

# PROFIBUS DP-Interface for Electric Actuators

Instructions

with V0, V1 and V2 services



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**Attachment**

- List of parameters PROFIBUS DP 29-44
- Data records PROFIBUS DP-V1 45-60

# 1 General information

## 1.1 Safety instructions: Used symbols and their meanings



**Warning** marks activities which, if not carried out correctly, can affect the safety of persons or property.



**Notice** marks activities which have major influence on the correct operation. Non-observance of these notes may lead to consequential damage.

## 1.2 Notes to the operation instructions

This manual describes the PROFIBUS interface for SEVEN electric actuators.

You can find more detailed information about the electric actuators, including the electrical and mechanical connections, parameterization and commissioning in the Y070.302/GB (PROFITRON/HiMod) and Y070.301/GB (ECOTRON) manuals



This manual is complete only in combination with the instruction manual of the respective actuator.

**The safety information contained in the instruction manuals must be heeded at all times when working with the actuators. This manual only contains specific information about the PROFIBUS interface!**

# 2 The PROFIBUS Interface for SEVEN



The PROFIBUS interface is pre-installed and tested in all devices that leave the factory "PROFIBUS-capable".

## 2.1 General description

### ■ General information about PROFIBUS-DP

PROFIBUS DP is an international, open fieldbus standard and allows the communication with field devices connected to the same network.

PROFIBUS DP is the leading open fieldbus system in Europe, which is also used successfully throughout the world. The application range includes automation in the areas of manufacturing, processing and building.

### ■ Basic characteristics

PROFIBUS DP determines the technical and functional features of a serial fieldbus system with which distributed digital automation devices can be interconnected.

PROFIBUS DP is designed for fast data transmission in the field level. Here central control devices, such as a PLC or PC, communicate via a fast serial connection with peripheral field stations with binary and/or analog inputs and outputs. The interchange of data among the field devices takes place cyclically, in combination with PROFIBUS DP and V1 services also acyclic data transfer is possible. The necessary communication functions are established by the PROFIBUS DP basic functions according to EN 50 170.

PROFIBUS DP distinguishes between master and slave devices.

- **Master devices** control the data traffic on the Bus. A master is allowed to send messages without an external request. Masters are also called "active stations" in the PROFIBUS protocol.
- **Slave devices** such as SEVEN actuators for example are field devices. They do not have bus access, i.e. they may only acknowledge received messages or, at the request of a master, transmit messages to that master. Slaves are also called "passive stations".

## ■ Basic functions of PROFIBUS DP

The master reads the input information cyclically from the slaves and writes the output information cyclically to the slaves. In addition to this cyclic data transfer of the process-representation PROFIBUS DP also provides powerful functions for diagnosis and commissioning purposes. The data traffic is monitored through the monitoring functions on the master and slave side.

### ● Functionality

- Peer-to-peer (net data transfer) or Multicast (control commands to all slaves).
- Cyclic net data transfer between DP-master and DP-slaves.
- Additional acyclic data transfer between DP-master and DP-slaves via PROFIBUS DP with V1 services.
- DP-V2 redundancy in accordance with PNO 2.212.
- DP-V2 timestamp in accordance with PNO 2.192.
- Dynamic activation or de-activation of individual DP-slaves.
- Checking of the configuration of the DP-slaves.
- Synchronization of inputs and/or outputs.

### ● Protection functions

- All messages are transmitted with Hamming Distance HD=4.
- Watch-dog timer at DP-slaves.
- Access protection for the inputs/outputs of the DP-slaves.
- Net data transfer monitoring with configurable timer interval at the master.
- Adjustable safety behavior.

## 2.2 PROFIBUS-DP: certification

SEVEN and PROFIBUS-DP have been certified by the PROFIBUS Trade Organization. The certification numbers are as follows:

**Z01420 / Z01421** (1- / 2- channel)

## 2.3 PROFIBUS-DP: identification numbers

Each DP slave and each DPM1 master has its own identification number. This is necessary in order for a DP master to be able to identify the types of the connected devices without any significant protocol overheads. The master compares the identification numbers of the connected DP devices with the identification numbers in the configuration data specified by the DPM2. The user data transfer only begins if the correct device types with the correct station addresses have been connected on the bus. This improves the quality of protection against configuration errors.

The PROFIBUS Trade Organization (PNO / PTO) administers the identification numbers together with the device data (GSD).

SEVEN has been assigned the following identification numbers by the PROFIBUS Users Organization:

- Component 1-channel: **0x56D**
- Component 2-channel: **0x56E** (PROFITRON/HiMod only)

## 2.4 Device data (GSD)

The performance features of the devices connected to the PROFIBUS-DP are documented by the manufacturers in the form of a device data sheet and a device master file (GSD file), and made available to users. The structure, contents and code of the GSD file are standardized. Any DP slave can thus be configured conveniently using configuration equipment from different manufacturers. The PNO archives this information in a manufacturer-neutral database and supplies details of the device data on request.

The following GSD files are valid for SEVEN with DP-V0/-V1/-V2:

- **SIPS056D.GSD** (1 channel)
- **SIPS056E.GSD** (2 channel)



The GSD files can be downloaded from our website [www.sipos.de](http://www.sipos.de).

## 3 Using actuators with PROFIBUS-interface

### 3.1 Inhibiting of the local control unit

The switch function for changing between remote control and local control by pressing the button on the local control unit can be disabled by means of a PROFIBUS command. The function is automatically activated again, depending on the parameterized function of the watch-dog, if communication via the bus is interrupted.

### 3.2 Fault messages on display

Error messages concerning the PROFIBUS interface and communication via the PROFIBUS are output in plain text on the PROFITRON/HiMod display of the local control unit.

These error messages must either be dealt with by the owner of the plant (parameters and settings, ambient temperature too high, electrical connections not made properly, etc.), or they are due to circumstances outside his control (voltage fluctuations, power failures, etc.).

### 3.3 Display of PROFIBUS status

- with COM-SIPOS: Read parameter, status is displayed in the "Fieldbus" tab sheet
- with PROFIBUS: can be read via parameters 22 (channel 1), 23 (channel 2) with regard to redundancy and timestamp via parameters 400 – 405
- SEVEN ECOTRON: "Fail-Safe"/"GC-Clear"-status of the active channel with flashing pattern  
"fault cable break"
- SEVEN PROFITRON/HiMod: Main menu → Observe → Inputs and outputs → PROFIBUS DP

## 4 Technical Data

### 4.1 SEVEN with PROFIBUS DP interface

Electrical connection / Fieldbus connection											
<b>Supply voltage</b>	1-ph AC 110 - 115 V 1-ph AC 220 - 230 V 3-ph AC 190 - 200 V 3-ph AC 380 - 460 V										
<b>Tolerances</b>	Permissible voltage tolerances: -10 %/+15 % Frequency range: 40 – 70 Hz										
<b>Automatic phase sequence correction</b>	The direction of rotation of the output shaft is independent of the phase sequence										
<b>Optional external power supply of the electronics</b>	24 V DC ± 25 % (protected against polarity reversal)  Current consumption of the electronics: PROFIBUS 1 channel: max. 160 mA; PROFIBUS 2 channel: max. 180 mA										
<b>Voltage output</b>	24 V DC, max. 125 mA (floating and protected against polarity reversal)										
<b>Electrical connection with PROFIBUS DP interface</b>	Round plug connector with 50-pin screw connections. PROFIBUS connection on integrated bus termination board with switchable bus termination resistors. Max. lead cross section - PROFIBUS: 1.5 mm <sup>2</sup> - analog / binary signals: 2.5 mm <sup>2</sup> - mains: 6 mm <sup>2</sup>										
<b>RS 485-interface</b>	EIA-485 (RS 485) → details see "Communication parameters of the PROFIBUS DP interface"										
<b>Fiber optic interface (option)</b>	Fiber optic interface for the realization of star, line and ring structures. → details see "Communication parameters of the PROFIBUS DP interface"										
<b>Overvoltage protection (option)</b>	Protection of the electronics and motor against over voltage up to 6 kV on the bus terminals, at a guaranteed PROFIBUS communication up to baud rate 1.5 Mbits/s										
Inputs, outputs / other features											
<b>Control</b>	Control and feedback signal via PROFIBUS → details see "Parameterizing of PROFIBUS"										
<b>analog / binary inputs</b>	<table border="1"> <thead> <tr> <th>ECOTRON</th> <th>PROFITRON/HiMod</th> </tr> </thead> <tbody> <tr> <td>- 3 binary 24/48 V DC inputs (OPEN, CLOSE, STOP)</td> <td>- 5 binary 24/48 V DC inputs (OPEN, CLOSE, STOP, EMERGENCY, Mode)</td> </tr> <tr> <td></td> <td>- 1 analog 0/4..20 mA input AI1 for e.g. positioner (option at PROFITRON)</td> </tr> <tr> <td></td> <td>- 1 analog 0/4..20 mA input AI2 (option)</td> </tr> <tr> <td>Status transmission possible via PROFIBUS.</td> <td>Status transmission possible via PROFIBUS.</td> </tr> </tbody> </table>	ECOTRON	PROFITRON/HiMod	- 3 binary 24/48 V DC inputs (OPEN, CLOSE, STOP)	- 5 binary 24/48 V DC inputs (OPEN, CLOSE, STOP, EMERGENCY, Mode)		- 1 analog 0/4..20 mA input AI1 for e.g. positioner (option at PROFITRON)		- 1 analog 0/4..20 mA input AI2 (option)	Status transmission possible via PROFIBUS.	Status transmission possible via PROFIBUS.
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<b>Galvanic separation</b>	- Binary inputs and outputs - analog inputs and outputs										
<b>PROFIBUS redundancy (option)</b>	Hardware (separate ASICs and DC/DC-converters)										
<b>Local control station</b>	Standard: - Drive Controller (option: lockable) - 2 indication lights for LOCAL (yellow) and REMOTE (blue) - Indication lights for CLOSE (yellow) and OPEN (green): run and end position indication - 2 indication lights (green and red) for status and fault signals (ECOTRON only) - Plain text status display on color graphics display (PROFITRON/HiMod only) - USB interface (ECOTRON: internally on control PCB; PROFITRON/HiMod: externally at the electronics housing) - Bluetooth interface for parameterizing and controlling (PROFITRON/HiMod only)										
<b>Remote control</b>	Control by remote depending on the parameter setting of "Control mode" and "Alternative control mode": - Conventional interface (24/48 V binary or 0/4-20 mA analog) - Fieldbus interface										

<b>Parameters / functions actuator</b>	
<b>Parameter settings</b>	- via PROFIBUS - menu based, via illuminated color graphics display with plain text display (operation with password-protection via Drive Controller of the local controls) (PROFITRON/HiMod only) - menu based, via illuminated LC display (ECOTRON only) - via the programming software COM-SIPOS
<b>Language settings</b> (PROFITRON/HiMod only)	CS, DA, DE, EL, EN, ES, FI, FR, IT, NL, NO, PL, PT, RU, SV, TR, ZH → other languages on request
<b>Output speed / positioning time settings</b>	- in 7 steps adjustable within the selected speed range (only ECOTRON) - continuous setting within the selected speed range (PROFITRON/HiMod only) Different settings possible for OPEN, CLOSE, EM. OP and EM. CL
<b>Soft start</b>	Constant torque with reduced speed in to and out of the end positions: - no overtorque - Starting current $\leq$ rated current
<b>Positioner</b> (option PROFITRON only)  (PROFITRON/HiMod only)	Adaptive three-step controller Setpoint via PROFIBUS or analog 0/4...20 mA signal, (rising/falling slope) Adjustable automatic adaptation of the dead band based on the quality of the setpoint and feedback signals. Speed reduction before reaching the setpoint
<b>Process controller</b> (option) (PROFITRON/HiMod only)	Setpoint via analog input AI1 or AI2 (0/4 ... 20 mA), via PROFIBUS or fixed setpoint Actual process value via analog input AI2 or AI1 (0/4 ... 20 mA)
<b>Programmable travel dependent output speed</b> (option) (PROFITRON/HiMod only)	Travel dependent speed setting via up to 10 interpolation points (value pairs): travel [% OPEN] in 1 % steps – speed [rpm]
<b>External output speed setting</b> (option) (PROFITRON/HiMod only)	Speed setpoint via PROFIBUS or analog 0/4 ... 20 mA signal
<b>Travel dependent freely adjustable positioning times</b> (option) (PROFITRON/HiMod only)	The positioning times between up to 10 intermediate positions can be programmed independently: travel 0...100 [% OPEN], positioning time 0 ... 60000 [sec] For EMERGENCY operation via positioning time curve possible with adjustable factor.
<b>Torque-curve recording from the valve</b> (not for 2SG7 and 2SQ7) (PROFITRON/HiMod only)	Recording of up to 3 torque reference curves for pre-emptive valve monitoring: sampling rate in 1 % travel increments; can be saved and downloaded. The recorded values are reference values and can deviate from the absolute values especially in the end positions and when changing output speeds.
<b>Retry torque block</b> (only PROFITRON/HiMod)	Automatic retry to get over torque block (max. 5 x programmable)
<b>Diagnostics</b>	
<b>Diagnosis data</b>	- switching cycles/hour - number of switching cycles / travel dependent and torque dependent cut-offs - relative operating time - operating hours of electronics unit and motor
<b>Maintenance limits /maintenance intervals</b> (regarding valve) (only PROFITRON/HiMod)	- switching cycles - torque dependent cut-offs - motor operating hours
<b>Fault memory</b>	former five faults are displayed
<b>Electronic rating-plate</b>	- manufacturer - ordering no. - Serial number - original Serial number - tag number actuator
<b>Monitoring and safety functions</b>	internal diagnosis: - runtime - motor protection - travel sensor

Settings / Parameterizing of PROFIBUS DP interface				
<b>Supported PROFIBUS DP-services (standard)</b>	<b>DP-V0:</b> cyclic data exchange, fail-safe mode <b>DP-V1:</b> Access to all commissioning parameters, observing and diagnosis data with acyclic and cyclic read/write services. <b>DP-V2:</b> Time stamp acc. to PNO 2.192, redundancy acc. to PNO 2.212			
<b>Baudrate recognition</b>	automatic			
<b>Process-representation output (command signals)</b>  <b>Master → Slave</b>	- OPEN - CLOSE - EMERGENCY (PROFITRON/HiMod only) - setpoint for position, process or output speed (PROFITRON/HiMod only) - fault signal reset - maintenance acknowledge			
<b>Process-representation input (feedback)</b>  <b>Slave → Master</b>	e.g. - actual position value (0.01 % steps) - ready + remote - actuator in end position "OPEN"/"CLOSE" - intermediate contact "OPEN"/"CLOSE" active - running indication "OPEN"/"CLOSE" - output speed/positioning time - end position OK - hand wheel/crank operated - local active - remote active - command "EMERGENCY" active - motor temperature warning (not for 2SG7) - motor temperature (not for 2SG7) - electronics temperature (PROFITRON/HiMod only) - maintenance necessary - diagnosis data (PROFITRON/HiMod only) - maintenance limits (PROFITRON/HiMod only) - PROFIBUS channel 1 or 2 is active channel - PROFIBUS channel 1 or 2 is present - etc.			
<b>Process-representation input (fault signals)</b>  <b>Slave → Master</b>	e.g. - sum fault signal - not ready - end positions not OK - main supply voltage fault - high voltage - low voltage - internal voltage faulty - moved too far - travel sensor signal fault - setpoint input I > 21 mA or I < 3.6 mA (live zero) (PROFITRON/HiMod only) - blocked in move - positioning time too high (runtime) - motor temperature too high - etc.			
<b>Behaviour in case of communication breakdown</b>	the reaction of the actuator is programmable: - keep position - move to EMERGENCY position (PROFITRON/HiMod only) - keep actual process value (PROFITRON/HiMod with process controller only) - move to fixed setpoint (PROFITRON/HiMod with process controller only) - execute last command			
<b>PTO certificate No.</b>	Z01420 / Z01421 (1 / 2 channel)			
Ambient conditions				
<b>Ambient temperature</b>	-20 °C to +60 °C			
<b>Enclosure protection according to EN 60529</b>	standard: IP68			
<b>Vibration resistance</b>		acceleration	frequency range	duration
	Germanischer Lloyd	0.7 g	5 ... 200 Hz , in the resonance frequencies	min. 1.5 h in 3 directions
	EN 60068-2-6	2 g	5 ... 500 Hz 1 octave/min	20 sweeps (10 cycles) in 3 directions
	Loads according to EN 60068-2-6 up to 5 g for separate mounting of electronics and gear unit on request. The actuators can withstand a continuous load caused by plant-generated vibrations within a frequency range of 5 ... 200 Hz at up to 0.5 g.			



## 4.2 General data of the PROFIBUS DP interface

### ■ Connection via copper cable – 1 and 2 channel (redundant)

<b>Communication log</b>	PROFIBUS DP according to EN 50170-2, DIN 19245		
<b>Network topology</b>	Line (BUS) structure. Tree structures can also be realized. Coupling and uncoupling of stations during operation without affecting other stations is possible.		
<b>Transmission medium</b>	twisted, screened 2-wire copper cable according to EN 50170		
<b>Interface</b>	EIA-485 (RS 485)		
<b>Transmission speed / Cable length</b>	baudrate (kbit/s)	max. cable length <b>without</b> repeater	max. cable length <b>with</b> repeater
	9.6	1,200 m	approx. 10 km
	19.2	1,200 m	approx. 10 km
	45.45	1,200 m	approx. 10 km
	93.75	1,200 m	approx. 10 km
	187.5	1,000 m	approx. 10 km
	500	400 m	approx. 4 km
	1,500	200 m	approx. 2 km
<b>Station types</b>	- DP-Master class 1, e.g. central controllers such as PLC, PC, - DP-Master class 2, e.g. programming / configuration tools - DP-Slave, e.g. SEVEN actuators, devices with binary and/or analog inputs/outputs, sensors.		
<b>Number of stations</b>	32 stations without repeater; with repeaters expandable up to 126 stations		
<b>Bus access</b>	Token-passing between the masters and polling for slaves. Mono-master or multi-master systems are possible.		

### ■ Connection via fiber optics (FO)

Fiber optics interface for the realization of star, line and ring structures.

➔ Details see supplement to operation instructions:

- „Fieldbus connection with fiber optics (FO) in line/star topology“ Y070.399/EN,
- „PROFIBUS DP with fiber optics (FO) in loop topology“ Y070.359/EN.

