Electric Drives and Controls | Hydraulics | Linear Motion and Assembly Technologies | Pneumatics | Service

Rexroth Bosch Group

VT-VPCD – Digital closed loop control electronics for axial piston pumps A4VS... with HS4 control and A2V with EO4 control

RE 30028-01-Z/08.06

Starting up Profibus

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1 Introduction

1.1 Document

Version 1.0

1.2 General

BODAC is used to configure the tables in which the data is defined that will be exchanged between the VPCD and the master over the fieldbus.

In the remainder of this document this will be refered to as Mapping and can be used for field bus Profibus-DP.

This manual only describes the installation and operation of the Controller in regards to the fielbus system. More detailed information about the installation of the controller using the BODAC software can be found in „Installation and operation of the controller VPCD and using BODAC“. A list of available VPCD documentation can be found in the chapter „Additonal documentation“.

Additional documentation

“VT-VPCD Digital controller amplifier for operational axial piston pumps of type A4VS... with HS4 control and A2V... with EO4 control“ has apart from this manual additional documentation.

It includes:

- RE data sheet “RE 30 028” in paper form.
- The documentation RE 30 028-B. “VPCD – Digital controller amplifier for operating axial piston pumps of type A4VS... with HS4 control and A2V... with EO4 control: Start up instruction”.
- The documentation RE 30 028-01-B. “VT-VPCD – Digital Control Amplifier for Dricing Axial Pump Units A4VS... with HS4-Control”.
- The documentation RE 30 028-02-Z: “Information about the field bus system Profibus“
- The documentation RE 30 028-U: “Declaration on environmental compatibility in the field of EMC, climate and mechanical stress”
- On the Internet: http://www.boschrexroth.com/hacd
- Further information about Profibus can be obtained from the association Profibus Member organisation (PNO, http://www.profibus.com/pb/).

1.3 Signs and symbols used in this document

The following signs and symbols are used in this manual:

- ➢ Activity symbol: The text following this sign describes activities. These are to be performed from top to bottom in the order indicated.
- ✓ Result symbol: The text following this sign describes the result of an action.

After this symbol you will find notes and useful tips for optimal usage of the controller card.

After this symbol you will find references to more detailed documentation.

Warning Special safety notes are given at the relevant locations. These are indicated using the following symbols.

General hazard: This sign is placed in front of activities which represent a potential hazard to persons and/or extensive damage to equipment.

2 Requirements

2.1 Mapping

Mapping requirements:

- PC with WIN95/98 or WIN NT, with an available COM port or one of the specified USB/RS232 Converters
- BODAC (Version 487 and up)
- VPCD Card with Profibus (e.g. VT-VPCD-1-1X/V0/1-P-1)
- Experience with the bus system
- PLC with a Profibus Master

Only qualified personnel that have experience with Profibus should configure this controller. When connecting you have to take care on the relevant specifications

The Profibus cable has to conform to the Profibus Norm (EN 50170 Part 2). The connectors used should be equipped with termination resistors that can be switched ON or OFF.

Every Profibus segment has to be terminated at the beginning and the end of this segment.

The VPCD can only be used as a slave device.

3 Profibus

3.1 Principle

Profibus DP V0 is a fast cyclical data exchange of pre-defined parameters.
The busmanager in BODAC can be used to define different parameters that are going to be transferred over Profibus. A seperate piece of memory is dedicated to the Transmit and Receive data table. Both areas are 32 Bytes in size. The parameters that are defined in the Transmit screen are sent to the Master in that exact order and the Receive screen determines in what order the Master has to send data to the VPCD so the data is correctly interpreted. The parameters are either 2 bytes or 4 bytes long. The exchange of the parameters is executed in the internal data format of the VPCD. Therefore a conversion has to take place in the PLC to end up with the correct representation of the transferred data. Also the limits of the parameter have to be monitored in the PLC.

3.2 Baudrate

The VPCD supports Baudrates up to 12MBit. The baudrate that is used for the Profibus is selected in the PLC and the VPCD automatically sets the correct baudrate.

