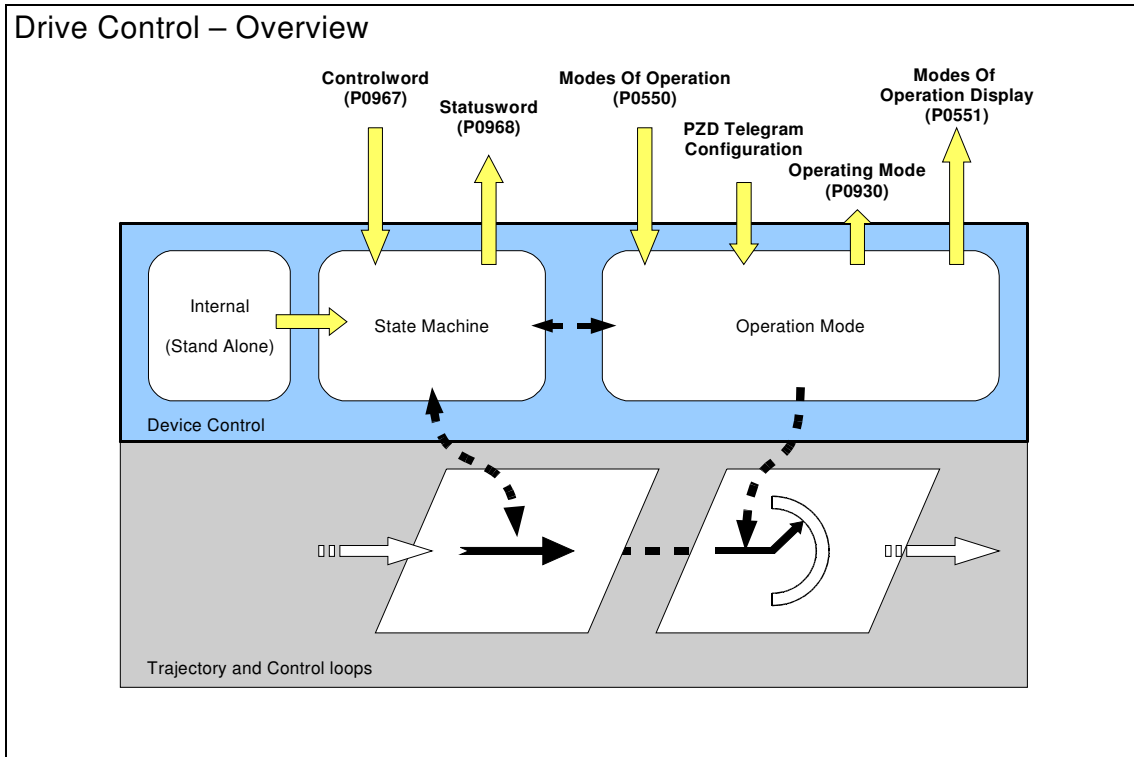
## 6.11 - Drive Control

PNU	Name	Object	Type	Attr.
P0967	Controlword	VAR	UNSIGNED16	rw
P0968	Statusword	VAR	UNSIGNED16	ro
P0930	Operating Mode	VAR	UNSIGNED16	ro
P0550	Modes of operation	VAR	INTEGER8	rw
P0551	Modes of operation display	VAR	INTEGER8	ro
P0555	Quick stop option code	VAR	INTEGER16	rw
P0556	Shutdown option code	VAR	INTEGER16	rw
P0557	Disable option code	VAR	INTEGER16	rw
P0558	Halt option code	VAR	INTEGER16	rw
P0560	Quick stop deceleration	VAR	UNSIGNED32	rw
P0561	Hardware limit, stop and Software limit switches function	VAR	UNSIGNED16	rw
P0562	Drive error word	VAR	UNSIGNED32	ro
P0563	Drive error mask	VAR	UNSIGNED32	rw
P0564	Drive warning	VAR	UNSIGNED32	ro
P0565	Drive status word	VAR	UNSIGNED16	ro
P0566	Procedure status word	VAR	UNSIGNED16	ro
P0928	Control priority PCD	VAR	UNSIGNED16	rw

The drive control handles all operation conditions of the drive. The drive control state machine can be controlled by different sources.

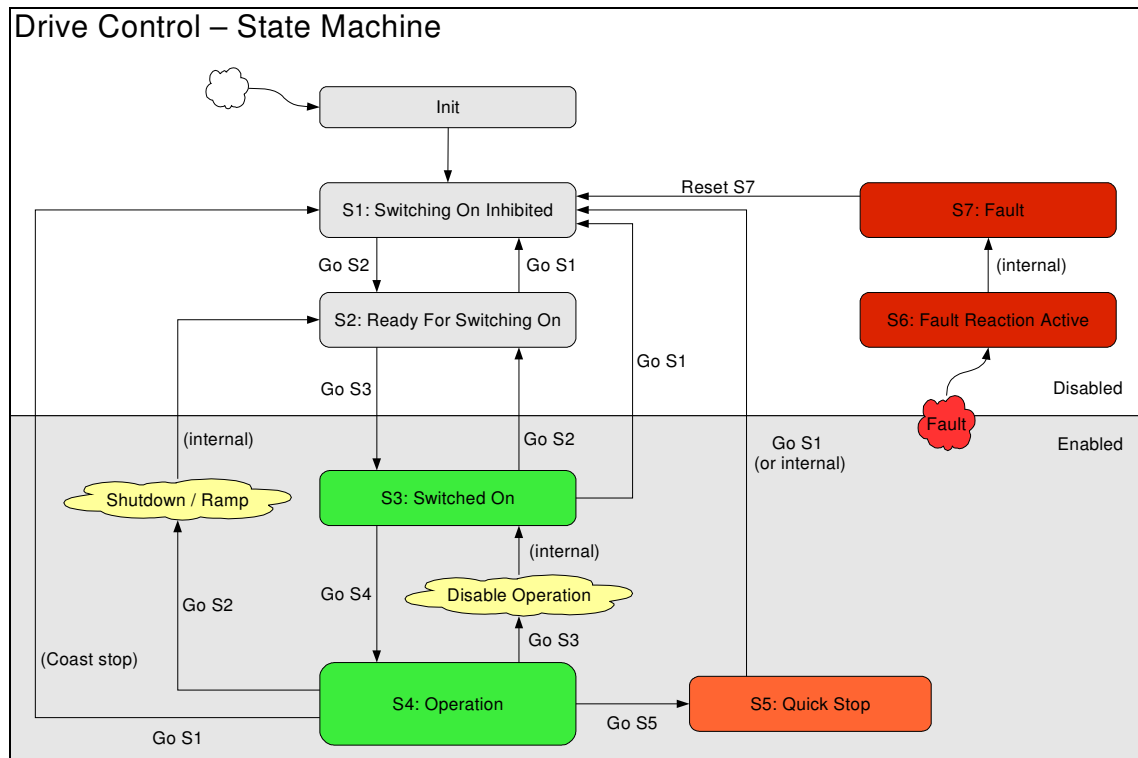
- Configuration software (MSD2BO)
- Fieldbus PLC
- Internal Master (Stand Alone)

The configuration software always has the highest priority and is able to capture the control. For using this device without a fieldbus device an internal master has been integrated.



### 6.11.1 - State Machine Description

The state machine describes the basic controlling of the drive along with the drive status. The drive is controlled by the bit coded controlword object P0967 and statusword object P0968 for feedback.



Some state transitions may occur with a rotating motor axes. The ramp down reaction for these transitions can be set with different option codes to protect the machine and/or power supply (e.g. from 'S4 Operation' to 'S3 Switched On' with 'Disable option code' P0557).

**6.11.2 - P0967 - Controlword**

Object Type	VAR
Access Type	Read/Write
Signal	1
Data Type	UNSIGNED16
Value Range	0x0 ... 0xFFFF
Default Value	0x0
NVMem	-
Restriction	-

The controlword is used to control the internal device state machine.

*6.11.2.1 - General definition of the controlword bits*

<b>15</b>	<b>11</b>	<b>10</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>6</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>
Manufacturer specific	PLC Control	Operation mode specific	Fault Reset	Operation mode specific	Enable Operation	No Quick Stop	No Coast Stop	ON/OFF			
			X		X	X	X	X			X

Detailed definition:

<b>Command</b>	<b>Bit definitions</b>					<b>Transitions</b>
	<b>Fault Reset</b>	<b>Enable Operation</b>	<b>No Quick Stop</b>	<b>No Coast Stop</b>	<b>ON/OFF</b>	
'Coast Stop'	0	X	X	0	X	Go S1
'OFF'	0	X	1	1	0	Go S2
'ON' or 'Disable Operation'	0	0	1	1	1	Go S3
'Enable Operation'	0	1	1	1	1	Go S4
'Quick stop'	0	X	0	1	1	Go S5
'Fault reset'	0->1	X	X	X	X	Reset S7

**Coast Stop – Go S1**

Disable the voltage from the drive. If it is supplied to the motor, the motor will coast down (free to rotate if unbraked).

**OFF – Go S2**

Shut down the drive by disabling the voltage from the motor. If the drive is in state 'Operation' the 'Shutdown Option' is used.

**ON / Disable Operation – Go S3**

Switch on the drive or if the drive is in state 'Operation' the 'Disable Operation option' is used.

**Enable Operation – Go S4**

If the drive was successfully switched on it will enable the drive operation.

### **Quick Stop – Go S5**

Run the 'Quick stop option' when used within state 'Operation'.

### **Fault Reset – Reset S7**

A positive edge will try to reset the drive from 'fault' state. If one or more errors are still present the drive will enter the fault state rapidly.

#### *6.11.2.2 - Mode specific definition of the controlword bits*

<b>Bit</b>	<b>Operation mode</b>			
	<b>Simple Current Mode</b>	<b>Simple Speed Mode</b>	<b>Position Mode</b>	<b>(Homing Mode)</b>
4	-	-	No Reject	No Reject
5	-	-	-	-
6	-	-	Start Sequence	-
8	-	-	Jogging 1	-
9	-	-	Jogging 2	-
11	-	-	Start / Abort homing	Start / Abort homing
12	-	-	Start Abs. Move	-
13	-	-	Start Rel. Move	-
14	-	-	-	-
15	-	-	-	-

#### **6.11.3 - P0968 - Statusword**

Object Type	VAR
Access Type	Read only
Signal	2
Data Type	UNSIGNED16
Value Range	0x0 ... 0xFFFF
Default Value	0x0
NVMem	-
Restriction	-

The actual statusword shows the reaction and state of the internal device state machine.

#### *6.11.3.1 - General definitions of the statusword bits*

<b>Bit</b>	<b>Description</b>
0	Ready To Switch On
1	Ready To Operate
2	Operation Enabled
3	Fault Present
4	Coast Stop Not Activated
5	Quick Stop Not Activated
6	Switching On Inhibited
7	Warning Present
8	Operation mode specific



<b>Bit</b>	<b>Description</b>
9	Remote mode active
10	Operation mode specific
11	Operation mode specific
12	Operation mode specific
13	Operation mode specific
14	Manufacturer specific
15	Manufacturer specific

### 6.11.3.2 - Mode indication table

<b>Bit of the statusword</b>										
15	8	7	6	5	4	3	2	1	0	
xxxx	xxxx	x	0	x	x	0	0	0	0	Init
xxxx	xxxx	x	1	x	x	0	0	0	0	S1: Switching On Inhibited
xxxx	xxxx	x	0	1	x	0	0	0	1	S2: Ready For Switching On
xxxx	xxxx	x	0	1	x	0	0	1	1	S3: Switched On
xxxx	xxxx	x	0	1	x	0	1	1	1	S4: Operation
xxxx	xxxx	x	0	0	x	0	1	1	1	S5: Quick Stop Active
xxxx	xxxx	x	0	x	x	1	1	1	1	S6: Fault Reaction Active
xxxx	xxxx	x	0	x	x	1	0	0	0	S7: Fault

### 6.11.3.3 - Mode specific definition of the statusword bits

<b>Bit</b>	<b>Operation mode</b>			
	<b>Simple Current Mode</b>	<b>Simple Speed Mode</b>	<b>Position Mode</b>	<b>Homing Mode</b>
8	-	-	No Following Error	No Following Error
10	-	-	Target Reached	Target Reached
11	-	-	Home Position Set	Home Position Set
12	-	-	Sequence Acknowledge	-
13	-	-	Drive Stopped	-
14	-	-	Within Sequence	-
15	Supply Voltage Avail.	Supply Voltage Avail.	Supply Voltage Avail.	Supply Voltage Avail.

### 6.11.4 - P0930 - Operating Mode

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	1 ... 2
Default Value	2
NVMem	-
Restriction	-

This parameter shows the actual operating mode of the drive.

- 1 - Speed control mode
- 2 - Positioning mode

### 6.11.5 - P0550 - Modes of operation

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER8
Value Range	-24 ... 6
Default Value	1
NVMem	General-Segment
Restriction	-

The Operating mode defines the behavior of the drive. This parameter is automatically set during the PROFIBUS telegram configuration.

The parameter switches the actually chosen operation mode. The current mode of operation is shown in the Modes of operation display. Mode changes are only allowed when not in state 'Operation'.