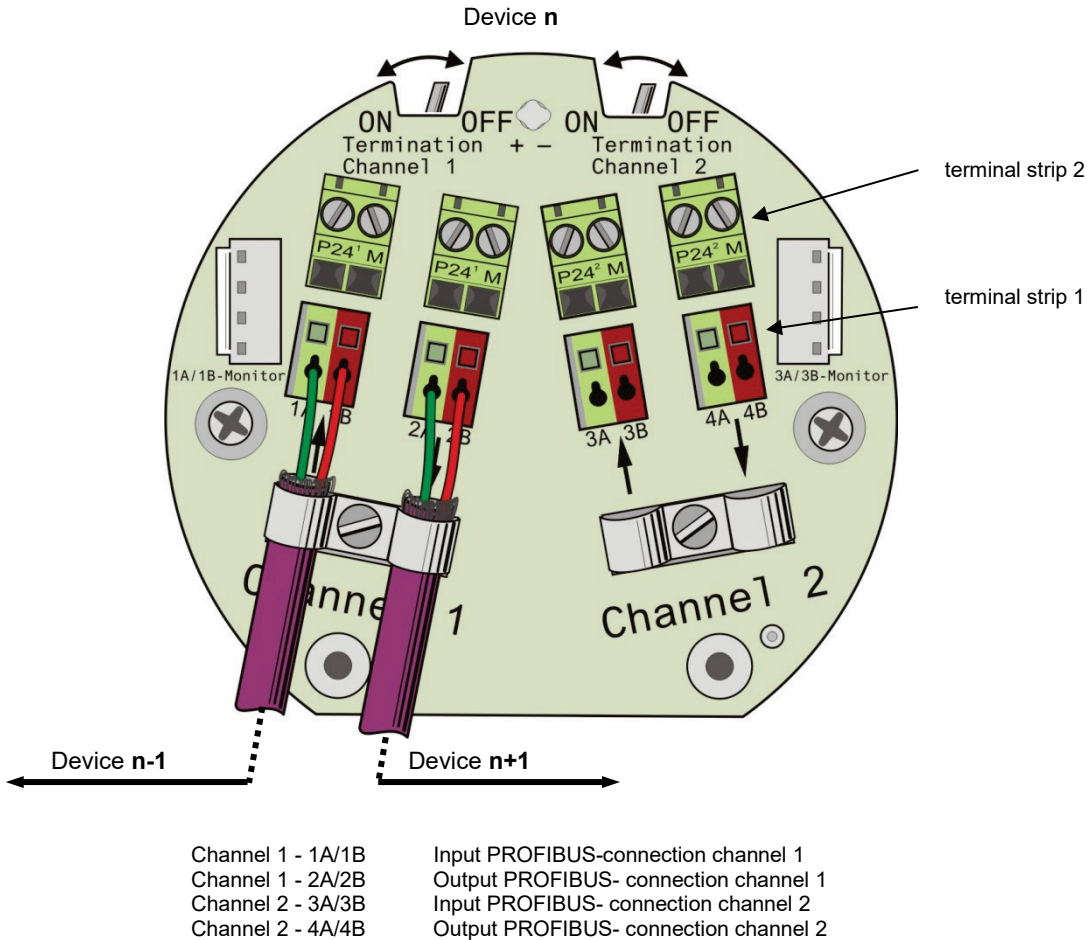
### 4.3 Connection to the fieldbus system

#### Connection via copper cable – 1 and 2 channel (redundant)

To comply with the RFI regulations, the shield has to be connected flatly with the housing by means of the screen strap.

This applies analogously to both channels of the version with a redundant PROFIBUS interface.

Correct pole-connection of the data-wire on terminal strip 1 is necessary for PROFIBUS data exchange. Please make sure that .A or .B connections are always done with the same lead: the .A connection with the green lead and .B connection with the red lead.



The 24 V DC external supply can be realized via the terminal strip 2. By doing this, the bus data exchange can be continued even if the main power supply (110-115V, 190-200V, 220-230V resp. 380-460V) is disconnected. The 24 V is internally connected with the pins 38 and 39 of the round plug.

#### Adjustment of the DIP-switches

Termination:      **OFF**      no bus termination resistor  
                          **ON**        bus termination resistor switched on and 2A/2B or 4A/4B separated from 1A/1B or 3A/3B

#### Bus cable

Only cables according to standard DIN 19245 or EN 50170-2, cable type A, may be used for PROFIBUS DP wiring.

The bus cable must be laid at a distance of at least 20 cm from other cables. It should be laid in a separate, conductive and earthed cable trunking.

It must be ensured that there are no potential differences between the individual stations on the PROFIBUS.

Cable specification  cable type A  for PROFIBUS DP:

Impedance:	135 to 165 Ohm, at a frequency of 3 to 20 MHz
Cable capacity:	< 30 pF per meter
Cable diameter:	> 0.64 mm
Core diameter:	> 0.34 mm <sup>2</sup> (corresponds to AWG 22), max. 1.5 mm <sup>2</sup>
Loop resistance:	< 110 Ohm per km
Screening:	Cu shielding braid or shielding braid and shielding foil

## 5 Setup of the DP-Slave address

Each device on the bus is handled via the bus address (field device address). This address must be unique on one bus line. SEVEN actuators are delivered with the default bus address 126. If the actuators are ordered with customer specific parameterization (order code „Y11“), the bus address is set to the specified value. In case of SEVEN actuators with redundant PROFIBUS interface, both channels are set to the default address 126.

The bus address is stored in the EEPROM located on the microcontroller board (non volatile).

The bus address can be setup as follows:

- via local control unit (PROFITRON/HiMod only). To setup the bus address, see manual instructions Y070.302/EN.
- with the PC-parameterization program COM-SIPOS (connection via USB interface or Bluetooth (PROFITRON/HiMod only)).

COM-SIPOS is available as accessory including software, data cable and description, order-no.: **2SX7100-3PC02**.



The newest COM-SIPOS version can be downloaded from our website [www.sipos.de](http://www.sipos.de).

- via PROFIBUS. For that, the actuator must be connected to the bus. Please take care, that only one single actuator with default address 126 is connected to the bus at a time. The actuator may then be assigned a new bus address using SAP 55 (Service-access-point set slave address).



Actuators with DP-V2 and redundant PROFIBUS interface:

Due to the start-up behavior of the actuator - only one channel is available for communication (see 6.8.2) - a command for changing the address might not be executed: If required, repeat telegram within an interval of approx. 30s. By sending a "set slave address" telegram each, the addresses of both channels are changed!

## 6 Setup of the communications and devices parameter

Following chapters (6.1 to 6.10) describe the necessary information for programming the individual application software for the communication with the control system.

The chapters 6.1 to 6.10 can be disregarded if the integration is performed via one of the following software tools:

- **Functions blocks** for higher-level control systems:
  - SIMATIC S7-300,
  - SIMATIC PCS7-400 (S7-400) with/without faceplate for WIN-CC,
  - SPPA-T2000 and SPPA-T3000 (Teleperm XP).
- **Cross-manufacturer project and parameterization tools:**
  - SIMATIC PDM (Process Device Manager)  
The SEVEN electronic device description (EDD) is integrated in this parameterizing and project tool.
  - FDT/DTM (Field Device Tool/ Device Type Manager)  
For integration in the parameterizing tool FDT the SEVEN device description DTM is available.

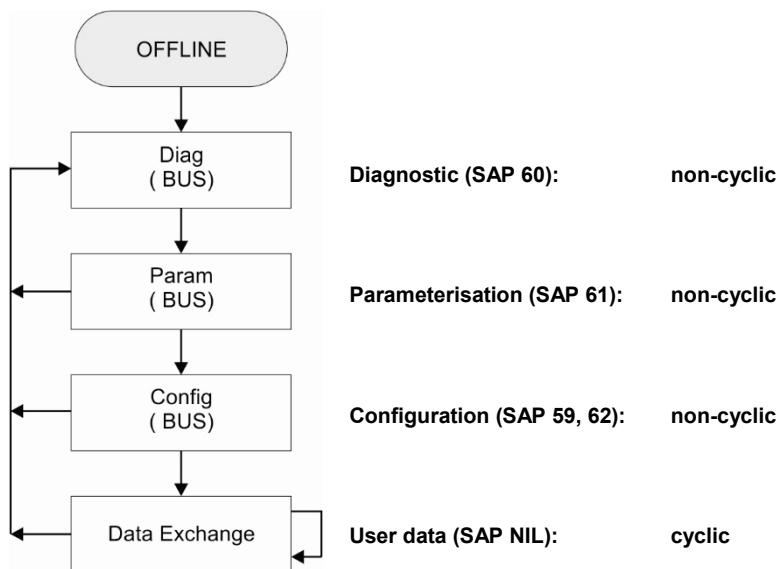
All software tools are available as accessories.

### 6.1 DP-state

The manufacturer-specific data is exchanged via the SAP NIL.

The data transmission when the equipment is started up is shown in the simplified diagram below. The actuator (slave) behaves in accordance with DIN 19245-3.

**Data exchange Master – Slave (actuator SEVEN)**  
DSAP 61 and 60 not used for actuator data



## 6.2 Parameterization of the DP-Slave

### ■ Actuator parameterizing

The DP slave must be parameterized separately for each channel by the master. You must therefore parameterize both channels of the 2-channel version of the PROFIBUS module.

The parameterization message has the following structure:

Byte	Bit position								Comment
	7	6	5	4	3	2	1	0	
0	Lock Req	Unlo. Rep	0	0	WD ON	res	res	res	Station Status
1									WD Fact 1
2									WD Fact 2
3									MinTSDR
4									Ident Nr High
5									Ident Nr Low
6									Group Ident
7	DPV1 enable	0	0	0	0	WD Base	0	0	DPV1 Status 1
8	0	Enable Proc.-alarm	0	0	0	0	0	0	DPV1 Status 2
9	Prm- Cmd	0	0	0	Prm- Struct.	AlarmMode			DPV1 Status 3

WD Base WD Base = 0 (time base 10ms)

WD Base = 1 (time base 1ms)

The calculating the watchdog time  $T_{WD} = (1 \text{ resp. } 10\text{ms}) \times \text{„WD Fact 1“} \times \text{„WD Fact 2“}$

The following bits are evaluated for DP-V2:

- Enable Proc. Alarm      Process alarm enabled (required for DP-V2 timestamp)
- AlarmMode                Number of alarms: only the value 0 is accepted by the actuator (0=1 alarm per type)
- PrmStruct                Structured parameters possible
- PrmCmd                  Parameter command activated

For a description of the parameter blocks, see 6.10.1.2 and 6.10.2.2.



- “WD Fact 1” = 1 and “WD Fact 2” = 1 are not allowed in combination!
- Even when no DP-V1 services are used, the parameterizing telegram always has to consist of 10 bytes!

### ■ Master monitoring parameterizing

A watchdog must be parameterized for monitoring the master and the connection between the master and the actuator.

If the monitoring time expires due to a communication failure, the consequences are dependent on certain default settings, as shown in the table below.

row	Settings				Consequences				
	SlaveNr =126	WD on =1	Mode controlled via bus (PNU 110)	Wire break causes emergency position (PNU 108)	Ready	Approach to emergency position	Position held	Fault bus comm.	DP-state
1	N	Y	Y	Y	N	Y	N	Y	Wait Prm
2	N	Y	Y	N	N	N	Y	Y	Wait Prm
3	N	Y	N	X	X	X	X	Y	Wait Prm
4	N	N	X	X	X	X	X	X	X
5	Y	X	X	X	X	X	X	X	X

X = don't care; Y = Yes; N = No

### 6.3 Configuration of the DP-Slave

The DP slave must be configured separately for each channel by the master. You must therefore configure both channels of the 2-channel version.

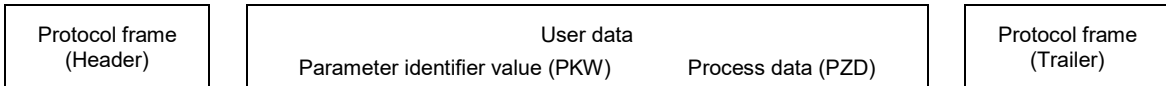
The two channels can also be configured differently, though the configuration message must always have three identification bytes (see "GSD files").

### 6.4 User data (Data Exchange) PPO-Types

The structure of user data is named **parameter-process-data-object (PPO)**.

2 PPO types (PPO1 and PPO2) are defined for SEVEN actuators.

Adjustment of this data structure for the cyclic data exchange via the indication bytes 0xF2, 0xF1 and 0x00 resp. 0xD3 (see "GSD-files").



#### ■ PPO-Type

The PPO type is selected during the configuration procedure by the PROFIBUS-DP master.

		PKW			PZD					
		Word 1	Word 2	Word 3	Word 1	Word 2	Word 3	Word 4	Word 5	Word 6
<b>PPO1</b>	Outputs	PKE	PWE		STW1	HSW	—	—	—	—
	Inputs	PKE	PWE		ZSW1	HIW	—	—	—	—
<b>PPO2</b>	Outputs	PKE	PWE		STW1	HSW	—	—	—	—
	Inputs	PKE	PWE		ZSW1	HIW	PZD3	PZD4	PZD5	PZD6

- PKW     Parameter identifier value
- PZD     Process data
- PKE     Parameter identifier
- PWE     Parameter value
- STW1    Control word 1
- ZSW1    Status word 1
- HSW     Main setpoint (position setpoint)
- HIW     Main actual value (position actual value)

#### ■ Job/response processing

- A job or an order only refers to one parameter value.
- The master must continue repeating a job until it receives the required response.
- The following information from the master must be evaluated, in order to determine whether or not a job has been completed:
  - Response identifier
  - Parameter number
  - Parameter value (if any)

## 6.4.1 Inputs (Actuator => Master)



All unused bytes/bits are sent with "0"!

	Byte.Bit	Meaning	Value range	
PKW	1.0 – 1.2	parameter number (high-byte)		
	1.3	unused		
	1.4 – 1.7	response identifier 0 = no response 1 = parameter transfer 2 = command not executable: - write/read of not defined parameters - parameter not writeable - write of invalid parameter values 3 = no PKW rights for this parameter: - channel is not active channel - commissioning local active	0 - 3	
	2.0 – 2.7	parameter number (low-byte)	dependent on parameter number (see parameter list)	
	3.0 – 3.7	parameter value (high-byte of high-word)		
	4.0 – 4.7	parameter value (low-byte of high-word)		
	5.0 – 5.7	parameter value (high-byte of low-word)		
	6.0 – 6.7	parameter value (low-byte of low-word)		
	PZD	7.0	hand wheel/crank operated	0 - 1
		7.1	remote active	0 - 1
7.2		actuator in end position CLOSE	0 - 1	
7.3		actuator in end position OPEN	0 - 1	
7.4		tripping torque CLOSE reached (torque dependent cut-off)	0 - 1	
7.5		tripping torque OPEN reached (torque dependent cut-off)	0 - 1	
7.6		actuator running in CLOSE direction	0 - 1	
7.7		actuator running in OPEN direction	0 - 1	
8.0		ready + remote	0 - 1	
8.1		EMERGENCY operating possible	0 - 1	
8.2		sum fault signal	0 - 1	
8.3		motor lock active via mode input	0 - 1	
8.4		factory programming OK	0 - 1	
8.5		end position OK	0 - 1	
8.6		actuator parameterization OK	0 - 1	
8.7		commissioning local OK	0 - 1	
9.0 – 9.7	actual position value (high-byte)	0 - 10000		
10.0 – 10.7	actual position value (low-byte)			

Only with PPO2 the following data are included in the cyclic telegram from the actuator to the master!

	Byte.Bit	Meaning	Value range
PZD	11.0 – 11.7	PZD 3 (high-byte)	dependent on parameter number (see parameter list)
	12.0 – 12.7	PZD 3 (low-byte)	
	13.0 – 13.7	PZD 4 (high-byte)	
	14.0 – 14.7	PZD 4 (low-byte)	
	15.0 – 15.7	PZD 5 (high-byte)	
	16.0 – 16.7	PZD 5 (low-byte)	
	17.0 – 17.7	PZD 6 (high-byte)	
	18.0 – 18.7	PZD 6 (low-byte)	

The selection of the parameters, which will be transferred as PZD 3 to 6, can be programmed using the COM-SIPOS software or writing the parameters 125 to 128!

The following parameter settings are necessary to transfer 32-bit values: P125 = P126 and P127 = P128.

## 6.4.2 Outputs (Master => Actuator)



All unused bytes/bits are sent with "0"!

	Byte.Bit	Meaning	Value range
PKW	1.0 – 1.2	parameter number (high-byte)	
	1.3	unused	
	1.4 – 1.7	job identifier 0 = no response 1 = parameter read 2 = parameter write	0 - 2
	2.0 – 2.7	parameter number (low-byte)	dependent on parameter number (see parameter list)
	3.0 – 3.7	parameter value (high-byte of high-word)	
	4.0 – 4.7	parameter value (low-byte of high-word)	
	5.0 – 5.7	parameter value (high-byte of low-word)	
	6.0 – 6.7	parameter value (low-byte of low-word)	
PZD	7.0 – 7.7	unused	
	8.0	control command OPEN	0 - 1
	8.1	control command CLOSE	0 - 1
	8.2	control command EMERGENCY	0 - 1
	8.3	fault signal reset	0 - 1
	8.4	maintenance carried out	0 - 1
	8.5	setpoint valid (Bit will be ignored, if the "Setpoint valid (bit)" user parameter was set to 0 (disable/unused) for the bus configuration.)	0 - 1
	8.6 – 8.7	Unused	
	9.0 – 9.7	setpoint (high-byte)	0 - 10000
	10.0 – 10.7	setpoint (low-byte)	



## 6.5 User data (Data Exchange) “AUMA-process representation “

Adjustment of this data structure for the cyclic data exchange via the indication bytes:

- 0x97 and 0xA3, resp. 0x53 and 0x61 for a total of 8 byte input data and 4 byte output data (see “GSD-files“)
- 0x9B and 0xA3 for a total of 12 byte input data and 4 byte output data (see “GSD-files“)



All unused bytes/bits are sent with “0“!

### 6.5.1 Inputs (Actuator => Master)

Byte.Bit	SIPOS meaning	Value range
1.0	End position OPEN	0 - 1
1.1	End position CLOSE	0 - 1
1.2	Always “0“	
1.3	Always “0“	
1.4	Remote active and traveling OPEN	0 - 1
1.5	Remote active and traveling CLOSE	0 - 1
1.7	Not (ready + remote)	0 - 1
2.0	Fault motor temperature	0 - 1
2.1	Sum fault (without blocked in move) <i>or</i> end position adjustment not OK <i>or</i> parameterization not OK	0 - 1
2.2	Remote active	0 - 1
2.3	Local active	0 - 1
2.4	Intermediate contact OPEN	0 - 1
2.5	Intermediate contact CLOSE	0 - 1
2.6	Tripping torque OPEN reached	0 - 1
2.7	Tripping torque CLOSE reached	0 - 1
3.0 – 3.7	Position actual value (high-byte)	0 - 1000
4.0 – 4.7	Position actual value (low-byte)	
5.0	Always “0“	
5.1	Not remote active	0 - 1
5.2	Fault motor temperature	0 - 1
5.3	Low voltage or excessive voltage or external power supply fault	0 - 1
5.4	Fault "blocked in move + tripping torque OPEN reached	0 - 1
5.5	Fault "blocked in move + tripping torque CLOSE reached	0 - 1
5.6	Always “0“	
5.7	Always “0“	
6.0	Always “0“	
6.1	Channel 2 active	0 - 1
6.2	Always “0“	
6.3	Always “0“	
6.4	Always “0“	
6.5	No end position adjustment	0 - 1
6.7	Runtime error (not automatic reset)	0 - 1
7.0	Channel 1 active	0 - 1
7.1	Channel 2 active	0 - 1
7.2	Channel 1 in Data Exchange	0 - 1
7.3	Channel 2 in Data Exchange	0 - 1
7.4	Remote active and traveling OPEN	0 - 1
7.5	Remote active and traveling CLOSE	0 - 1
7.6	Hand wheel/crank <i>or</i> actuator running OPEN dir. locally controlled	0 - 1
7.7	Hand wheel/crank <i>or</i> actuator running CLOSE dir. locally controlled	0 - 1
8.0	Warning motor temperature	0 - 1
8.4	ClockSynchronization telegram received	0 - 1
8.5	Open circuit signal analog input 1	0 - 1
8.6	Open circuit signal analog input 2	0 - 1
8.7	Maintenance necessary	0 - 1
9.0 – 9.7	Analog input 1 (high-byte)	0 - 1000
10.0 – 10.7	Analog input 1 (low-byte)	
11.0 – 11.7	Analog input 2 (high-byte)	0 - 1000
12.0 – 12.7	Analog input 2 (low-byte)	

## 6.5.2 Outputs (Master => Actuator)

Byte.Bit	SIPOS meaning	Value range
1.0	control command OPEN	0 - 1
1.1	control command CLOSE	0 - 1
1.2	Setpoint valid (bit will be ignored, if the "Setpoint valid (bit)" user parameter was set to 0 (disable/unused) for the bus configuration.)	0 - 1
1.3	Fault signal reset	0 - 1
3.0 – 3.7	Setpoint (high-byte)	0 - 1000
4.0 – 4.7	Setpoint (low-byte)	

## 6.6 Monitoring methods

### ■ Master monitoring

see 6.2 "Parameterization of the DP-Slave – Master monitoring parameterizing"

### ■ „Fail-Safe” and „Global-Control-Clear“

One way to ensure that the slave is set to a safe condition (or changed over to the other channel) in the event of an error is with a "Fail-Safe" message (user data length = 0). This method is described in the DP-V1 recommendation and not in the basic DP standard.