3.3 Address

The configuration of the address is accomplished by setting the dipswitches on the Profibus daughterboard prior to commisionning. The address selected is limited to the range 1-126. In general the adresses 0-2 are used for the Profibus-DP master. It is therefore recommended that an address for the VPCD should start at 3. Following is an example of the dipswitch configuration fort he address 40:

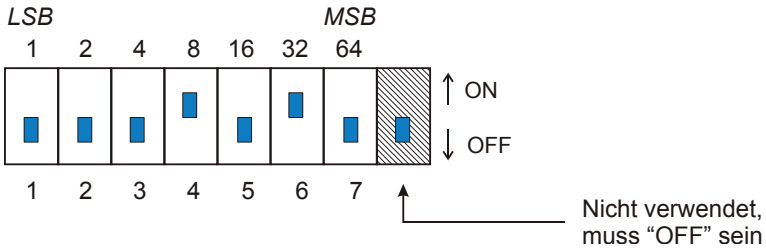

Fig. 1 Address dipswitches

The address specified by the dip switch setting is read at power-up of the VT-VPCD. An address change does not become effective until the power of the VT-VPCD is toggled.
When configuring the address the user has to ensure that every Profibus device connected to the fieldbus has a unique address.

3 **Profibus**

4 Definition of the data

4.1 Example

The parameters that are transferred have to be configured in the VPCD as well as in the PLC. The following example illustrates this process.

The following parameters need to be transferred:

Data to the VPCD:
4 Byte Trigger
4 Byte Pressure CMD (BUS)

4 Byte Angle CMD (BUS)
4 Byte Power Cmd binary 1

Data from the VPCD:
4 Byte act. Pressure B,
4 Byte act. Valve

2 Byte Digital Outputs

The parameters are configured in the Transmit and Receive table, each 32 bytes in size, on the VPCD according to the above order. The Transmit and Receive table configuration defines the order in which the parameters are transferred over the bus.

4.2 Definition of data from the VPCD

The table on the left hand side of the Transmit screen contains all parameters that can be transferred from the VT-VPCD to the Master. 2 Byte or 4 Byte values can be selected. The figure below shows the configuration of our example:

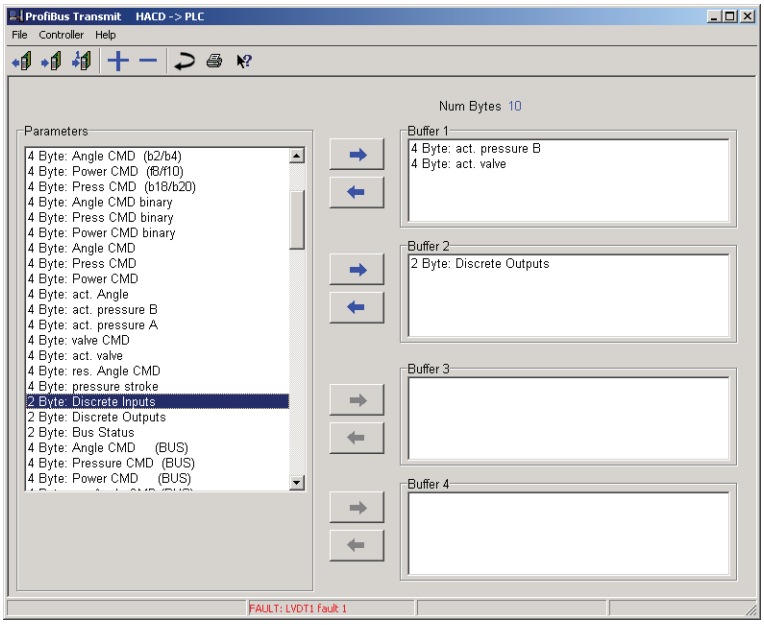

Fig. 2 Busmanager screen „Transmit“

4.3 Definition of data to the VPCD

Data that is sent to the VPCD by the Master also can be configured with the busmanager in BODAC. Below is the configuration of our example:

