bürkert
FLUID CONTROL SYSTEMS

Type 8681
IO-Link IODD

Control Head

Supplement to Operating Instructions

Document version 1.9

Document version 1.9

Operating Instructions 2011/01 EU-ML / Original EN

Type 8681, IO-Link IODD

Table of contents

1 History

Document version	IODD version / Firmware version	Date	Changes
1.9	V1.2 / A.00.04.00 V1.2 / A.02.02.00	2020-11-23	Chapter 5: 0x2C000subA Additional Device Identity – Software version removed – information not supported by IODD / IO-Link interface; but available via common data object 0x0017 (23 dec) 0x2C43 Travel time limits: added remark of teach process impact
	V1.3 / A.02.02.00	2020-11-23	Changed objects / chapters: Chapter 5: 0x2C06sub1 Diagnosis – ErrorByte: added error bits for power supply error, temperature error, PCB calibration required Chapter 6: Event 0x180E PCB calibration required added
1.8.1	V1.2 / A.00.04.00	2019-12-16	Changed objects / chapters: • Chapter 5: index number info added • 0x2004sub13 Actuator Supply Voltage: description for Class A added
1.8	V1.2 / A.00.04.00	2019-11-06	Changed objects / chapters: • Chapter Events: minor description enhancement • 0x2101 Locating function: minor description enhancement
1.7	V1.2 / A.00.04.00	2019-10-30	Changed objects / chapters: • Chapter Events: ○ 0x181C (6172) Error Power Supply Measurement added
1.6	V1.1 / A.00.03.00	2019-10-11	Changed objects / chapters: • Detail description of following objects enhanced: ○ 0x2C02, • Minor description enhancements ○ 0x210A ○ 0x2C04subB, sub10 ○ 0x2C07sub1 ○ 0x2C08 ○ 0x2C15sub2,sub4 ○ 0x2C16 ○ 0x2C43sub10
1.5	V1.1 / A.00.03.00	2019-09-27	Changed objects / chapters: • 0x2C15sub1 (Teach function state): enum added (*-12: Error determining switching times)* • Chapter order restructured. • Chapter “Events” added • Chapter “Supported common data objects” added • Detail description of following objects enhanced: ○ 0x200A, ○ 0x2C02sub1, ○ 0x2C04sub2,3, ○ 0x2C06sub1, ○ 0x2C07sub7, ○ 0x2C10sub3-5 ○ 0x2C15sub1,sub4-A ○ 0x2C43subC
1.4		2019-08-02	Changed objects / chapters: • 0x2C15sub1 (Teach function state): enum added (*-11: Function not started (not all solenoid valves off))*
1.3		2019-07-10	Changed objects / chapters: • 0x2C10sub3-6 description enhanced • 0x2C43sub10 Advanced Diagnostics Limits / Control - Reset command – description corrected, object name changed from “Reset command” to “Diagnostic command”
1.2		2019-06-20	Changed objects / chapters: • 0x2004subE Device Status Object – Trans Mem Status removed • 0x2C10sub3-5 Maintenance - Cycles Vx To Next Maintenance • 0x2C05sub2 Device Configuration - DIP Switch Color removed

Document version	IODD version / Firmware version	Date	Changes
1.1		2019-06-12	Changed objects / chapters: 0x2C40, 0x2C41: Travel accumulators, Travel time error counters, Switching Timeout counters, Teach counter are reset by reset group A (factory reset)
1.1		2019-06-04	System commands reworked. Reset group assignment revised (Chapter 3) Added objects • 0x210A Trigger Maintenance Function Changed objects / chapters: • 0x2C02 CMD set point Removed objects: • 0x2C07subA (Device State – Current position) • 0x2CA1 SIO Mode • 0x2CAB IOLink Process Data Collection
1.1		2019-05-24	Comments added. Decisions required for 0x2C13 Valve Mode Blink Modes Changed objects / chapters: • 0x2004 Device Status Object: sub0x13 External Power Supply added • 0x200B Temperature Alarm Values: Warnlimits RW? • 0x2C14 External Power Supply Alarm Values relabelled, removed Hysterese and Warning limits; Value moved to 0x2004 Device Status Object • 0x2C04 Service Parameters: - Maintenance at cycles V1,V2, V3: UINT32 values instead of UI8 x 1000 (sub0x11-0x13 instead of sub0x05-0x07) - subF: Service Indication Display Option • 0x2C16 FactoryReset Object for factory reset and partial factory reset (device reset function) • 0x2C43 Time Tolerance for Travel Times not for Switching Timeout • 02CA1 SIO Mode enhanced Removed objects: • 0x2C07subC (Device State - External Power Supply Voltage) – use 0x2004sub0x13 • 0x2C22 Teach Reset Function – use 0x2C43sub0x10 • 0x2C23 Device Reset Function – use 0x2C16 • 0x2C24 Daily Counter Reset Function – use 0x2C43sub0x10 • 0x2C26 Factory Reset Function – use 0x2C16 • 0x2C27 Confirm Maintenance Function – use 0x2C10 • 0x2C28 Feedback Field Reset Function – use 0x2C03sub0xD
1.1		2019-05-17	Changed objects / chapters: 0x2C43sub1 Advanced Diagnostics Limits / Control – Travel Accumulator Limit added
1.1		2019-05-16	Changed objects / chapters: • Process Input Data (8byte instead of 6 bytes, changed offsets/ indexes) • 0x2004 Device Status Object • 0x2C02 CMD set point Added objects / chapters: • 0x200A (Power Supply Alarm Values) • 0x200B (Temperature Alarm Values) • 0x2120 (LED Modi) • 0x2122 (LED Extern Color) • 0x2C03subD (Feedback Fields – Reset command) • 0x2C04sub10 (Control head settings - Device lock)

Document version	IODD version / Firmware version	Date	Changes
			• 0x2C11 Device Specific LED Mode • 0x2C12 Valve Mode Feedback Colors • 0x2C13 Valve Mode Feedback Blink Modes • 0x2C14 External Power Supply (Class B only) • 0x2C15 Teach functions • 0x2C40 Advanced Diagnostics Totalizer • 0x2C41 Advanced Diagnostics Counters • 0x2C42 Advanced Diagnostics Values • 0x2C43 Advanced Diagnostics Limits / Control • 0x2CA1 IOLink SIO Mode Settings • 0x2CAB IOLink Process Data Collection • Chapter 4: Supported IO-Link system commands Removed objects: • 0x2C07subC (Device State - External Power Supply Voltage) • 0x2C20 AutoTune Function • 0x2C21 Teach Function • 0x2C22 TeachReset Function • 0x2C23 DeviceReset Function • 0x2C24 Daily Counter Reset Function • 0x2C26 Factory Reset Function • 0x2C27 Confirm Maintenance Function • 0x2C28 Feedback Field Reset Function
1.0	Prototype B.01.13.71	2019-04-24	Draft version IODD for first prototype 8681 IO-Link Class B IODD (based on CANopen EDS description from 2019-03-28, Reduced to currently supported variables for IO-Link)

2 Abbreviations

Following datatype abbreviations are used in this document:

Abbreviation	IO-Link type	Length
BOOL	BooleanT	1 bit
UI8	UIntegerT	1 byte (8 bit)
SI8	SIntegerT	1 byte (8 bit)
UI16	UIntegerT	2 bytes (16 bit)
UI32	UIntegerT	4 bytes (32 bit)
UI64	UIntegerT	8 bytes (64 bit)
FL32	Float32T	Real32 (Float, 32bit)
STR	StringT	20 characters characters coded with “US-ASCII”

Following abbreviations are used for expressing conditions:

Abbreviation	Meaning
!=	Not equal
==	Equals

Description of used table columns:

Column label	Description
Sub	Sub-index of object
Name	Name of object in IODD file
Description	Object description
Access type	IO-Link access rights: RO = read only, RW = read write
Data type	Data type of sub index / object (if only sub index 0 exists)
Data memory	Data storage
Reset group	Sub index will be reset to factory default settings, if corresponding reset group is reset. (Refer to reset group overview below.)