If a "Fail-Safe" message is received, the slave remains in "Data Exchange" mode.

If a master fails, it sends a "Fail-Safe" message rather than changing to STOP mode.

If the actuator receives "Global-Control-Clear" (GC-Clear), it responds in exactly the same way as to a "Fail-Safe" message.

The response to the "Fail-Safe" message/„Global-Control-Clear" is shown in section 6.2 "Parameterization of the DP-Slave - Master monitoring parameterizing, table, rows 1 to 3".

The setting of "WD ON" is not relevant.

The slave leaves the "Fail-Safe" condition again when a valid user data message with a length > 0 is received.

### ■ Actuator monitoring

A watchdog is activated in the PROFIBUS interface of the actuator (slave) for monitoring the latter. This watchdog is reset cyclically by the microcontroller of the actuator control electronics.

If the watchdog is not reset by the microcontroller, the PROFIBUS interface of the actuator changes to the "Wait Pm" state after 300 Write-Read-Data messages have been received.

## 6.7 DP-V1 extension

With the DP-V1 extension it is possible to have an acyclic data exchange in addition to the cyclic data exchange.

For addressing the data records slot and index are used. By specifying the record length, it is possible to read and write parts of the data record. To exchange as much of the same kind of information as possible via one access, up to 244 bytes can be transferred. Due to the data record shape of the SEVEN (see attachment „Data records PROFIBUS DP-V1“) max. 240 bytes are transferred.

The MSAC1-connection (master-slave-acyclic-communication of Class 1, SPS) is automatically established when the slave is defined as DP-V1 slave from the master (Set Prm).

The MSAC2-connection (engineering and control tools) is dynamic. Only one connection can be established.

### ■ Master Class services

#### • Master Class 1 services

Following services are supported:

- „MSAC1 Read“ read data record (addressed by slot and index)
- „MSAC1 Write“ write data record (addressed by slot and index)
- „MSAC1 Alarm“ transfer of alarm from slave to master (DP-V2 timestamp)

Following services aren't supported:

- „MSAC1 Status“ transfer of status signal from slave to master

#### • Master Class 2 services

Following services are supported:

- „MSAC2 Initiate“ connection build-up
- „MSAC2 Abort“ connection termination
- „MSAC2 Read“ read data record (addressed by slot and index)
- „MSAC2 Write“ write data record (addressed by slot and index)

This service „MSAC2DataTransport“ is not supported yet. This service is thought for a acyclic data exchange and is defined by general profiles (manufacturer independent).

### ■ Supported fault message

	Error code 1	Fault reason
read	Access.Invalid slot	access to wrong slot
	Access.Invalid index	access to wrong index
write	Access.Invalid slot	access to inadmissible slot
	Access.Invalid index	access to inadmissible index
	Access.write length	data record length too small or too long
	Access.invalid parameter	invalid write value
	Access.access denied	no write access allowed (EEPROM inaccessible), commissioning active: <ul style="list-style-type: none"> <li>• on local control station <i>or</i></li> <li>• over USB-interface <i>or</i></li> <li>• on other PROFIBUS channel</li> </ul>
	Application write error	slot.Index can only be read

■ Slot and index assignment

Assignment slot 1		
index	write	data record
0		manufacturer
1	no	data of actuator
2		firmware version
3-5	-----	unused
6	yes	tag number actuator
7-8	-----	unused
9		speed and torque – continuous speed setting
10		speed and torque – 7-step speed setting
11		control and structure code
12		PROFIBUS
13		control signals
14	yes	Stroke-speed curve – 7-step speed setting (only PROFITRON/HiMod)
15		process controller (only PROFITRON/HiMod)
16		Positioner with split range function (only PROFITRON/HiMod)
17		travel-positioning time-curve (only PROFITRON/HiMod)
19		acknowledgment
20		observing standard assignment
21		observing "PG-assignment"
22		former errors
23	no	binary and analog inputs
24		PNO redundancy and timestamp
25		actual diagnosis data
26		maintenance limits for diagnosis data
27	yes	maintenance intervals (only PROFITRON/HiMod)
28	-----	unused
29		SIPOS 7 PROFITRON/HiMod-parameters (only PROFITRON/HiMod)
30	yes	Data/time (only PROFITRON/HiMod)
31		SIPOS 7 special parameters
32-39	-----	unused
40	yes	Torque measurement flange: connection (only PROFITRON/HiMod)
41		Torque measurement flange: zero adjust (only PROFITRON/HiMod)
42	no	Torque measurement flange: current torque and offset (only PROFITRON/HiMod)
43	yes	Additional gear: setting (only PROFITRON/HiMod)
44	no	Additional gear: proposed signaling gear setting (only PROFITRON/HiMod)
45		Test operation (only PROFITRON/HiMod)
46	yes	Stroke-speed curve – continuous speed setting (only PROFITRON/HiMod)

Assignment Slot 2 (only with PROFITRON/HiMod)			
index	write	data record	
0		output torque graph 1	travel position in direction CLOSE
1			output torque in direction CLOSE
2			travel position in direction OPEN
3		output torque in direction OPEN	
4		output torque graph 2	travel position in direction CLOSE
5	no		output torque in direction CLOSE
6			travel position in direction OPEN
7		output torque in direction OPEN	
8		output torque graph 3	travel position in direction CLOSE
9			output torque in direction CLOSE
10			travel position in direction OPEN
11		output torque in direction OPEN	
12	yes	torque graph recording control	
13	no	torque graph recording status	

For the composition of the data records see attachment "Data records PROFIBUS DP-V1".

■ Write permissions

Depending on the redundancy type, there are different write access rights for Master Class 1 "MSAC1 Write":

- for SIPOS redundancy, both channels have write access,
- for PNO redundancy, only the PRIMARY channel has write access.

For "MSAC1 Write"/"MSAC2 Write" every participant has write access.

Control over the access shall be performed via the observing and control system (e.g. SIMATIC PDM via authorization: maintenance and specialist).

Simultaneous access via "MSAC1 Write"/"MSAC2 Write" is not possible.

### 6.7.1 I&M Function (Identification and maintenance function)

The I&M data can be read using index 255 (any slot).  
The data can be read via MSAC1 and MSAC2.

In the I&M 0 block, the following data can be read.

Designation	Size [byte]	Data type	Value
HEADER	10	Manufacturer-specific	Is not used => assign with 0x00
MANUFACTURER_ID	2	Unsigned 16	321
ORDER_ID	20	Visible String	Order no.
SERIAL_ID	16	Visible String	Serial number
HARDWARE_REVISION	2	Unsigned 16	Low-Byte (Byte 1): Bit 0 = 1-channel Bit 1 = 2-channel Bit 2 = SPC3 Bit 3 = VPC3 Bit 4 = MPI Bit 5-7 = 0  HighByte (Byte 0)= 0
SOFTWARE_REVISION	4	1 char, 3 unsigned 8	Firmware version e.g. 3.02 Byte 0 = ,V' Byte 1 = 3 Byte 2 = 02
REV_COUNTER	2	Unsigned 16	Counter for write access to customer parameters.
PROFIL_ID	2	Unsigned 16	0xF600 (does not support any profile)
PROFIL_SPECIFIC_TYPE	2	Unsigned 16	0x0000 (does not support any profile)
IM_VERSION	2	2 unsigned 8	Version of the I&M function profile (1.1) Byte 0: 1 Byte 1: 1
IM_SUPPORTED	2	Unsigned 16	Bit 0 to 15: 0 (I&M 0 only)

## 6.8 Redundancy

In order to increase the reliability of the installation when actuators are used with PROFIBUS interface, the PROFIBUS board can be supplied in a 2-channel version (redundant) as an option.

In this case, the ASIC, the driver devices, the opto isolator and the DC/DC converter are separately provided on the PROFIBUS board for each channel.

SEVEN supports two different redundancy types:

- **SIPOS redundancy** (see 6.9)  
**Actuator decides** which channel is active (PRIMARY) and may operate the actuator.  
This redundancy type is selected if no PrmCmd telegram was received within the SetPrm telegram.
- **PNO redundancy** (see 6.10.1)  
**The master decides** which channel is active (PRIMARY) and may operate the actuator.  
This redundancy type is selected if a Prm\_Cmd block was received within the SetPrm telegram.  
Switching over to SIPOS redundancy is only possible via software reset or via power off/on.

After switching on, the actuator is always in the "SIPOS redundancy" mode.

### 6.8.1 Telegrams and bus addresses

The two channels can be configured for different user data telegrams.

The station address for both channels can be selected freely (even the same address for both channels is possible).

## 6.8.2 Start-up behavior

After switching on the actuator, the PROFIBUS communication is in the "start-up" state.

In this state, there is only one actuator communicating on the bus. The channels cyclically change between "communicates at the bus" and "does not communicate at the bus".

The communicating channel is always assigned the address of channel 1 (PRIMARY address).

The change first occurs after 2 s. This interval doubles after each change until the maximum interval of 32 s has been reached.

The PROFIBUS communication remains in the "start-up" state, until the master switches one of the channels to the "Data Exchange" state. This channel will then become the active channel (PRIMARY).

Once the first channel is in the "Data Exchange" state, the second channel on the bus will also be active.

During the "Start-up" state, an MSAC2 connection may be established. The change over to the other channel is only performed once the MSAC2 connection was terminated.

## 6.8.3 PZD area (process data) and "AUMA-process image"

Only the active channel (PRIMARY) can write to outputs. The outputs which the passive channel (BACKUP) writes to are only stored and are not passed on to the control electronics until a changeover is made to this channel.

Inputs, on the other hand, can be read by both channels.

## 6.8.4 PKW area (parameter ID value of PPO1 and PPO2)

The PKW area of the outputs can be written by both channels. The PKW areas of both channels are evaluated.

### ■ Writing parameters

Write access to parameters is only allowed to the active channel (PRIMARY).

Exception: If the data in the PKW area are identical, the passive channel (BACKUP) receives the same read back via the PKW area of the inputs as the active channel (PRIMARY).

### ■ Reading parameters

Both channels can read out parameters. It is also possible that channel 1 reads different parameters than channel 2.

If both channels read the same parameters, they receive the same data in the PKW area of the inputs.

## 6.9 SIPOS redundancy

The channel which is the first to enter the cyclic user data communication ("Data Exchange") when the actuator is switched on is the active channel (PRIMARY). Via this channel, read and write access to the actuator is possible. This includes process mode, i.e. the drive is moved via this channel. The second channel is the passive channel (BACKUP), via which only data is sent from the actuator to the digital control system. The digital control system therefore can only observe the actuator via this passive channel but cannot move it.

By means of the status word, the digital control system is able to determine which channel is the active one.

### 6.9.1 MSAC1 (Master slave acyclic-communication of class 1)

If both channels are parameterized with "DP-V1 Enable" (see section 6.2) 2 acyclic connections are active. However writing an index on both channels simultaneously is not possible.

### 6.9.2 Changeover criteria

A changeover to the other channel is necessary whenever data is no longer being exchanged over the active channel.

This is the case if the following conditions apply:

- Set Prm" or "Set Cfg" during "Data Exchange"  
(In order to avoid changeover collisions, a changeover delay is provided (approx. 60 ms delay time), i.e. if the active channel leaves the user data exchange mode with "Set Prm"/"Set Cfg" and returns to user data exchange within the changeover delay time, a changeover is not performed.)
- Master failure
- Loss of DP connection (cable break)
- ASIC defect
- Fail-Safe or Global-Control-Clear (Actuator remain "Data Exchange")



A response monitoring function has to be parameterized to ensure that failure of the master or a cable break is detected (see section 6.2)!

#### Sequence:

If a changeover criterion occurs, a changeover to the passive channel is performed, if a user data communication is possible on this channel.

If no channel is selected as the active channel, the actuator behaves as described in section 6.2.

## 6.10 DP-V2 extension

### 6.10.1 PNO- redundancy

The PNO redundancy is described in the "Specification Slave redundancy", order no. 2.212.

This redundancy type has two communication channels. One channel is the so-called PRIMARY, the other channel is the BACKUP:

#### ■ PRIMARY

- Evaluates the input data of the cyclic data exchange. The actuator can be controlled via this channel.
- The MSAC1 connection is active.
- An MSAC2 connection can be established; MSAC2-Read and MSAC2-Write are supported.
- The BACKUP channel also sends diagnosis data.

#### ■ BACKUP

- Does **not** evaluate the input data of the cyclic data exchange. The actuator **cannot** be controlled via this channel.
- The MSAC1 connection is **not** active.
- An MSAC2 connection can be established; MSAC2-Read and MSAC2-Write are supported.

Via a PmCmd block in the SetPm telegram (see 6.10.1.2), the master indicates which channel will be the PRIMARY.

There are two redundancy types within the PNO redundancy:

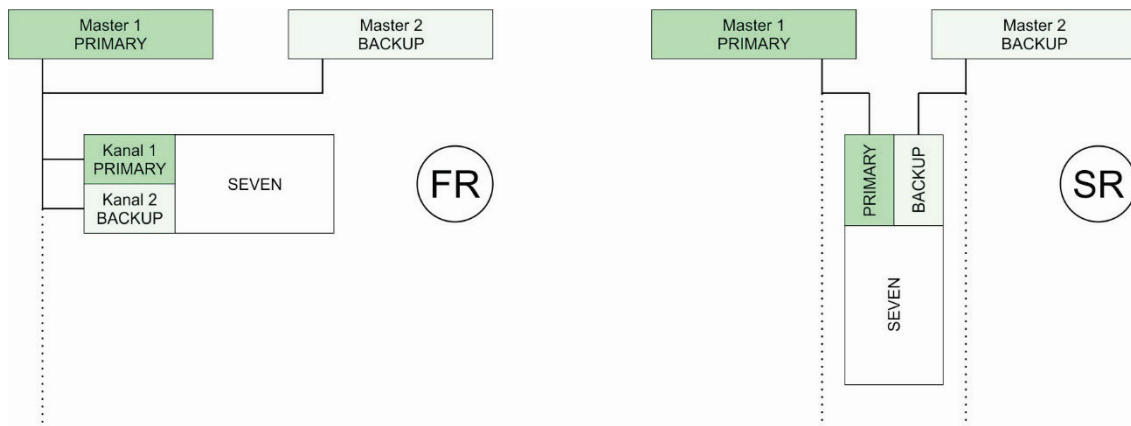
#### ■ Flying Redundancy (FR)

- No cable redundancy, master redundancy possible.
- The master never communicates via the BACKUP channel.
- The BACKUP address is: PRIMARY address + 64  
→ PRIMARY address must be less than 62.

#### ■ System Redundancy (SR)

- Cable redundancy and master redundancy possible.
- The master can communicate with both the PRIMARY and the BACKUP slave.
- The addresses of BACKUP and PRIMARY may be identical.

System redundancy (SR) is set as default. The flying redundancy is set via the PmCmd block (see 6.10.1.2).



Example of the structure for FR or SR, in this case shown with master redundancy. The PRIMARY master communicates with the slaves and forwards the data to the BACKUP master. Should the PRIMARY master fail, the masters swap roles and the BACKUP master becomes PRIMARY master.

Communication start-up behavior, see section 6.8.2.

### 6.10.1.1 Setup of the slave address

Setup of the slave address (see chapter 5).

Note the following for PNO redundancy:

- Address channel 1 = PRIMARY address
- Address channel 2 = BACKUP address

### 6.10.1.2 Prm Cmd

The PrmCmd block is part of the SetPrm telegram.

Byte	Bit position								Designation
	7	6	5	4	3	2	1	0	
0	0	0	0	0	1	0	0	0	Block length = 0x08
1	0	0	0	0	0	0	1	0	Structure type = 0x02
2	0	0	0	0	0	0	0	0	Slot = 0x0
3	seq	seq	seq	seq	seq	reserve	reserve	reserve	Specifier
4	reserve	Master State Clear	reserve	Check Properties	Start_MSAC1S	Stop_MSAC1S	Primary Request	reserve	Function
5	reserve	reserve	reserve	reserve	Address Offset64	Address Change	Start/Stop MSAC1S used	PrimaryReq MS0_MS1 used	Properties
6									Output_Hold_Time high-byte
7									Output_Hold_Time low-byte

Output\_Hold\_Time: 1 = 10ms

- **Flying Redundancy (FR)**  
Selected by AddressOffset64=1 and AddressChange=1.
- **System Redundancy (SR)**  
Selected by AddressOffset64=0 and AddressChange=1.

System redundancy (SR) is set as default.



### 6.10.1.3 Extended diagnosis (Red\_Status, Prm\_Cmd\_Ack)

If the PNO redundancy is active, the actuator sends the extended diagnosis (Red\_Status and Prm\_Cmd\_Ack).

Within the Red\_Status, the states of both PRIMARY and BACKUP channel are described.

As soon as the status of one of the two channels changes, the PRIMARY channel sends a top priority response telegram within the cyclic data exchange. The master then reads the diagnosis data with the new states.

If the master sends a PrmCmd, the slave responds with a PrmCmdAck in the diagnosis data.

Byte	Red_Status	Prm_Cmd_Ack
0	Headerbyte = 0x08	Headerbyte = 0x08
1	Status_Type = 0x9F	Status_Type = 0x9E
2	Slot_Number = 0	Slot_Number = 0
3	Specifier	Specifier
4	Function	Function
5	Red_State_1 (this channel)	Red_State_1 (this channel)
6	Red_State_2 (other channel)	Red_State_2 (other channel)
7	Red_State_3 (not used)	Red_State_3 (not used)

#### Function

- Bit 0: Reserve
- Bit 1: PrimaryRequest
- Bit 2: Stop\_MSAC1S
- Bit 3: Start\_MSAC1S
- Bit 4: Check\_Properties
- Bit 5: Reserve
- Bit 6: Master\_State\_Clear
- Bit 7: Reserve

#### Red\_State\_1 and Red\_State\_2

- Bit 0: This channel is BACKUP
- Bit 1: This channel is PRIMARY
- Bit 2: Hardware is defective
- Bit 3: This channel is in Data Exchange
- Bit 4: Master\_State\_Clear
- Bit 5: Baud rate was found
- Bit 6: Time monitoring for switchover is active: OutputHoldTime (TOH) was started.

### 6.10.2 Clock synchronization and timestamp

Events within the actuator can be assigned a timestamp and be sent to the master with a process alarm.

To ensure that all messages within a plant can be sorted chronologically, the clocks of all devices have to be synchronized. Therefore, the master cyclically sends the current time to all slaves.