The following modes can be selected:

	<b>Modes</b>
6	Homing Mode
1	Position Mode
-1	Analog Input Offset Compensation
-20	Simple Current Mode
-21	Simple Speed Mode
-23	Simple Current Mode with analog input
-24	Simple Speed Mode with analog input

### 6.11.6 - P0551 - Modes of operation display

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	INTEGER8
Value Range	-128 ... 127
Default Value	1
NVMem	-
Restriction	-

This instruction shows the mode of operation of the drive.

The following modes are shown:

	<b>Modes</b>
6	Homing Mode
1	Position Mode
-1	Analog Input Offset Compensation
-6	Current measurement offset compensation
-20	Simple Current Mode
-21	Simple Speed Mode
-23	Simple Current Mode with analog input
-24	Simple Speed Mode with analog input

### 6.11.7 - P0555 - Quick stop option code

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	0 ... 7
Default Value	3
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the quick stop function.

0: disable drive

1: slow down on slow down ramp; disable drive

2: slow down on quick stop ramp; disable drive

3: slow down on the current limit; disable drive

4: (slow down on the voltage limit; disable drive) - not implemented

5: slow down on slow down ramp and stay in QUICK STOP

6: slow down on quick stop ramp and stay in QUICK STOP

7: slow down on the current limit and stay in QUICK STOP

8: (slow down on the voltage limit and stay in QUICK STOP) - not implemented

### 6.11.8 - P0556 - Shutdown option code

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	0 ... 1
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the shutdown function.

0: Disable drive function

1: Slow down with slow down ramp; disable drive

### 6.11.9 - P0557 - Disable option code

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	0 ... 1
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the disable function.

0: Disable drive function

1: Slow down with slow down ramp; disable drive

### 6.11.10 - P0558 - Halt option code

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	0 ... 3
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the halt function.

0: disable drive

1: slow down on slow down ramp

2: slow down on quick stop ramp

3: slow down on the current limit

4: (slow down on the voltage limit) - not implemented

### 6.11.11 - P0560 - Quick stop deceleration

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

The quick stop deceleration is the deceleration used to stop the motor if the 'Quick Stop' command is given and the quick stop option code is set to 2.

The quick stop deceleration is given in the same units as the profile acceleration.

### 6.11.12 - P0561 - Hardware limit, stop and Software limit switches function

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the drive action in case of reaching one of the following conditions: positive and negative hardware limit switches, stop switch, positive and negative software limit switches. The drive action can be warning: stop and stay in position or zero speed; or error: disable drive and generate error.

Bit0 = 0 Hardware limit switch and stop switch warning function

Bit0 = 1: Hardware limit switch and stop switch error function  
 Bit1 = 0: Software limit switch warning function  
 Bit1 = 1: Software limit switch error function

### 6.11.13 - P0562 - Drive error word

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	-
Restriction	-

Read the drive error word.

0x00000001: Limit switch error  
 0x00000002: I2t error  
 0x00000004: Overspeed error  
 0x00000008: Position following error  
 0x00000010: NVMem (EEPROM) error  
 0x00000020: CAN/Profibus error  
 0x00000040: Logic undervoltage error  
 0x00000080: Procedure execution error  
 0x00000100: DC bus overvoltage error  
 0x00000200: Overcurrent error  
 0x00000400: HALL error  
 0x00000800: DC bus undervoltage error  
 0x00001000: Amplifier overtemperature error  
 0x00002000: Motor overtemperature error  
 0x00004000: Encoder error  
 0x00008000: Not used  
 0x00010000: BUS hardware error  
 0x00020000: NVMem (EEPROM) hardware error  
 0x00040000: Internal software init error  
 0x00080000: User unit error  
 0x00100000: Not used  
 ...  
 0x80000000: Not used

### 6.11.14 - P0563 - Drive error mask

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	4294967295
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the drive error mask. This mask can be used to avoid the disabling of the drive in case of a defined error.

0x00000001: Res.  
 0x00000002: Res.  
 0x00000004: Res.  
 0x00000008: Position following error  
 0x00000010: Res.  
 0x00000020: CAN/Profibus error  
 0x00000040: Res.  
 0x00000080: Res.  
 0x00000100: Res.  
 0x00000200: Res.  
 0x00000400: Positive software limit switch  
 0x00000800: Negative software limit switch  
 0x00001000: Res.  
 ...  
 0x80000000: Res.

### 6.11.15 - P0564 - Drive warning

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	-
Restriction	-

#### Read drive warning word

This parameters shows in a bit coded form the actual warnings in this drive. The warnings are shown as long as they are present and are automatically reset when the warning reason has gone.

0x00000001: The electronics temperature is too high  
 0x00000002: The I2t limiting for the motor current is active  
 0x00000004: Not used  
 0x00000008: Negative software limit switch reached  
 0x00000010: Positive software limit switch reached  
 0x00000020: Jogging not possible  
 0x00000040: Not used  
 0x00000080: Not used  
 0x00000100: Not used  
 0x00000200: Program cannot be started  
 0x00000400: Not used  
 0x00000800: Not used  
 0x00001000: The load voltage is to low  
 0x00002000: Negative hardware limit switch reached  
 0x00004000: Positive hardware limit switch reached  
 0x00008000: The motor temperature is too high  
 0x00010000: Res.  
 ...  
 0x80000000: Res.

### 6.11.16 - P0565 - Drive status word

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	-
Restriction	-

Read the drive status word

0x0001: Not used  
 0x0002: Reverse direction of rotation  
 0x0004: Not used  
 0x0008: Positive logic  
 0x0010: Positive limit switch  
 0x0020: Negative limit switch  
 0x0040: Not used  
 0x0080: Home  
 0x0100: Enable input  
 0x0200: Rapid stop switch  
 0x0400: Not used  
 0x0800: Not used  
 0x1000: Software enable  
 0x2000: Not used  
 0x4000: Position captured  
 0x8000: Position captured

### 6.11.17 - P0566 - Procedure status word

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	-
Restriction	-

If the drive is executing a procedure the status of that can be read (executing, aborted with error, executed without error).

0x0001: Not used  
 0x0002: Not used  
 0x0004: Not used  
 0x0008: Not used  
 0x0010: Not used  
 0x0020: Index research  
 0x0040: Not used  
 0x0080: Not used  
 0x0100: EEPROM saving  
 0x0200: Not used  
 0x0400: Not used

0x0800: Not used  
 0x1000: Not used  
 0x2000: Procedure cancelled  
 0x4000: Procedure correctly executed  
 0x8000: Procedure error

### 6.11.18 - P0928 - Control priority PCD

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 1
Default Value	1
NVMem	Communication-Segment
Restriction	'Read only' when operational

This parameter defines the drive control authority.

Selects the control source when the drive is free to operate (no internal function or configuration software (BO) running).

0 - Internal Hardware (Stand alone)

1 - Fieldbus master PLC

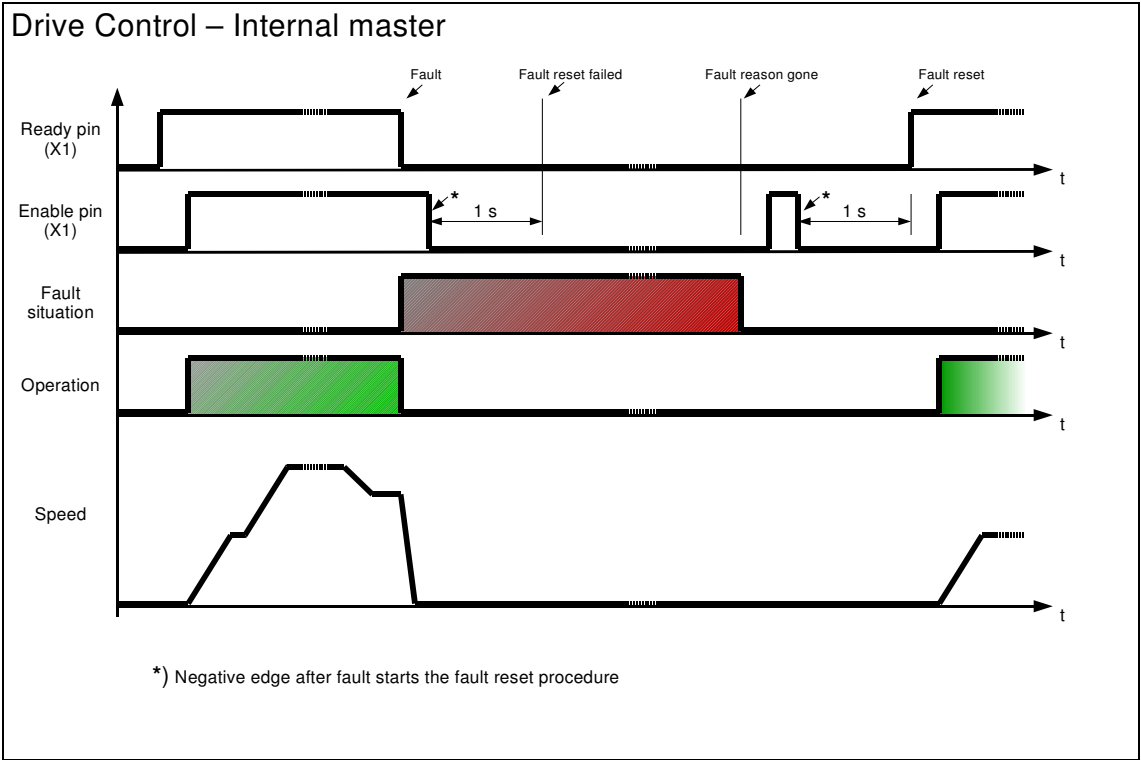
### 6.11.19 - Internal master (Stand Alone)

With the internal master mode it is possible to run the drive e.g. as an analog speed drive without fieldbus usage. The internal master emulates the PLC's state machine control. To enable this feature it is necessary to change the contrl priority from a fieldbus PLC to the internal hardware.

When setting the enable pin of X1 the state machine will change to „Operation Enabled“. On resetting it the state machine falls back to „Switch On Disabled“.

In case of a fault a „fault reset procedure“ is necessary to bring the state machine from state „Fault“ to „Switch On Disabled“. Therefore a negative edge on the enable pin followed by a 1 second pause needs to be made.





## 6.12 - Simple Speed Mode (with analog input)

PNU	Name	Object	Type	Attr.
P0600	Digital speed reference value	VAR	INTEGER16	rw
P0601	Digital speed ramp generator time constant	VAR	INTEGER32	rw

The Simple Speed Mode allows to move the motor with different speeds.

### 6.12.1 - P0600 - Digital speed reference value

Object Type	VAR
Access Type	Read/Write
Signal	5
Data Type	INTEGER16
Value Range	-32767 ... 32767
Default Value	0
NVMem	General-Segment
Restriction	-

Defines the digital reference value of the drive speed.  
 +/- 32767 = +/- RPM max

### 6.12.2 - P0601 - Digital speed ramp generator time constant

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER32
Value Range	0 ... 32000
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Specifies the acceleration and deceleration ramp time for the simple speed mode in ms.  
 The value 0 disables the ramp function.  
 The valid constant value range is between 1 ms and 32000 ms.

### 6.13 - Simple Current Mode (with analog input)

PNU	Name	Object	Type	Attr.
P0610	Digital current reference value	VAR	INTEGER16	rw

The Simple Current Mode allows to move the motor with different current ratings.