Reset group overview:

Reset Group	Description	For details refer to description of object
A	Factory reset	0x2C16 Factory Reset
B	Partial factory reset (device reset function)	0x2C16 Factory Reset
C	Teach reset	0x2C15 Teach functions: sub0x4 Teach reset command
D	Counter reset	0x2C43 Advanced Diagnostics Limits / Control: sub0x10 Reset command
E	Feedback Field reset	0x2C03 Feedback Field: sub0xD Reset Command

3 Process Data, IO-Link

3.1 Process input data (PDin)

Length: 6 bytes

Sub-index	Bit offset	Length (bits)	Data type	Description
1	16	32	Float32T	Position in mm (resolution 0.1mm)
2	8	8	UIntegerT	Device status 0: normal 1: diagnose active 2: maintenance required 3: out of specification 4: warning 5: error Bit 4-7 reserved
3	4	4	UIntegerT	Valve Mode 0: Initialization 1: Normal operation 2: Teach function active 3: SafePos active 4: Manual control active 5: Service Mode active 6: Internal SafePos active (all valves off)
4	3	1	BooleanT	Feedback Position 4 (External initiator, S4) True = On False = Off
5	2	1	BooleanT	Feedback position 3 (S3) True = On False = Off
6	1	1	BooleanT	Feedback position 2 (S2) True = On False = Off
7	0	1	BooleanT	Feedback position 1 (S1) True = On False = Off

	↓ Bitoffset Position			↓ Bittoffset Device Status			↓ Bittoffset Valve Mode			↓ Bitoffset Position S4	↓ Bitoffset Position S3	↓ Bitoffset Position S2	↓ Bitoffset Position S1
Bits	47	..	16	15	…	8	7	..	4	3	2	1	0
Sub index	1			2			3			4	5	6	7
Data type	Float32T			UIntegerT			UIntegerT			BooleanT	BooleanT	BooleanT	BooleanT
Name	Position			Device Status			Valve Mode			S4	S3	S2	S1
Length [Bits]	32			8			4			1	1	1	1

3.2 Process output data (PDout)

Length: 1 byte

Sub-index	Bit offset	Length (bits)	Data type	Description
1	3	1	BooleanT	Locating function (fast flashing LEDs) True = Activated False = Deactivated
2	2	1	BooleanT	Set point valve 3 (V3): True = Open False = Closed
3	1	1	BooleanT	Set point valve 2 (V2): True = Open False = Closed
4	0	1	BooleanT	Set point valve 1 (V1): True = Open False = Closed

					↓ Bitoffset Locating function	↓ Bitoffset Set point V3	↓ Bitoffset Set point V2	↓ Bitoffset Set point V1
Bits	7	6	5	4	3	2	1	0
Sub-index					1	2	3	4
Data type					BooleanT	BooleanT	BooleanT	BooleanT
Name	Not used				Locate	V3	V2	V1
Length[Bits]	4				1	1	1	1

4 Supported IO-Link system commands

command	description
128	Device reset (restart)
130	Restore factory settings
160	Start automatic teach function 1
161	Start automatic teach function 2
162	Start automatic teach function 3
163	Start automatic teach function 4
164	Start automatic teach function 5
165	Start automatic teach function 6
166	Start manual teach function position S1
167	Start manual teach function position S2
168	Start manual teach function position S3

5 Non-cyclic parameters (On-Request Data (ISDU))

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D	Counter reset	0x2C43 Advanced Diagnostics Limits / Control: sub0x10 Reset command
E	Feedback Field reset	0x2C03 Feedback Field: sub0xD Reset Command

5.1 Supported common data objects

Index (dec)	Object name	Access	Length	Data type	Remark *)
0x0000 (0)	*Direct Parameter Page 1*	R		RecordT	*Redirected to the page communication channel, see 10.7.5*
0x0001 (1)	*Direct Parameter Page 2*	R/W		RecordT	*Redirected to the page communication channel, see 10.7.5*
0x0002 (2)	*System-Command*	W	1 octet	UIntegerT	*Command Code Definition (See B.2.2)*
0x0003 (3)	*Data Storage Index*	R/W	variable	RecordT	*Set of data objects for storage (See B.2.3)*
0x000C (12)	*Device Access Locks*	R/W	2 octets	RecordT	*Standardized Device locking functions (See B.2.4)*
0x0010 (16)	*Vendor Name*	R	max. 64 octets	STR	*Informative (See B.2.8)*
0x0011 (17)	*Vendor Text*	R	max. 64 octets	STR	*Additional vendor information (See B.2.9)*
0x0012 (18)	*Product Name*	R	max. 64 octets	STR	*Detailed product or type name (See B.2.10)*
0x0013 (19)	*Product ID*	R	max. 64 octets	STR	*Product or type identification (See B.2.11 for details)*
0x0014 (20)	*Product Text*	R	max. 64 octets	STR	*Description of Device function or characteristic (See B.2.12)*
0x0015 (21)	*Serial- Number*	R	max. 16 octets	STR	*Vendor specific serial number (See B.2.13)*
0x0016 (22)	*Hardware Revision*	R	max. 64 octets	STR	*Vendor specific format (See B.2.14)*
0x0017 (23)	*Firmware Revision*	R	max. 64 octets	STR	*Vendor specific format (See B.2.15)*
0x0018 (24)	*Application Specific Tag*	R/W	19 octets	STR	*Tag location or tag function defined by user (See B.2.16)*
0x0024 (36)	*Device Status*	R	1 octet	UIntegerT	*Contains current status of the Device (See B.2.18)* *Supported since firmware revision A.0.3.0*
0x0025 (37)	*Detailed Device Status*	R	variable	ArrayT of OctetStringT3	*See B.2.19*

*) Referenced chapters refer to "*IO-Link Interface and System Specification*"
(File name: IOL-Interface-Spec_10002_V112_Jul13)

5.2 0x2000 Buerkert Device Description Object

Index: 0x2000 (8192)

sub	name	description	access type	data type	data memory	reset group
0x1	Device Name	*Device name* *Used to identify the device in a büS system by name (e.g. Buerkert Communicator)*	RO	STR		
0x2	Ident Number	*Device identification number*	RO	UI32		
0x3	Manufacture Date	*Manufacture Date*	RO	STR		
0x4	Software Ident Number	*Identification number of firmware*	RO	UI32		
0x5	Software Version	*Firmware version number*	RO	UI32		
0x6	Hardware Version	*Hardware version number*	RO	UI32		
0x7	Serial Number	*Serial number of device*	RO	UI32		
0x8	Product Code	*Type of product (type code)*	RO	UI32		
0x9	Product Group	*Buerkert specific product group like sensor, actuator, ...* *Used for büS system configuration*	RO	UI8		