Activation of timestamp and clock synchronization:

1. Master activates timestamp and selects messages for timestamp via UserParameter block
2. Master sends ClockSync interval via structured parameter block (time AR)
3. Master cyclically sends TimeEvent and ClockValue telegrams (clock synchronization)
4. Actuator (slave) sends start-up data of the timestamp (current status of the messages)

Sending timestamped messages:

1. Actuator (slaves) sends top priority response telegram in Data Exchange mode
2. Master reads diagnosis data with the process alarm and the sent data record (slot/index)
3. Master acknowledges the alarm
4. Master reads the sent data record and evaluates timestamped information

### 6.10.2.1 Activating the timestamp

The UserPrmData block is part of the SetPrm telegram.

The timestamp is activated via byte 1 of the user data in the UserPrmData block.

The UserPrmData is embedded in a structured block (see GSD file).

The following data is defined within the user data of the block:

Byte. Bit	Value	Name of parameters	Type	Value range
0	<b>Setpoint valid</b>		Unsigned8	0 ... 1
	0	deactivated		
	1	activated		
1	<b>Activate timestamp</b>		Unsigned8	0 ... 1
	0	deactivated		
	1	activated		
2	<b>Enable individual messages</b>			
2.0		End position CLOSE	Bit	0 ... 1
2.1		End position OPEN	Bit	0 ... 1
2.2		tripping torque CLOSE reached	Bit	0 ... 1
2.3		tripping torque OPEN reached	Bit	0 ... 1
2.4		Ready+remote	Bit	0 ... 1
2.5		Sum fault	Bit	0 ... 1
2.6		Fault power supply (low or excessive voltage)	Bit	0 ... 1
2.7		Reserve	Bit	0 ... 1
3	<b>Reserve</b>		Unsigned8	

The individual messages are stored within the data record as follows:

- **incoming message** at flank 0→1
- **outgoing message** at flank 1→0

### 6.10.2.2 Time AR parameter block

The "Time AR" parameter block is part of the SetPrm telegram.

By means of this telegram, the master indicates the intervals for time synchronization.

The structure of the telegram conforms to the DP-V1 standard.

Byte	Bit position								Designation
	7	6	5	4	3	2	1	0	
0									Structure length
1	0	0	0	0	1	0	0	0	Structure type
2	0	0	0	0	0	0	0	0	Slot
3	0	0	0	0	0	0	0	0	Reserved
4-5									Clock_Sync_Interval Zeitbasis 10 ms
6-9	Seconds ( $2^{31}..0$ )								CS Delay Time (kann entfallen)
10-13	Split seconds ( $2^{31}..0$ ) Unit $1/(2^{32})$ seconds								

Clock\_Sync\_Interval: The interval times (1 s, 10 s, 1 min and 10 min) are supported.

### 6.10.2.3 ClockValue telegram

The time synchronization is transmitted in 2 steps:

- Master sends TimEvent
- Master sends ClockValue telegram with the time specification when the TimeEvent telegram was sent.

Byte	Bit position								Description
	7	6	5	4	3	2	1	0	
0-3	Seconds ( $2^{31}..0$ ) since 1.1.1900 0:00.00 or since 7.2.2036 6:28:16 if value < 0x9dff4400								Clock_Value of Time_Event (TE)
4-7	Split seconds ( $2^{31}..0$ ) Unit $1/(2^{32})$ seconds								
8-11	Seconds ( $2^{31}..0$ ) since 1.1.1900 0:00.00 or since 7.2.2036 6:28:16 if value < 0x9dff4400								Clock_Value previous TE
12-15	Split seconds ( $2^{31}..0$ ) Unit $1/(2^{32})$ seconds								
16	C	CV				Reserved			Clock_Value_Status1
17	ANH	SWT	Reserve d	CR		Reserve d		SYF	Clock_Value_Status2

### 6.10.2.4 Process alarm

The alarm is sent with the diagnosis telegram.

The actuator only supports the process alarm.

Byte	Meaning	Value range
0	Header byte Bit 0...5: Block length including the header byte Bit 6...7: Alarm message ID	Fixed 08
1	Alarm type = process alarm	Fixed 2
2	Slot	Fixed 0
3	Alarm specifier Bit 0...2: Alarm type Bit 3...7: Sequence number	Bit 0...2 = 00
4	Timestamp state Bit 2: Buffer overflow Bit 5: Timestamp reset	
5	Data record to be read	100...115
6	Number of messages within the data record	1...17
7	Data structure Delta_Trigger_Discrete	Fixed 13

### 6.10.2.5 Reading the data record

The data record (slot 0 index 100 to 115) indicated in the process alarm can be read after acknowledging the alarm.

Up to 17 messages can be contained in a data record.

A message within the data record consists of 14 bytes.

A message either contains

- a timestamped message (byte 0 = 1) or
- a special message (byte 0 >= 128).

Byte.Bit	Value	Name of parameters	Type	Value range
0	<b>Type of message</b>		Unsigned8	1, 2, 128 ... 135
	1 0x01	Delta_Trigger_Discrete (timestamped message)		
	2 0x02	Time_Trigger_Discrete (timestamped message)		
	128 0x80	Startup data Status (coded in byte 3) = 1 => start Status = 0 => end		
	132 0x84	Timestamp end Status (in byte 3) = 1 => start of timestamp interruption Status = 0 => end of timestamp interruption		
	133 0x85	Buffer overflow Status (in byte 3) = 1 => no buffer for messages available Status = 0 => buffers available		
	134 0x86	Channel switchover for redundancy Status (in byte 3) = 1 => start of switchover Status = 0 => end of switchover		
	135 0x87	Information loss for redundancy Status (in byte 3) = 1 => start of information loss Status = 0 => end of information loss		
1	<b>Slot</b>		Unsigned8	0
2	<b>Message (for byte 0 = 1)</b>		Unsigned8	0 ... 7
	1	End position CLOSE		
	2	End position OPEN		
	3	tripping torque CLOSE reached		
	4	tripping torque OPEN reached		
	5	Ready+remote		
	6	Sum fault		
	7	Fault power supply (low or excessive voltage)		
3.7	<b>Special message status</b>		Bit	0 / 1
	0	Message not active (outgoing)		
	1	Message active (incoming)		
4...5	<b>Not used</b>		Unsigned8	0
6	<b>Seconds since 1.1.1900 (bit 24...31)</b>		Unsigned8	0 ... 255
7	Seconds since 1.1.1900 (bit 16...23)		Unsigned8	0 ... 255
8	Seconds since 1.1.1900 (bit 8...15)		Unsigned8	0 ... 255
9	Seconds since 1.1.1900 (bit 0...7)		Unsigned8	0 ... 255
10	<b>Split seconds 1/2<sup>32</sup> (Bit 24...31)</b>		Unsigned8	0 ... 255
11	Split seconds 1/2 <sup>32</sup> (Bit 16...23)		Unsigned8	0 ... 255
12	Split seconds 1/2 <sup>32</sup> (Bit 8...15)		Unsigned8	0 ... 255
13	Split seconds 1/2 <sup>32</sup> (Bit 0...7)		Unsigned8	0 ... 255

### 6.10.2.6 Timestamp and redundancy

Timestamped messages are sent on the PRIMARY channel only.

Timestamped messages are buffered during a channel switchover and sent to the master once the switchover is complete. In case of buffer overflow, the startup data is sent.

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ParNo	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		HiMod		Remark
						2S.70	2S.73	2S.70	2S.73	
9		status word 3 (SW3)			unsigned16	r	r	r	r	
	bit 4	travel dependent freely adjustable positioning times (travel-positioning time-curve) enabled		1 = yes; 0 = no						
	bit 5	Bluetooth available		1 = yes; 0 = no						
	bit 6	customer variant subject to charges		1 = yes; 0 = no						
	bit 7	customer variant subject to charges enabled		1 = yes; 0 = no						
	bit 8	electronic temperature sensor available		1 = yes; 0 = no						
	bit 9	non-intrusive position encoder available 2) 3)		1 = yes; 0 = no						
	bit 10	travel dependent freely adjustable positioning times (stroke-time curve) valid		1 = yes; 0 = no						
	bit 11	add-on PCB AI2/AO2 enabled		1 = yes; 0 = no						
	bit 13	error remote source		1 = yes; 0 = no						
	bit 14	keep actual_process value (if the "process setpoint" control source has failed)		1 = yes; 0 = no						
	bit 15	approach fixed setpoint value (if the "process setpoint" control source has failed)		1 = yes; 0 = no						only with process controller
10		status word 1 (ZSW1)			unsigned16	r	r	r	r	
		standard		Siemens PG (see ParNo 109)						
	bit 0	ready + remote		1 = yes; 0 = no						
	bit 1	EMERGENCY operating possible		1 = yes; 0 = no						
	bit 2	sum fault signal		1 = yes; 0 = no						
	bit 3	motor lock active via mode input		1 = yes; 0 = no						
	bit 4	factory programming OK		1 = yes; 0 = no						
	bit 5	end positions OK		1 = yes; 0 = no						
	bit 6	actuator parameterization OK		1 = yes; 0 = no						
	bit 7	commissioning local OK		1 = yes; 0 = no						
	bit 8	hand wheel/crank operated 2) 3)		1 = yes; 0 = no						
	bit 9	remote active		1 = yes; 0 = local active						
	bit 10	actuator in end position CLOSE		1 = yes; 0 = no						
	bit 11	actuator in end position OPEN		1 = yes; 0 = no						
	bit 12	tripping torque CLOSE reached		1 = yes; 0 = no						
	bit 13	tripping torque OPEN reached		1 = yes; 0 = no						
	bit 14	actuator running in CLOSE direction		1 = yes; 0 = no						
	bit 15	actuator running in OPEN direction		1 = yes; 0 = no						
11		status word 2 (ZSW2)			unsigned16	r	r	r	r	
	bit 0	command „EMERGENCY“ active		1 = yes; 0 = no						
	bit 1	intermediate contact CLOSE active		1 = yes; 0 = no						
	bit 2	intermediate contact OPEN active		1 = yes; 0 = no						
	bit 3	PROFIBUS-channel 1 is active channel		1 = yes; 0 = no						
	bit 4	PROFIBUS-channel 2 is active channel		1 = yes; 0 = no						
	bit 5	warning motor temperature 2)		1 = yes; 0 = no						
	bit 6	motor protection active		1 = yes; 0 = no						
	bit 7	motor warranty present		1 = yes; 0 = no						
	bit 8	maintenance necessary		1 = yes; 0 = no						
	bit 9	PROFIBUS-channel 1 present		1 = yes; 0 = no						
	bit 10	PROFIBUS-channel 2 present		1 = yes; 0 = no						
	bit 11	positioner with split-range functionality enabled		1 = yes; 0 = no						
	bit 12	travel dependent output speed adjustment (speed curve) enabled		1 = yes; 0 = no						
	bit 13	analog output speed setpoint enabled		1 = yes; 0 = no						
	bit 14	positioner enabled		1 = yes; 0 = no						
	bit 15	process controller enabled		1 = yes; 0 = no						
12		actual duty			unsigned8	r	r	r	r	
	0 ... 13	(see ParNo 110)								
13		actual_position value			integer16	r	r	r	r	
		0.01% OPEN								
14		actual_process value			integer16					
		(0.01%)								
1)	r = read									
										3) not for 2SQ7
										2) not for 2SG7

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ParNo	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		PROFITRON 1)		HIMod	Remark
						2S.70 2S.73	2S.75	2S.70 2S.73	2S.75 2S.78		
15		actual output speed		actual positioning time	unsigned8	r	r	r	r		7-step speed setting (for continuous setting see ParNo 631)
	0	1.25 rpm		80 $\frac{\text{sec}}{\text{90}^\circ}$							
	1	1.75 rpm		56 $\frac{\text{sec}}{\text{90}^\circ}$							
	2	2.50 rpm		40 $\frac{\text{sec}}{\text{90}^\circ}$							
	3	3.50 rpm		28 $\frac{\text{sec}}{\text{90}^\circ}$							
	4	5.00 rpm		20 $\frac{\text{sec}}{\text{90}^\circ}$							
	5	7.00 rpm		14 $\frac{\text{sec}}{\text{90}^\circ}$							
	6	10.0 rpm		10 $\frac{\text{sec}}{\text{90}^\circ}$							
	7	14.0 rpm									
	8	20.0 rpm									
	9	28.0 rpm									
	10	40.0 rpm									
	11	56.0 rpm									
	12	80.0 rpm									
	13	112 rpm									
	14	160 rpm									
	15	0 rpm									
16		motor temperature 2)			integer16	r	r	r	r		
		0.01°C									
17		DC-link voltage converter [V]			unsigned16	r	r	r	r		
18		analog input AI1 + analog input AI2			unsigned32						
	0 ... 15	analog input 1: 0-10000 scaling, 0=0mA, 10000=20mA, independent of parameterization									
	16 ... 31	analog input 2: 0-10000 scaling, 0=0mA, 10000=20mA, independent of parameterization									
19		binary input , independent of parameterization high/low active			unsigned16						
	0	binary input CLOSE				r	r	r	r		
	1	binary input OPEN				r	r	r	r		
	2	binary input STOP				r	r	r	r		
	3	binary input EMERGENCY				r	r	r	r		
	4	binary input Mode				r	r	r	r		
20		baudrate channel 1			unsigned8	r	r	r	r		
	0	no data exchange									
	1	9.6 kbit/s									
	2	19.2 kbit/s									
	3	45.45 kbit/s									
	4	93.75 kbit/s									
	5	187.5 kbit/s									
	6	500 kbit/s									
	7	1500 kbit/s									
21		baudrate channel 2			unsigned8	r	r	r	r		
	0 ... 7	(see ParNo 20)									
22		status channel 1			unsigned8	r	r	r	r		
	0	„Wait Prrm“ (no bus parameterization)									
	1	„Wait Cfg“ (no bus configuration)									
	2	„Data Exchange“ (user data)									
	6	„Fail-Safe“									
	10	„GC-Clear“									
23		status channel 2			unsigned8	r	r	r	r		
	0 ... 10	(see ParNo 22)									
24		PROFIBUS identification number			unsigned16	r	r	r	r		
	0..65535										

1) r = read

2) not for 2SG7

ParNo	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		HiMod		Remark
						2S.70	2S.73	PROFITRON 1)	2S.75	
25	0	binary input , according parameterization high/low active			unsigned16					
	1	binary input CLOSE				r	r	r	r	
	2	binary input OPEN				r	r	r	r	
	3	binary input STOP				r	r	r	r	
	4	binary input EMERGENCY								
	5	binary input Mode								
	6	no signal analog input AI1								
	6	no signal analog input AI2								
26		analog input AI1			unsigned16					
		0-10000 scaling, according parameterization (ParNo. 108 or at the graphics display)								
27		analog input AI2			unsigned16					
		0-10000 scaling, according parameterization (ParNo. 108 or at the graphics display)								
29		electronics temperature			signed16					
		(1 = 0.1°C)								
30		switching cycles per hour			unsigned16	r	r	r	r	
31		relative operational time			unsigned8	r	r	r	r	
32		number of switching cycles			unsigned32	r	r	r	r	
33		number of travel dependence cut-offs			unsigned16	r	r	r	r	
34		number of torque dependence cut-offs			unsigned16	r	r	r	r	
35		electronics unit operating hours			unsigned32	r	r	r	r	
36		motor/gear unit operating hours			unsigned16	r	r	r	r	
38		number of write access attempts to customer parameters			unsigned16	r	r	r	r	
46		setpoint from DCS (setpoint before adaptation to valve curve)			signed16					only with activated valve curve adaptation
		0-10000 scaling (1 = 0.01% OPEN)								
47		actual valve to DCS (actual value after adaptation to valve curve; in controlled state = flow rate)			signed16					
		0-10000 scaling (1 = 0.01% OPEN)								
50		valve maintenance limits:			unsigned32	r	r	r	r	
		switching cycles								
		torque cut-offs			unsigned16	r	r	r	r	
		motor operating hours			unsigned16	r	r	r	r	
60	bit 0	torque curves recording possible 2) 3)			unsigned16					
	bit 1	curve recording curve 1 active								
	bit 2	curve recording curve 2 active								
	bit 3	curve recording curve 2 active								
61		number of recorded curves (first curve) 2) 3)			unsigned16					
62		number of recorded curves (second curve) 2) 3)			unsigned16					
63		number of recorded curves (third curve) 2) 3)			unsigned16					
65		run time determined by the actuator in direction CLOSE from 100 % OPEN to 0 % OPEN			unsigned16	r	r	r	r	
	0 ... 65535 (1 = 0.1 sec)									
66		run time determined by the actuator in direction OPEN from 0% OPEN to 100% OPEN			unsigned16	r	r	r	r	
	0 ... 65535 (1 = 0.1 sec)									
67		move in revolutions/stroke (for non-intrusive position encoder) 2) 3)			unsigned32	r	r	r	r	
	0 ... 4294967295 (1 = 0.1 rev/stroke)									

1) r = read

2) not for 2SG7

3) not for 2SQ7

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						2S.70 2S.73	2S.75	PROFITRON 1)	2S.70 2S.73 2S.75 2S.78	
70		fault signal 1			unsigned16	r	r	r	r	
	bit 0	PB-ASIC defect		1 = yes; 0 = no						
	bit 1	Flash Memory defect		1 = yes; 0 = no						
	bit 2	RAM defect		1 = yes; 0 = no						
	bit 3	EEPROM defect		1 = yes; 0 = no						
	bit 4	internal voltage faulty		1 = yes; 0 = no						
	bit 5	Watchdog active		1 = yes; 0 = no						
	bit 6	high current converter		1 = yes; 0 = no						
	bit 8	main supply voltage fault		1 = yes; 0 = no						
	bit 9	high voltage		1 = yes; 0 = no						
	bit 10	low voltage		1 = yes; 0 = no						
	bit 11	moved too far		1 = yes; 0 = no						
	bit 12	no signal potentiometer		1 = yes; 0 = no						
	bit 13	no signal motor temperature 2)		1 = yes; 0 = no						
71		fault signal 2			unsigned16	r	r	r	r	
	bit 0	analog input AI2   > 21 mA or   < 3.6 mA (live zero)		1 = yes; 0 = no						
	bit 1	analog input AI1   > 21 mA or   < 3.6 mA (live zero)		1 = yes; 0 = no						
	bit 2	analog output AO1 defect		1 = yes; 0 = no						
	bit 4	no bus communication channel 1 and 2		1 = yes; 0 = no						
	bit 5	blocked in move		1 = yes; 0 = no						
	bit 6	run time error		1 = yes; 0 = no						
	bit 7	motor temperature too high		1 = yes; 0 = no						
	bit 8	no signal fiber optics		1 = yes; 0 = no						
	bit 9	fault Bluetooth		1 = yes; 0 = no						
	bit 10	fault electronic temperature		1 = yes; 0 = no						
	bit 11	no signal non-intrusive position encoder 2) 3)		1 = yes; 0 = no						
	bit 12	no communication non-intrusive position encoder 2) 3)		1 = yes; 0 = no						
	bit 14	no signal standstill sensor 2) 3)		1 = yes; 0 = no						
72		fault signal 3			unsigned16	r	r	r	r	
	bit 0	fault analog PCB AI2/AO2		1 = yes; 0 = no						
	bit 2	fault analog output AO2		1 = yes; 0 = no						
73		fault signal 4			unsigned16	r	r	r	r	
	bit 0	no signal analog output AO2		1 = yes; 0 = no						
	bit 2	no signal torque switch		1 = yes; 0 = no						
80 -		former errors (last 5 errors)			unsigned32	r	r	r	r	
84		bit 0-7 (see ParNo 71, bit 0-7)		1 = yes; 0 = no						
		bit 8-23 (see ParNo 70, bit 0-13)		1 = yes; 0 = no						
		bit 24-29 (see ParNo 71, bit 8-14)		1 = yes; 0 = no						