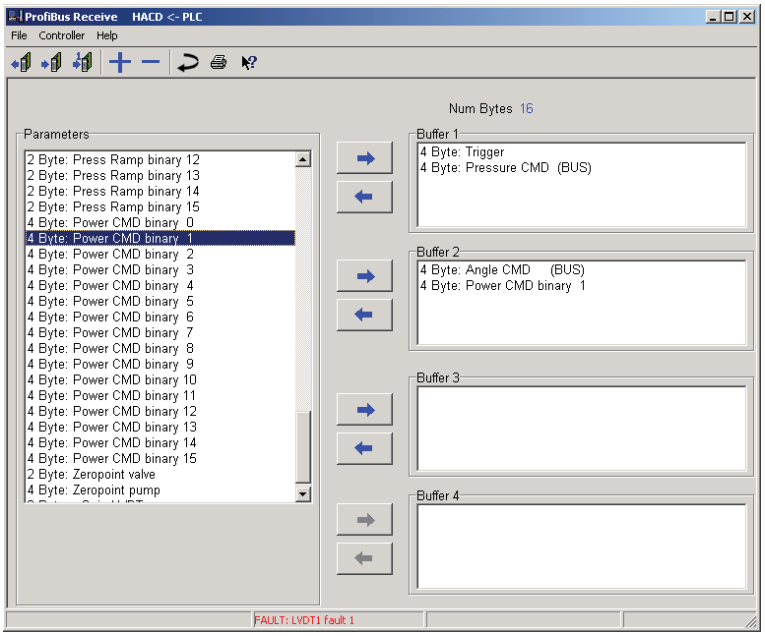

Fig. 3 Busmanager screen „Receive“

After finalizing the mapped parameters this data has to be stored in non-volatile memory of the VT-VPCD (FLASH EPROM).

4.4 Definition of data on the PLC side

In the PLC the same parameters need to be configured as in the VPCD.

The first step to accomplish this is to register the VPCD in the Profibus DP system. E.g. when using Siemens STEP 7 software the user can add the VPCD in the Hardware Catalog by entering the file „BREX010A.gsd“ under the menu „Install new GSD file“. As a result the VPCD is listed under “Weitere Feldgeräte / Regler / 24V /“.

4 **Definition of the data**

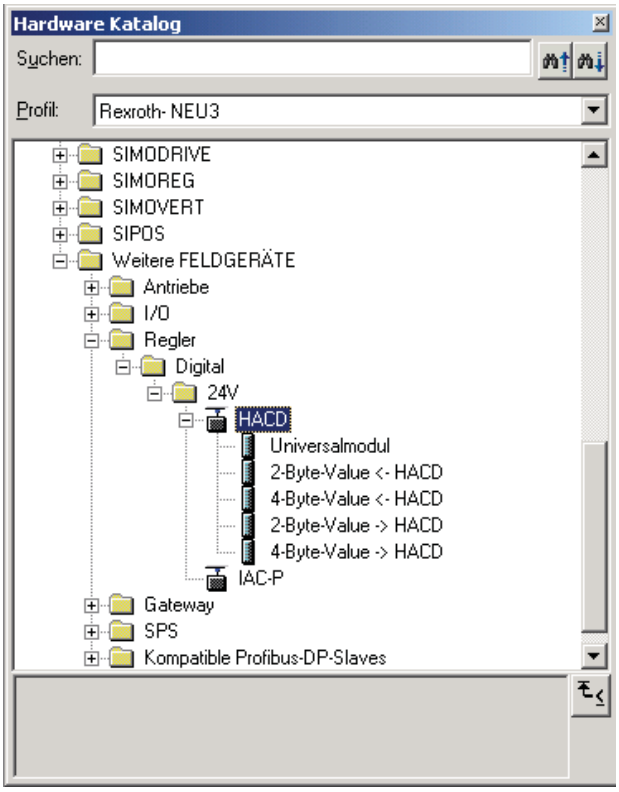

Fig. 4

The GSD file can be downloaded from the Bosch Rexroth Homepage.

VPCD is a member of the HACD family. Therefore there is only one GSD file available that is named HACD.