5.3 0x2002 User Configuration Object

Index: 0x2002 (8194)

sub	name	description	access type	data type	data memory	reset group
0x1	Unique Device Name	*Do not change.* <ID><SN> with <ID> device ident number (8digits, with leading zeros) <SN> device serial number (8digits, with leading zeros)	RW	STR	x	A
0x2	Location Information	*Additional user information about the devices location*	RW	STR	x	A
0x3	User Description	*Additional user information about the device*	RW	STR	x	A
0x4	Displayed Device Name	*Device (TAG) name* *(also used for display in Bürkert Communicator via Service büS)*	RW	STR	x	A

5.4 0x2004 Device Status Object

Index: 0x2004 (8196)

sub	name	description	access type	data type	data memory	reset group
0x1	Device Status NamurNe107	*Corresponds to the device status *)*	RO	UI8		
0x2	Device Temperature	*Temperature of the device in kelvin*	RO	FL32		
0x3	Device Supply Voltage	*Supply voltage in volt*	RO	FL32		
0x4	Operation Time_[s]	*Device operating time counter in seconds*	RO	UI32		
0x5	Maximum Device Temperature	*Maximum internal device temperature in kelvin throughout the device's service life*	RO	FL32		
0x6	Minimum Device Temperature	*Minimum internal device temperature in kelvin throughout the device's service life*	RO	FL32		
0x7	Maximum Device Supply Voltage	*Maximum device power supply voltage since start-up in volt*	RO	FL32		
0x8	Minimum Device Supply Voltage	*Minimum device power supply voltage since start-up in volt*	RO	FL32		
0xD	Device Boot Counter	*Number of device starts*	RO	UI32		
0x13	Actuator Supply Voltage	*Class A devices: Supply voltage for actuators in volt.* *Class B devices: Supply voltage of second power supply for actuators in volt.*	RO	FL32		

*) Details of Device Status NamurNe107:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	0	Namur mode: 0 – auto 1 – manual 2 – flashing		Namur state: 0 – diagnose passive (normal) 1 – diagnose active 2 – maintenance required 3 – out of specification 4 – check function (warning) 5 – error			

5.5 0x200A Power Supply Alarm Values

Index: 0x200A (8202)

sub	name	description	access type	data type	data memory	reset group
0x1	Voltage error limit high	*In volt. If the supply voltage exceeds this value, an error message is output.*	RO	FL32		
0x2	Voltage error limit low	*In volt. If the supply voltage falls below this value, an error message is output.*	RO	FL32		
0x3	Voltage warning limit high	*In volt. If the supply voltage exceeds this value, a warning message is output.*	RW	FL32	x	A
0x4	Voltage warning limit low	*In volt. If the supply voltage falls below this value, a warning message is output.*	RW	FL32	x	A
0x5	Voltage hysteresis	*In volt. 1.0 means limit +/- 0.5 volts.*	RW	FL32	x	A

5.6 0x200B Temperature Alarm Values

Index: 0x200B (8203)

sub	name	description	access type	data type	data memory	reset group
0x1	Temperature error limit high	*In kelvin. If the temperature exceeds this value, an error message is output.*	RO	FL32		
0x2	Temperature error limit low	*In kelvin. If the temperature falls below this value, an error message is output.*	RO	FL32		
0x3	Temperature warning limit high	*In kelvin. If the temperature exceeds this value, a warning message is output.*	RO	FL32		
0x4	Temperature warning limit low	*In kelvin. If the temperature falls below this value, a warning message is output.*	RO	FL32		
0x5	Temperature hysteresis	*In kelvin. 4.0 means limit +/-2 kelvin.*	RO	FL32		
0x6	Calibration temperature	*For future use.*	RO	FL32		
0x7	Calibration offset	*For future use.*	RO	FL32		

5.7 0x2101 Locating Function

Index: 0x2101 (8449)

sub	name	description	access type	data type	data memory	reset group
0x1	call/cancel	*Activate or deactivate locating function :* *This function enables a device in the system to be located using the PLC. The top LED indicator will briefly start to flash for about 10 seconds when the locating function is activated (fast flashing LEDs)* *1 = activated* *0 = deactivated* *Use this function only if device is in DL (Data Link layer) state "PreOperate".* *In DL state "Operate" use the locating function in the cyclic process output data (PDout), refer also to chapter 3.2.*	RW	UI8		

5.8 0x210A Trigger Maintenance Function

Index: 0x210A (8458)

sub	name	description	access type	data type	data memory	reset group
0x1	call/cancel	*Trigger a maintenance signal from extern:* *0: Deactivated.* *1: Activated.* *The top LED indicator shows a maintenance required signal until reboot or set 0 to the call/cancel Object, if* • *there is no warning / error to be indicated* *AND* • *one of the following LED modes is selected by 0x2120 LED Modi:* *0 – NAMUR mode* *3 – Valve mode + errors + warnings* *7 – Device specific* *Additionally a warning is output.*	RW	UI8		

5.9 0x2120 LED Modi

Index: 0x2120 (8480)

sub	name	description	access type	data type	data memory	reset group
0x0	LED Modi	*Select LED indicator mode.* *Please refer to the operating instructions for a description of the possible indicator modes.* *0 – NAMUR mode* *1 – Valve mode (position signal, no errors) *)* *2 – Valve mode + errors (red) *)* *3 – Valve mode + errors (red) + warnings (orange, yellow, blue) *)* *4 – Fixed color mode configured by object 0x2122 (LED Extern Color)* *6 – (Top) LEDs off* *7 – Device specific configured by object 0x2C11 (Device Specific LED Mode)* **) Position colors and blink modes can be configured by objects 0x2C12 (Valve Mode Feedback Colors) and 0x2C13 (Valve Mode Feedback Blink Modes)*	RW	UI32	x	A

5.10 0x2122 LED Extern Color

Index: 0x2122 (8482)

sub	name	description	access type	data type	data memory	reset group
0x0	LED Extern Color	*In case of setting object 0x2120 LED Modi to 4 (Fixed Color) the color of TOP LEDs is controlled externally by writing a corresponding value to this object *)*	RW	UI32	x	A

*) Details on color value:

Byte 3		Byte 2	Byte 1	Byte 0
Bit 4-7	Bit 0-3	Bit 0-7	Bit 0-7	Bit 0-7
0x0		RGB: blue component	RGB: green component	RGB: red component
0x1	Blink mode *0x0: Always on* *0x1: Slow flashing* *0x2: Fast flashing* *0x3: Double flashing*	0x00	0x00	Fixed color list: *0x00: Off* *0x01: White* *0x02: Green* *0x03: Blue* *0x04: Yellow* *0x05: Orange* *0x06: Red*

Example values:

TOP LED Color (Always on)	Value	Byte 3	Byte 2	Byte 1	Byte 0
White	0x10000001	0x10	0x00	0x00	0x01
Red	0x10000006	0x10	0x00	0x00	0x06
Orange	0x10000005	0x10	0x00	0x00	0x05
Yellow	0x10000004	0x10	0x00	0x00	0x04

TOP LED Color (Always on)	Value	Byte 3	Byte 2	Byte 1	Byte 0
Green	0x10000002	0x10	0x00	0x00	0x02
Blue	0x10000003	0x10	0x00	0x00	0x03
LED Off	0x10000000	0x10	0x00	0x00	0x00