1) r = read

2) not for 2SG7

3) not for 2SQ7



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ParNo	Value	Name of parameters Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		PROFITRON 1)		HIMod	Remark
					2S.70 2S.73	r+w	2S.70 2S.73	r+w		
100		output speed in direction CLOSE	positioning time in direction CLOSE	unsigned8	r+w	r+w	r+w	r+w		7-step speed setting (for continuous setting see ParNo 632 – 635)
	0	1.25 rpm	80 <sup>sec</sup> / <sub>g<sup>o</sup></sub> *							
	1	1.75 rpm	56 <sup>sec</sup> / <sub>g<sup>o</sup></sub> *							
	2	2.50 rpm	40 <sup>sec</sup> / <sub>g<sup>o</sup></sub> *							
	3	3.50 rpm	28 <sup>sec</sup> / <sub>g<sup>o</sup></sub> *							
	4	5.00 rpm	20 <sup>sec</sup> / <sub>g<sup>o</sup></sub> *							
	5	7.00 rpm	14 <sup>sec</sup> / <sub>g<sup>o</sup></sub> *							
	6	10.0 rpm	10 <sup>sec</sup> / <sub>g<sup>o</sup></sub> *							
	7	14.0 rpm								
	8	20.0 rpm								
	9	28.0 rpm								
	10	40.0 rpm								
	11	56.0 rpm								
	12	80.0 rpm								
	13	112 rpm								
	14	160 rpm								
101		output speed in direction OPEN	positioning time in direction OPEN	unsigned8	r	r	r+w	r+w		
	0 ... 14	(see ParNo 100)								
102		EMERGENCY output speed in direction CLOSE	positioning time in direction CLOSE by EMERGENCY	unsigned8	r	r	r+w	r+w		
	0 ... 14	(see ParNo 100)								
103		EMERGENCY output speed in direction OPEN	positioning time in direction OPEN by EMERGENCY	unsigned8	r	r	r+w	r+w		
	0 ... 14	(see ParNo 100)								
104		tripping torque in end position CLOSE in % of ParNo 199 2)	100% T <sub>c max.</sub>	unsigned8	r+w	r+w	r+w	r+w		
	0	100% T <sub>c max.</sub>								
	1	90% T <sub>c max.</sub>								
	2	80% T <sub>c max.</sub>								
	3	70% T <sub>c max.</sub>								
	4	60% T <sub>c max.</sub>								
	5	50% T <sub>c max.</sub>								
	6	40% T <sub>c max.</sub> (only 2S.70.. and 2S.73..)								
	7	30% T <sub>c max.</sub> (only 2S.70.. and 2S.73..)								
105		tripping torque in end position OPEN in % of ParNo 199 2)		unsigned8	r+w	r+w	r+w	r+w		
	0 ... 7	(see ParNo 104)								
106		end position range CLOSE from 0% to parameter value		unsigned16	r	r	r+w	r+w		
	200 ... 2000	(0.01% OPEN)								
107		end position range OPEN from 100% to parameter value		unsigned16	r	r	r+w	r+w		
	8000 ... 9800	(0.01% OPEN)								

1) r = read; r+w = read+write

2) for 2SG7 and 2SQ7 only 100% T<sub>c max.</sub> readable

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ParNo	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		HIMod		Remark
						2S.70 2S.73	2S.75	PROFITRON 1)	2S.75 2S.78	
108		structure code 1			unsigned16					
	bit 0	clockwise rotation CLOSE		1 = yes; 0 = anti-clockwise		r	r	r	r	from firmware 3.13 only read
	bit 1	travel dependent cut-off in end position CLOSE		1 = yes; 0 = torque dependence cut-off		r	r	r	r	
	bit 2	travel dependent cut-off in end position OPEN		1 = yes; 0 = torque dependence cut-off		r	r	r	r	
	bit 3	close tightly		1 = yes; 0 = no		r	r	r	r	for 2SG7 / 2SQ7 fixed at 0
	bit 4-5	control source fault				r+w	r+w	r+w	r+w	
	0	keep position								
	1	move to EMERGENCY position								only with process controller
	2	keep actual process value								
	3	move to fixed setpoint								
	bit 6	„NC“ on binary input EMERGENCY		1 = yes; 0 = "NO"		r	r	r+w	r+w	
	bit 7	„NC“ on binary inputs (OPEN, CLOSE, STOP, Mode)		1 = yes; 0 = "NO"		r	r	r+w	r+w	
	bit 9	analog input AI1 setpoint input with live zero 4 to 20 mA		1 = yes; 0 = with dead zero 0 to 20 mA		r	r	r+w	r+w	
	bit 10	analog input AI1 setpoint with slope rising		1 = yes; 0 = with slope falling		r	r	r+w	r+w	
	bit 11	analog input AI2 with live zero 4 to 20 mA		1 = yes; 0 = with dead zero 0 to 20 mA		r	r	r+w	r+w	
	bit 12	analog input AI2 with rising slope		1 = yes; 0 = with slope falling		r	r	r+w	r+w	
	bit 13	analog output AO1 with actual process value		1 = yes; 0 = with actual position value		r	r	r+w	r+w	
	bit 14	analog output AO1 with live zero 4 to 20 mA		1 = yes; 0 = with dead zero 0 to 20 mA		r	r	r+w	r+w	
	bit 15	analog output AO1 with rising slope		1 = yes; 0 = with slope falling		r	r	r+w	r+w	
109		structure code 2			unsigned16					
	bit 0	motor heating ON		1 = yes; 0 = no		r+w	r+w	r+w	r+w	
	bit 1	ZSW1 with Siemens PG assignment		1 = yes; 0 = standard						
	bit 2	local blocked		1 = yes; 0 = no						
	bit 3	analog output AO2 active		1 = yes; 0 = no						
	bit 4	analog output AO2 with actual process value		1 = yes; 0 = with actual position value						
	bit 5	analog output AO2 with live zero 4 to 20 mA		1 = yes; 0 = with dead zero 0 to 20 mA		r	r	r+w	r+w	
	bit 6	analog output AO2 with rising slope		1 = yes; 0 = with slope falling						
	bit 8 - 11	valve curve adaptation		0 = without						
		1 = equal percentage								
		2 = quick opening								
	bit 12	feedback		1 = flow rate; 0 = valve position		r	r	r+w	r+w	
110		remote control			bit					
	0	analog: process controller AI1			unsigned8					
	1	fieldbus: process controller								only with process controller
	2	internal: process controller with fixed setpoint value								
	3	analog: positioner AI1								
	4	fieldbus: positioner								only with positioner
	6	binary: permanent contact signal				r+w	r+w	r+w	r+w	
	7	fieldbus: permanent contact signal				r+w	r+w	r+w	r+w	
	8	binary: pulse contact signal				r+w	r+w	r+w	r+w	
	10	binary: proportional operation				r+w	r+w	r+w	r+w	
	11	fieldbus: proportional operation				r+w	r+w	r+w	r+w	only with positioner
	12	analog: process controller AI2								only with process controller
	13	analog: positioner AI2								only with positioner
	14	time control								from firmware 3.13
111		alternative control mode			unsigned8					
	255	not active (else, see ParNo 110)				r	r	r+w	r+w	
112		EMERGENCY position			unsigned16					
		0 ... 10000 (0.01% OPEN)				r	r	r+w	r+w	
1)		r = read; r+w = read+write								

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ParNo	Value	Name of parameters		Type	ECOTRON 1)		PROFITRON 1)		HIMod	Remark
		Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7		2S.70 2S.73	2S.75	2S.70 2S.73	2S.75 2S.78		
113		intermediate contact CLOSE		unsigned16	r	r	r+w	r+w	r+w	
		0 ... 10000 (0.01% OPEN)								
114		intermediate contact OPEN		unsigned16	r	r	r+w	r+w	r+w	
		0 ... 10000 (0.01% OPEN)								
115		rise time		unsigned8	r	r	r+w	r+w	r+w	
		1 ... 100 (0.1 sec), for 2S.75.. and 2S.78.. 1 ... 200								
116		dc-brake		unsigned8	r	r	r+w	r+w	r+w	
		0 ... 250 %								
117		retry to get over torque block when out of travel limit areas		unsigned8	r+w	r+w	r+w	r+w	r+w	
		0 ... 5 (0 = no repeated start)								
118	bit 0	separate mounting		bit	r+w	r+w	r+w	r+w	r+w	
		control source fault		unsigned8	r+w	r+w	r+w	r+w	r+w	from firmware 3.10
	0	keep position								
	1	move to EMERGENCY position								
	2	keep actual process value								
	3	move to fixed setpoint								
	4	execute last command								only with process controller
120		slave-no. channel 1		unsigned8	r	r	r	r	r	
		0 - 125 (default address = 126)								
121		slave-no. channel 2		unsigned8	r	r	r	r	r	
		(see ParNo 120)								
125		PZD 3 = ParNo transfer		unsigned8	r+w	r+w	r+w	r+w	r+w	
126		PZD 4 = ParNo transfer		unsigned8	r+w	r+w	r+w	r+w	r+w	
127		PZD 5 = ParNo transfer		unsigned8	r+w	r+w	r+w	r+w	r+w	
128		PZD 6 = ParNo transfer		unsigned8	r+w	r+w	r+w	r+w	r+w	
129		output signal sets		unsigned8	r+w	r+w	r+w	r+w	r+w	
	1	Set 1	Output 1 Travel end OPEN, NO	Output 2 Travel end CLOSE, NO	Output 3 Torque CL/OP reached, NC	Output 4 Ready + Remote, NO	Output 5 Warning motor temp 2), NC			
	2	Set 2	End position OPEN, NO	End position CLOSED, NO	Blinker, NO	Ready + Remote, NO	Warning motor temp 2), NC			
	3	Set 3	End position OPEN, NO	End position CLOSED, NO	Fault NC	Local, NO	Warning motor temp 2), NC			
	4	Set 4	Travel end OPEN, NO	Travel end CLOSE, NO	Ready + Remote, NO	Torque OPEN reached, NC	Torque CLOSE reached, NC			

1) r = read; r+w = read+write

2) for 2SG7 "Fault motor temperature"

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ParNo	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		HiMod		Remark
						2S.70 2S.73	2S.75	PROFITRON 1)	2S.70 2S.73	
130	bit 0-6	output 1			unsigned8	r	r	r+w	r+w	
	0	not used								
	1	end position CLOSED								
	2	end position OPEN								
	3	torque CLOSE reached								
	4	torque OPEN reached								
	5	torque CL/OP reached								
	6	fault								
	7	blinker								
	8	ready								
	9	ready+remote								
	10	local								
	11	intermediate contact CL								
	12	intermediate contact OP								
	13	fault motor temperature								
	14	warning motor temp. 2)								
	15	fault external voltage								
	16	maintenance								
	17	run indication CLOSE								
	18	run indication OPEN								
	19	run indication CLOSE/OPEN								
	20	blinker + end position CL								
	21	blinker + end position OP								
	22	travel end CLOSE								
	23	travel end OPEN								
	bit 7	NC (low-active)								
131	output 2	output 2		1 = yes; 0 = NO (high active)	unsigned8	r	r	r+w	r+w	from firmware 3.10
		(see ParNo 130)								
132	output 3	output 3			unsigned8	r	r	r+w	r+w	
		(see ParNo 130)								
133	output 4	output 4			unsigned8	r	r	r+w	r+w	
		(see ParNo 130)								
134	output 5	output 5			unsigned8	r	r	r+w	r+w	
		(see ParNo 130)								
135	output 6	output 6			unsigned8	r	r	r+w	r+w	
		(see ParNo 130)								
136	output 7	output 7			unsigned8			r+w	r+w	
		(see ParNo 130)								
137	output 8	output 8			unsigned8			r+w	r+w	
		(see ParNo 130)								
138	warning motor temperature at ... °C 2)	warning motor temperature at ... °C 2)			integer16	r+w	r+w	r+w	r+w	
	-20°C ... 155°C (0.01°C)									

1) r = read; r+w = read+write 2) not for 2SG7

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ParNo	Value	Name of parameters		Type	ECOTRON 1)		PROFITRON 1)		HIMod	Remark
		Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7		2S.70 2S.73	2S.75	2S.70 2S.73	2S.75 2S.78		
139		language on the Display		unsigned8					r+w	
	0	German							r+w	
	1	English							r+w	
	2	French							r+w	
	3	Spanish							r+w	
	4	Italian							r+w	
	5	Polish							r+w	
	6	Czech							r+w	
	7	Swedish							r+w	
	8	Netherlands							r+w	
	9	Portuguese							r+w	
	10	Finnish							r+w	
	11	Chinese							r+w	
	12	American							r+w	
	13	Russian							r+w	
	14	Danish							r+w	
	15	Turkish							r+w	
	16	Romanian							r+w	
	17	Arabic							r+w	
	18	Slovakian							r+w	
	19	Greek							r+w	
	20	Brazilian							r+w	
	21	Japanese							r+w	
	22	Egyptian							r+w	
	23	Bulgarian							r+w	
	24	Indian							r+w	
	25	Korean							r+w	
	26	Croatian							r+w	
	27	Norwegian							r+w	
	28	Slovene							r+w	
	29	Hungarian							r+w	
	30	Thai							r+w	
	31	Franconian							r+w	
140		customer variant 0 ... 127		unsigned8					r+w	
150		interval value switching cycles		unsigned32					r+w	
	0 ... 30 Mio. (for 2S.75.. and 2S.78.)								r+w	
	0 ... 100000 (for 2S.70.. and 2S.73.)								r+w	
151		interval value torque dependent out-offs		unsigned16					r+w	
	0 ... 20000 (for 2S.75.. and 2S.78.)								r+w	
	0 ... 10000 (for 2S.70.. and 2S.73.)								r+w	
152		interval value motor operating hours		unsigned16					r+w	
	0 ... 2500								r+w	
160		tag number		Visible-String					r+w	
161		0 - 3. digit							r+w	
162		4 - 7. digit							r+w	
163		8 - 11. digit							r+w	
164		12 - 15. digit							r+w	
		16 - 19. digit							r+w	

1) r+w = read+write

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ParNo	Value	Name of parameters		Type	ECOTRON 1)		HiMod		Remark
		Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7		2S.70 2S.73	2S.75	PROFITRON 1) 2S.70 2S.73	2S.75 2S.78	
180	bit 0 bit 1 bit 8 - 15	control word torque curve 2) 3) start recording cancel recording select curve No. 0 = curve 1 1 = curve 2 2 = curve 3	1 = yes; 0 = no 1 = yes; 0 = no					r+w	
181		run time in direction CLOSE for control via proportional operation		unsigned16				r+w	
182		0 or 50 ... 32760 (1=0.1s) run time in direction OPEN for control via proportional operation	0 = run time determined by the actuator (ParNo 65) is used	unsigned16				r+w	
185		0 or 50 ... 32760 (1=0.1s) process controller: amplification Kp -100 ... 100 (1 = 0.01%)	0 = run time determined by the actuator (ParNo 66) is used	signed16				r+w	
186		process controller: reset time Tn 0 ... 30000 (1 = 0.1 s)		unsigned16				r+w	
187		process controller: fixed setpoint value 0 ... 200 (1 = 0.5 %)		unsigned8				r+w	
197		function control 1 delete former errors		unsigned8	w	w		w	
199		max. tripping torque (T <sub>c,max</sub> [Nm]) 0 ... 6000 (1 = 1 Nm)		unsigned16	r	r		r	
200		manufacturer		Visible-String	r	r		r	
201		0. - 3. digit							
202		4. - 7. digit							
203		8. - 11. digit							
204		0. - 8. digit		unsigned32	r	r		r	
205		9. - 12. digit		unsigned16	r	r		r	
206		0. - 3. digit		Visible-String	r	r		r	
207		4. - 7. digit							
208		8. - 11. digit							
211		12. - 15. digit							
212		firmware version		Visible-String	r	r		r	
213		0. - 3. digit							
215		4. - 7. digit							
216		8. - 11. digit							
221		0. - 8. digit		unsigned32	r	r		r	
222-		9. - 12. digit		unsigned16	r	r		r	
230		speed curve - position 1 0 ... 100 (% OPEN; 0 = end position CLOSE) speed curve - position 2-10 (see ParNo 221)		unsigned8				r+w	

1) r = read; w = write; r+w = read+write

2) not for 2SG7

3) not for 2SQ7

ParNo	Value	Name of parameters		Type	ECOTRON 1)		HIMod		Remark						
		Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7		2S.70 2S.73	2S.75	PROFITRON 1) 2S.70 2S.73	2S.75 2S.78							
231		speed curve - speed 1		unsigned8				r+w	7-step speed setting (for continuous setting see ParNo 636 – 645)						
	0	1.25 rpm	positioning time 1												
	1	1.75 rpm	80 <sup>sec</sup> / <sub>90°</sub>												
	2	2.50 rpm	56 <sup>sec</sup> / <sub>90°</sub>												
	3	3.50 rpm	40 <sup>sec</sup> / <sub>90°</sub>												
	4	5.00 rpm	28 <sup>sec</sup> / <sub>90°</sub>												
	5	7.00 rpm	20 <sup>sec</sup> / <sub>90°</sub>												
	6	10.0 rpm	14 <sup>sec</sup> / <sub>90°</sub>												
	7	14.0 rpm	10 <sup>sec</sup> / <sub>90°</sub>												
	8	20.0 rpm													
	9	28.0 rpm													
	10	40.0 rpm													
	11	56.0 rpm													
	12	80.0 rpm													
	13	112 rpm													
	14	160 rpm													
232-		speed curve - speed 2-10		unsigned8				r+w							
240		(see ParNo 231)													
241		speed – function selection		unsigned8				r+w							
	bit 0	speed curve setting: local via speed curve	1 = yes; 0 = parameterized OPEN/CLOSE speeds												
	bit 1	speed curve setting: remote via speed curve	1 = yes; 0 = parameterized OPEN/CLOSE speeds												
	bit 2	speed curve setting: local via external speed setpoint	1 = yes; 0 = parameterized OPEN/CLOSE speeds												
	bit 3	speed curve setting: remote via external speed setpoint	1 = yes; 0 = parameterized OPEN/CLOSE speeds												
	bit 4	external speed setpoint via analog input A11	1 = yes; 0 = via analog input A12												
	bit 7	activate curve position / curve speed	1 = yes												
245		split range function: current value 1		unsigned8				r+w	smaller than current value 2						
	0 ... 200 (1 = 0.1 mA)														
246		split-range function: position value 1		unsigned8				r+w	unequal position 2						
	0 ... 100 (1 = 1% Open)														
247		split-range function: current value 2		unsigned8				r+w	larger than current value 1						
	0 ... 200 (1 = 0.1 mA)														
248		split-range function: position value 2		unsigned8				r+w	unequal position 1						
	0 ... 100 (1 = 1% Open)														
250		travel-positioning time-curve		unsigned8				r+w							
	bit 0	active at "local operation"	1 = yes; 0 = no												
	bit 1	active at "remote operation"	1 = yes; 0 = no												
	bit 2	active at "EMERGENCY operation"	1 = yes; 0 = no												
	bit 7	position values/ - positioning times activate	1 = yes; 0 = no												
251		travel-positioning time-curve: position 1								unsigned8				r+w	
	0 ... 100 (% OPEN; 0 = end position CLOSE)														
252-		travel-positioning time-curve: position 2 up to position 5		unsigned8				r+w							
255		(see ParNo 251)													
256		travel-positioning time-curve: positioning time 1		unsigned16				r+w							
	0 ... 60000 (1 = 1 sec)														
257-		travel-positioning time-curve: positioning time 2 up to positioning time 5		unsigned16				r+w							
260		(see ParNo 256)													
261-		travel-positioning time-curve: position 6 up to position 10		unsigned8				r+w							
265		(see ParNo 251)													
266-		travel-positioning time-curve: positioning time 6 up to positioning time 10		unsigned16				r+w							
270		(see ParNo 256)													
271		travel-positioning time-curve: EMERGENCY factor		unsigned16				r+w							
	1 ... 100 (1 = 0.1)														