Now the 2 and 4 byte values have to be configured. The configuration of these values on the PLC side have to correspond with the configuration of the VPCD.In the following figure the configuration on the PLC side is shown for our example:

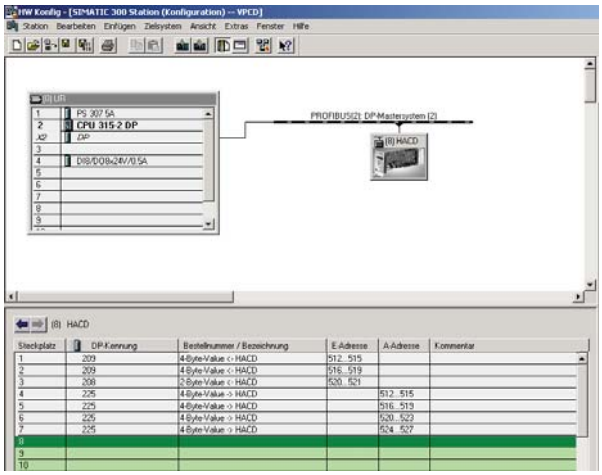

Fig. 5 "

The configuration of the transferred parameters in the PLC has to be the same as in the busmanager of BODAC. The configuration is started with the data from the VPCD. If the configuration of the PLC and the VPCD do not match a Configuration Error is the result and the buscommunication is stopped.

4.5 Data conversion

The internal data format of the VPCD is used for data transfer. Therefore all data to and from the VPCD has to be converted in the PLC. Offset and Scale are needed for this conversion and can be found in the busparameter table. The values for both Scale and Offset can differ from parameter to parameter.

Use the following convention for the data conversion.

PLC -> VPCD:
(EU_Value – offset) * scale = Internal_transfervalue

VPCD -> PLC:
(Internal_transfervalue / scale) + offset = EU_Value

EU_value = Engineering Unit

Internal_transfervalue = Internal data format of the VPCD

If you want to transfer for example "Setpoint CMD1" to the VPCD the following values from the parameter table need to be used:

4 **Definition of the data**

Name		Angle CMD (BUS)	
Slot	Index	0x0D	0x72
Bytes	Units	4	Unit
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		Available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

(4,0 – 0) * 327,67 = 1310,68 (decimal)

This value is mathematically rounded (= 1311) and converted into a hexadecimal value (= 0x051F). Now the value can be transferred.

Testing transfer data for limits (min/max value) also has to be performed by the PLC. Values that are outside the parameter limits can result in incorrect data being used by the VPCD (e.g. overflow can result in a negative number instead of a large positive number.).

4.6 Example program for datatransfer between S7-400 and the VPCD

In this example the limits of the parameters are not checked.

```
//*******************************
// 4 Byte: Bus Trigger

L       MD    200          //      Load value for Trigger; here Block 10
                           //      is triggered
T       PAD   512          //      Transfer result to corresponding PAW



//*******************************
// 4 Byte: Pressure CMD   (BUS)

L       185.0000e+000      //      Change pressure command to 185.0 bar
L       3.276700e+002      //      Convert value to VPCD internal units
*R                         //      using the given documentation
RND                        //      Round result
T       PAW   516          //      Transfer result to corresponding PAW



//*****************************
// 4 Byte: Angle CMD   (BUS)

L       37.50000e+002      //      Change angle command to 37.5°
        3.276700e+000      //      Convert value to VPCD internal units
*R                         //      using the given documentation
RND                        //      Round result
T       PAW   520          //      Transfer result to corresponding PAW



//*************************
// 4 Byte:  Power CMD binary 1

L       50.50000e+002      //      Change power command binary 1 to 50,2 %
L       3.276700e+000      //      Convert value to VPCD internal units
*R                         //      using the given documentation
RND                        //      Round result
T       PAW   524          //      Transfer result to corresponding PAW
```

4 **Definition of the data**

```
//*************************
// 4 Byte: Pressure FB B

L       PED   512          //     Load VPCD internal VALUE
DTR                        //     convert to real
L       3.276700e+002      //     Convert value to VPCD internal units
*R                         //     using the given documentation
RND                        //     Round result
T       MD    214          //     For conversion use Table in the documentation


//*************************
// 4 Byte: Valve FB

L       PED   516          //     Load VPCD internal VALUE
DTR                        //     convert to real
L       3.276700e+002      //     Convert value to VPCD internal units
*R                         //     using the given documentation
RND                        //     Round result
T       MD    214          //     For conversion use Table in the documentation


//*************************
// 2 Byte:  Digital Outputs

L       PEW   520          //     Load VPCD internal VALUE
T       MB    210          //     For conversion use Table in the documentation
```

5 Busparameter

5.1 act. Angle

Name		act. Angle	
Slot	Index	0x11	0x07
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.2 act. pressure A