5.11 0x2C00 Additional Device Identity

Index: 0x2C00 (11264)

sub	name	description	access type	data type	data memory	reset group
0x2	Device Ident Number Customer	*Customer specific device identification number*	RO	UI32		
0x5	PCB Ident Number	*Buerkert specific PCB identification number*	RO	UI32		
0x6	PCB Ident Number Customer	*Customer specific PCB identification number*	RO	UI32		
0x7	PCB Serial Number	*PCB serial number*	RO	UI32		
0x8	PCB Hardware Version	*PCB hardware version*	RO	UI8		
0x9	PCB Hardware Index	*PCB hardware index*	RO	UI8		

5.12 0x2C01 Life Data

Index: 0x2C01 (11265)

sub	name	description	access type	data type	data memory	reset group
0x1	Operation Hours Total	*Operation hours total.*	RO	UI32		A
0x2	Operation Hours Resettable	*Resettable operation hours. *)*	RO	UI32		A, B, D
0x3	Cycles V1 Total	*Total switching cycles of solenoid valve V1.*	RO	UI32		A
0x4	Cycles V1 Resettable	*Resettable switching cycles of solenoid valve V1.*)*	RO	UI32		A, B, D
0x5	Cycles V2 Total	*Switching cycles of solenoid valve V2.*	RO	UI32		A
0x6	Cycles V2 Resettable	*Resettable switching cycles of solenoid valve V2.*)*	RO	UI32		A, B, D
0x7	Cycles V3 Total	*Switching cycles of solenoid valve V3.*	RO	UI32		A
0x8	Cycles V3 Resettable	*Resettable switching cycles of solenoid valve V3.*)*	RO	UI32		A, B, D

*) *Can be reset e.g. with Advanced Diagnostics Limits / Control (refer to 0x2C43sub0x10)*

5.13 0x2C02 CMD set point

Index: 0x2C02 (11265)

sub	name	description	access type	data type	data memory	reset group
0x1	CMD set point value source	*Select CMD set point value source:* *Configure the source of the control signal for solenoid valves* *0 – IO-Link* *1 – Manual set point value (see sub index 0x2) *)* *Selection is stored persistently.* *CMD set point value source is reset to IO-Link during Automatic teach function, Service Mode, Device Reset Mode.*	RW	UI8	x	A
0x2	Manual CMD set point	*Manual set point value for solenoid valves *) **)* *Value is stored persistently.*	RW	UI8		A

*) When *0x2C02sub1 CMD set point value source* is switched from *IO-Link* to *Manual set point value*, *0x2C02sub2 Manual CMD set point* is updated with latest solenoid valve set points to provide bumpless switching to manual valve control.

**) Details on solenoid valves setpoint bits in manual mode:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Not used					Solenoid Valve 3	Solenoid Valve 2	Solenoid Valve 1
					0 = OFF, 1 = ON		

5.14 0x2C03 Feedback Fields

Index: 0x2C03 (11267)

sub	name	description	access type	data type	data memory	reset group
0x7	TP1 Positive	*Feedback field size at top of position S1 in mm *).*	RW	FL32	x	A, B, E
0x8	TP1 Negative	*Feedback field size at bottom of position S1 in mm *).*	RW	FL32	x	A, B, E
0x9	TP2 Positive	*Feedback field size at top of position S2 in mm *).*	RW	FL32	x	A, B, E
0xA	TP2 Negative	*Feedback field size at bottom of position S2 in mm *).*	RW	FL32	x	A, B, E
0xB	TP3 Positive	*Feedback field size at top of position S3 in mm *).*	RW	FL32	x	A, B, E
0xC	TP3 Negative	*Feedback field size at bottom of position S3 in mm *).*	RW	FL32	x	A, B, E
0xD	Reset Command	*Bit mask, which feedback fields shall be reset to default values **)*	RW	UI8		

*) resolution: 0.1 mm

**) Feedback Field Reset Command - details

Bit	Bit = 1	Affected objects
0	Reset Feedback fields S1	0x2C03sub7, 0x2C03sub8
1	Reset Feedback fields S2	0x2C03sub9, 0x2C03subA
2	Reset Feedback fields S3	0x2C03subB, 0x2C03subC

5.15 0x2C04 Control head settings (Service Parameters)

Index: 0x2C04 (11268)

sub	name	description	access type	data type	data memory	reset group
0x1	Magnetic Manual Control Active	*Activation / Deactivation: 1 - On, 0 - Off*	RW	UI8	x	A,B
0x2	Service Indication Time Active	*Activation / Deactivation of service indication after expired time : 1 - On, 0 - Off* *Expired time is counted by "Operating Hours Resettable" (0x2C01 sub 2).* *If enabled, service indication / warning will be raised after time "Maintenance At Days" (0x2C04 sub 4) expired.*	RW	UI8	x	A,B
0x3	Service Indication Cycles Active	*Activation / Deactivation of service indication after expired solenoid valve cycles V1, V2 or V3 : 1 - On, 0 - Off* *Cycles are counted by "Cycles Vx Resettable" (V1: 0x2C01 sub 4, V2: 0x2C01 sub 6, V3: 0x2C01 sub 8).* *If enabled, service indication / warning will be raised if at least one of the resettable cycle counter exceeds its corresponding limit "Maintenance At Cycles Vx" (V1: 0x2C04 sub 0x11, V2: 0x2C04 sub 0x12, V3: 0x2C004 sub 0x13)*	RW	UI8	x	A,B
0x4	Maintenance At Days	*Time based service indication interval in days.* *Refer to 0x2C04 sub 2 for details.*	RW	UI16	x	A,B
0x8	Set-point error (Safety Mode)	*Select reaction in the event of a set point error (bus error or invalid process data):* *0 – Safety Position* *Solenoid valves are controlled by value from "Valves Safety Position" (refer to object 0x2C04 sub 9)* *1 – Maintain Position (Last position)* *Solenoid valves are controlled by hold set point values V1, V2, V3 of process output data (PDout) from before the communication loss.*	RW	UI8	x	A
0x9	Valves Safety Position	*Control bits for solenoid valves safety position* *(used only in case set point error (Safety Mode, 0x2C04 sub 8) is set to 0 "Safety Position")* Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 Not used | Solenoid Valve: V3 | V2 | V1 0 = OFF, 1 = ON	RW	UI8	x	A
0xA	Use Of External Ini S4 (0 - Closer, 1 - Opener)	*Real function of the external initiator S4:* *0 – Closer (NO), 1 – Opener (NC)*	RW	UI8	x	A,B
0xB	S4 As S1	*Use S4 as S1: 0 – Off, 1 – On*	RW	UI8	x	A,B
0xE	WMS Filter	*Filter for position measuring system (WMS).* *0 – Standard, 1 – Array, 2 – Special*	RW	UI8	x	A
0xF	Service Indication Display Option	*Optical display of service indication via top LED indicator if 0x2120 LED Modi is set to* *3 – "Valve Mode + errors + warnings" **or*** *7 – "Device specific" (8681 Classic (LED) modes)* *0 – Enabled* *1 – Disabled*	RW	UI8	x	A,B

sub	name	description	access type	data type	data memory	reset group
0x10	Local control lock (Device lock)	*Activate or deactivate local operation:* *Buttons for manual operation (manual teach / reset functions) inside the device are deactivated to prevent unintentional operation* *0 = Not deactivated (buttons are enabled)* *1 = Deactivated (buttons are disabled)*	RW	UI8	x	A
0x11	Maintenance At Cycles V1	*Cycle based service indication interval for solenoid valve V1. Refer to 0x2C04 sub 3 for details.*	RW	UI32	x	A,B
0x12	Maintenance At Cycles V2	*Cycle based service indication interval for solenoid valve V2. Refer to 0x2C04 sub 3 for details.*	RW	UI32	x	A,B
0x13	Maintenance At Cycles V3	*Cycle based service indication interval for solenoid valve V3. Refer to 0x2C04 sub 3 for details.*	RW	UI32	x	A,B