#### 6.13.1 - P0610 - Digital current reference value

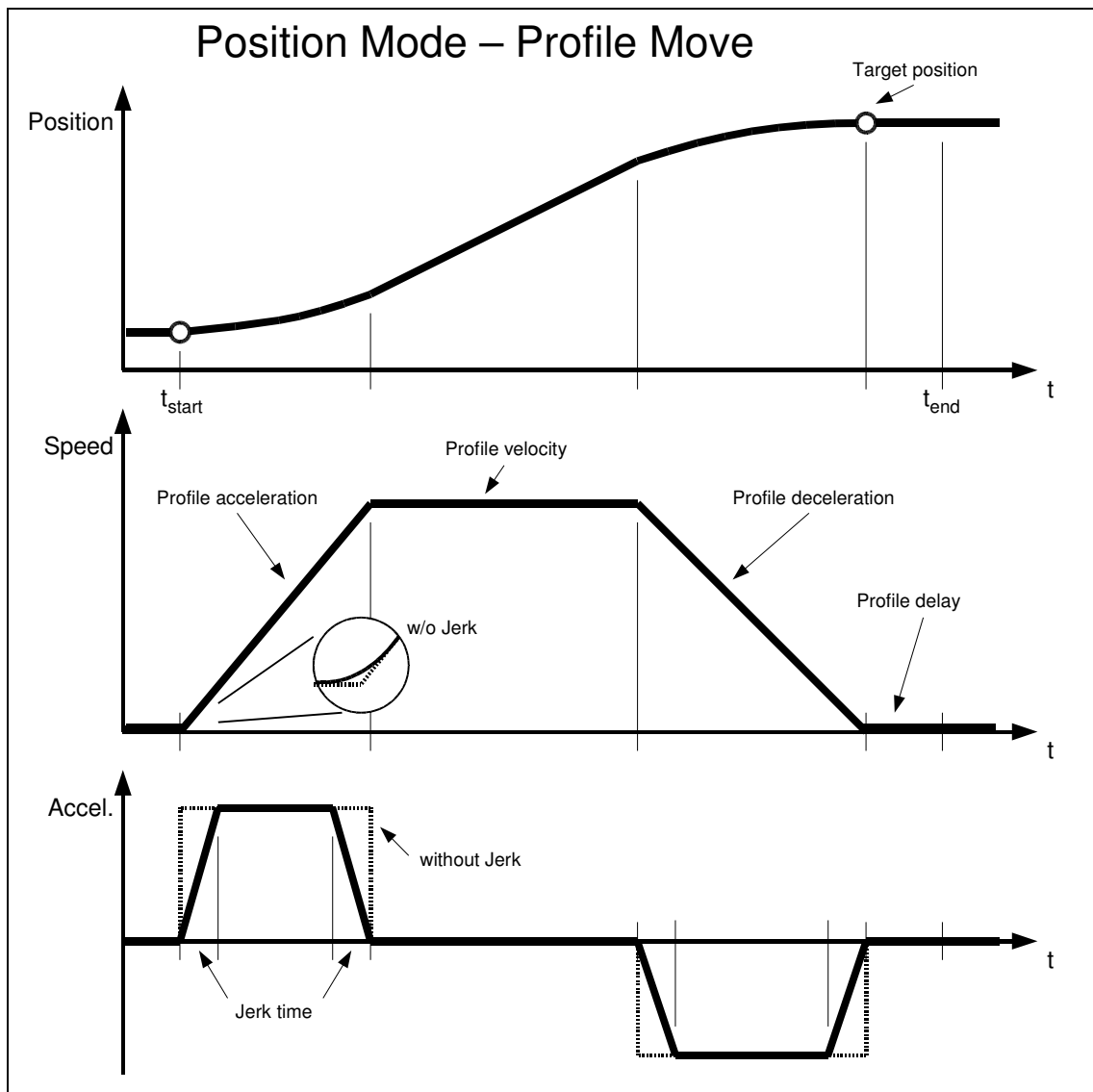
Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-32768 ... 32767
Default Value	0
NVMem	General-Segment
Restriction	-

Defines the digital reference value of the drive current in current reference mode.  
 $\pm 32767 = \pm I_{max}$

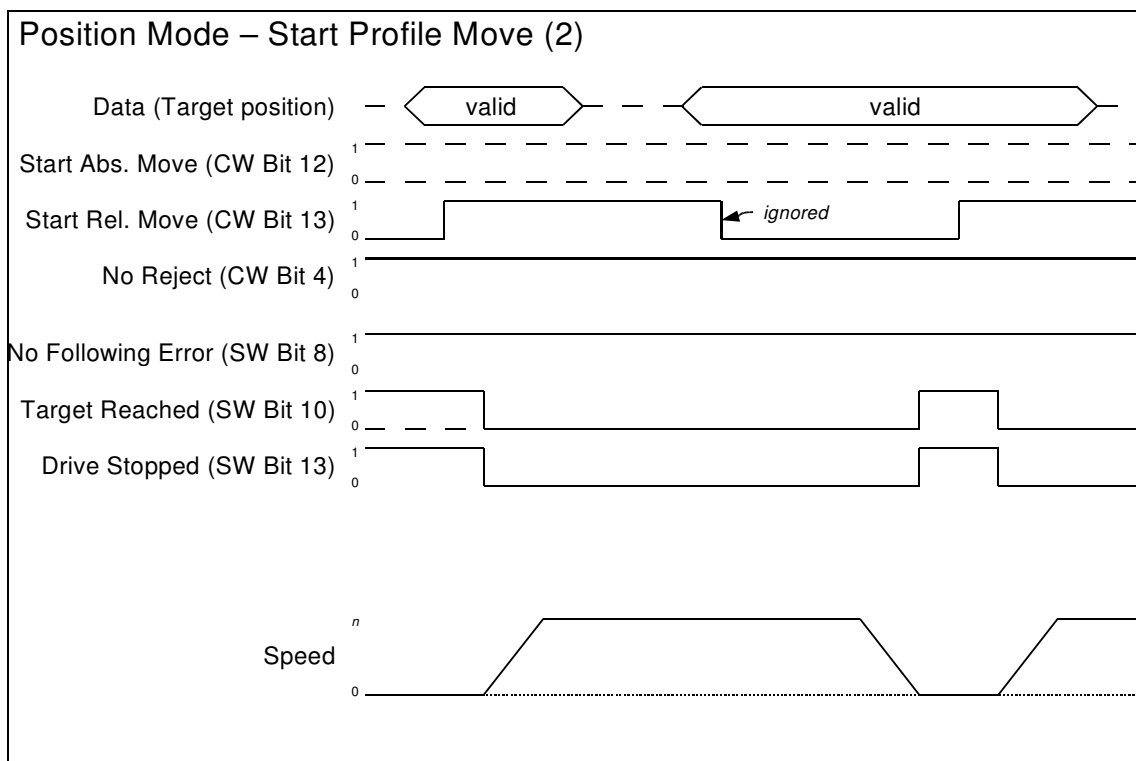
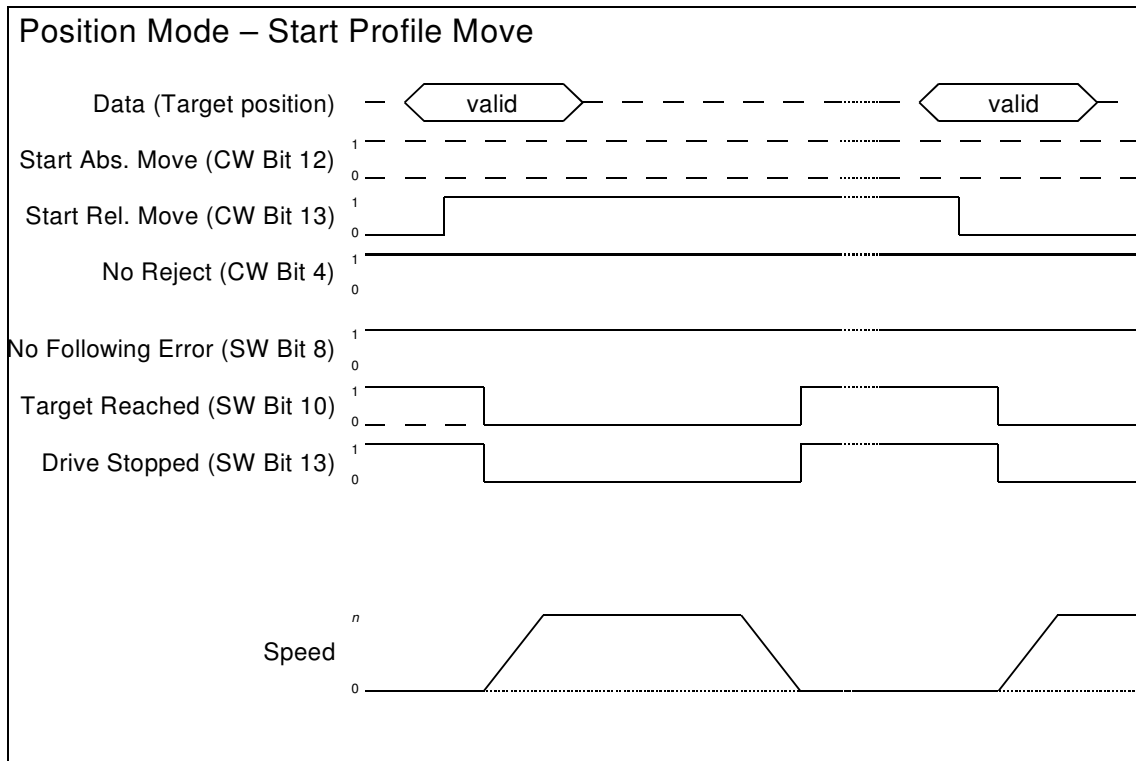
### 6.14 - Position Mode

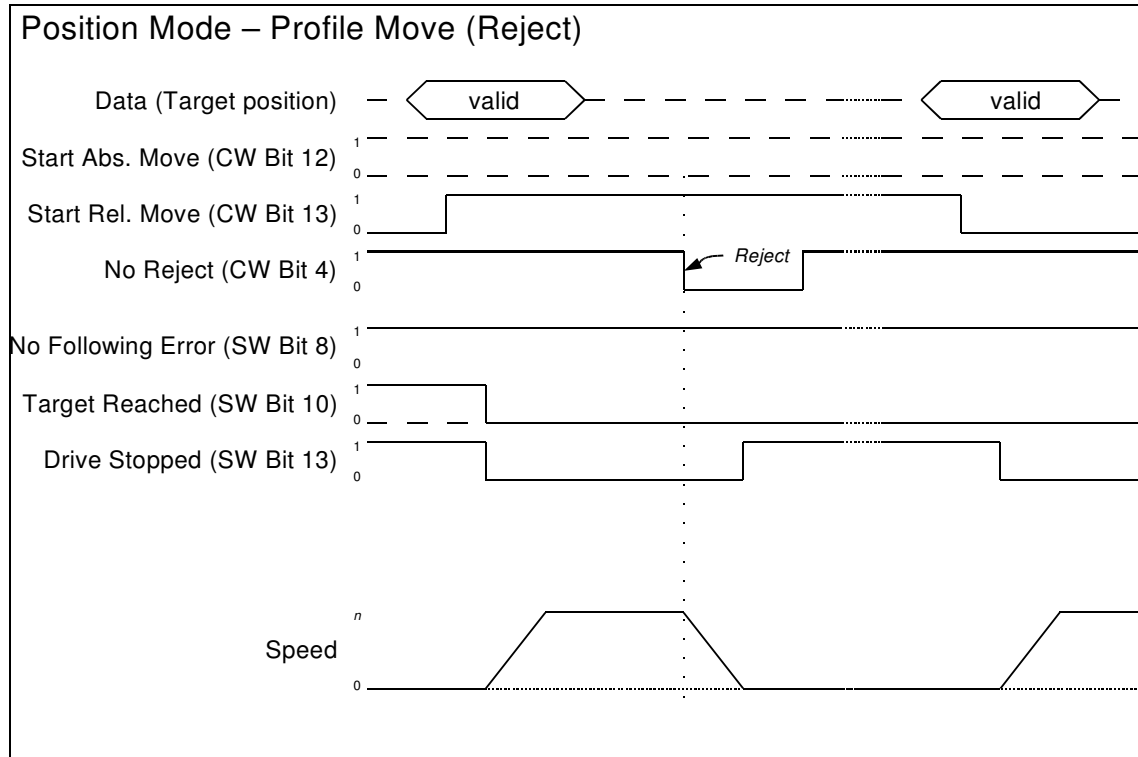
PNU	Name	Object	Type	Attr.
P0630	Target position	VAR	INTEGER32	rw
P0631	Profile velocity	VAR	UNSIGNED32	rw
P0633	Profile acceleration	VAR	UNSIGNED32	rw
P0634	Profile deceleration	VAR	UNSIGNED32	rw
P0635	Motion profile type	VAR	INTEGER16	rw
P0636	Profile delay	VAR	UNSIGNED16	rw
P0637	Jerk time constant	VAR	UNSIGNED16	rw
P0638	Jogging1 speed	VAR	INTEGER16	rw
P0639	Jogging2 speed	VAR	INTEGER16	rw

#### 6.14.1 - Profile procedure

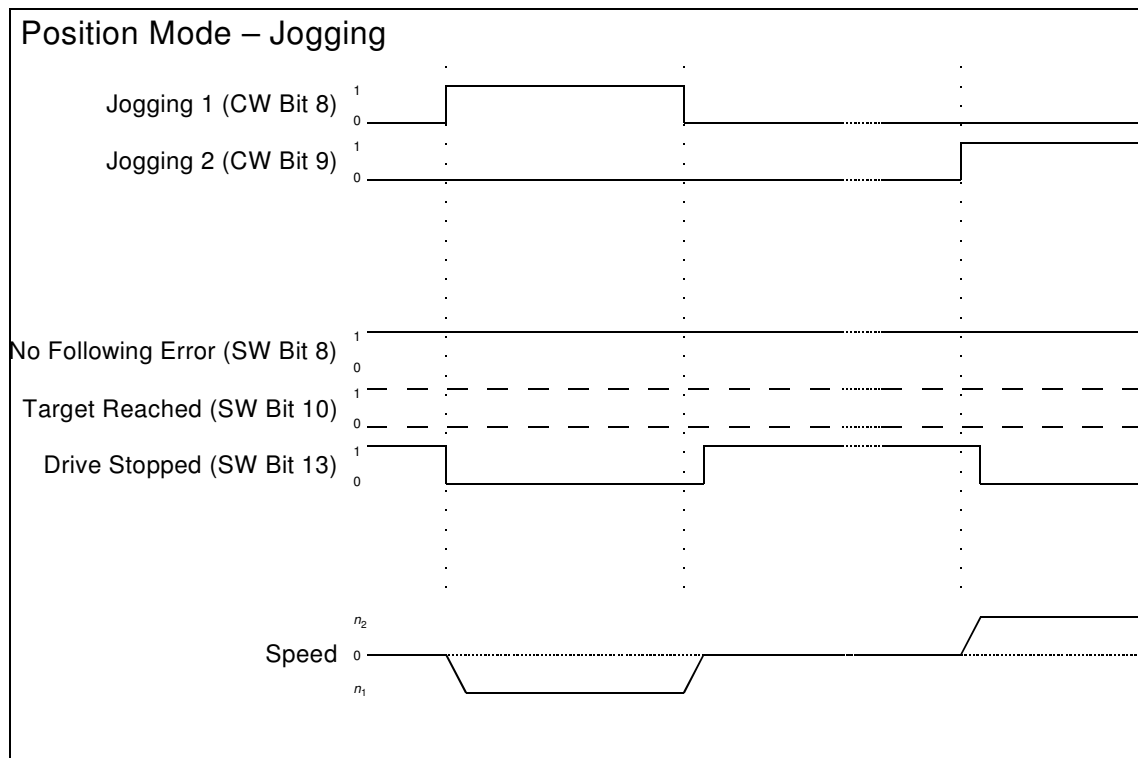


### 6.14.2 - Drive Control timings





The Position Mode includes a manufacturer specific jogging extension. It is possible to move the axes with two different preset speeds. This feature is controlled with the Controlword bits 14 and 15:



### 6.14.3 - P0630 - Target position

Object Type	VAR
Access Type	Read/Write
Signal	34
Data Type	INTEGER32
Value Range	-2147483648 ... 2147483647
Default Value	0
NVMem	General-Segment
Restriction	-

The target position is the position that the drive should move to in position profile mode using the current settings of motion control parameters such as velocity, acceleration, deceleration, motion profile type etc. The target position is given in user defined position units. It is converted to position increments using the position factor. The target position will be interpreted as absolute or relative depending on the 'abs / rel' flag in the controlword.