1) r+w = read+write

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ParNo	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		HIMod		Remark
						2S.70 2S.73	2S.75	PROFITRON 1)	2S.70 2S.75 2S.78	
280		minimum dead zone positioner 0.2 ... 5%			unsigned16			r+w	r+w	
281		20 ... 500 (1 = 0.01%) maximum dead zone positioner 0.2 ... 5%			unsigned16			r+w	r+w	
282		20 ... 500 (1 = 0.01%) delay time undervoltage signal 0 ... 25 sec			unsigned8	r+w	r+w	r+w	r+w	
283		0 ... 250 (1 = 0.1 sec) masking value for ZSW1			unsigned16	r+w	r+w	r+w	r+w	
284		masking value for ZSW2			unsigned16	r+w	r+w	r+w	r+w	
300		customer parameter 1 for customer variant 0 ... 65534			unsigned16	r+w	r+w	r+w	r+w	
301		customer parameter 2 for customer variant 0 ... 65534			unsigned16	r+w	r+w	r+w	r+w	
302		customer parameter 3 for customer variant 0 ... 65534			unsigned16	r+w	r+w	r+w	r+w	
303		customer parameter 4 for customer variant 0 ... 65534			unsigned16	r+w	r+w	r+w	r+w	
400		redundancy.type			unsigned8	r	r	r	r	
401	bit 0	PNO redundancy								
	bit 1	PNO system redundancy								
402	0	POWER ON								
	1	S_WAITING								
	2	S_PRIMARY								
	3	C_CONFIGURE								
	4	BACKUP								
	5	BTP PARTNER ACK								
	6	BTP SWITCHOVER								
	7	BTP_PRM_CMD								
	8	BTP_DX								
	9	PRIMARY								
	10	PTB PARTNER ACK								
	11	PTB SWITCHOVER								
12	NIL									
402		redundancy status channel 2			unsigned16	r	r	r	r	
403	0 ... 12 (see ParNo 401)	OutputHoldTime (1 = 1ms)			unsigned16	r	r	r	r	
404	status timestamp channel 1				unsigned32	r	r	r	r	
	bit 0	timestamp started								
	bit 1	buffer overflow								
	bit 13	time AR parameter block included								
	bit 14	master in "OPERATE" status								
	bit 15	USER_PRM_DATA received with TS-Enable								
	bit 16	time synchronization received (ClockValue telegram), primary only								
405	status timestamp channel 2				unsigned32	r	r	r	r	
	bit 0	timestamp started								
	bit 1	buffer overflow								
	bit 13	time AR parameter block included								
	bit 14	master in "OPERATE" status								
	bit 15	USER_PRM_DATA received with TS-Enable								
	bit 16	time synchronization received (ClockValue telegram), primary only								

1) r = read; r+w = read+write



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ParNo	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		HiMod		Remark
						2S.70	2S.73	PROFITRON 1)	2S.70 2S.73	
410		lowest adjustable tripping torque			unsigned8	r	r	r	r	
		30 ... 100 (1 = 1% max. tripping torque)								
411		highest adjustable tripping torque			unsigned8	r	r	r	r	
		30 ... 100 (1 = 1% max. tripping torque)								
500		special parameters			unsigned16	r+w	r+w	r+w	r+w	from firmware 3.05
	bit 0	deactivate "Maintenance required" signal	1 = yes; 0 = no							
	bit 1	deactivate DC link voltage limitation	1 = yes; 0 = no							
	bit 2	deactivate runtime monitoring	1 = yes; 0 = no							
	bit 3	deactivate end position adaptation for torque-dependent cut-off	1 = yes; 0 = no							
502		test operation			unsigned8			r+w	r+w	
	0	normal operation								
	1	test operation active								
503		test operation: runtime CLOSE			unsigned16			r+w	r+w	
	0 ... 65530 (1 = 0.1 sec)									
504		test operation: pause CLOSE			unsigned16			r+w	r+w	
	0 ... 65530 (1 = 0.1 sec)									
505		test operation: runtime OPEN			unsigned16			r+w	r+w	
	0 ... 65530 (1 = 0.1 sec)									
506		test operation: pause OPEN			unsigned16			r+w	r+w	
	0 ... 65530 (1 = 0.1 sec)									
520		data: year			unsigned16			r+w	r+w	from firmware 3.04
	1 ... 99									
521		data: month			unsigned8			r+w	r+w	
	1 ... 12									
522		data: day			unsigned8			r+w	r+w	
	1 ... 31									
523		time: hours			unsigned8			r+w	r+w	
	0 ... 23									
524		time: minutes			unsigned8			r+w	r+w	
	0 ... 59									
525		time: seconds			unsigned8			r+w	r+w	
	0 ... 59									
530		Mode input			unsigned8			r+w	r+w	from firmware 3.05
	0	no function								
	1	interlock LOCAL/REMOTE								from firmware 3.08
	2	enable motor operation								from firmware 3.10
	3	enable LOCAL								
533		display orientation			unsigned8			r+w	r+w	from firmware 3.07
	0	standard								
	1	turned 90° to the left								from firmware 3.07
	2	turned 180°								
	3	turned 90° to the right								from firmware 3.07
534		lower limit value for wire break detection at analog inputs			unsigned8			r+w	r+w	from firmware 3.05
	0 ... 36 (1 = 0.1 mA)									
535		upper limit value for wire break detection at analog inputs			unsigned8			r+w	r+w	
	200 ... 220 (1 = 0.1 mA)									
540		bit parameter			unsigned8			r+w	r+w	from firmware 3.03
	bit 0	Bluetooth activated	1 = yes; 0 = no							
	bit 1	USB deactivated	1 = yes; 0 = no							from firmware 3.13
550		state			unsigned8	r	r	r	r	
	bit 0	actuator rotates (pulses from standstill sensor or nIP available)	1 = yes; 0 = no							
	bit 1	standstill sensor detected	1 = yes; 0 = no							

1) r = read; r+w = read+write

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ParNo	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		HiMod		Remark
						2S.70 2S.73	2S.75	PROFITRON 1) 2S.70 2S.73	2S.75 2S.78	
551		status signal at binary outputs			unsigned8	r	r	r	r	
	bit 0	binary output 1		1 = active; 0 = not active						
	bit 1	binary output 2		1 = active; 0 = not active						
	bit 2	binary output 3		1 = active; 0 = not active						
	bit 3	binary output 4		1 = active; 0 = not active						
	bit 4	binary output 5		1 = active; 0 = not active						
	bit 5	binary output 6		1 = active; 0 = not active						
	bit 6	binary output 7		1 = active; 0 = not active						
	bit 7	binary output 8		1 = active; 0 = not active						
552		analog output AO1			unsigned16	r	r	r	r	
		0-10000 scaling, 0=0mA, 10000=20mA, independent of parameterization								
553		analog output AO2			unsigned16			r	r	
		0-10000 scaling, 0=0mA, 10000=20mA, independent of parameterization								
555		end position speed			unsigned8	r+w	r+w	r+w	r+w	from firmware 3.05
	0	normal								
	1	quick start								
	2	quick start/stop								
556		DCS acceptance time			unsigned8	r+w	r+w	r+w	r+w	
	0 ... 255 (1 = 0.1 s)									
557		torque measurement flange: connection 2)			unsigned8					
	0	not available								
	1	at analog input AI1								
	2	at analog input AI2								
558		torque measurement flange: current torque 2)			signed16			r	r	
	-32768 ... +32767 (1 = 0.1 Nrm)									
559		torque measurement flange: offset 2)			signed16			r	r	
	-32768 ... +32767 (1 = 0.1 Nrm)									
560	bit 0	torque measurement flange: perform zero adjustment (current torque is stored as offset) 2)		1 = yes, 0 = no	unsigned8				w	
560	0	torque measurement flange: zero adjust 2)			unsigned8				w	
	1	do not perform zero adjustment								
	1	perform zero adjustment (current torque is stored as offset)								
561	0	additional.gear: gear_type 2) 3)			unsigned8			r+w	r+w	from firmware 3.05
	1	not available								
	1	rotary gearbox								
	2	part-turn gearbox								
	3	linear thrust unit								
564		additional.gear: reduction ratio 2) 3)			unsigned16			r+w	r+w	
	rotary gearbox: 100 ... 10000 (1 = 0.01); part-turn gearbox: 1 ... 10000 (1 = 1)									
565		additional.gear: factor output/input torque 2) 3)			unsigned16			r+w	r+w	
	10 ... 50000 (rotary gearbox: 1 = 0.01; part-turn gearbox: 1 = 0.1)									
566		additional.gear: max. output torque 2) 3)			unsigned16			r+w	r+w	
	1 ... 50000 (rotary gearbox: 1 = 1 Nm; part-turn gearbox: 1 = 10 Nm)									
567		additional.gear: max. input speed 2) 3)			unsigned16			r+w	r+w	
	1 ... 1000 (1 = 1 rpm)									
568		additional.gear: spindle pitch 2) 3)			unsigned16			r+w	r+w	
	10 ... 1000 (linear thrust unit: 1 = 0.1 mm)									
569		additional.gear: factor input torque/output force 2) 3)			unsigned16			r+w	r+w	
	10 ... 1000 (linear thrust unit: 1 = 0.1)									
570		additional.gear: max. output force 2) 3)			unsigned16			r+w	r+w	
	1 ... 1000 (linear thrust unit: 1 = 1 kN)									
571		additional.gear: positioning angle 2) 3)			unsigned16			r+w	r+w	
	1 ... 360 (part-turn gearbox: 1 = 1 °)									

1) r = read; w = write; r+w = read+write

2) only for 2SA7.1 ... 2SA7.6

3) can be changed for user-defined additional gear

**List of parameters PROFIBUS DP**

**SEVEN**

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ParNo	Value	Name of parameters		Type	ECOTRON 1)		PROFITRON 1)		Remark
		Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7		2S.70 2S.73	2S.75	2S.70 2S.73	2S.75 2S.78	
572		additional gear: stroke 2) 3) 1 ... 10000 (linear thrust unit: 1 = 1 mm)		unsigned16		r+w	r+w		from firmware 3.05
573		additional gear: rev/stroke 2) 3) 1 ... 99000 (rotary gearbox: 1 = 0.1 rev./stroke)		unsigned32		r+w	r+w		
574		additional gear: proposed signaling gear setting 2) (1 = 0.1 rev./stroke)		unsigned32		r	r		
580		Bluetooth address	0 - 3. digit	Visible-String		r	r		
581			4 - 7. digit						
582			8 - 11. digit						
620		standby screen		unsigned8		r+w	r+w		from firmware 3.07
	0	standard							
	1	position							
	2	position+filling							
	3	position+bar+status							
	4	fast to LOCAL							
630		speed setting in steps or continuously		unsigned8	r	r	r		from firmware 3.10 continuous speed setting from firmware 3.08
	0	7-step setting							
	1	continuous setting							
631		actual speed		unsigned16	r	r	r		
	125 ... 1000 (1 = 0.1 % n <sub>max</sub> )								
632		output speed in direction CLOSE		unsigned16		r+w	r+w		(for 7-step setting see ParNo 100 – 103)
	125 ... 1000 (1 = 0.1 % n <sub>max</sub> )								
633		output speed in direction OPEN		unsigned16		r+w	r+w		
	125 ... 1000 (1 = 0.1 % n <sub>max</sub> )								
634		EMERGENCY output speed in direction CLOSE		unsigned16		r+w	r+w		
	125 ... 1000 (1 = 0.1 % n <sub>max</sub> )								
635		EMERGENCY output speed in direction OPEN		unsigned16		r+w	r+w		
	125 ... 1000 (1 = 0.1 % n <sub>max</sub> )								
636		speed curve - speed 1		unsigned16		r+w	r+w		
	125 ... 1000 (1 = 0.1 % n <sub>max</sub> )								
637-		speed curve - speed 2-10		unsigned16		r+w	r+w		
	125 ... 1000 (1 = 0.1 % n <sub>max</sub> )								
645		positioning time in direction CLOSE		unsigned32		r	r		
	(1 = 0.1 sec)								
646		positioning time in direction OPEN		unsigned32		r	r		
	(1 = 0.1 sec)								
647		positioning time in direction CLOSE by EMERGENCY		unsigned32		r	r		
	(1 = 0.1 sec)								
648		positioning time in direction OPEN by EMERGENCY		unsigned32		r	r		
	(1 = 0.1 sec)								
649		torque measurement flange + additional gear: current torque / current force (rotary gearbox and part-turn gearbox: 1 = 0.1 Nm; linear thrust unit: 1 = 0.1 kN)		signed32		r	r		from firmware 3.10
655		standby time		unsigned32		r+w	r+w		
	1 ... 1000 (1 = 1 min)								
657		activate standby		unsigned32		w	w		
658		activate standby screen		unsigned32		w	w		
659		torque measurement flange: reset zero adjustment (offset is set to zero) 2)	1 = yes; 0 = no	unsigned8		w	w		from firmware 3.11
660		torque measurement flange: measuring range 2)		unsigned8		r+w	r+w		
	0	±120 Nm (2SX7100-6A..)							
	1	± 500 Nm (2SX7100-6B..)							
	2	± 1000 Nm (2SX7100-6C..)							

1) r = read; w = write; r+w = read+write

2) only for 2SA7.1 ... 2SA7.6

3) can be changed for user-defined additional gear

List of parameters PROFIBUS DP

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ParNo	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		PROFITRON 1)		HIMod	Remark
						2S.70 2S.73	2S.75	2S.70 2S.73	2S.75 2S.78		
663		latching function of local control 0 = not activ; 1= activ			unsigned8			r+w	r+w		from firmware 3.12
670		time control: switching point 1 control signal			unsigned8			r+w	r+w		from firmware 3.13
	0	STOP									
	1	CLOSE									
	2	OPEN									
671-679		time control: switching point 2-10 control signal (see ParNo 670)			unsigned8			r+w	r+w		
680		time control: switching point 1 hour 0 ... 23			unsigned8			r+w	r+w		
681-689		time control: switching point 2-10 hour (see ParNo 680)			unsigned8			r+w	r+w		
690		time control: switching point 1 minute 0 ... 59			unsigned8			r+w	r+w		
691-699		time control: switching point 2-10 minute (see ParNo 690)			unsigned8			r+w	r+w		
700		switching control mode			unsigned8			r+w	r+w		
	0	Not active									
	1	binary input STOP									
	2	binary input EMERGENCY									

1) r+w = read+write

Byte.Bit	Value	Name of parameters		Part-turm actuator	Type	ECOTRON 1)		HIMod		Value range
		Rotary actuator	2SA7			2S.70	2S.73	2S.70	2S.73	
0.0	Data record (slot 1, index 0), "Manufacturer"									
total length 10 byte										
0.0	manufacturer									
16.0	ordering no.									
31.0	3 <sup>rd</sup> digit of the order number (type): rotary actuator "A"= 0, part-turm actuator "C" = 6, "Q" = 16									
32.0	5 <sup>th</sup> digit of the order number (operating mode): for ON-OFF "0" = 0, for positioning duty "3" = 3, for modulating duty "5" = 5, for continuous modulating duty "g" = 8 lowest range "A" = 0, "B" = 1, "C" = 2, "D" = 3, highest range "E" = 4									
33.0	6 <sup>th</sup> digit of the order number (tripping torque force range): lowest range "1" = 1, .... highest range "8" = 8									
34.0	9 <sup>th</sup> digit of the order number (output speed/ positioning time range): lowest range "A" = 0, "B" = 1, "C" = 2, "D" = 3, highest range "E" = 4									
35.0	13 <sup>th</sup> digit of the order number (electronics version): ECOTRON = 3, PROFITRON/HIMod = 4									
36.0	lowest adjustable speed									
	0	1.25	rpm							
	1	1.75	rpm							
	2	2.50	rpm							
	3	3.50	rpm							
	4	5.00	rpm							
	5	7.00	rpm							
	6	10.0	rpm							
	7	14.0	rpm							
	8	20.0	rpm							
	lowest positioning time									
		80	sec/90°							
		56	sec/90°							
		40	sec/90°							
		28	sec/90°							
		20	sec/90°							
		14	sec/90°							
		10	sec/90°							
37.0	highest adjustable speed									
	0	10.0	rpm							
	1	14.0	rpm							
	2	20.0	rpm							
	3	28.0	rpm							
	4	40.0	rpm							
	5	56.0	rpm							
	6	80.0	rpm							
	7	112	rpm							
	8	160	rpm							
	highest tripping torque									
	0	100%	T <sub>c,max.</sub>							
	1	90%	T <sub>c,max.</sub>							
	2	80%	T <sub>c,max.</sub>							
	3	70%	T <sub>c,max.</sub>							
	4	60%	T <sub>c,max.</sub>							
	5	50%	T <sub>c,max.</sub>							
	6	40%	T <sub>c,max.</sub> (only 2S.70.. and 2S.73..)							
	7	30%	T <sub>c,max.</sub> (only 2S.70.. and 2S.73..)							
38.0	highest adjustable tripping torque									
	0	100%	T <sub>c,max.</sub>							
	1	90%	T <sub>c,max.</sub>							
	2	80%	T <sub>c,max.</sub>							
	3	70%	T <sub>c,max.</sub>							
	4	60%	T <sub>c,max.</sub>							
	5	50%	T <sub>c,max.</sub>							
	6	40%	T <sub>c,max.</sub> (only 2S.70.. and 2S.73..)							
	7	30%	T <sub>c,max.</sub> (only 2S.70.. and 2S.73..)							
39.0	customer variant									
40.0	original serial number									
53.0	lowest adjustable tripping torque/force									
	0-7	(see byte bit 38.0)								
total length 54 byte										
Data record (slot 1, index 2), "Firmware version"										
0.0	firmware version									
9.0	firmware version									
total length 10 byte										
1) r = r = read; r+w = read+write										