5.16 0x2C05 Device Configuration

Index: 0x2C05 (11269)

sub	name	description	access type	data type	data memory	reset group
0x8	Feedback Priority	*Configuration of priority of feedback positions for LED indication. For details refer to operating instructions.*	RW	UI8	x	A

5.17 0x2C06 Diagnose

Index: 0x2C06 (11270)

sub	name	description	access type	data type	data memory	reset group
0x1	ErrorByte	*Description of bits refer to *)*	RO	UI32		
0x2	Info/WarningByte	*Description of bits refer to **)*	RO	UI32		

***) Details of ErrorByte**

Bit	Bitmask	Description
0	0x00000001	Teach function required (No position taught)
1	0x00000002	IO-Link set-point value error (Bus error)
2	0x00000004	Internal - Reserved
3	0x00000008	Internal - Reserved
4	0x00000010	Internal - Reserved
5	0x00000020	Teach function error
6	0x00000040	WMS (position measuring system) signal error
8	0x00000100	Error persistent memory
16	0x00010000	Switching timeout error
20	0x00100000	Error power supply measurement
21	0x00200000	Internal common error
22	0x00400000	Error actuator power supply (Class B devices only)
23	0x00800000	Error power supply [1)]
24	0x01000000	Error device temperature [1)]
31	0x80000000	PCB calibration required [1)] (electronics module, Class B devices only)

[1)] Available from Firmware A.02.02.00

****) Details of Info/WarningByte**

Bit	Bitmask	Description
0	0x00000001	--
1	0x00000002	Solenoid valves in safety position
2	0x00000004	Service / maintenance required
4	0x00000010	Internal safety position active: all solenoid valves off
5	0x00000020	Internal - Reserved
8	0x00000100	Internal - Reserved
12	0x00001000	Internal - Reserved
13	0x00002000	Internal - Reserved
14	0x00004000	Internal - Reserved
16	0x00010000	Travel accumulator threshold reached
17	0x00020000	Valve switching cycle threshold reached
18	0x00040000	Operating time threshold reached
19	0x00080000	Travel Timeout threshold reached
20	0x00100000	Trigger Maintenance Function active

5.18 0x2C07 Device State

Index: 0x2C07 (11271)

<table>
<tr><th>sub</th><th>name</th><th>description</th><th>access type</th><th>data type</th><th>data memory</th><th>reset group</th></tr>
<tr><td>0x1</td><td>Mode</td><td>Current device mode:
<table>
<tr><td>0</td><td>Automatic mode</td></tr>
<tr><td>1</td><td>Test mode</td></tr>
<tr><td>2</td><td>Test mode</td></tr>
<tr><td>3</td><td>Service mode</td></tr>
</table>
<table>
<tr><td>4</td><td>Manual mode</td></tr>
<tr><td>5</td><td>Autotune mode</td></tr>
<tr><td>6</td><td>(reserved)</td></tr>
<tr><td>7</td><td>Device Reset mode</td></tr>
</table></td><td>RO</td><td>UI8</td><td></td><td></td></tr>
<tr><td>0x2</td><td>Teach State</td><td>current teach state of Positions S1 ... S3 – bit coded
<table>
<tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr>
<tr><td colspan="5">Not used</td><td colspan="3">Position</td></tr>
<tr><td colspan="5" rowspan="3"></td><td colspan="3">S3 S2 S1</td></tr>
<tr><td colspan="3">0 – not taught
1 – taught</td></tr>
</table></td><td>RO</td><td>UI8</td><td></td><td></td></tr>
<tr><td>0x4</td><td>Valves State</td><td>Current state of the solenoid valves – bit coded
<table>
<tr><td>Bit 7</td><td>Bit 6</td><td>Bit 5</td><td>Bit 4</td><td>Bit 3</td><td>Bit 2</td><td>Bit 1</td><td>Bit 0</td></tr>
<tr><td colspan="5">Not used</td><td colspan="3">Solenoid valve</td></tr>
<tr><td colspan="5" rowspan="3"></td><td colspan="3">V3 V2 V1</td></tr>
<tr><td colspan="3">0 – not activated
1 – activated</td></tr>
</table></td><td>RO</td><td>UI8</td><td></td><td></td></tr>
<tr><td>0x7</td><td>Service Indication State</td><td>Current state of service indication
0 – disabled
1 – enabled
2 - enabled and maintenance required
The status of “Trigger Maintenance Function” (0x210A) is not considered.</td><td>RO</td><td>UI8</td><td></td><td></td></tr>
</table>

5.19 0x2C08 WMS

Index: 0x2C08 (11272)

WMS = position measuring system

sub	name	description	access type	data type	data memory	reset group
0x1	Feedback position S1	*WMS value of teach position S1 in digits; 0 if not taught*	RO	UI16		A, B, C
0x2	Feedback position S2	*WMS value of teach position S2 in digits; 0 if not taught*	RO	UI16		A, B, C
0x3	Feedback position S3	*WMS value of teach position S3 in digits; 0 if not taught*	RO	UI16		A, B, C
0x4	Feedback field S1 upper limit	*WMS value of upper feedback limit of S1 in digits*	RO	UI16		A, B, C
0x5	Feedback field S1 lower limit	*WMS value of lower feedback limit of S1 in digits*	RO	UI16		A, B, C
0x6	Feedback field S2 upper limit	*WMS value of upper feedback limit of S2 in digits*	RO	UI16		A, B, C
0x7	Feedback field S2 lower limit	*WMS value of lower feedback limit of S2 in digits*	RO	UI16		A, B, C
0x8	Feedback field S3 upper limit	*WMS value of upper feedback limit of S3 in digits*	RO	UI16		A, B, C
0x9	Feedback field S3 lower limit	*WMS value of lower feedback limit of S3 in digits*	RO	UI16		A, B, C
0xA	WMS Position	*WMS position value in digits*	RO	UI16		

5.20 0x2C10 Maintenance

Index: 0x2C10 (11280)

sub	name	description	access type	data type	data memory	reset group
0x1	Last Maintenance Date	*Date of last maintenance*	RW	STR		A
0x2	Last Maintenance By	*Name of person / company who performed last maintenance*	RW	STR		A
0x3	Cycles V1 To Next Maintenance	*Left switching cycles of solenoid valve Vx (x=1, 2, 3) to next maintenance notification.* *Calculation:* *0x2C01sub4/6/8 (Cycles V1/2/3 Resettable) – 0x2C04sub11/12/13 (Maintenance At Cycles V1/2/3)* *A value of 0 indicates maintenance required.* *A value of 0xFFFFFFFF indicates disabled service notification function for valve cycles. (object 0x2C04sub3 Service Indication Cycles Active).*	RO	UI32		
0x4	Cycles V2 To Next Maintenance		RO	UI32		
0x5	Cycles V3 To Next Maintenance		RO	UI32		
0x6	OpHours To Next Maintenance	*Left operation hours to next maintenance notification.* *Calculation: 0x2C01sub2 (Operation Hours Resettable) – 24h/day * 0x2C04sub4 (Maintenance At Days)* *A value of 0 indicates maintenance required.* *A value ≥ 99999999 indicates disabled service notification function for operation hours (object 0x2C04sub2 Service Indication Time Active).*	RO	UI32		

5.21 0x2C11 Device Specific LED Mode

Index: 0x2C11 (11281)

sub	name	description	access type	data type	data memory	reset group
0x0	Device Specific LED Mode	*Selection of device specific LED mode *).* *Selected mode gets only active in case Object 0x2120 (LED Modi) is set to 7 (Device specific)*	RW	UI8	x	A

*) Details on available device specific LED modes

Value	Device specific LED mode
0	8681 Classic 0
1	8681 Classic 1
…	…
15	8681 Classic 15

Refer to operating instructions for details.