Name		act. pressure A	
Slot	Index	0x11	0x10
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		1	600
Scale	Offset	327,67	0

5.3 act. pressure B

Name		act. pressure B	
Slot	Index	0x11	0x0F
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		1	600
Scale	Offset	327,67	0

5.4 act. valve

Name		act. valve	
Slot	Index	0x11	0x19
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,7	0

5.5 Angle CMD

Name		Angle CMD	
Slot	Index	0x11	0x33
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.6 Angle CMD (BUS)

Name		Angle CMD (BUS)	
Slot	Index	0x0D	0x72
Bytes	Units	4	
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.7 Angle CMD (b14/b16)

Name		Angle CMD (b14/b16)	
Slot	Index	0x11	0x03
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.8 Angle CMD (b2/b4)

Name		Angle CMD (b2/b4)	
Slot	Index	0x11	0x1A
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.9 Angle CMD binary

Name		Angle CMD binary	
Slot	Index	0x11	0x2F
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.10 Angle CMD binary 0

Name		Angle CMD binary 0	
Slot	Index	0x01	0x01
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.11 Angle CMD binary 1

Name		Angle CMD binary 1	
Slot	Index	0x01	0x02
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.12 Angle CMD binary 2

Name		Angle CMD binary 2	
Slot	Index	0x01	0x03
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.13 Angle CMD binary 3

Name		Angle CMD binary 3	
Slot	Index	0x01	0x04
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.14 Angle CMD binary 4

Name		Angle CMD binary 4	
Slot	Index	0x01	0x05
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.15 Angle CMD binary 5

Name		Angle CMD binary 5	
Slot	Index	0x01	0x06
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.16 Angle CMD binary 6

Name		Angle CMD binary 6	
Slot	Index	0x01	0x07
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.17 Angle CMD binary 7

Name		Angle CMD binary 7	
Slot	Index	0x01	0x08
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.18 Angle CMD binary 8

Name		Angle CMD binary 8	
Slot	Index	0x01	0x09
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.19 Angle CMD binary 9

Name		Angle CMD binary 9	
Slot	Index	0x01	0x0A
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.20 Angle CMD binary 10

Name		Angle CMD binary 10	
Slot	Index	0x01	0x0B
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.21 Angle CMD binary 11

Name		Angle CMD binary 11	
Slot	Index	0x01	0x0C
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.22 Angle CMD binary 12

Name		Angle CMD binary 12	
Slot	Index	0x01	0x0D
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.23 Angle CMD binary 13

Name		Angle CMD binary 13	
Slot	Index	0x01	0x0E
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.24 Angle CMD binary 14

Name		Angle CMD binary 14	
Slot	Index	0x01	0x0F
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.25 Angle CMD binary 15

Name		Angle CMD binary 15	
Slot	Index	0x01	0x10
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.26 Angle Ramp binary 0

Name		Angle Ramp binary 0	
Slot	Index	0x02	0x01
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.27 Angle Ramp binary 1

Name		Angle Ramp binary 1	
Slot	Index	0x02	0x02
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.28 Angle Ramp binary 2

Name		Angle Ramp binary 2	
Slot	Index	0x02	0x03
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.29 Angle Ramp binary 3

Name		Angle Ramp binary 3	
Slot	Index	0x02	0x04
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.30 Angle Ramp binary 4

Name		Angle Ramp binary 4	
Slot	Index	0x02	0x05
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.31 Angle Ramp binary 5

Name		Angle Ramp binary 5	
Slot	Index	0x02	0x06
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.32 Angle Ramp binary 6

Name		Angle Ramp binary 6	
Slot	Index	0x02	0x07
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.33 Angle Ramp binary 7

Name		Angle Ramp binary 7	
Slot	Index	0x02	0x08
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.34 Angle Ramp binary 8

Name		Angle Ramp binary 8	
Slot	Index	0x02	0x09
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.35 Angle Ramp binary 9

Name		Angle Ramp binary 9	
Slot	Index	0x02	0x0A
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.36 Angle Ramp binary 10

Name		Angle Ramp binary 10	
Slot	Index	0x02	0x0B
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.37 Angle Ramp binary 11

Name		Angle Ramp binary 11	
Slot	Index	0x02	0x0C
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.38 Angle Ramp binary 12