### 6.14.4 - P0631 - Profile velocity

Object Type	VAR
Access Type	Read/Write
Signal	35
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	General-Segment
Restriction	-

The profile velocity is the velocity normally attained at the end of the acceleration ramp during a profiled move and is valid for both directions of motion. The profile velocity is given in user defined speed units. It is converted to position increments per second using the velocity encoder factor.

### 6.14.5 - P0633 - Profile acceleration

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	General-Segment
Restriction	-

The profile acceleration is given in user defined acceleration units. It is converted to position increments per second<sup>2</sup> using the normalizing factors.

### 6.14.6 - P0634 - Profile deceleration

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	General-Segment
Restriction	-

The profile deceleration is given in the same units as profile acceleration.

### 6.14.7 - P0635 - Motion profile type

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	3 ... 3
Default Value	3
NVMem	-
Restriction	-

The motion profile type is used to select the type of motion profile used to perform a profiled move. Actually, only type 3 is supported.

3 - Jerk-limited ramp

### 6.14.8 - P0636 - Profile delay

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 16000
Default Value	0
NVMem	General-Segment
Restriction	-

Defines a delay time after the profile move has reached its target value. The parameter unit is milliseconds [ms].



### 6.14.9 - P0637 - Jerk time constant

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	10
NVMem	General-Segment
Restriction	'Read only' when operational

The jerk time constant allows a smooth acceleration and deceleration. The acceleration/deceleration has a trapezoidal profile if the jerk time constant is not zero. The jerk time constant defines the time necessary for reaching the defined acceleration/deceleration.

Jerk time = Parameter \* 0,25 ms

### 6.14.10 - P0638 - Jogging1 speed

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-32767 ... 32767
Default Value	-328
NVMem	General-Segment
Restriction	'Read only' when operational

Defines the jogging1 speed.

+/- 32767 = +/- 1875 RPM

### 6.14.11 - P0639 - Jogging2 speed

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-32767 ... 32767
Default Value	328
NVMem	General-Segment
Restriction	'Read only' when operational

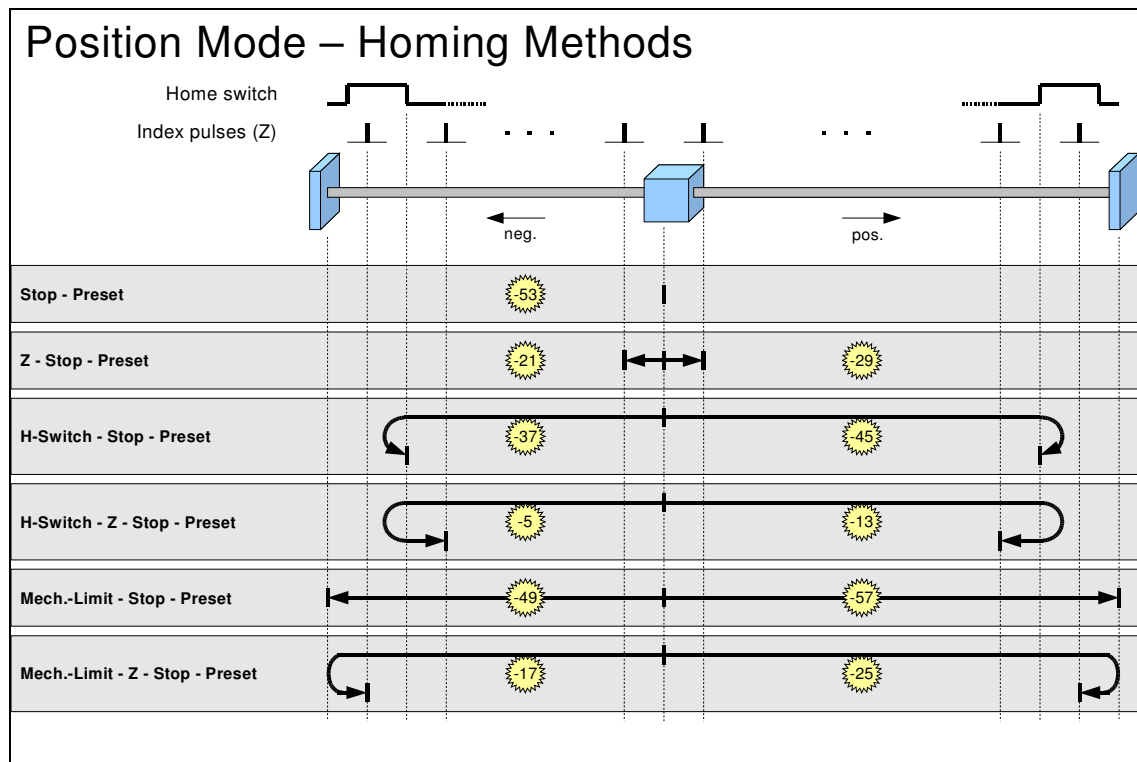
Defines the jogging2 speed.

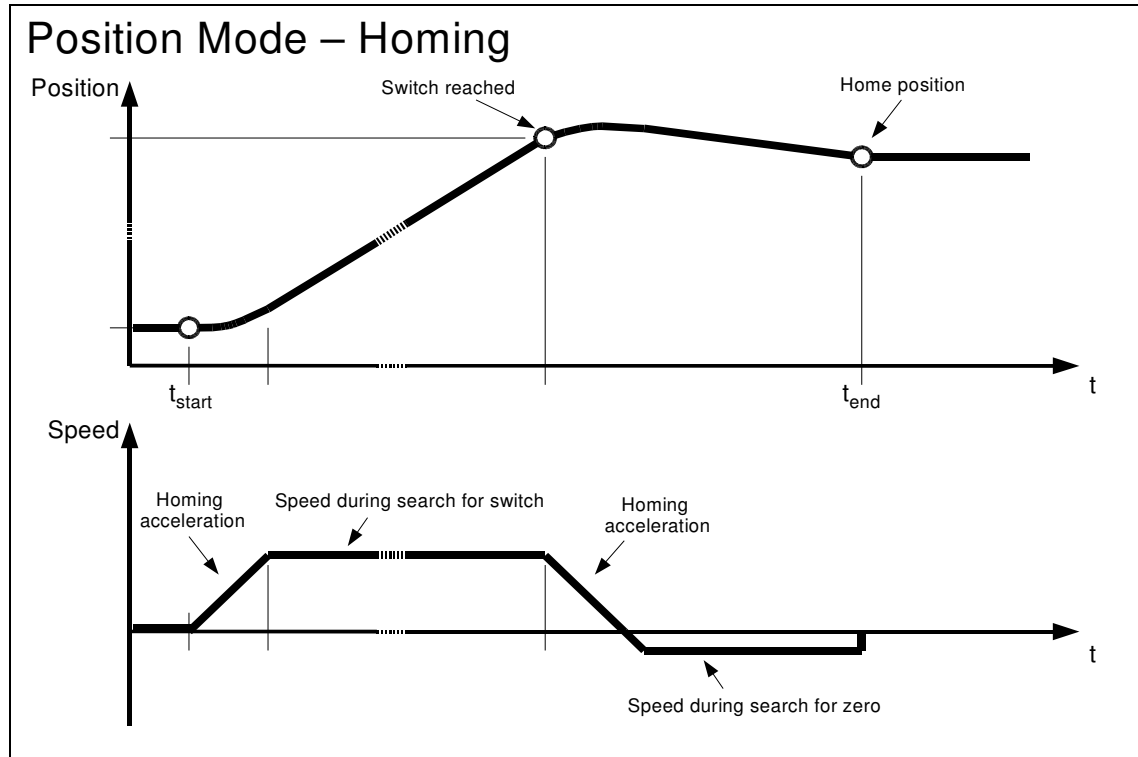
+/- 32767 = +/- 1875 RPM

## 6.15 - Homing

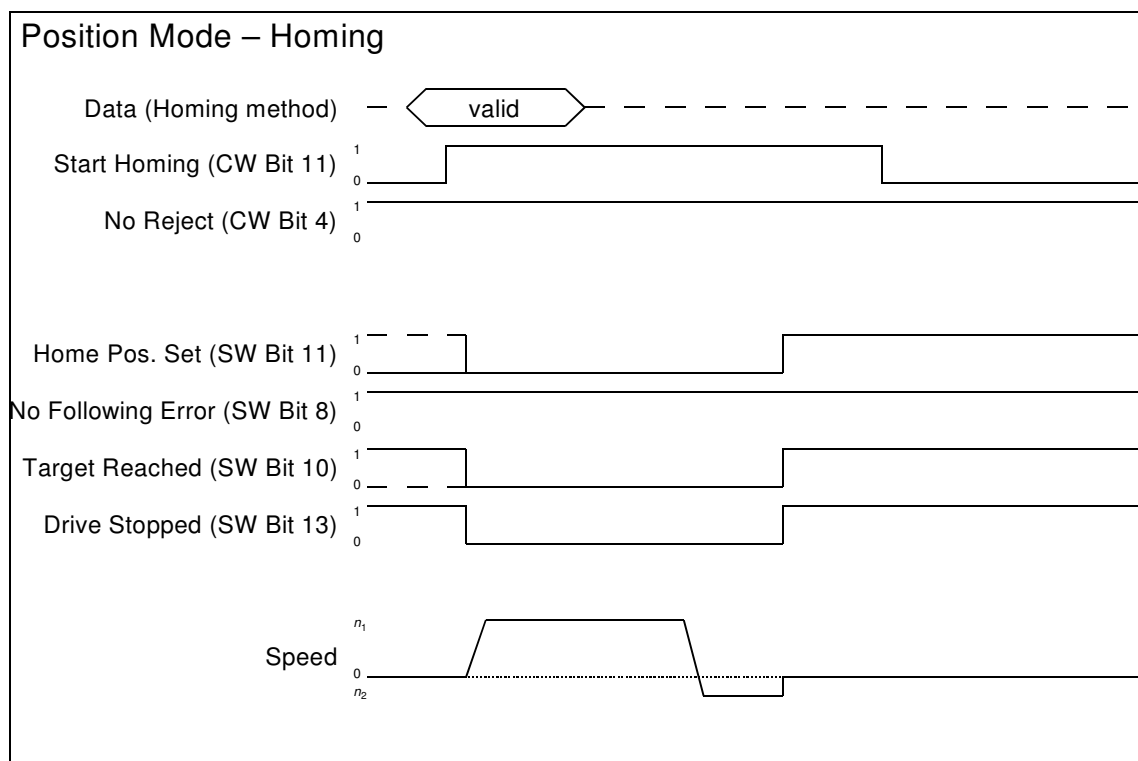
PNU	Name	Object	Type	Attr.
P0650	Home offset	VAR	INTEGER32	rw
P0651	Homing method	VAR	INTEGER8	rw
P0652	Homing speeds	ARRAY	UNSIGNED32	rw
P0653	Homing acceleration	VAR	UNSIGNED32	rw
P0654	Homing timeout	VAR	UNSIGNED16	rw
P0655	Mechanical limit current ratio	VAR	UNSIGNED16	rw
P0656	Mechanical limit speed	VAR	UNSIGNED32	rw