5.22 0x2C12 Valve Mode Feedback Colors

Index: 0x2C12 (11282)

sub	name	description	access type	data type	data memory	reset group
0x1	Color Position S1	*Color for indication of position S1 *)*	RW	UI32	x	A
0x2	Color Position S2	*Color for indication of position S2 *)*	RW	UI32	x	A
0x3	Color Position S3	*Color for indication of position S3 *)*	RW	UI32	x	A
0x4	Color Position S4	*Color for indication of position S4 *)*	RW	UI32	x	A
0x5	Color Position None	*Color for indication of no active position *)*	RW	UI32	x	A

*) Details on color value:

Byte 3		Byte 2	Byte 1	Byte 0
Bit 4-7	**Bit 0-3**	**Bit 0-7**	**Bit 0-7**	**Bit 0-7**
0x0	0x0	RGB: blue component	RGB: green component	RGB: red component
0x1	0x0	0x00	0x00	*Fixed color list:* *0x00: Off* *0x01: White* *0x02: Green* *0x03: Blue* *0x04: Yellow* *0x05: Orange* *0x06: Red*

Example values:

TOP LED Color	Value	Byte 3	Byte 2	Byte 1	Byte 0
White	0x10000001	0x10	0x00	0x00	0x01
Red	0x10000006	0x10	0x00	0x00	0x06
Orange	0x10000005	0x10	0x00	0x00	0x05
Yellow	0x10000004	0x10	0x00	0x00	0x04
Green	0x10000002	0x10	0x00	0x00	0x02
Blue	0x10000003	0x10	0x00	0x00	0x03
LED Off	0x10000000	0x10	0x00	0x00	0x00

5.23 0x2C13 Valve Mode Feedback Blink Modes

Index: 0x2C13 (11283)

sub	name	description	access type	data type	data memory	reset group
0x3	Blink Mode Position S3	*Blink mode for indication of position S3 **)*	RW	UI8	x	A
0x4	Blink Mode Position S4	*Blink mode for indication of position S4 **)*	RW	UI8	x	A

**) Details on blinking mode value:
0: Permanent on
1: Blinking 250 ms ON, 250 ms OFF
2: Blinking 125 ms ON, 125 ms OFF

5.24 0x2C14 Actuator Supply Alarm Values (Class B only)

Index: 0x2C14 (11284)

sub	name	description	access type	data type	data memory	reset group
0x1	Voltage error limit high	*In volt. If the actuator supply voltage exceeds this value, an error message is output.*	RO	FL32		
0x2	Voltage error limit low	*In volt. If the actuator supply voltage falls below this value, an error message is output.*	RO	FL32		

5.25 0x2C15 Teach functions

Index: 0x2C15 (11285)

sub	name	description	access type	data type	data memory	reset group
0x1	Teach function state	*State of teach function* *0: Complete* *1: Initialization* *2: Process valve Open* *3: Process valve Close* *4: Process valve Open Clock Valve Plate* *5: Process valve Close Clock Valve Plate* *6: Process valve Open Intermediate Position* *7: Process valve Close Intermediate Position* *11: Process valve Closed Position Teach Position S1* *12: Process valve Open Position Teach Position S2* *13: Process valve Intermediate Position Teach Position S3* *14: Process valve Clock Valve Plate Teach Position S3* *-1: Abort by user* *-2: Timeout reaching position S1* *-3: Timeout reaching position S2* *-4: Error teaching position S1* *-5: Error teaching position S2* *-6: Error teaching position S3* *-7: Error teach reset* *-8: Reserved teach function.* *-9: Error storing values* *-11: Function not started (not all solenoid valves off)* *-12: Error determining switching times*	RO	SI8		

sub	name	description	access type	data type	data memory	reset group
0x2	Teach function start	*Start teach function* *Automatic teach functions 1-6 measure* • *positions S1, S2 and S3 (only automatic teach functions 3, 5)* • *travelling times assigned to actuated valve* *Manual teach functions assign the current position value to the selected position* 0: Finished / teach function aborted 1…6: Start automatic teach function 1…6 11: Start manual teach function S1 12: Start manual teach function S2 13: Start manual teach function S3	RW	UI8		
0x3	Is taught (Teach state)	*Indicates, which positions S1 ... S3 are taught – bit coded:* *Bit0 = Position S1* *Bit1 = Position S2* *Bit2 = Position S3* *Values:* 0 – not taught 1 – taught	RO	UI8		
0x4	Teach reset command	*Reset automatic or manually taught values* 0: Finished / teach reset function aborted 1: Reset all taught positions (S1, S2, S3) 2: Reset all taught positions (S1, S2, S3) and travelling times 0x2C15sub5 - subA	RW	UI8		
0x5	Travel Time V1 On	*If solenoid valve V1 was switched on:* *Time (in ms) measured during automatic teach function from leaving static position (tolerance band or S4) until reaching static position (tolerance band or S4)*	RO	UI16		
0x6	Travel Time V1 Off	*If solenoid valve V1 was switched off:* *Time (in ms) measured during automatic teach function from leaving static position (tolerance band or S4) until reaching static position (tolerance band or S4)*	RO	UI16		
0x7	Travel Time V2 On	*Refer to Travel Time V1 On (0x2C15sub5), but with solenoid valve V2*	RO	UI16		
0x8	Travel Time V2 Off	*Refer to Travel Time V1 Off (0x2C15sub6), but with solenoid valve V2*	RO	UI16		
0x9	Travel Time V3 On	*Refer to Travel Time V1 On (0x2C15sub5), but with solenoid valve V3*	RO	UI16		
0xA	Travel Time V3 Off	*Refer to Travel Time V1 Off (0x2C15sub6), but with solenoid valve V3*	RO	UI16		

5.26 0x2C16 Factory Reset

Index: 0x2C16 (11286)

Attention: **Refer to operating instructions of type 8681 before starting this function! The device requires a restart afterwards to apply the changed settings.**

Warning: **It is possible that your settings for the device are changed and the communication with device fails with the restored settings.**

sub	name	description	access type	data type	data memory	reset group
		Factory reset parameters *Refer to operating instructions of type 8681 before starting this function!* *0: Finished* *99: Partial factory reset (reset group B) start (device reset function)* *111: Factory reset (reset group A) start*	RW	UI8		