Name		Angle Ramp binary 12	
Slot	Index	0x02	0x0D
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.39 Angle Ramp binary 13

Name		Angle Ramp binary 13	
Slot	Index	0x02	0x0E
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.40 Angle Ramp binary 14

Name		Angle Ramp binary 14	
Slot	Index	0x02	0x0F
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.41 Angle Ramp binary 15

Name		Angle Ramp binary 15	
Slot	Index	0x02	0x10
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.42 Bus Status

Name		Bus Status	
Slot	Index	0x0D	0x68
Bytes	Units	2	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	1	0
Description		Highbyte = Errorflags Bits 15 = Error|Error 8 Bits 14 = Error|Error 7 Bits 13 = Error|Error 6 Bits 12 = Error|Error 5 Bits 11 = Error|Error 4 Bits 10 = Error|Error 3 Bits 09 = Error|Error 2 Bits 08 = Error|Error 1 Lowbyte =Nummber of Fault Angle Cmd Stopp = 0 Pressure CMD Stopp = 1 Power CMD Stopp = 2 act.Pressure B Stopp = 3 act.Pressure A Stopp = 4 res.Angle CMD Stopp = 5 MCP-40/4742 Stopp = 6 Timeout Stopp = 16 Trigger Stopp = 18 Loop Fault Stopp = 19 Checksum = 22 Checksum = 23 Voltage Ub = 24 Reference Voltage = 25 DO1 Short = 26 DO1 Short = 27 DO1 Short = 28 DO1 Short = 29 DO1 Short = 30 DO1 Short = 31 DO1 Short = 32 DO1 Short = 33	

5.43 Contr I binary 0~ 3

Name		Contr I binary 0~ 3	
Slot	Index	0x05	0x23
Bytes	Units	2	ms
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		2	30000
Scale	Offset	1	0

5.44 Contr I binary 4~ 7

Name		Contr I binary 4~ 7	
Slot	Index	0x05	0x27
Bytes	Units	2	ms
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		2	30000
Scale	Offset	1	0

5.45 Contr I binary 8~11

Name		Contr I binary 8~11	
Slot	Index	0x05	0x2B
Bytes	Units	2	ms
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		2	30000
Scale	Offset	1	0

5.46 Contr I binary 12~15

Name		Contr I binary 12~15	
Slot	Index	0x05	0x2F
Bytes	Units	2	ms
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		2	30000
Scale	Offset	1	0

5.47 Contr P binary 0~ 3

Name		Contr P binary 0~ 3	
Slot	Index	0x04	0x23
Bytes	Units	2	
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	255
Scale	Offset	128	0

5.48 Contr P binary 4~ 7

Name		Contr P binary 4~ 7	
Slot	Index	0x04	0x27
Bytes	Units	2	
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	255
Scale	Offset	128	0

5.49 Contr P binary 8~11

Name		Contr P binary 8~11	
Slot	Index	0x04	0x2B
Bytes	Units	2	
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	255
Scale	Offset	128	0

5.50 Contr P binary 12~15

Name		Contr P binary 12~15	
Slot	Index	0x04	0x2F
Bytes	Units	2	
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	255
Scale	Offset	128	0

5.51 Discrete Inputs

Name		Discrete Inputs	
Slot	Index	0x10	0x27
Bytes	Units	2	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	511
Scale	Offset	1	0
Description		bit 1 = binary 1 (DI1) bit 2 = binary 2 (DI2) bit 3 = binary 4 (DI3) bit 4 = binary 8 (DI4) bit 5 = Master (DI5) bit 6 = binary enable (DI6) bit 7 = n.c. bit 8 = n.c. bit 9 = Enable	

5.52 Discrete Outputs

Name		Discrete Outputs	
Slot	Index	0x10	0x26
Bytes	Units	2	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	255
Scale	Offset	1	0
Description		Bit 1 = DO1 Bit 2 = OK Bit 3 = DO2 Bit 4 = DO3 Bit 5 = DO4 Bit 6 = DO5 Bit 7 = DO6 Bit 8 = DO7	

5.53 Gain LVDT pump

Name		Gain LVDT pump	
Slot	Index	0x11	0x2C
Bytes	Units	2	
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	200
Scale	Offset	12,6	0