Byte.Bit	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1) 2S.70 2S.73	PROFITRON 1) 2S.70 2S.73	HIMod 2S.75 2S.78	Value range
0.0	total length 20 byte	tag number			string [20]	r+w	r+w	r+w	
Data record (slot 1, index 6), "Tag number"									
0.0	output speed in direction CLOSE				unsigned16		r+w	r+w	125 ... 1000
2.0	output speed in direction OPEN				unsigned16		r+w	r+w	(1 = 0.1 % $f_{max}$ )
4.0	EMERGENCY output speed in direction CLOSE				unsigned16		r+w	r+w	(for 7-step setting
6.0	EMERGENCY output speed in direction OPEN				unsigned16		r+w	r+w	see slot 1, index 10)
8.0	tripping torque in end position CLOSE in % 2)				unsigned8		r+w	r+w	0 ... 7
	0	100% $T_c$ max.							
	1	90% $T_c$ max.							
	2	80% $T_c$ max.							
	3	70% $T_c$ max.							
	4	60% $T_c$ max.							
	5	50% $T_c$ max.							
	6	40% $T_c$ max. (only 2S.70.. and 2S.73..)							
	7	30% $T_c$ max. (only 2S.70.. and 2S.73..)							
9.0	tripping torque in end position OPEN in % 2)				unsigned8		r+w	r+w	
	0 ... 7	(see byte.bit 8.0)							
10.0	0 ... 5	retry to get over torque block when out of travel limit areas			unsigned8		r+w	r+w	0 ... 5
total length 11 byte									
Data record (slot 1, index 10), "Speed and torque – 7-step speed setting"									
0.0	output speed in direction CLOSE				unsigned8	r+w	r+w	r+w	0 ... 14
	0	positioning time in direction CLOSE							(for continuous setting
	1	1.25 rpm							see slot 1, index 9)
	2	1.75 rpm							
	3	2.50 rpm							
	4	3.50 rpm							
	5	5.00 rpm							
	6	7.00 rpm							
	7	10.0 rpm							
	8	14.0 rpm							
	9	20.0 rpm							
	10	28.0 rpm							
	11	40.0 rpm							
	12	56.0 rpm							
	13	80.0 rpm							
	14	112 rpm							
	15	160 rpm							
1.0	output speed in direction OPEN				unsigned8	r	r	r+w	
	0 ... 14	(see byte.bit 0.0)							
2.0	EMERGENCY output speed in direction CLOSE				unsigned8	r	r	r+w	
	0 ... 14	(see byte.bit 0.0)							
3.0	EMERGENCY output speed in direction OPEN				unsigned8	r	r	r+w	
	0 ... 14	(see byte.bit 0.0)							
4.0	tripping torque in end position CLOSE in % 2)				unsigned8	r+w	r+w	r+w	0 ... 7
	0 ... 7	(see slot 1, index 9, byte.bit 8.0)							
	0 ... 7	(tripping torque in end position OPEN in % 2)							
	0 ... 7	(see byte.bit 4.0)							
6.0	0 ... 5	retry to get over torque block when out of travel limit areas			unsigned8	r+w	r+w	r+w	0 ... 5
total length 7 byte									

1) r = read; r+w = read+write

2) for 2SG7 and 2SQ7 only 100%  $T_c$  max. readable

Byte:Bit	Value	Name of parameters		Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		PROFITRON 1)		HIMod	Value range
		Rotary actuator 2SA7				2S.70 2S.73	2S.75 2S.73	2S.70 2S.75	2S.73 2S.75		
Data record (slot 1, index 11), "Control and structure code"											
0.0		end position range CLOSE from 0% to parameter value			unsigned16	r	r	r+w	r+w	r+w	200 ... 2000 (1 = 0.01% OPEN)
2.0		end position range OPEN from 100% to parameter value			unsigned16	r	r	r+w	r+w	r+w	8000 ... 9800 (1 = 0.01% OPEN)
structure code 1											
4.1		analog input AI1 setpoint input with live zero 4 to 20 mA		1 = yes; 0 = with dead zero 0 to 20 mA	bit	r	r	r+w	r+w	r+w	0 ... 1
4.2		analog input AI1 setpoint with slope rising		1 = yes; 0 = with slope falling	bit	r	r	r+w	r+w	r+w	
4.3		analog input AI2 with live zero 4 to 20 mA		1 = yes; 0 = with dead zero 0 to 20 mA	bit	r	r	r+w	r+w	r+w	
4.4		analog input AI2 with rising slope		1 = yes; 0 = with slope falling	bit	r	r	r+w	r+w	r+w	
4.5		analog output AO1 with actual process value		1 = yes; 0 = with actual position value	bit	r	r	r+w	r+w	r+w	
4.6		analog output AO1 with live zero 4 to 20 mA		1 = yes; 0 = with dead zero 0 to 20 mA	bit	r	r	r+w	r+w	r+w	
4.7		analog output AO1 with rising slope		1 = yes; 0 = with slope falling	bit	r	r	r+w	r+w	r+w	
5.0		clockwise rotation CLOSE		1 = yes; 0 = anti-clockwise	bit	r	r	r	r	r	
5.1		travel dependence cut-off in end position CLOSE		1 = yes; 0 = torque dependence cut-off	bit	r	r	r	r	r	
5.2		travel dependence cut-off in end position OPEN		1 = yes; 0 = torque dependence cut-off	bit	r	r	r	r	r	
5.3		close tightly 2)		1 = yes; 0 = no	bit	r	r	r+w	r+w	r+w	0 ... 1
5.4 - 5.5		control source fault			bit	r+w	r+w	r+w	r+w	r+w	0 ... 3
0		keep position									
1		move to EMERGENCY position									
2		keep actual process value									
3		move to fixed setpoint									
5.6		.NC" on binary input EMERGENCY		1 = yes; 0 = "NO"	bit	r	r	r+w	r+w	r+w	0 ... 1
5.7		.NC" on binary inputs (OPEN, CLOSE, STOP, Mode)		1 = yes; 0 = "NO"	bit	r	r	r+w	r+w	r+w	0 ... 2
6.0 - 6.3		valve curve adaptation			4 bit						
0		without									
1		equal percentage									
2		quick opening									
6.4		feedback		1 = flow rate; 0 = valve position	bit			r+w	r+w	r+w	0 ... 1
structure code 2											
7.0		motor heating ON		1 = yes; 0 = no	bit	r+w	r+w	r+w	r+w	r+w	0 ... 1
7.1		ZSW1 with Siemens PG assignment		1 = yes; 0 = standard	bit	r+w	r+w	r+w	r+w	r+w	0 ... 1 (in position "remote")
7.2		local blocked		1 = yes; 0 = no	bit	r+w	r+w	r+w	r+w	r+w	0 ... 1
7.3		analog output AO2 active		1 = yes; 0 = no	bit	r	r	r+w	r+w	r+w	
7.4		analog output AO2 with actual process value		1 = yes; 0 = with actual position value	bit	r	r	r+w	r+w	r+w	
7.5		analog output AO2 with live zero 4 to 20 mA		1 = yes; 0 = with dead zero 0 to 20 mA	bit	r	r	r+w	r+w	r+w	
7.6		analog output AO2 with rising slope		1 = yes; 0 = with slope falling	bit	r	r	r+w	r+w	r+w	
8.0		remote control			unsigned8						0 ... 13
0		analog: process controller AI1						r+w	r+w	r+w	only with process controller
1		fieldbus: process controller						r+w	r+w	r+w	
2		internal: process controller with fixed setpoint value						r+w	r+w	r+w	
3		analog: positioner AI1						r+w	r+w	r+w	only with positioner
4		fieldbus: positioner						r+w	r+w	r+w	
7		binary: permanent contact signal				r+w	r+w	r+w	r+w	r+w	
6		fieldbus: permanent contact signal				r+w	r+w	r+w	r+w	r+w	
8		binary: pulse contact signal						r+w	r+w	r+w	only with positioner
10		binary: proportional operation						r+w	r+w	r+w	
11		fieldbus: proportional operation						r+w	r+w	r+w	
12		analog: process controller AI2						r+w	r+w	r+w	only with process controller
13		analog: positioner AI2						r+w	r+w	r+w	only with positioner
9.0		alternative control mode not active (else, see byte bit 8.0)			unsigned8	r	r	r	r	r	
10.0		EMERGENCY position			unsigned16	r	r	r+w	r+w	r+w	0 ... 10000 (1 = 0.01%)

1) r = read; r+w = read+write

2) for 2SG7 / 2SQ7 fixed at 0

Byte.Bit	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		HIMOD		Value range
						2S.70 2S.73	2S.75	PROFITRON 1)	2S.70 2S.73	
12.0		intermediate contact CLOSE			unsigned16	r	r	r+w	r+w	0 ... 10000 (1 = 0.01% OPEN)
14.0		intermediate contact OPEN			unsigned16	r	r	r+w	r+w	
16.0		rise time (for 2S.75.. and 2S.78..)			unsigned8	r	r	r+w	r+w	1 ... 100 (1 = 0.1 sec)
17.0		dc-brake			unsigned8	r	r	r+w	r+w	0 ... 250 %
18.0		warning motor temperature at ... °C 2)			integer16	r+w	r+w	r+w	r+w	-20°C ... 155°C (1 = 0.01°C)
20.0		language on the Display			unsigned8	r+w	r+w	r+w	r+w	0 ... 31
	0	German								
	1	English								
	2	French								
	3	Spanish								
	4	Italian								
	5	Polish								
	6	Czech								
	7	Swedish								
	8	Netherlands								
	9	Portuguese								
	10	Finnish								
	11	Chinese								
	12	American								
	13	Russian								
	14	Danish								
	15	Turkish								
	16	Romanian								
	17	Arabic								
	18	Slovakian								
	19	Greek								
	20	Brazilian								
	21	Japanese								
	22	Egyptian								
	23	Bulgarian								
	24	Indian								
	25	Korean								
	26	Croatian								
	27	Norwegian								
	28	Slovene								
	29	Hungarian								
	30	Thai								
	31	Franconian								
21.0		run time in direction CLOSE for control via proportional operation			unsigned16			r+w	r+w	0 or 50 ... 32760 (1 = 0.1 sec)
		run time in direction OPEN for control via proportional operation			unsigned16			r+w	r+w	
23.0		minimum dead zone positioner 0.2 ... 5%			unsigned16			r+w	r+w	20 ... 500 (1 = 0.01%)
27.0		maximum dead zone positioner 0.2 ... 5%			unsigned16			r+w	r+w	
29.0		delay time undervoltage signal 0 ... 25 sec			unsigned8	r+w	r+w	r+w	r+w	0 ... 250 (1 = 0.1 sec)
30.0		separate mounting			bit	r+w	r+w	r+w	r+w	0 ... 1
31.0		control source fault			unsigned8	r+w	r+w	r+w	r+w	0 ... 4
	0	keep position								
	1	move to EMERGENCY position								
	2	keep actual process value								
	3	move to fixed setpoint								
	4	execute last command								only with process controller

1) r = read; r+w = read+write

2) not for 2SG7



**Data records PROFIBUS DP-V1**

**SEVEN**

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Byte.Bit	Value	Name of parameters		Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		PROFITRON 1)		Value range
		Rotary actuator 2SA7	switching control mode			2S.70 2S.73	r+w	2S.70 2S.73	r+w	
32.0	0		not active		unsigned8	r+w	r+w	r+w	r+w	0 ... 2
	1		binary input STOP							
	2		binary input EMERGENCY							

total length 33 byte

**Data record (slot 1, index 12), "PROFIBUS"**

0.0	PZD 3 = ParNr (see attachment „List of parameters PROFIBUS DP“) transfer	unsigned8	r+w	r+w	r+w	r+w	1 ... 400
1.0	PZD 4 = ParNr (see attachment „List of parameters PROFIBUS DP“) transfer	unsigned8	r+w	r+w	r+w	r+w	
2.0	PZD 5 = ParNr (see attachment „List of parameters PROFIBUS DP“) transfer	unsigned8	r+w	r+w	r+w	r+w	
3.0	PZD 6 = ParNr (see attachment „List of parameters PROFIBUS DP“) transfer	unsigned8	r+w	r+w	r+w	r+w	
4.0	masking value for ZSW1	unsigned16	r+w	r+w	r+w	r+w	0 ... 65535
6.0	masking value for ZSW2	unsigned16	r+w	r+w	r+w	r+w	

total length 8 byte

**Data record (slot 1, index 13), "Control signals"**

0.0	output 1	unsigned8	r	r	r	r	0 ... 23
	not used						
	end position CLOSED						
	end position OPEN						
	torque CLOSE reached						
	torque OPEN reached						
	torque C/OP reached						
	fault						
	blinker						
	ready						
	ready+remote						
	local						
	intermediate contact CL						
	intermediate contact OP						
	fault motor temperature						
	warning motor temp. 2)						
	fault external voltage						
	maintenance						
	run indication CLOSE						
	run indication OPEN						
	run indication CLOSE/OPEN						
	blinker + end position CL						
	blinker + end position OP						
	travel end CLOSE						
	travel end OPEN						
0.7	NC (low-active)	bit					0 ... 1
1.0	output 2	unsigned8	r	r	r	r	0 ... 23
1.7	NC (low-active)	bit					0 ... 1
2.0	output 3	unsigned8	r	r	r	r	0 ... 23
2.7	NC (low-active)	bit					0 ... 1
3.0	output 4	unsigned8	r	r	r	r	0 ... 23
3.7	NC (low-active)	bit					0 ... 1
4.0	output 5	unsigned8	r	r	r	r	0 ... 23
4.7	NC (low-active)	bit					0 ... 1

1) r = read; r+w = read+write

Byte.Bit	Value	Name of parameters		Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		PROFITRON 1)		Value range
		Rotary actuator 2SA7				2S.70 2S.73	2S.75	2S.70 2S.73	2S.75 2S.78	
5.0	output 6			(see byte.bit 0.0)	unsigned8			r+W	r+W	0 ... 23
5.7	NC (low-active)			(see byte.bit 0.7)	bit					0 ... 1
6.0	output 7			(see byte.bit 0.0)	unsigned8			r+W	r+W	0 ... 23
6.7	NC (low-active)			(see byte.bit 0.7)	bit					0 ... 1
7.0	output 8			(see byte.bit 0.0)	unsigned8			r+W	r+W	0 ... 23
7.7	NC (low-active)			(see byte.bit 0.7)	bit					0 ... 1
8.0	output signal sets				unsigned8	r+W	r+W			1 ... 4
	1	Set 1	Output 1	Output 4	Output 5					
	2	Set 2	Travel end OPEN, NO	Ready + Remote, NO	Warning motor temp. NC 2)					
	3	Set 3	End position OPEN, NO	Ready + Remote, NO	Warning motor temp. NC 2)					
	4	Set 4	End position OPEN, NO	Local, NO	Warning motor temp. NC 2)					
			Travel end OPEN, NO	Torque OPEN reached, NC	Torque CLOSE reached, NC					

total length 9 byte

Data record (slot 1, index 14), "Stroke-speed curve - 7-step speed setting"

Index	Value	Type	ECOTRON 1)	PROFITRON 1)	Value range
0.0	position 1	unsigned8		r+W	0 ... 100 (% OPEN)
1.0	position 2	unsigned8		r+W	
2.0	position 3	unsigned8		r+W	
3.0	position 4	unsigned8		r+W	
4.0	position 5	unsigned8		r+W	
5.0	position 6	unsigned8		r+W	
6.0	position 7	unsigned8		r+W	
7.0	position 8	unsigned8		r+W	
8.0	position 9	unsigned8		r+W	
9.0	position 10	unsigned8		r+W	
10.0	speed/ positioning time 1	unsigned8		r+W	0 ... 14 (for continuous setting see slot 1, index 46)
0	1.25 rpm				
1	1.75 rpm				
2	2.50 rpm				
3	3.50 rpm				
4	5.00 rpm				
5	7.00 rpm				
6	10.0 rpm				
7	14.0 rpm				
8	20.0 rpm				
9	28.0 rpm				
10	40.0 rpm				
11	56.0 rpm				
12	80.0 rpm				
13	112 rpm				
14	160 rpm				
11.0	speed/ positioning time 2	unsigned8		r+W	
12.0	speed/ positioning time 3	unsigned8		r+W	
13.0	speed/ positioning time 4	unsigned8		r+W	
14.0	speed/ positioning time 5	unsigned8		r+W	
15.0	speed/ positioning time 6	unsigned8		r+W	
16.0	speed/ positioning time 7	unsigned8		r+W	
17.0	speed/ positioning time 8	unsigned8		r+W	
18.0	speed/ positioning time 9	unsigned8		r+W	
19.0	speed/ positioning time 10	unsigned8		r+W	

1) r+W = read+write

2) not for 2SG7

Byte.Bit	Value	Name of parameters		Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		HIMod		Value range
		Rotary actuator 2SA7				2S.70 2S.73	2S.75 2S.78	PROFITRON 1) 2S.70 2S.73	2S.75 2S.78	
20.0	local via speed curve				bit			r+w	r+w	0 ... 1
20.1	remote via speed curve				bit			r+w	r+w	
20.2	local via external speed setpoint				bit			r+w	r+w	
20.3	remote via external speed setpoint				bit			r+w	r+w	
20.4	external speed setpoint via analog input A11				bit			r+w	r+w	
total length 21 byte										
Data record (slot 1, index 15), "Process controller"										
0.0	fixed setpoint value (1 = 0.5 %)				unsigned8			r+w	r+w	0 ... 200
1.0	amplification Kp (1 = 0.01%)				signed16			r+w	r+w	-100 ... 100
3.0	reset time Tn (1 = 0.1 sec)				unsigned16			r+w	r+w	0 ... 30000
total length 5 byte										
Data record (slot 1, index 16), "Positioner with split range function"										
0.0	current value 1 (0.1mA)				unsigned8			r+w	r+w	0 ... 200
1.0	position value1 (1% Open)				unsigned8			r+w	r+w	0 ... 100
2.0	current value 2 (0.1mA)				unsigned8			r+w	r+w	0 ... 200
3.0	position value 2 (1% Open)				unsigned8			r+w	r+w	0 ... 100
total length 4 byte										
Data record (slot 1, index 17), "Stroke-time-curve"										
0.0	position 1				unsigned8			r+w	r+w	0 ... 100 (% OPEN)
1.0	position 2				unsigned8			r+w	r+w	
2.0	position 3				unsigned8			r+w	r+w	
3.0	position 4				unsigned8			r+w	r+w	
4.0	position 5				unsigned8			r+w	r+w	
5.0	positioning time 1				unsigned16			r+w	r+w	0 ... 60000 (1 = 1 sec)
7.0	positioning time 2				unsigned16			r+w	r+w	
9.0	positioning time 3				unsigned16			r+w	r+w	
11.0	positioning time 4				unsigned16			r+w	r+w	
13.0	positioning time 5				unsigned16			r+w	r+w	
15.0	active at "local operation"				bit			r+w	r+w	0 ... 1
15.1	active at "remote operation"				bit			r+w	r+w	
15.2	active at "EMERGENCY operation"				bit			r+w	r+w	
15.7	position values/ -positioning times activate				bit			r+w	r+w	
16.0	position 6				unsigned8			r+w	r+w	0 ... 100 (% OPEN)
17.0	position 7				unsigned8			r+w	r+w	
18.0	position 8				unsigned8			r+w	r+w	
19.0	position 9				unsigned8			r+w	r+w	
20.0	position 10				unsigned8			r+w	r+w	
21.0	positioning time 6				unsigned16			r+w	r+w	0 ... 60000 (1 = 1 sec)
23.0	positioning time 7				unsigned16			r+w	r+w	
25.0	positioning time 8				unsigned16			r+w	r+w	
27.0	positioning time 9				unsigned16			r+w	r+w	
29.0	positioning time 10				unsigned16			r+w	r+w	
31.0	EMERGENCY factor				unsigned8			r+w	r+w	0 ... 100 (1 = 0.1)
total length 32 byte										

1) r+w = read+write

2) for 2SG7 "Fault motor temperature"

Byte.Bit	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 / 2SQ7	Type	ECOTRON 1) 2S.70 2S.73	PROFITRON 1) 2S.70 2S.73	HIMod 2S.75 2S.78	Value range
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Data record (slot 1, index 19), "Acknowledgment"