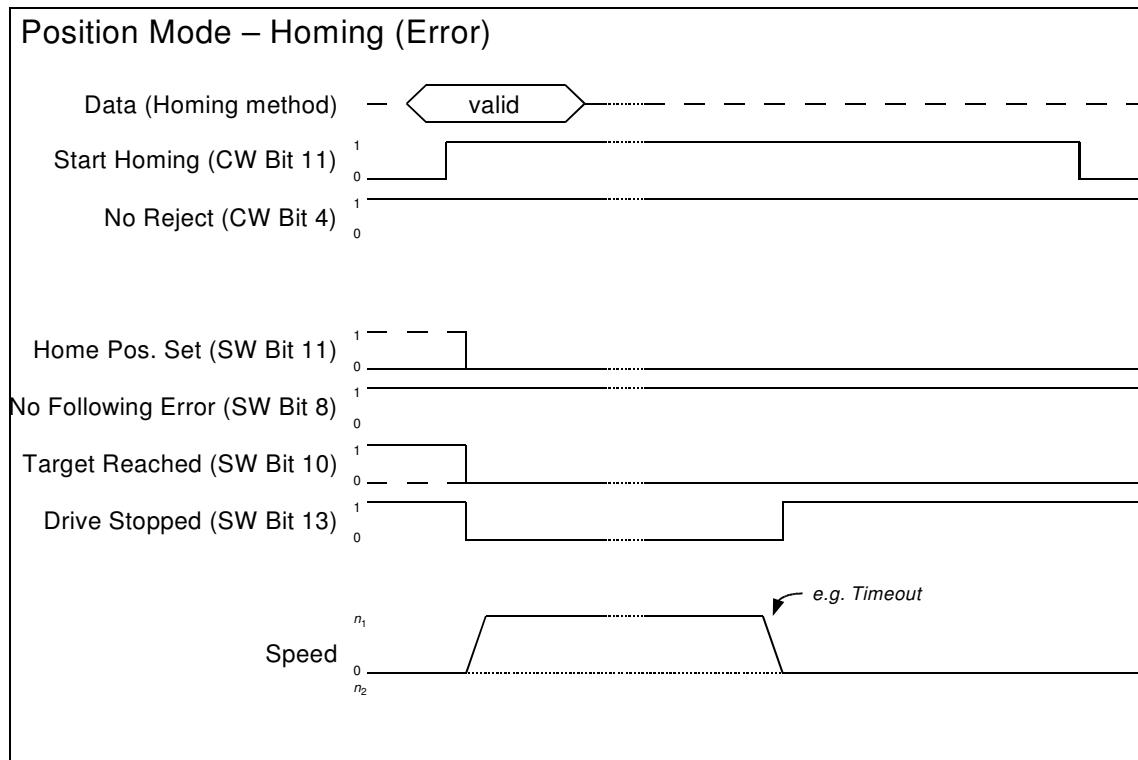
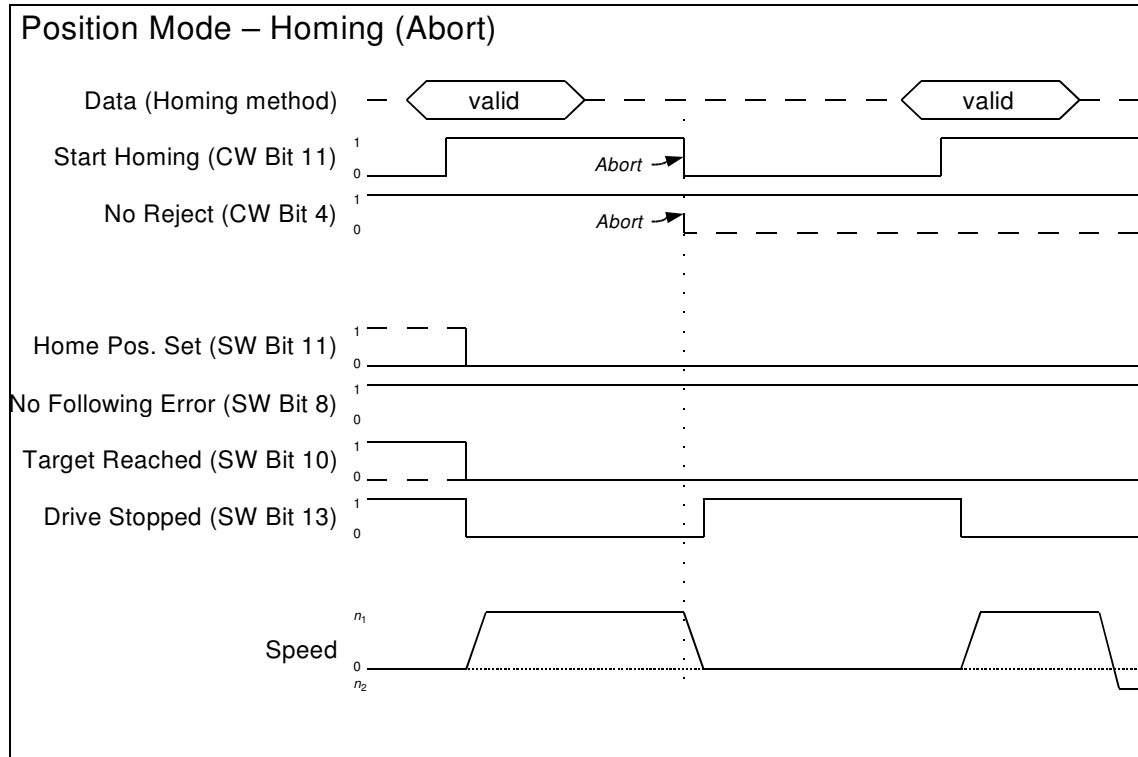
### 6.15.1 - Functions





### 6.15.2 - Drive Control timings





### 6.15.3 - P0650 - Home offset

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER32
Value Range	-2147483648 ... 2147483647
Default Value	0
NVMem	General-Segment
Restriction	-

The difference between the zero position for the application and the machine home position (found during homing). The home offset is measured in position units. During homing the machine home position is found and once the homing is completed the zero position is offset from the home position by adding the home offset to the home position. All subsequent absolute moves are relative to this new zero position.

### 6.15.4 - P0651 - Homing method

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER8
Value Range	-61 ... 35
Default Value	0
NVMem	General-Segment
Restriction	-

Determines the method that will be used during homing.

### 6.15.5 - P0652 - Homing speeds

Object Type	ARRAY
Sub Range	1 - 2

Defines the speeds used during homing. It is given velocity units.

#### 6.15.5.1 - First Sub Index 1 - Speed during search for switch

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0x00000000 ... 0xFFFFFFFF
Default Value	0x00000000
NVMem	General-Segment
Restriction	-

Speed during search for switch.

### 6.15.5.2 - Last Sub Index 2 - Speed during search for zero

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0x00000000 ... 0xFFFFFFFF
Default Value	0x00000000
NVMem	General-Segment
Restriction	-

Speed during search for zero.

### 6.15.6 - P0653 - Homing acceleration

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0x00000000 ... 0xFFFFFFFF
Default Value	0x00000000
NVMem	General-Segment
Restriction	-

Establishes the acceleration to be used for all accelerations and decelerations with the standard homing modes. It is given in acceleration units.

### 6.15.7 - P0654 - Homing timeout

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 16000
Default Value	16000
NVMem	General-Segment
Restriction	-

Defines a timeout for the homing procedure. The homing aborts when timeout is reached. The parameter unit is seconds [s].

### 6.15.8 - P0655 - Mechanical limit current ratio

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 32767
Default Value	5112
NVMem	General-Segment
Restriction	-

Defines the limit current for mechanical homing function.  
 The mechanical current limit is reached when the actual current is above this limit value.  
 This value must be scaled into an internal value.  
 $25558 = 100\% \text{ of } I_m$   
 $(5112 = 20\% \text{ of } I_m)$

### 6.15.9 - P0656 - Mechanical limit speed

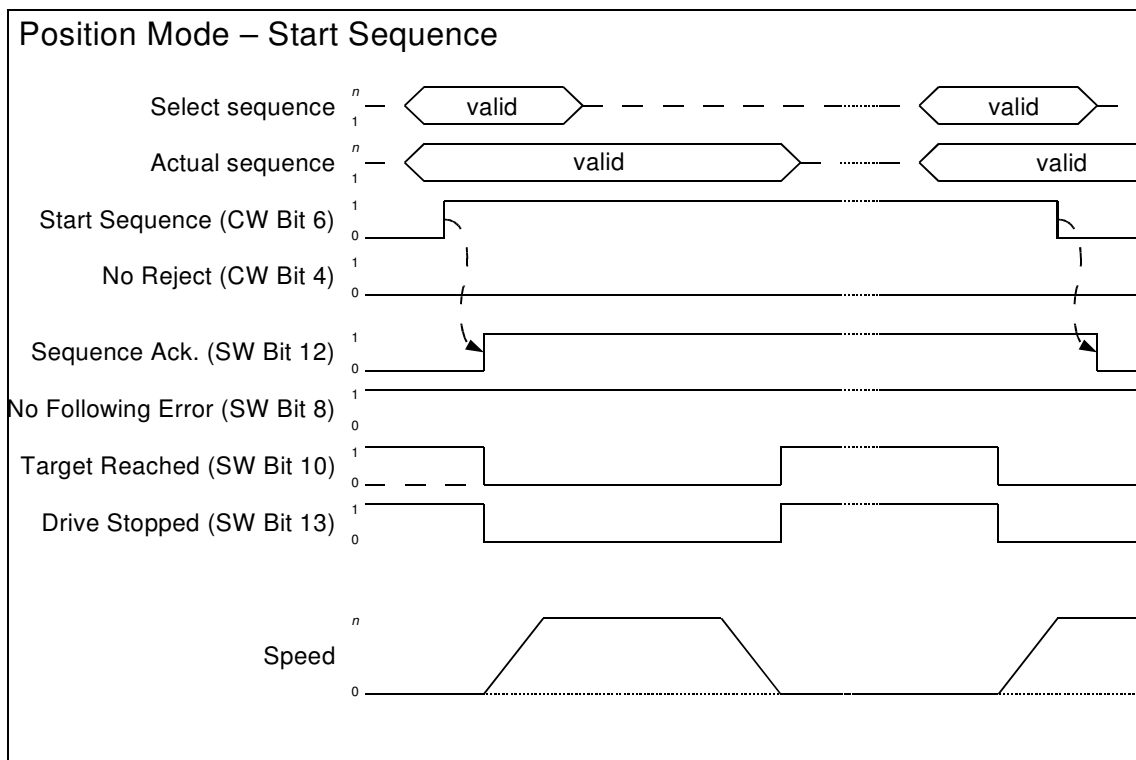
Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	100
NVMem	General-Segment
Restriction	-

Defines the limit speed for mechanical homing function in speed units.  
 The mechanical speed limit is reached when the actual speed is lower than this limit speed.

### 6.16 - Sequences

PNU	Name	Object	Type	Attr.
P0800	Program control word	ARRAY	UNSIGNED16	rw
P0801	Target position	ARRAY	INTEGER32	rw
P0802	Velocity or speed	ARRAY	UNSIGNED32	rw
P0803	Acceleration	ARRAY	UNSIGNED32	rw
P0804	Deceleration	ARRAY	UNSIGNED32	rw
P0805	Timer value	ARRAY	UNSIGNED16	rw
P0806	Trigger Position	ARRAY	INTEGER32	rw
P0807	Link Sequence	ARRAY	INTEGER16	rw
P0808	Loop Counter	ARRAY	INTEGER16	rw
P0809	Counter Link	ARRAY	INTEGER16	rw
P0810	Start Conditions	ARRAY	UNSIGNED16	rw
P0811	Logic Outputs	ARRAY	UNSIGNED16	rw
P0830	Sequence homing speed (zero)	VAR	UNSIGNED32	rw
P0835	Sequence input selection	VAR	UNSIGNED16	rw
P0840	Select sequence number and virtual inputs	VAR	UNSIGNED16	rw
P0841	Actual sequence number and virtual outputs	VAR	UNSIGNED16	ro
P0842	Sequence status	VAR	UNSIGNED16	ro

#### 6.16.1 - Drive Control timings





### 6.16.2 - P0800 - Program control word

Object Type	ARRAY
Sub Range	1 - 31

Defines the type of the sequence.

Bit Function

0 = 0: Non valid sequence

0 = 1: Valid sequence

1 = 0: Positioning sequence

1 = 1: Homing sequence

2 = 0: Absolute positioning

2 = 1: Relative positioning

3 = 0:

3 = 1: Speed sequence

If the sequence is homing (bit1 = 1) bits 3...7 have the following meaning

2 = 0: Homing without mechanical limit

2 = 1: Homing with mechanical limit

3 = 0: Homing in positive direction

3 = 1: Homing in negative direction

4 = 0: Homing without switch

4 = 1: Homing with switch

5 = 0: Homing without marker pulse

5 = 1: Homing with marker pulse

6 = 0: Stops the motor after the home position is found

6 = 1: Positions the motor on the home position

7 = 0: Does not reset the position counter

7 = 1: Resets the position counter

8 -11: Defines the triggering for the logic outputs

= 0: End of sequence

= 1: Begin of sequence

= 2: Stop (Target position reached)

= 3: Speed reached

= 4: Trigger position reached

12 -14: Reserved

15 = 0: Conditional start

15 = 1: Conditional stop

#### 6.16.2.1 - First Sub Index 1 - Program control word Seq. 1

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0x0 ... 0xFFFF
Default Value	0x0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.2.2 - Last Sub Index 31 - Program control word Seq. 31

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0x0 ... 0xFFFF
Default Value	0x0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.3 - P0801 - Target position

Object Type	ARRAY
Sub Range	1 - 31

Defines the target position of a positioning sequence or the reset position value of a homing sequence.