5.54 Power CMD

Name		Power CMD	
Slot	Index	0x11	0x18
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,67	0

5.55 Power CMD (BUS)

Name		Power CMD (BUS)	
Slot	Index	0x0D	0x76
Bytes	Units	4	
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,67	0

5.56 Power CMD (f8/f10)

Name		Power CMD (f8/f10)	
Slot	Index	0x11	0x17
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,67	0

5.57 Power CMD binary

Name		Power CMD binary	
Slot	Index	0x11	0x31
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.58 Power CMD binary 0

Name		Power CMD binary 0	
Slot	Index	0x01	0x45
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.59 Power CMD binary 1

Name		Power CMD binary 1	
Slot	Index	0x01	0x46
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.60 Power CMD binary 2

Name		Power CMD binary 2	
Slot	Index	0x01	0x47
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.61 Power CMD binary 3

Name		Power CMD binary 3	
Slot	Index	0x01	0x48
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.62 Power CMD binary 4

Name		Power CMD binary 4	
Slot	Index	0x01	0x49
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.63 Power CMD binary 5

Name		Power CMD binary 5	
Slot	Index	0x01	0x4A
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.64 Power CMD binary 6

Name		Power CMD binary 6	
Slot	Index	0x01	0x4B
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.65 Power CMD binary 7

Name		Power CMD binary 7	
Slot	Index	0x01	0x4C
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.66 Power CMD binary 8

Name		Power CMD binary 8	
Slot	Index	0x01	0x4D
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.67 Power CMD binary 9

Name		Power CMD binary 9	
Slot	Index	0x01	0x4E
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.68 Power CMD binary 10

Name		Power CMD binary 10	
Slot	Index	0x01	0x4F
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.69 Power CMD binary 11

Name		Power CMD binary 11	
Slot	Index	0x01	0x50
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.70 Power CMD binary 12

Name		Power CMD binary 12	
Slot	Index	0x01	0x51
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.71 Power CMD binary 13

Name		Power CMD binary 13	
Slot	Index	0x01	0x52
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.72 Power CMD binary 14

Name		Power CMD binary 14	
Slot	Index	0x01	0x53
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.73 Power CMD binary 15

Name		Power CMD binary 15	
Slot	Index	0x01	0x54
Bytes	Units	4	%
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	100
Scale	Offset	327,7	0

5.74 Press CMD

Name		Press CMD	
Slot	Index	0x11	0x0E
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		1	600
Scale	Offset	324,7	0

5.75 Press CMD (b18/b20)

Name		Press CMD (b18/b20)	
Slot	Index	0x11	0x0D
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		1	600
Scale	Offset	327,67	0

5.76 Press CMD binary

Name		Press CMD binary	
Slot	Index	0x11	0x30
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.77 Press Ramp binary 0

Name		Press Ramp binary 0	
Slot	Index	0x02	0x23
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.78 Press Ramp binary 1

Name		Press Ramp binary 1	
Slot	Index	0x02	0x24
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.79 Press Ramp binary 2

Name		Press Ramp binary 2	
Slot	Index	0x02	0x25
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.80 Press Ramp binary 3

Name		Press Ramp binary 3	
Slot	Index	0x02	0x26
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.81 Press Ramp binary 4

Name		Press Ramp binary 4	
Slot	Index	0x02	0x27
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.82 Press Ramp binary 5

Name		Press Ramp binary 5	
Slot	Index	0x02	0x28
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.83 Press Ramp binary 6

Name		Press Ramp binary 6	
Slot	Index	0x02	0x29
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.84 Press Ramp binary 7

Name		Press Ramp binary 7	
Slot	Index	0x02	0x2A
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.85 Press Ramp binary 8

Name		Press Ramp binary 8	
Slot	Index	0x02	0x2B
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.86 Press Ramp binary 9

Name		Press Ramp binary 9	
Slot	Index	0x02	0x2C
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.87 Press Ramp binary 10

Name		Press Ramp binary 10	
Slot	Index	0x02	0x2D
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.88 Press Ramp binary 11

Name		Press Ramp binary 11	
Slot	Index	0x02	0x2E
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.89 Press Ramp binary 12

Name		Press Ramp binary 12	
Slot	Index	0x02	0x2F
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.90 Press Ramp binary 13