5.27 0x2C40 Advanced Diagnostics Totalizers

Index: 0x2C40 (11328)

sub	name	description	access type	data type	data memory	reset group
0x1	Travel accumulator	*Travel accumulator total [mm]* *Travel distance of the valve spindle.* *Added up from factory default / last factory reset.*	RO	FL32		A
0x2	Travel accumulator resettable	*Travel accumulator resettable [mm]* *Travel distance of the valve spindle is added up since last reset (e.g. once maintenance is complete)*	RO	FL32		A,D
0x3	Travel accumulator V1	*Travel accumulator total [mm]* *Travel distance of the valve spindle if only solenoid valve V1 was switched on / off.* *Added up from factory default / last factory reset.*	RO	FL32		A
0x4	Travel accumulator V1 resettable	*Travel accumulator resettable [mm]* *Travel distance of the valve spindle if only solenoid valve V1 was switched on / off. Added up since last reset (e.g. once maintenance is complete)*	RO	FL32		A,D
0x5	Travel accumulator V2	*Travel accumulator total [mm]* *Travel distance of the valve spindle if only solenoid valve V2 was switched on / off.* *Added up from factory default / last factory reset.*	RO	FL32		A
0x6	Travel accumulator V2 resettable	*Travel accumulator resettable [mm]* *Travel distance of the valve spindle if only solenoid valve V2 was switched on / off. Added up since last reset (e.g. once maintenance is complete)*	RO	FL32		A,D
0x7	Travel accumulator V3	*Travel accumulator total [mm]* *Travel distance of the valve spindle if only solenoid valve V3 was switched on / off.* *Added up from factory default / last factory reset.*	RO	FL32		A
0x8	Travel accumulator V3 resettable	*Travel accumulator resettable [mm]* *Travel distance of the valve spindle if only solenoid valve V3 was switched on / off. Added up since last reset (e.g. once maintenance is complete)*	RO	FL32		A,D

5.28 0x2C41 Advanced Diagnostics Counters

Index: 0x2C41 (11329)

sub	name	description	access type	data type	data memory	reset group
0x1	Travel time V1 On Error counter	*Number of times "Travel Time Limit V1 On" threshold exceeded (resettable):* *Value (0x2C43sub5 "Travel Time Limit V1 On") + "Time Tolerance" (0x2C43subB) has been exceeded*	RO	UI32		A, D
0x2	Travel time V1 Off Error counter	*Number of times "Travel Time Limit V1 Off" threshold exceeded (resettable):* *Value (0x2C43sub6 "Travel Time Limit V1 Off") + "Time Tolerance" (0x2C43subB) has been exceeded*	RO	UI32		A, D

sub	name	description	access type	data type	data memory	reset group
0x3	Travel time V2 On Error counter	*Number of times "Travel Time Limit V2 On" threshold exceeded (resettable):* *Value (0x2C43sub7 "Travel Time Limit V2 On") + "Time Tolerance" (0x2C43subB) has been exceeded*	RO	UI32		A, D
0x4	Travel time V2 Off Error counter	*Number of times "Travel Time Limit V2 Off" threshold exceeded (resettable):* *Value (0x2C43sub8 "Travel Time Limit V2 Off") + "Time Tolerance" (0x2C43subB) has been exceeded*	RO	UI32		A, D
0x5	Travel time V3 On Error counter	*Number of times "Travel Time Limit V3 On" threshold exceeded (resettable):* *Value (0x2C43sub9 "Travel Time Limit V3 On") + "Time Tolerance" (0x2C43subB) has been exceeded*	RO	UI32		A, D
0x6	Travel time V3 Off Error counter	*Number of times "Travel Time Limit V3 Off" threshold exceeded (resettable):* *Value (0x2C43subA "Travel Time Limit V3 Off") + "Time Tolerance" (0x2C43subB) has been exceeded*	RO	UI32		A, D
0x7	Switching Timeout Counter V1	*Number of switching timeouts, if solenoid valves V1 was switched on / off*	RO	UI32		A, D
0x8	Switching Timeout Counter V2	*Number of switching timeouts, if solenoid valves V2 was switched on / off*	RO	UI32		A, D
0x9	Switching Timeout Counter V3	*Number of switching timeouts, if solenoid valves V2 was switched on / off*	RO	UI32		A, D
0xA	Teach function counter	*Number of teach functions performed*	RO	UI32		A

5.29 0x2C42 Advanced Diagnostics Values

Index: 0x2C42 (11330)

sub	name	description	access type	data type	data memory	reset group
0x1	Travel Time V1 On	*If solenoid valve V1 was switched on:* *Time (in ms) measured* *from leaving static position (tolerance band or S4)* *until reaching static position (tolerance band or S4)*	RO	UI16		
0x2	Travel Time V1 Off	*If solenoid valve V1 was switched off:* *Time (in ms) measured* *from leaving static position (tolerance band or S4)* *until reaching static position (tolerance band or S4)*	RO	UI16		
0x3	Travel Time V2 On	*Refer to Travel Time V1 On, but with solenoid valve V2*	RO	UI16		
0x4	Travel Time V2 Off	*Refer to Travel Time V1 Off, but with solenoid valve V2*	RO	UI16		
0x5	Travel Time V3 On	*Refer to Travel Time V1 On, but with solenoid valve V3*	RO	UI16		
0x6	Travel Time V3 Off	*Refer to Travel Time V1 Off, but with solenoid valve V3*	RO	UI16		

5.30 0x2C43 Advanced Diagnostics Limits / Control

Index: 0x2C43 (11331)

sub	name	description	access type	data type	data memory	reset group
0x1	Travel accumulator limit	*Travel accumulator: Activate or deactivate maintenance threshold [mm]* *0: Diagnostics deactivated* *>0: Diagnostics activated* *Warning is output when the resettable travel accumulator reaches this threshold*	RW	FL32	x	A
0x2	Travel accumulator V1 limit	*Travel accumulator: Activate or deactivate maintenance threshold [mm]* *0: Diagnostics deactivated* *>0: Diagnostics activated* *Warning is output when the resettable travel accumulator reaches this threshold*	RW	FL32	x	A
0x3	Travel accumulator V2 limit	*Travel accumulator: Activate or deactivate maintenance threshold [mm]* *0: Diagnostics deactivated* *>0: Diagnostics activated* *Warning is output when the resettable travel accumulator reaches this threshold*	RW	FL32	x	A
0x4	Travel accumulator V3 limit	*Travel accumulator: Activate or deactivate maintenance threshold [mm]* *0: Diagnostics deactivated* *>0: Diagnostics activated* *Warning is output when the resettable travel accumulator reaches this threshold*	RW	FL32	x	A
0x5	Travel Time Limit V1 On	*Maximum travel time if solenoid valve V1 is actuated [ms]:* *Adjustable travel time from which a warning (active) should be generated to indicate potential faults in the system (e.g. pilot pressure too low, excessive friction in actuator, etc.).* *A warning is generated if travel time exceeds limit + time tolerance (0x2C43subB).* *Value 0 [ms] disables this travel time monitoring function.* *A teach function may evoke a travel time warning, if travel time monitoring function was already activated*	RW	UI16	x	A
0x6	Travel Time Limit V1 Off	*Maximum travel time if solenoid valve V1 is switched off [ms]: Refer to Travel Time Limit V1 On for further details*	RW	UI16	x	A
0x7	Travel Time Limit V2 On	*Refer to Travel Time Limit V1 On, but with solenoid valve V2*	RW	UI16	x	A
0x8	Travel Time Limit V2 Off	*Refer to Travel Time Limit V1 Off, but with solenoid valve V2*	RW	UI16	x	A
0x9	Travel Time Limit V3 On	*Refer to Travel Time Limit V1 On, but with solenoid valve V3*	RW	UI16	x	A
0xA	Travel Time Limit V3 Off	*Refer to Travel Time Limit V1 Off, but with solenoid valve V3*	RW	UI16	x	A
0xB	Time tolerance	*Tolerance for configurable Travel Time Limits [%]:* *Specifies the tolerance for the parameters "Travel Time Limit V1/V2/V3 On/Off" (0x2C43sub5 – subA), from which point an active warning is generated.*	RW	UI8	x	A