#### 6.16.3.1 - First Sub Index 1 - Target position Seq. 1

Access Type	Read/Write
Signal	-
Data Type	INTEGER32
Value Range	-2147483648 ... 2147483647
Default Value	0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

#### 6.16.3.2 - Last Sub Index 31 - Target position Seq. 31

Access Type	Read/Write
Signal	-
Data Type	INTEGER32
Value Range	-2147483648 ... 2147483647
Default Value	0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.4 - P0802 - Velocity or speed

Object Type	ARRAY
Sub Range	1 - 31

Defines the speed of the sequence.  
The sequence velocity is given in user defined speed units.

#### 6.16.4.1 - First Sub Index 1 - Velocity or speed Seq. 1

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

#### 6.16.4.2 - Last Sub Index 31 - Velocity or speed Seq. 31

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.5 - P0803 - Acceleration

Object Type	ARRAY
Sub Range	1 - 31

Defines the acceleration of the sequence.  
The sequence acceleration is given in user defined acceleration units.

#### 6.16.5.1 - First Sub Index 1 - Acceleration Seq. 1

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.5.2 - Last Sub Index 31 - Acceleration Seq. 31

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.6 - P0804 - Deceleration

Object Type	ARRAY
Sub Range	1 - 31

Not implemented!

The profile deceleration is given in the same units as profile acceleration.

#### 6.16.6.1 - First Sub Index 1 - Deceleration Seq. 1

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

#### 6.16.6.2 - Last Sub Index 31 - Deceleration Seq. 31

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0 ... 4294967295
Default Value	0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.7 - P0805 - Timer value

Object Type	ARRAY
Sub Range	1 - 31

Sequence delay (positioning seq.) or timeout (home seq.).

Defines:

-A delay time at the end of the positioning sequence [ms]

-A timeout for a homing sequence [s]

#### 6.16.7.1 - First Sub Index 1 - Timer value Seq. 1

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 16000
Default Value	64
NVMem	Sequences-Segment
Restriction	'Read only' when operational

#### 6.16.7.2 - Last Sub Index 31 - Timer value Seq. 31

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 16000
Default Value	64
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.8 - P0806 - Trigger Position

Object Type	ARRAY
Sub Range	1 - 31

Defines the triggering position of the sequence.

When this position is reached, the correspondent trigger position mask bits within the sequence status word are set.

#### 6.16.8.1 - First Sub Index 1 - Trigger Position Seq. 1

Access Type	Read/Write
Signal	-
Data Type	INTEGER32
Value Range	-2147483648 ... 2147483647
Default Value	0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.8.2 - Last Sub Index 31 - Trigger Position Seq. 31

Access Type	Read/Write
Signal	-
Data Type	INTEGER32
Value Range	-2147483648 ... 2147483647
Default Value	0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.9 - P0807 - Link Sequence

Object Type	ARRAY
Sub Range	1 - 31

Defines the sequence link parameter.

1-x: Number of the link sequence (x - Maximum sequence number)

-1: No link

#### 6.16.9.1 - First Sub Index 1 - Link Sequence Seq. 1

Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-1 ... 31
Default Value	-1
NVMem	Sequences-Segment
Restriction	'Read only' when operational

#### 6.16.9.2 - Last Sub Index 31 - Link Sequence Seq. 31

Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-1 ... 31
Default Value	-1
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.10 - P0808 - Loop Counter

Object Type	ARRAY
Sub Range	1 - 31

Defines the counter parameter of the sequence.

1-32767: Counter value

0: No counter  
 -1: Conditional link

#### 6.16.10.1 - First Sub Index 1 - Loop Counter Seq. 1

Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-1 ... 16000
Default Value	-1
NVMem	Sequences-Segment
Restriction	'Read only' when operational

#### 6.16.10.2 - Last Sub Index 31 - Loop Counter Seq. 31

Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-1 ... 16000
Default Value	-1
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.11 - P0809 - Counter Link

Object Type	ARRAY
Sub Range	1 - 31

Defines the counter link parameter of the sequence.  
 1-x: Number of the link sequence (x - Maximum sequence number)  
 -1: No link

#### 6.16.11.1 - First Sub Index 1 - Counter Link Seq. 1

Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-1 ... 31
Default Value	-1
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.11.2 - Last Sub Index 31 - Counter Link Seq. 31

Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-1 ... 31
Default Value	-1
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.12 - P0810 - Start Conditions

Object Type	ARRAY
Sub Range	1 - 31

Defines the start condition parameter of the sequence.

Bit Function

0-7: The inputs 0 to 7 must be set at 0

8-15: The inputs 0 to 7 must be set at 1

#### 6.16.12.1 - First Sub Index 1 - Start Conditions Seq. 1

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 0xFFFF
Default Value	0x00FF
NVMem	Sequences-Segment
Restriction	'Read only' when operational

#### 6.16.12.2 - Last Sub Index 31 - Start Conditions Seq. 31

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 0xFFFF
Default Value	0x00FF
NVMem	Sequences-Segment
Restriction	'Read only' when operational

### 6.16.13 - P0811 - Logic Outputs

Object Type	ARRAY
Sub Range	1 - 31

Defines the output control sequence parameter.



**Bit Function**

0-7: Mask s for the outputs 0 to 7

8-15: Mask r for the outputs 0 to 7

The combination of the s and r masks gives rs

01: Sets at 1 the corresponding output

00: Sets at 0 the corresponding output

10: Keeps the output unchanged

11: Reverses the output

**6.16.13.1 - First Sub Index 1 - Logic Outputs Seq. 1**

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

**6.16.13.2 - Last Sub Index 31 - Logic Outputs Seq. 31**

Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 65535
Default Value	0
NVMem	Sequences-Segment
Restriction	'Read only' when operational

**6.16.14 - P0830 - Sequence homing speed (zero)**

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0x00000000 ... 0xFFFFFFFF
Default Value	0x00000000
NVMem	Sequences-Segment
Restriction	'Read only' when operational

Sequence speed during search for zero. This value is used for all homing sequences. It is given velocity units.

### 6.16.15 - P0835 - Sequence input selection

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0 ... 7
Default Value	0x00001
NVMem	Sequences-Segment
Restriction	'Read only' when operational

Sequence input selection

This parameter selects the logical sequence input link.

0 = No inputs are used

1 = Virtual inputs

2 = Physical inputs

3 = Virtual AND physical inputs (with logical AND)

7 = Virtual OR physical inputs (with logical OR)

(4-6 = undefined)

### 6.16.16 - P0840 - Select sequence number and virtual inputs

Object Type	VAR
Access Type	Read/Write
Signal	32
Data Type	UNSIGNED16
Value Range	0x0001 ... 0xFFFF
Default Value	0x0001
NVMem	Sequences-Segment
Restriction	-

Sets the next sequence number selection and virtual inputs.

The word is divided into the lower 8 bits (next sequence number) and upper 8 bits (virtual inputs).

Bit 0- 7: next sequence number

Bit 8-15: virtual inputs (bit 0-7)

### 6.16.17 - P0841 - Actual sequence number and virtual outputs

Object Type	VAR
Access Type	Read only
Signal	33
Data Type	UNSIGNED16
Value Range	0x0001 ... 0xFFFF
Default Value	0x0001
NVMem	-
Restriction	-

Shows the actual sequence number which is read for execution and the virtual outputs.

The word is divided into the lower 8 bits (actual sequence number) and upper 8 bits (virtual outputs).

Bit 0- 7: actual sequence number

Bit 8-15: virtual outputs (bit 0-7)

### 6.16.18 - P0842 - Sequence status

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0x0000
NVMem	-
Restriction	-

Shows the actual sequence status.

0 - Sequence ended (after delay)

1 - Sequence begin

2 - Sequence position reached

3 - Sequence speed reached

4 - Sequence trigger position reached

## Chapter 7 - Drive Tools

### 7.1 - Parameter

PNU	Name	Object	Type	Attr.
P0100	Sample time	VAR	UNSIGNED16	rw
P0101	Trigger mode	VAR	INTEGER16	rw
P0102	Trigger type	VAR	UNSIGNED16	rw
P0103	Trigger level	VAR	INTEGER16	rw
P0104	Trigger count	VAR	UNSIGNED16	rw
P0105	Trigger offset	VAR	INTEGER16	rw
P0106	DScope start	VAR	INTEGER16	rw
P0107	DScope status	VAR	INTEGER16	ro
P0108	DScope view index start	VAR	UNSIGNED16	ro
P0109	DScope view index end	VAR	UNSIGNED16	ro
P0110	DScope view index trigger	VAR	UNSIGNED16	ro
P0111	Trigger channel probe number	VAR	UNSIGNED32	rw
P0112	Channel 1 probe number	VAR	UNSIGNED32	rw
P0113	Channel 2 probe number	VAR	UNSIGNED32	rw
P0114	Channel 3 probe number	VAR	UNSIGNED32	rw
P0115	Channel 4 probe number	VAR	UNSIGNED32	rw
P0180	Current measurement offset compensation function	VAR	INTEGER16	rw
P0181	Current measuring offset compensation value (phase U)	VAR	INTEGER16	rw
P0182	Current measuring offset compensation value (phase V)	VAR	INTEGER16	rw
P0183	Analog input offset compensation function	VAR	INTEGER16	rw
P0184	Analog input 1 offset compensation value	VAR	INTEGER16	rw

## 7.2 - DigiScope

PNU	Name	Object	Type	Attr.
P0100	Sample time	VAR	UNSIGNED16	rw
P0101	Trigger mode	VAR	INTEGER16	rw
P0102	Trigger type	VAR	UNSIGNED16	rw
P0103	Trigger level	VAR	INTEGER16	rw
P0104	Trigger count	VAR	UNSIGNED16	rw
P0105	Trigger offset	VAR	INTEGER16	rw
P0106	DScope start	VAR	INTEGER16	rw
P0107	DScope status	VAR	INTEGER16	ro
P0108	DScope view index start	VAR	UNSIGNED16	ro
P0109	DScope view index end	VAR	UNSIGNED16	ro
P0110	DScope view index trigger	VAR	UNSIGNED16	ro
P0111	Trigger channel probe number	VAR	UNSIGNED32	rw
P0112	Channel 1 probe number	VAR	UNSIGNED32	rw
P0113	Channel 2 probe number	VAR	UNSIGNED32	rw
P0114	Channel 3 probe number	VAR	UNSIGNED32	rw
P0115	Channel 4 probe number	VAR	UNSIGNED32	rw

### 7.2.1 - P0100 - Sample time

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0x0001 ... 0xFFFF
Default Value	0x0001
NVMem	General-Segment
Restriction	-

Specifies the sample time as a factor  $n * 62,5 \text{ us}$   
 $1 = 62,5 \text{ us}$  ;  $2 = 125 \text{ us}$  ; ... ;  $16000 = 1 \text{ s}$  ; ... ;  $65535 = 4,096 \text{ s}$

### 7.2.2 - P0101 - Trigger mode

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	0x0000 ... 0x0002
Default Value	0x0000
NVMem	General-Segment
Restriction	-

Trigger modes are  
 0 - AUTO : Recording is independent from trigger  
 1 - NORM : Recording restarts again with every trigger

2 - SINGLE : Recording stops a end until restart forced

### 7.2.3 - P0102 - Trigger type

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0x0000
NVMem	General-Segment
Restriction	-

Trigger types are

0x0000 = NONE

0x0001 = NEGATIVE\_LEVEL : signal is below or equal trigger level

0x0002 = POSITIVE\_LEVEL : signal is above trigger level

0x0011 = FALLING\_EDGE : signal is falling below trigger level

0x0022 = RISING\_EDGE : signal is rising above trigger level

0x0041 = STRICT\_FALLING\_EDGE : signal is strictly falling below trigger level

0x00A2 = STRICT\_RISING\_EDGE : signal is strictly rising above trigger level

0x8001 = LOGICAL\_ALL\_UNSET : all selected bits are unset

0x8004 = LOGICAL\_ALL\_SET : all selected bits are set

0x8006 = LOGICAL\_SET : one or more selected bits are set

0x8009 = LOGICAL\_UNSET : one or more selected bits are unset

0x8010 = LOGICAL\_FALLING\_EDGE : one or more selected bits have a falling edge

0x8020 = LOGICAL\_RISING\_EDGE : one or more selected bits have a rising edge

0x8030 = LOGICAL\_CHANGED : one or more selected bits have changed

### 7.2.4 - P0103 - Trigger level

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-32768 ... 32767
Default Value	0x0000
NVMem	General-Segment
Restriction	-

The trigger level or the trigger bit mask.

For arithmetic trigger types: -32768 to 32767

For logical trigger types: All bit combinations bit 0 to bit 15

### 7.2.5 - P0104 - Trigger count

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED16
Value Range	1 ... 65535
Default Value	1
NVMem	General-Segment
Restriction	-

The scope is triggered after the trigger condition occurred x times.

### 7.2.6 - P0105 - Trigger offset

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	0 ... 99
Default Value	0
NVMem	General-Segment
Restriction	-

Sets the position of the trigger mark within the scope view.  
 When trigger is detected the trigger position is marked. After recording the screen has pre triggered and post triggered part.