Name		Press Ramp binary 13	
Slot	Index	0x02	0x30
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.91 Press Ramp binary 14

Name		Press Ramp binary 14	
Slot	Index	0x02	0x31
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.92 Press Ramp binary 15

Name		Press Ramp binary 15	
Slot	Index	0x02	0x32
Bytes	Units	2	s
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	300
Scale	Offset	125	0

5.93 Press. CMD binary 0

Name		Press. CMD binary 0	
Slot	Index	0x01	0x23
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.94 Press. CMD binary 1

Name		Press. CMD binary 1	
Slot	Index	0x01	0x24
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.95 Press. CMD binary 2

Name		Press. CMD binary 2	
Slot	Index	0x01	0x25
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.96 Press. CMD binary 3

Name		Press. CMD binary 3	
Slot	Index	0x01	0x26
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.97 Press. CMD binary 4

Name		Press. CMD binary 4	
Slot	Index	0x01	0x27
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.98 Press. CMD binary 5

Name		Press. CMD binary 5	
Slot	Index	0x01	0x28
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.99 Press. CMD binary 6

Name		Press. CMD binary 6	
Slot	Index	0x01	0x29
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.100 Press. CMD binary 7

Name		Press. CMD binary 7	
Slot	Index	0x01	0x2A
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.101 Press. CMD binary 8

Name		Press. CMD binary 8	
Slot	Index	0x01	0x2B
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.102 Press. CMD binary 9

Name		Press. CMD binary 9	
Slot	Index	0x01	0x2C
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.103 Press. CMD binary 10

Name		Press. CMD binary 10	
Slot	Index	0x01	0x2D
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.104 Press. CMD binary 11

Name		Press. CMD binary 11	
Slot	Index	0x01	0x2E
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.105 Press. CMD binary 12

Name		Press. CMD binary 12	
Slot	Index	0x01	0x2F
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.106 Press. CMD binary 13

Name		Press. CMD binary 13	
Slot	Index	0x01	0x30
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.107 Press. CMD binary 14

Name		Press. CMD binary 14	
Slot	Index	0x01	0x31
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.108 Press. CMD binary 15

Name		Press. CMD binary 15	
Slot	Index	0x01	0x32
Bytes	Units	4	bar
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	600
Scale	Offset	327,7	0

5.109 Pressure CMD (BUS)

Name		Pressure CMD (BUS)	
Slot	Index	0x0D	0x74
Bytes	Units	4	
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,67	0

5.110 pressure stroke

Name		pressure stroke	
Slot	Index	0x11	0x32
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,7	0

5.111 res. Angle CMD

Name		res. Angle CMD	
Slot	Index	0x11	0x20
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,7	0

5.112 res. Angle CMD (BUS)

Name		res. Angle CMD (BUS)	
Slot	Index	0x0E	0x99
Bytes	Units	4	
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		1	600
Scale	Offset	327,67	0

5.113 Trigger

Name		Trigger	
Slot	Index	0x0D	0x67
Bytes	Units	4	
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		0	32
Scale	Offset	1	0
Description		Bit 0 = binary 0 Bit 1 = binary 1 Bit 2 = binary 2 Bit 3 = binary 3 Bit 4 = binary 4 Bit 5 = binary 5 Bit 6 = binary 6 Bit 7 = binary 7 Bit 8 = binary 8 Bit 9 = binary 9 Bit 10 = binary 10 Bit 11 = binary 11 Bit 12 = binary 12 Bit 13 = binary 13 Bit 14 = binary 14 Bit 15 = binary 15 Bit 16 = Slave other bits not used	

5.114 valve CMD

Name		valve CMD	
Slot	Index	0x11	0x1F
Bytes	Units	4	
Access		Read Only	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-100	100
Scale	Offset	327,7	0

5.115 Zeropoint pump

Name		Zeropoint pump	
Slot	Index	0x0D	0x69
Bytes	Units	4	
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-20	20
Scale	Offset	327,7	0

5.116 Zeropoint valve

Name		Zeropoint valve	
Slot	Index	0x12	0x2A
Bytes	Units	2	[%]
Access		Read/Write	
Value Acceptance		also with active enabling	
Busmanager		available	
Min./Max. Value		-12	12
Scale	Offset	150	0