sub	name	description	access type	data type	data memory	reset group
0xC	Switching timeout detection	*Activate or deactivate switching time timeout detection:* *If activated, switching time timeouts will be detected whenever the end position is not reached within a certain time (refer to sub index 0xD – 0xF) and an error is output.* *Requires at least two detectable end positions.* *Not active during automatic teach function.* *Switching timeouts are measured, if only 1 solenoid valve is switched on / off and max. 1 solenoid valve is active.* *Bit – coded:* *Bit0 = Switching timeout detection V1* *Bit1 = Switching timeout detection V2* *Bit2 = Switching timeout detection V3* *Value:* *0: Deactivated* *1: Activated*	RW	UI8	x	A
0xD	Switching timeout V1	Select maximum time by which the end position should be reached [ms]	RW	UI16	x	A
0xE	Switching timeout V2	Select maximum time by which the end position should be reached [ms]	RW	UI16	x	A
0xF	Switching timeout V3	*Select maximum time by which the end position should be reached [ms]*	RW	UI16	x	A
0x10	Diagnosis command	*Reset counters / Import vales.* *Selection is bit-coded.* *All bits = 0: command finished* *For details refer to table *) below.*	RW	UI32		

*) Reset command - details

Bit	Bit = 1	Affected objects
0	Reset operation hour counter	0x2C01sub2
1	Reset switching cycles V1	0x2C01sub4
2	Reset switching cycles V2	0x2C01sub6
3	Reset switching cycles V3	0x2C01sub8
4	Reset travel accumulator	0x2C40sub2
5	Reset travel accumulator V1	0x2C40sub4
6	Reset travel accumulator V2	0x2C40sub6
7	Reset travel accumulator V3	0x2C40sub8
8	Reset number of Travel timeouts V1 On	0x2C41sub1
9	Reset number of Travel timeouts V1 Off	0x2C41sub2
10	Reset number of Travel timeouts V2 On	0x2C41sub3
11	Reset number of Travel timeouts V2 Off	0x2C41sub4
12	Reset number of Travel timeouts V3 On	0x2C41sub5
13	Reset number of Travel timeouts V3 Off	0x2C41sub6
14	Reset number of switching time timeouts V1	0x2C41sub7
15	Reset number of switching time timeouts V2	0x2C41sub8
16	Reset number of switching time timeouts V3	0x2C41sub9
17	Copy measured travel times V1 On / Off from 0x2C42sub1, 0x2C42sub2	0x2C43sub5 0x2C43sub6
18	Copy measured travel times V2 On / Off from 0x2C42sub3, 0x2C42sub4	0x2C43sub7 0x2C43sub8
19	Copy measured travel times V3 On / Off from 0x2C42sub5, 0x2C42sub6	0x2C43sub9 0x2C43subA

6 Events

Event Code	Event Type	Description	Action
0x1000 (4096)	*ERROR*	*General malfunction - unknown error*	*Restart device If fault persists, contact Bürkert Service*
0x4000 (16384)	*ERROR*	*Temperature error overload - device temperature for operation too high*	*Modify ambient temperature. If fault persists, contact Bürkert Service*
0x4210 (16912)	*WARNING*	*Temperature warning upper threshold exceeded - ambient temperature too high or excessive friction in actuator*	*Reduce ambient temperature. If fault persists, contact Bürkert Service.*
0x4220 (16928)	*WARNING*	*Temperature warning lower threshold exceeded - ambient temperature too low.*	*Increase ambient temperature*
0x5100 (20736)	*ERROR*	*General power supply error - supply voltage for operation of device too low*	*Check supply voltage If fault persists, contact Bürkert Service.*
0x5110 (20752)	*WARNING*	*Voltage warning upper threshold exceeded - supply voltage too high*	*Check supply voltage*
0x5111 (20753)	*WARNING*	*Voltage warning lower threshold exceeded - supply voltage too low*	*Check supply voltage*
0x6000 (24576)	*ERROR*	*Internal software error*	*Restart device If fault persists, contact Bürkert Service*
0x1801 (6145)	*ERROR*	*General power supply error - supply voltage for operation of device too high*	*Check supply voltage If fault persists, contact Bürkert Service.*
0x1802 (6146)	*ERROR*	*Temperature error lower threshold exceeded - ambient temperature too low*	*Increase ambient temperature*
0x1804 (6148)	*ERROR*	*Internal error: WMS signal error (WMS: position measuring system)*	*Check the target for correct mounting and condition If fault persists, contact Bürkert Service*
0x1809 (6153)	*ERROR*	*Nonvolatile storage memory isn't usable*	*Restart device If fault persists, contact Bürkert Service*
0x180A (6154)	*WARNING*	*Teach function required*	*Starting teach function*
0x180B (6155)	*ERROR*	*Teach function error*	*Check pilot pressure Check pilot valves Restart teach function If fault persists, contact Bürkert Service*
0x180C (6156)	*WARNING*	*Exceed travel accumulator limit*	*Where appropriate, check wear-and-tear parts in pneumatic actuator and valve*

Event Code	Event Type	Description	Action
0x180D (6157)	*WARNING*	*Exceed valve cycle limit*	*Where appropriate, check wear-and-tear parts in pneumatic actuator and valve*
0x180E (6158)	*WARNING*	*Exceed operation time limit*	*Perform maintenance as appropriate*
0x180F (6159)	*WARNING*	*At least one travel time threshold (specified travel time and tolerance) exceeded*	*1. Check compressed air supply* *2. Check actuator and valve for friction*
0x1811 (6161)	*ERROR*	*Switching timeout - end position not reached*	*Check pilot pressure* *Check pilot valve* *Restart teach function* *If fault persists,* *contact Bürkert Service*
0x1813 (6163)	*WARNING*	*Automatic teach function active*	*Wait until automatic teach function has been completed*
0x1814 (6164)	*ERROR*	*IO-Link error*	*Check IO-Link connection*
0x1815 (6165)	*WARNING*	*Manual valve control active (Valves Mode = MAN)*	*To disable manual valve control, refer to description of object 0x2C02.*
0x1816 (6166)	*WARNING*	*Service Mode active*	*To disable Service Mode apply the magnetic service tool or restart device.*
0x1817 (6167)	*ERROR*	*PCB not supported by current firmware*	*Restart device. If fault persists, contact Bürkert Service*
0x1818 (6168)	*WARNING*	*User triggered maintenance signal* *Device marked e.g. for maintenance purposes.*	*To disable signal refer to description of object 0x210A or restart device.*
0x1819 (6169)	*ERROR*	*Class B devices only:* *Overvoltage actuator supply detected*	*Check actuator supply voltage* *If fault persists, contact Bürkert Service.*
0x181A (6170)	*ERROR*	*Class B devices only:* *Undervoltage actuator supply detected*	
0x181B (6171)	*ERROR*	*Class B devices only:* *Out of specification actuator supply voltage detected*	
0x181C (6172)	*ERROR*	*Error power supply measurement*	*Check supply voltage.* *Restart device.* *If fault persists, contact Bürkert Service.*
0x181E (6174)	*ERROR*	*Class B devices only:* *PCB calibration required.* Available from Firmware A.02.02.00.	*Contact Bürkert Service.*