### 7.2.7 - P0106 - DScope start

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	0 ... 1
Default Value	0
NVMem	General-Segment
Restriction	-

Starts or stops the dscope recording.  
 For modes AUTO and NORM:  
 0 - no recording ; 1 - recording  
 For mode SINGLE:  
 1 - Starts single recording  
 Start is reset after trigger search started.

### 7.2.8 - P0107 - DScope status

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	INTEGER16
Value Range	0x0000 ... 0x7FFF
Default Value	0x0000
NVMem	-
Restriction	-

Shows the status of the dscope:

- 0 - Stopped
- 3 - Waiting for trigger
- 2 - Recording

### 7.2.9 - P0108 - DScope view index start

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0x0000
NVMem	-
Restriction	-

Start index of channel buffer

### 7.2.10 - P0109 - DScope view index end

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0x0000
NVMem	-
Restriction	-

End index of channel buffer



### 7.2.11 - P0110 - DScope view index trigger

Object Type	VAR
Access Type	Read only
Signal	-
Data Type	UNSIGNED16
Value Range	0x0000 ... 0xFFFF
Default Value	0x0000
NVMem	-
Restriction	-

Trigger index of channel buffer

### 7.2.12 - P0111 - Trigger channel probe number

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0x00000000 ... 0xFFFFFFFF
Default Value	0x00000000
NVMem	General-Segment
Restriction	-

Signal number (Index and SubIndex) for the trigger channel.

### 7.2.13 - P0112 - Channel 1 probe number

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0x00000000 ... 0xFFFFFFFF
Default Value	0x00000000
NVMem	General-Segment
Restriction	-

Signal number (Index and SubIndex) for channel 1.

### 7.2.14 - P0113 - Channel 2 probe number

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0x00000000 ... 0xFFFFFFFF
Default Value	0x00000000
NVMem	General-Segment
Restriction	-

Signal number (Index and SubIndex) for channel 2.

### 7.2.15 - P0114 - Channel 3 probe number

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0x00000000 ... 0xFFFFFFFF
Default Value	0x00000000
NVMem	General-Segment
Restriction	-

Signal number (Index and SubIndex) for channel 3.

### 7.2.16 - P0115 - Channel 4 probe number

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	UNSIGNED32
Value Range	0x00000000 ... 0xFFFFFFFF
Default Value	0x00000000
NVMem	General-Segment
Restriction	-

Signal number (Index and SubIndex) for channel 4.

## 7.3 - Special Functions

PNU	Name	Object	Type	Attr.
P0180	Current measurement offset compensation function	VAR	INTEGER16	rw
P0181	Current measuring offset compensation value (phase U)	VAR	INTEGER16	rw
P0182	Current measuring offset compensation value (phase V)	VAR	INTEGER16	rw
P0183	Analog input offset compensation function	VAR	INTEGER16	rw
P0184	Analog input 1 offset compensation value	VAR	INTEGER16	rw

### 7.3.1 - P0180 - Current measurement offset compensation function

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	0 ... 1
Default Value	0
NVMem	-
Restriction	'Read only' when operational

This function is executing the offset measurement of the U and V currents and reads them in two variables (see phase U and phase V). The values are subtracted in the current calculations from the measured currents. In this way the influence of the hardware offset is compensated and the correct feedback current is calculated.

Write: 1 - starts measurement / 0 - does nothing

Read: 1 - Function is running / 0 - Function not running

### 7.3.2 - P0181 - Current measuring offset compensation value (phase U)

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-3280 ... 3280
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Compensates the offset of the current measurement on phase U.

+/- 32767 = +/- 1,65 V

### 7.3.3 - P0182 - Current measuring offset compensation value (phase V)

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-3280 ... 3280
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Compensates the offset of the current measurement on phase V.  
 $\pm 32767 = \pm 1,65 \text{ V}$

### 7.3.4 - P0183 - Analog input offset compensation function

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	0 ... 1
Default Value	0
NVMem	-
Restriction	-

This function is executing the offset measurement of the analog input(s).  
 To start the function the operation mode „Analog input offset compensation“ must be set first. It can be started with or without operational state (switch\_on\_disabled or operation\_enabled). Within operation a closed speed loop is used with a speed reference 0.  
 Write: 1 - starts measurement / 0 - does nothing  
 Read: 1 - Function is running / 0 - Function not running

### 7.3.5 - P0184 - Analog input 1 offset compensation value

Object Type	VAR
Access Type	Read/Write
Signal	-
Data Type	INTEGER16
Value Range	-1638 ... 1638
Default Value	0
NVMem	General-Segment
Restriction	'Read only' when operational

Compensates the offset of the analog input 1. This value is automatically set with the offset compensation function.  
 Scaling:  $\pm 21646 = \pm 10 \text{ V}$

## Chapter 8 - Appendix

### 8.1 - Parameter by Index

PNU	Name	Object	Type	Attr.
P0010	Fieldbus status bits	VAR	UNSIGNED16	ro
P0011	Fieldbus error bits	VAR	UNSIGNED16	ro
P0012	Fieldbus error bit mask	VAR	UNSIGNED16	rw
P0013	Fieldbus state	VAR	UNSIGNED16	ro
P0045	RS 232 Baudrate	VAR	UNSIGNED16	rw
P0050	Bootloader ident string	VAR	VIS_STRING_T	co
P0051	Bootloader revision	VAR	UNSIGNED32	ro
P0060	Drive serial number	VAR	UNSIGNED32	ro
P0061	Hardware version	VAR	UNSIGNED32	ro
P0062	Software version	VAR	UNSIGNED32	ro
P0064	PLD version	VAR	UNSIGNED16	ro
P0066	Drive Manufacturer	VAR	VIS_STRING_T	co
P0100	Sample time	VAR	UNSIGNED16	rw
P0101	Trigger mode	VAR	INTEGER16	rw
P0102	Trigger type	VAR	UNSIGNED16	rw
P0103	Trigger level	VAR	INTEGER16	rw
P0104	Trigger count	VAR	UNSIGNED16	rw
P0105	Trigger offset	VAR	INTEGER16	rw
P0106	DScope start	VAR	INTEGER16	rw
P0107	DScope status	VAR	INTEGER16	ro
P0108	DScope view index start	VAR	UNSIGNED16	ro
P0109	DScope view index end	VAR	UNSIGNED16	ro
P0110	DScope view index trigger	VAR	UNSIGNED16	ro
P0111	Trigger channel probe number	VAR	UNSIGNED32	rw
P0112	Channel 1 probe number	VAR	UNSIGNED32	rw
P0113	Channel 2 probe number	VAR	UNSIGNED32	rw
P0114	Channel 3 probe number	VAR	UNSIGNED32	rw
P0115	Channel 4 probe number	VAR	UNSIGNED32	rw
P0180	Current measurement offset compensation function	VAR	INTEGER16	rw
P0181	Current measuring offset compensation value (phase U)	VAR	INTEGER16	rw
P0182	Current measuring offset compensation value (phase V)	VAR	INTEGER16	rw
P0183	Analog input offset compensation function	VAR	INTEGER16	rw
P0184	Analog input 1 offset compensation value	VAR	INTEGER16	rw
P0200	Undervoltage function: error/ warning	VAR	UNSIGNED16	rw
P0201	Undervoltage error: DC voltage minimum value	VAR	UNSIGNED16	rw
P0202	Overvoltage error: DC voltage maximum value	VAR	UNSIGNED16	rw
P0203	DC voltage actual value	VAR	UNSIGNED16	ro
P0211	Drive temperature limit value	VAR	UNSIGNED16	rw
P0212	Drive temperature actual value	VAR	UNSIGNED16	ro
P0213	Drive temperature error time constant	VAR	UNSIGNED16	rw
P0250	Motor type	VAR	UNSIGNED16	rw
P0251	Motor data	ARRAY	UNSIGNED16	rw
P0255	Max. motor speed	VAR	UNSIGNED32	rw
P0260	Motor temperature sensor type (NTC/ PTC)	VAR	UNSIGNED16	rw
P0261	Motor temperature limit value	VAR	UNSIGNED16	rw
P0262	Motor temperature actual value	VAR	UNSIGNED16	ro

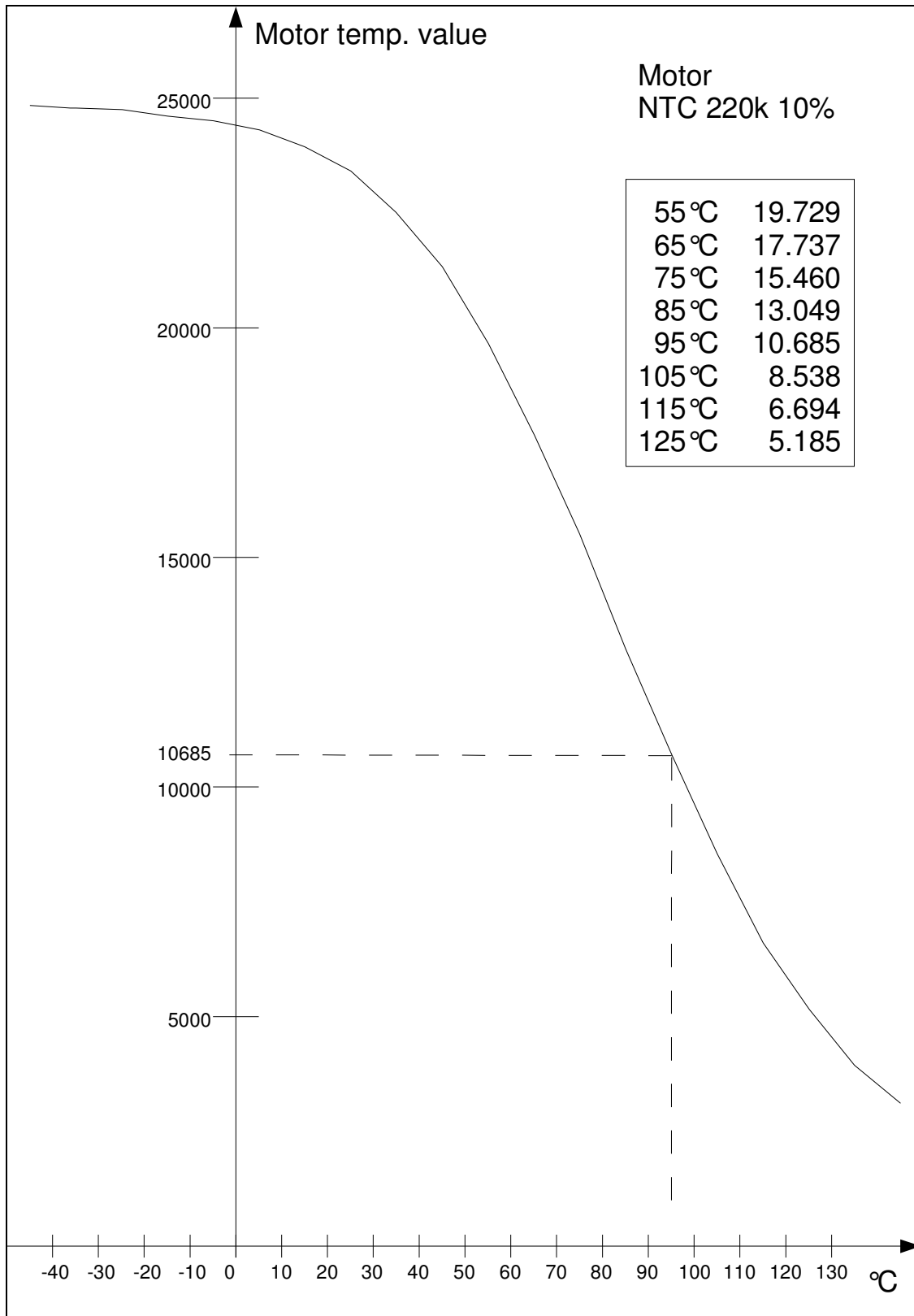
P0263	Motor temperature error time constant	VAR	UNSIGNED16	rw
P0265	Braking function time constant 1	VAR	UNSIGNED16	rw
P0300	Motor encoder resolution	VAR	UNSIGNED16	rw
P0325	Digital inputs (H)	VAR	UNSIGNED16	ro
P0326	Digital outputs (H)	VAR	UNSIGNED16	rw
P0327	Digital inputs (L)	VAR	UNSIGNED16	ro
P0328	Digital outputs (L)	VAR	UNSIGNED16	rw
P0329	Digital inputs	VAR	UNSIGNED32	ro
P0330	Digital outputs	ARRAY	UNSIGNED32	rw
P0331	Analog input 1 voltage	VAR	INTEGER16	ro
P0350	Position unit	VAR	UNSIGNED16	rw
P0352	Velocity unit	VAR	UNSIGNED16	rw
P0354	Acceleration unit	VAR	UNSIGNED16	rw
P0360	Position encoder resolution	ARRAY	UNSIGNED32	rw
P0361	Velocity encoder resolution	ARRAY	UNSIGNED32	rw
P0362	Gear ratio	ARRAY	UNSIGNED32	rw
P0363	Feed constant	ARRAY	UNSIGNED32	rw
P0364	Polarity	VAR	UNSIGNED8	rw
P0365	Position factor	ARRAY	UNSIGNED32	rw
P0366	Velocity encoder factor	ARRAY	UNSIGNED32	rw
P0369	Acceleration factor	ARRAY	UNSIGNED32	rw
P0400	Filter function selection	VAR	UNSIGNED16	rw
P0410	P-gain current loop	VAR	UNSIGNED16	rw
P0411	I-gain current loop	VAR	UNSIGNED16	rw
P0413	Maximum current	VAR	UNSIGNED16	rw
P0414	Nominal current	VAR	UNSIGNED16	rw
P0415	I2t function: limiting/ fusing	VAR	UNSIGNED16	rw
P0416	I2t function: time constant 1	VAR	UNSIGNED16	rw
P0417	I2t function: time constant 2	VAR	UNSIGNED16	rw
P0418	I2t function: limiting constant 1	VAR	UNSIGNED16	rw
P0419	I2t function: limiting constant 2	VAR	UNSIGNED16	rw
P0420	Current reference low-pass filter parameter (b0)	VAR	INTEGER16	rw
P0421	Current reference low-pass filter parameter (a0)	VAR	INTEGER16	rw
P0422	Current reference low-pass filter parameter (a1)	VAR	INTEGER16	rw
P0423	Current reference average filter: cell number	VAR	INTEGER16	rw
P0427	Current monitor	VAR	INTEGER16	ro
P0460	P-gain speed loop	VAR	UNSIGNED16	rw
P0461	I-gain speed loop	VAR	UNSIGNED16	rw
P0462	D-gain speed loop	VAR	UNSIGNED16	rw
P0463	Feedforward speed loop	VAR	UNSIGNED16	rw
P0464	Speed loop type (P/PID + FF)	VAR	UNSIGNED16	rw
P0468	Speed reference low-pass filter parameter (b0)	VAR	INTEGER16	rw
P0469	Speed reference low-pass filter parameter (a0)	VAR	INTEGER16	rw
P0470	Speed reference low-pass filter parameter (a1)	VAR	INTEGER16	rw
P0471	Speed reference average filter: cell number	VAR	INTEGER16	rw
P0472	Speed feedback low-pass filter parameter (b0)	VAR	INTEGER16	rw
P0473	Speed feedback low-pass filter parameter (a0)	VAR	INTEGER16	rw
P0474	Speed feedback low-pass filter parameter (a1)	VAR	INTEGER16	rw
P0475	Speed feedback average filter: cell number	VAR	INTEGER16	rw
P0480	Max. profile velocity	VAR	UNSIGNED32	rw
P0481	Actual drive speed	VAR	INTEGER16	ro
P0482	Velocity actual value	VAR	INTEGER32	ro
P0510	P-gain position loop	VAR	UNSIGNED16	rw
P0511	D-gain position loop	VAR	UNSIGNED16	rw
P0512	In position window value	VAR	UNSIGNED32	rw

P0513	Maximum position following error	VAR	UNSIGNED32	rw
P0515	Software position limit	ARRAY	INTEGER32	rw
P0517	Position loop internal error input	VAR	INTEGER32	ro
P0518	Position internal setpoint	VAR	INTEGER32	ro
P0520	Position actual value*	VAR	INTEGER32	ro
P0521	Position actual value	VAR	INTEGER32	ro
P0550	Modes of operation	VAR	INTEGER8	rw
P0551	Modes of operation display	VAR	INTEGER8	ro
P0555	Quick stop option code	VAR	INTEGER16	rw
P0556	Shutdown option code	VAR	INTEGER16	rw
P0557	Disable option code	VAR	INTEGER16	rw
P0558	Halt option code	VAR	INTEGER16	rw
P0560	Quick stop deceleration	VAR	UNSIGNED32	rw
P0561	Hardware limit, stop and Software limit switches function	VAR	UNSIGNED16	rw
P0562	Drive error word	VAR	UNSIGNED32	ro
P0563	Drive error mask	VAR	UNSIGNED32	rw
P0564	Drive warning	VAR	UNSIGNED32	ro
P0565	Drive status word	VAR	UNSIGNED16	ro
P0566	Procedure status word	VAR	UNSIGNED16	ro
P0600	Digital speed reference value	VAR	INTEGER16	rw
P0601	Digital speed ramp generator time constant	VAR	INTEGER32	rw
P0610	Digital current reference value	VAR	INTEGER16	rw
P0630	Target position	VAR	INTEGER32	rw
P0631	Profile velocity	VAR	UNSIGNED32	rw
P0633	Profile acceleration	VAR	UNSIGNED32	rw
P0634	Profile deceleration	VAR	UNSIGNED32	rw
P0635	Motion profile type	VAR	INTEGER16	rw
P0636	Profile delay	VAR	UNSIGNED16	rw
P0637	Jerk time constant	VAR	UNSIGNED16	rw
P0638	Jogging1 speed	VAR	INTEGER16	rw
P0639	Jogging2 speed	VAR	INTEGER16	rw
P0650	Home offset	VAR	INTEGER32	rw
P0651	Homing method	VAR	INTEGER8	rw
P0652	Homing speeds	ARRAY	UNSIGNED32	rw
P0653	Homing acceleration	VAR	UNSIGNED32	rw
P0654	Homing timeout	VAR	UNSIGNED16	rw
P0655	Mechanical limit current ratio	VAR	UNSIGNED16	rw
P0656	Mechanical limit speed	VAR	UNSIGNED32	rw
P0800	Program control word	ARRAY	UNSIGNED16	rw
P0801	Target position	ARRAY	INTEGER32	rw
P0802	Velocity or speed	ARRAY	UNSIGNED32	rw
P0803	Acceleration	ARRAY	UNSIGNED32	rw
P0804	Deceleration	ARRAY	UNSIGNED32	rw
P0805	Timer value	ARRAY	UNSIGNED16	rw
P0806	Trigger Position	ARRAY	INTEGER32	rw
P0807	Link Sequence	ARRAY	INTEGER16	rw
P0808	Loop Counter	ARRAY	INTEGER16	rw
P0809	Counter Link	ARRAY	INTEGER16	rw
P0810	Start Conditions	ARRAY	UNSIGNED16	rw
P0811	Logic Outputs	ARRAY	UNSIGNED16	rw
P0830	Sequence homing speed (zero)	VAR	UNSIGNED32	rw
P0835	Sequence input selection	VAR	UNSIGNED16	rw
P0840	Select sequence number and virtual inputs	VAR	UNSIGNED16	rw
P0841	Actual sequence number and virtual outputs	VAR	UNSIGNED16	ro

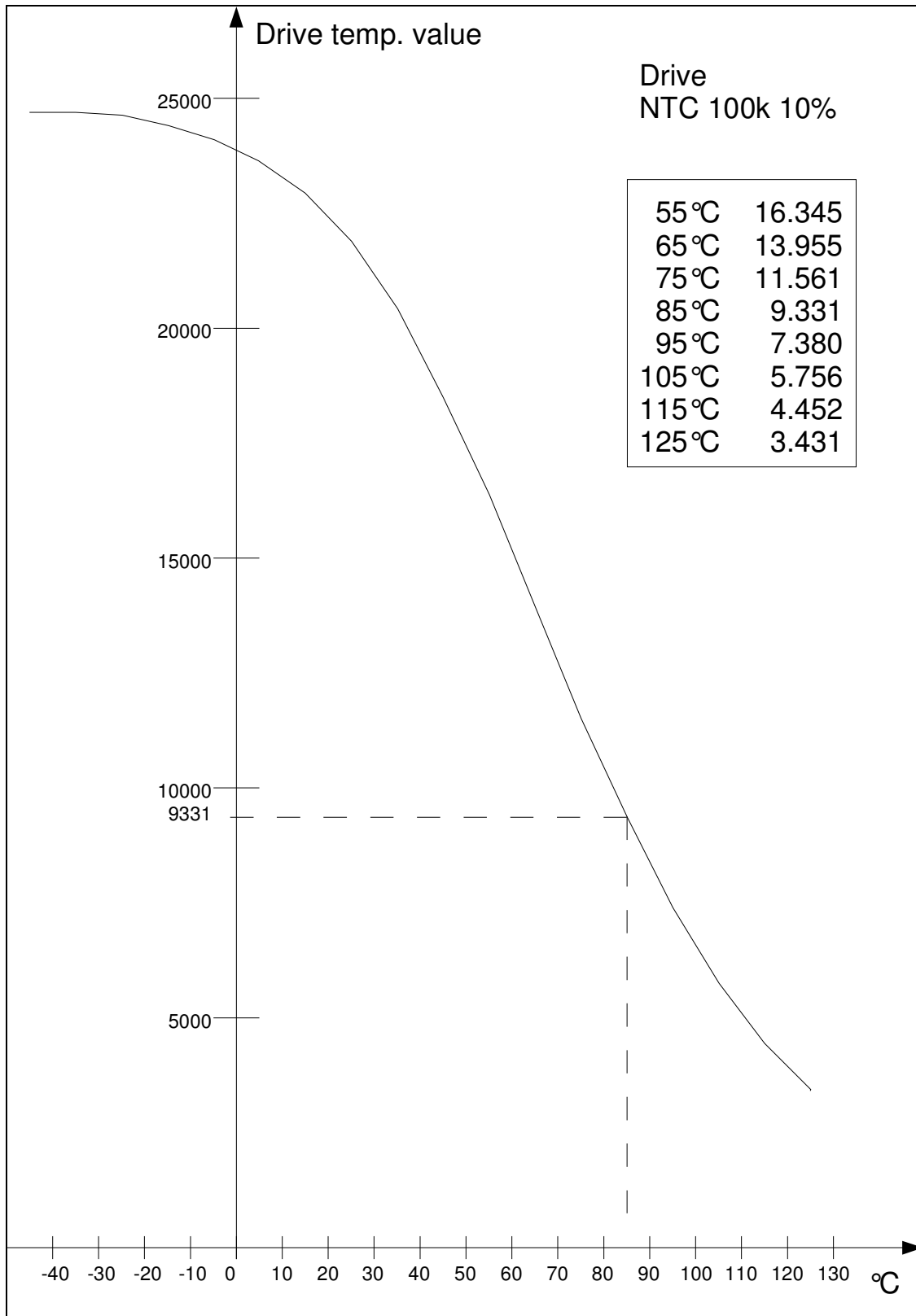
P0842	Sequence status	VAR	UNSIGNED16	ro
P0915	Selection PZD output	ARRAY	UNSIGNED16	rw
P0916	Selection PZD input	ARRAY	UNSIGNED16	rw
P0918	PROFIBUS Node address	VAR	UNSIGNED16	rw
P0922	Telegram selection	VAR	UNSIGNED16	rw
P0923	List of parameters	ARRAY	UNSIGNED16	ro
P0928	Control priority PCD	VAR	UNSIGNED16	rw
P0930	Operating Mode	VAR	UNSIGNED16	ro
P0963	PROFIBUS Actual baud rate	VAR	UNSIGNED16	ro
P0964	Drive Identification	ARRAY	UNSIGNED16	ro
P0967	Controlword	VAR	UNSIGNED16	rw
P0968	Statusword	VAR	UNSIGNED16	ro
P0970	Load factory default parameter set	VAR	UNSIGNED16	rw
P0971	Transfer into non-volatile memory	VAR	UNSIGNED16	rw
P0980	Number list of supported parameter	ARRAY	UNSIGNED16	ro

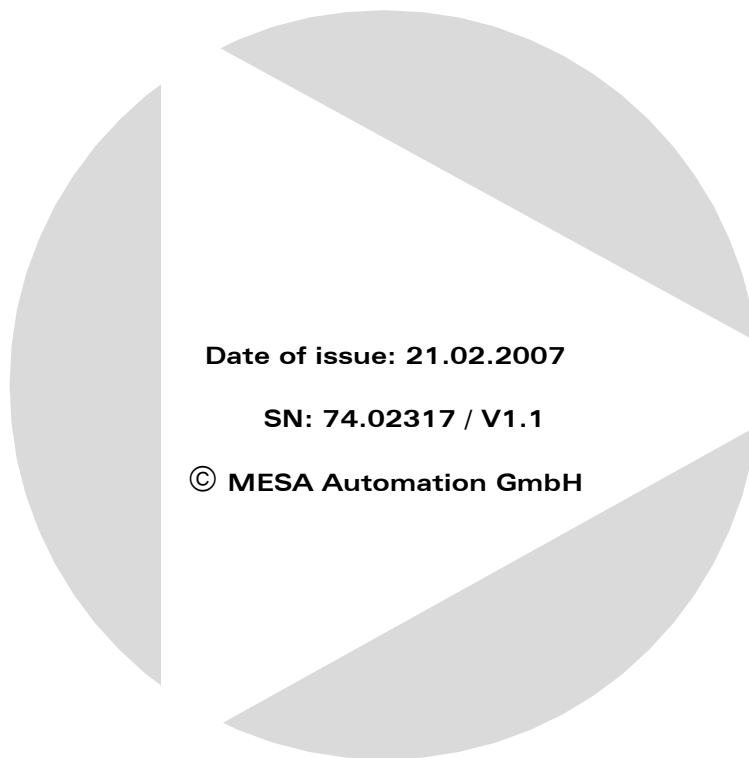


### 8.2 - Motor temperature diagram



### 8.3 - Drive temperature diagram





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