0.0		control command			bit				
0.1		fault signal reset		1 = yes; 0 = not reset	bit				0 ... 1
0.2		maintenance carried out		1 = yes; 0 = not carried out	bit				
0.2		clear former errors		1 = yes; 0 = not clear	bit				
total length 1 byte									

Data record (slot 1, index 20/21), "Observing standard assignment / Siemens PG-assignment"

		Siemens PG (see slot 1, index 11, byte.bit 7.1)							
0.0		status word 1 (ZSW1) standard			bit				0 ... 1
0.1		hand wheel/crank operated 2) 3)	1 = yes; 0 = no	tripping torque CLOSE reached	bit	r	r	r	
0.2		remote active	1 = yes; 0 = local active	tripping torque OPEN reached	bit				
0.3		actuator in end position CLOSE	1 = yes; 0 = no	local active	bit				
0.4		actuator in end position OPEN	1 = yes; 0 = no	actuator in end position CLOSE	bit				
0.5		tripping torque CLOSE reached	1 = yes; 0 = no	runtime error	bit				
0.6		actuator running in CLOSE direction	1 = yes; 0 = no	actuator in end position OPEN	bit				
0.7		actuator running in OPEN direction	1 = yes; 0 = no	warning motor temperature 2)	bit				
1.0		ready + remote	1 = yes; 0 = no	not ready	bit				
1.1		EMERGENCY operating possible	1 = yes; 0 = no	maintenance necessary	bit				
1.2		sum fault signal	1 = yes; 0 = no	parameters not OK	bit				
1.3		factory lock active via mode input	1 = yes; 0 = no	end positions not OK	bit				
1.4		end positions OK	1 = yes; 0 = no	unused	bit				
1.5		actuator parameterization OK	1 = yes; 0 = no	unused	bit				
1.6		commissioning local OK	1 = yes; 0 = no	unused	bit				
1.7		status word 2 (ZSW2)		unused	bit				
2.0		maintenance necessary	1 = yes; 0 = no	unused	bit	r	r	r	
2.1		PROFIBUS-channel 1 present	1 = yes; 0 = no	unused	bit				
2.2		PROFIBUS-channel 2 present	1 = yes; 0 = no	unused	bit				
2.3		positioner with split range function enabled	1 = yes; 0 = no	unused	bit				
2.4		travel dependent output speed adjustment (speed curve) enabled	1 = yes; 0 = no	unused	bit				
2.5		analog output speed setpoint enabled	1 = yes; 0 = no	unused	bit				
2.6		positioner enabled	1 = yes; 0 = no	unused	bit				
2.7		process controller enabled	1 = yes; 0 = no	unused	bit				
3.0		command „EMERGENCY“ active	1 = yes; 0 = no	unused	bit				
3.1		intermediate contact CLOSE active	1 = yes; 0 = no	unused	bit				
3.2		intermediate contact OPEN active	1 = yes; 0 = no	unused	bit				
3.3		PROFIBUS-channel 1 is active channel	1 = yes; 0 = no	unused	bit				
3.4		PROFIBUS- channel 2 is active channel	1 = yes; 0 = no	unused	bit				
3.5		warning motor temperature 2)	1 = yes; 0 = no	unused	bit				
3.6		motor protection active	1 = yes; 0 = no	unused	bit				
3.7		motor warranty present	1 = yes; 0 = no	unused	bit				
4.0		actual duty (see slot 1, index 11, byte.bit 8.0)		unused	integer16	r	r	r	0 ... 13
5.0		actual position value		unused	integer16	r	r	r	0 ... 10000 (1 = 0.01% OPEN)
7.0		actual process value		unused	integer16	r	r	r	0 ... 10000 (1 = 0.01%)

1) r = read; w = write

2) not for 2SG7

3) not for 2SQ7

Byte.Bit	Value	Name of parameters		Type	ECOTRON 1)		PROFITRON 1)		Value range
		Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7		2S.70 2S.73	2S.75	2S.70 2S.73	2S.75 2S.78	
9.0		actual output speed		unsigned8	r	r	r	r	0 ... 15
0	1.25 rpm	actual positioning time							
1	1.75 rpm	80 <sup>sec</sup> / <sub>90°</sub>							
2	2.50 rpm	56 <sup>sec</sup> / <sub>90°</sub>							
3	3.50 rpm	40 <sup>sec</sup> / <sub>90°</sub>							
4	5.00 rpm	28 <sup>sec</sup> / <sub>90°</sub>							
5	7.00 rpm	20 <sup>sec</sup> / <sub>90°</sub>							
6	10.0 rpm	14 <sup>sec</sup> / <sub>90°</sub>							
7	14.0 rpm	10 <sup>sec</sup> / <sub>90°</sub>							
8	20.0 rpm								
9	28.0 rpm								
10	40.0 rpm								
11	56.0 rpm								
12	80.0 rpm								
13	112 rpm								
14	160 rpm								
15	0 rpm								
10.0		motor temperature 2)		integer16	r	r	r	r	-2562 ... +16500 (1 = 0.01 °C)
12.0		dc-link voltage converter [V]		unsigned16	r	r	r	r	0 ... 1000
14.0		actual position/process setpoint		integer16	r	r	r	r	0 ... 10000 (1 = 0.01 % OPEN)
16.0		setpoint from DCS (setpoint before adaptation to valve curve)		integer16	r	r	r	r	0 ... 10000 (1 = 0.01 % OPEN)
18.0		baudrate channel 1		unsigned8	r	r	r	r	0 ... 7
0	no data communication								
1	9.6 kbit/s								
2	19.2 kbit/s								
3	45.45 kbit/s								
4	93.75 kbit/s								
5	187.5 kbit/s								
6	500 kbit/s								
7	1500 kbit/s								
19.0		baudrate channel 2		unsigned8	r	r	r	r	
20.0		(see byte.bit 18.0)		unsigned8	r	r	r	r	0 ... 10
0	status channel 1								
1	„Wait Prim“ (no bus parameterization)								
2	„Wait Cfg“ (no bus configuration)								
6	„Data Exchange“ (user data)								
10	„GC-Clear“								
21.0		status channel 2		unsigned8	r	r	r	r	
		(see byte.bit 20.0)		bit	r	r	r	r	0 ... 1
22.0		fault signal 1							
22.1	main supply voltage fault	1 = yes; 0 = no							
22.2	high voltage	1 = yes; 0 = no							
22.3	low voltage	1 = yes; 0 = no							
22.4	moved too far	1 = yes; 0 = no							
22.5	no signal potentiometer	1 = yes; 0 = no							
22.5	no signal motor temperature 2)	1 = yes; 0 = no							

1) r = read

2) not for 2SG7

Byte.Bit	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		PROFITRON 1)		Value range
						2S.70 2S.73	2S.75	2S.70 2S.73	2S.75 2S.78	
23.0		PB-ASIC defect		1 = yes; 0 = no	bit	r	r	r		0 ... 1
23.1		Flash Memory defect		1 = yes; 0 = no	bit					
23.2		RAM defect		1 = yes; 0 = no	bit					
23.3		EEPROM defect		1 = yes; 0 = no	bit					
23.4		internal voltage faulty		1 = yes; 0 = no	bit					
23.5		Watchdog active		1 = yes; 0 = no	bit					
23.6		high current converter		1 = yes; 0 = no	bit					
24.0		fault signal 2								
24.1		no signal fiber optics		1 = yes; 0 = no	bit	r	r	r		0 ... 1
24.2		fault Bluetooth		1 = yes; 0 = no	bit					
24.3		fault electronic temperature		1 = yes; 0 = no	bit					
24.4		no signal non-intrusive position encoder 2) 3)		1 = yes; 0 = no	bit					
24.4		no communication non-intrusive position encoder 2) 3)		1 = yes; 0 = no	bit					
24.6		no signal standstill sensor 2) 3)		1 = yes; 0 = no	bit					
25.0		analog input AI1 > 21 mA or I < 3.6 mA (live zero)		1 = yes; 0 = no	bit					
25.1		analog input AI1 > 21 mA or I < 3.6 mA (live zero)		1 = yes; 0 = no	bit					
25.2		analog output AO1 defect		1 = yes; 0 = no	bit					
25.4		no bus communication channel 1 and 2		1 = yes; 0 = no	bit					
25.5		blocked in move		1 = yes; 0 = no	bit					
25.6		run time error		1 = yes; 0 = no	bit					
25.7		motor temperature too high		1 = yes; 0 = no	bit					
26.4		status word 3 (ZSW3)								
26.4		travel-positioning time-curve enabled		1 = yes; 0 = no	bit	r	r	r		0 ... 1
26.5		Bluetooth available		1 = yes; 0 = no	bit					
26.6		customer variant, subject to charges		1 = yes; 0 = no	bit					
26.7		customer variant subject to charges enabled		1 = yes; 0 = no	bit					
27.0		electronic temperature sensor available		1 = yes; 0 = no	bit					
27.1		non-intrusive position encoder available 2) 3)		1 = yes; 0 = no	bit					
27.2		travel dependent freely adjustable positioning times (stroke-time curve) valid		1 = yes; 0 = no	bit					
27.3		add-on PCB AI2/AO2 enabled		1 = yes; 0 = no	bit					
27.5		error remote source		1 = yes; 0 = no	bit					
27.6		Keep actual process value (if the "process setpoint" control source has failed)		1 = yes; 0 = no	bit					
27.7		approach fixed setpoint value (if the "process setpoint" control source has failed)		1 = yes; 0 = no	bit					
28.0		actual value on analog output AO1 to DCS (actual value after adaptation to value curve: in controlled state = flow rate)		1 = yes; 0 = no	bit					
30.0		run time determined by the actuator in direction CLOSE from 100 % OPEN to 0 % OPEN		0 = run time not yet determined	signed16	r	r	r		0 ... 10000 (1 = 0.01 % OPEN) 0 ... 65535 (1 = 0.1 sec)
32.0		run time determined by the actuator in direction OPEN from 0% OPEN to 100% OPEN		0 = run time not yet determined	unsigned16	r	r	r		
34.0		move in revolutions/stroke (for non-intrusive position encoder) 2) 3)		0 = run time not yet determined	unsigned32	r	r	r		0 ... 4294967295 (1 = 0.1 rev/stroke)
38.0		electronics temperature		0 = no non-intrusive position encoder or no end position available or set revolutions/stroke < 0.1	signed16					-32768 ... 32767 (1 = 0.1°C)
41.0		fault signal 3		0 = temperature sensor not available						
41.2		fault analog PCB AI2/AO2		1 = yes; 0 = no	bit					0 ... 1
43.0		fault analog output AO2		1 = yes; 0 = no	bit					
43.2		no signal analog output AO2		1 = yes; 0 = no	bit					0 ... 1
44.0		no signal torque switch		1 = yes; 0 = no	bit					
44.0		actual speed		1 = yes; 0 = no	unsigned16	r	r	r		125 ... 1000 (1 = 0.1 % n <sub>max</sub> )

total length 46 byte

1) r = read

2) not for 2SG7

3) not for 2SQ7

Byte.Bit	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1) 2S.70 2S.73	PROFITRON 1) 2S.70 2S.73	HIMod 2S.75 2S.78	Value range
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Data record (slot 1, index 22), "Former errors"

0.0		fault memory 1 <sup>st</sup> entry (last fault)			bit	r	r	r	0 ... 1
0.1		no signal fiber optics		1 = yes; 0 = no	bit				
0.2		fault Bluetooth		1 = yes; 0 = no	bit				
0.3		fault electronic temperature		1 = yes; 0 = no	bit				
0.4		no signal non-intrusive position encoder 2) 3)		1 = yes; 0 = no	bit				
0.6		no communication non-intrusive position encoder 2) 3)		1 = yes; 0 = no	bit				
1.0		no signal standstill sensor 2) 3)		1 = yes; 0 = no	bit				
1.1		main supply voltage fault		1 = yes; 0 = no	bit				
1.2		high voltage		1 = yes; 0 = no	bit				
1.3		low voltage		1 = yes; 0 = no	bit				
1.4		moved too far		1 = yes; 0 = no	bit				
1.5		no signal potentiometer		1 = yes; 0 = no	bit				
2.0		no signal motor temperature 2)		1 = yes; 0 = no	bit				
2.1		PB-ASIC defect		1 = yes; 0 = no	bit				
2.2		Flash Memory defect		1 = yes; 0 = no	bit				
2.3		RAM defect		1 = yes; 0 = no	bit				
2.4		EEPROM defect		1 = yes; 0 = no	bit				
2.5		internal voltage faulty		1 = yes; 0 = no	bit				
2.6		Watchdog active		1 = yes; 0 = no	bit				
3.0		high current converter		1 = yes; 0 = no	bit				
3.1		analog input AI2   > 21 mA or   < 3.6 mA (live zero)		1 = yes; 0 = no	bit				
3.2		analog input AI1   > 21 mA or   < 3.6 mA (live zero)		1 = yes; 0 = no	bit				
3.4		analog output AO1 defect		1 = yes; 0 = no	bit				
3.5		no bus communication channel 1 and 2		1 = yes; 0 = no	bit				
3.6		blocked in move		1 = yes; 0 = no	bit				
3.7		run time error		1 = yes; 0 = no	bit				
4.0 - 7.0		motor temperature too high		1 = yes; 0 = no	bit				
8.0 - 11.0		fault memory 2 <sup>nd</sup> entry (last but one fault)			bit				
12.0 - 15.0		fault memory 3 <sup>rd</sup> entry			bit				
16.0 - 19.0		fault memory 4 <sup>th</sup> entry			bit				
		fault memory 5 <sup>th</sup> entry			bit				
total length 20 byte									

bit coded see byte.bit 1.0 – 3.7

Data record (slot 1, index 23), "Binary and analog inputs"

0.0		binary input . according parameterization high/low active			bit	r	r	r	0 ... 1
0.1		binary input CLOSE		1 = yes; 0 = no	bit	r	r	r	
0.2		binary input OPEN		1 = yes; 0 = no	bit	r	r	r	
0.3		binary input STOP		1 = yes; 0 = no	bit	r	r	r	
0.4		binary input EMERGENCY		1 = yes; 0 = no	bit	r	r	r	
0.5		binary input Mode		1 = yes; 0 = no	bit	r	r	r	
0.6		no signal analog input AI1		1 = yes; 0 = no	bit	r	r	r	
1.0		no signal analog input AI2		1 = yes; 0 = no	bit	r	r	r	
3.0		analog input AI1		0-10000 scaling, according parameterization (see slot 1, index 11, byte.bit 4.)	unsigned16				0 ... 10000
		analog input AI2		0-10000 scaling, according parameterization (see slot 1, index 11, byte.bit 4.)	unsigned16				

1) r = read

2) not for 2SG7

3) not for 2SQ7

Byte.Bit	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		PROFITRON 1)		Value range
						2S.70 2S.73	2S.75	2S.70 2S.73	2S.75 2S.78	
5.0		binary inputs, irrespective of high/low active parameterization								
5.1		binary input CLOSE	1 = yes; 0 = no		bit	r	r	r	r	0 ... 1
5.2		binary input OPEN	1 = yes; 0 = no		bit	r	r	r	r	
5.3		binary input STOP	1 = yes; 0 = no		bit	r	r	r	r	
5.4		binary input EMERGENCY	1 = yes; 0 = no		bit	r	r	r	r	
5.4		binary input Mode	1 = yes; 0 = no		bit	r	r	r	r	
6.0		analog input AI1	1 = yes; 0 = no		bit	r	r	r	r	
		analog input AI2	0-10000 scaling, 0=0mA, 10000=20mA, irrespective of parameterization		unsigned16					0 ... 10000
8.0		analog input AI2	0-10000 scaling, 0=0mA, 10000=20mA, irrespective of parameterization		unsigned16					
total length 10 byte										
Data record (slot 1, index 24), "PNO redundancy and timestamp"										
		redundancy.type								
0.0		PNO redundancy	1 = yes; 0 = SIPOS redundancy		bit	r	r	r	r	0 ... 1
0.1		PNO system redundancy	1 = yes; 0 = PNO flying redundancy		bit					
1.0		redundancy status channel 1			unsigned8	r	r	r	r	0 ... 12
0		POWER_ON								
1		S_WAITING								
2		S_PRIMARY								
3		C_CONFIGURE								
4		BACKUP								
5		BTP_PARTNER_ACK								
6		BTP_SWITCHOVER								
7		BTP_PRM_CMD								
8		BTP_DX								
9		PRIMARY								
10		PTB_PARTNER_ACK								
11		PTB_SWITCHOVER								
12		NIL								
2.0		redundancy status channel 2			unsigned8	r	r	r	r	
0 ... 12		(similar to byte.bit 1.0)								
3.0		OutputHoldTime (1=1ms)			unsigned16	r	r	r	r	0 ... 65535
		status timestamp channel 1								
5.0		timestamp started	1 = yes; 0 = no		bit					
5.1		buffer overflow	1 = yes; 0 = no		bit	r	r	r	r	0 ... 1
5.2		time AR parameter block included	1 = yes; 0 = no		bit					
5.3		master in "OPERATE" status	1 = yes; 0 = no		bit					
5.4		USER_PRM_DATA received with TS-Enable	1 = yes; 0 = no		bit					
5.5		time synchronization received (ClockValue telegram), primary only	1 = yes; 0 = no		bit					
		status timestamp channel 2								
6.0		timestamp started	1 = yes; 0 = no		bit					
6.1		buffer overflow	1 = yes; 0 = no		bit	r	r	r	r	
6.2		time AR parameter block included	1 = yes; 0 = no		bit					
6.3		master in "OPERATE" status	1 = yes; 0 = no		bit					
6.4		USER_PRM_DATA received with TS-Enable	1 = yes; 0 = no		bit					
6.5		time synchronization received (ClockValue telegram), primary only	1 = yes; 0 = no		bit					
total length 7 byte										

1) r = read



Byte.Bit	Value	Name of parameters		Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		HIMod		Value range
		Rotary actuator 2SA7				2S.70 2S.73	2S.75	2S.70 2S.73	2S.75 2S.78	
<b>Data record (slot 1, index 25), "Actual diagnosis data"</b>										
0.0	switching cycles per hour				unsigned16	r	r	r	r	0 ... 65535
2.0	relative operational time				unsigned8	r	r	r	r	0 ... 100
3.0	number of switching cycles				unsigned32	r	r	r	r	0 ... 4.294.967.295
7.0	number of travel dependence cut-offs				unsigned16	r	r	r	r	0 ... 65535
9.0	number of torque dependence cut-offs				unsigned16	r	r	r	r	0 ... 65535
11.0	electronics unit operating hours				unsigned32	r	r	r	r	0 ... 4.294.967.295
15.0	motor/gear unit operating hours				unsigned16	r	r	r	r	0 ... 65535
total length 17 byte										
<b>Data record (slot 1, index 26), "Maintenance limits for diagnosis data"</b>										
0.0	valve maintenance limits:				unsigned32	r	r	r	r	0 ... 4.294.967.295
4.0	switching cycles				unsigned16	r	r	r	r	0 ... 65535
6.0	torque cut-offs				unsigned16	r	r	r	r	0 ... 65535
6.0	motor operating hours				unsigned16	r	r	r	r	0 ... 65535
total length 8 byte										
<b>Data record (slot 1, index 27), "Maintenance intervals"</b>										
0.0	interval value switching cycles				unsigned32	r	r	r	r	0 ... 30.000.000 0 ... 100.000
4.0	interval value torque dependent cut-offs				unsigned16	r	r	r	r	0 ... 20.000 0 ... 10.000
6.0	interval value motor operating hours				unsigned16	r	r	r	r	0 ... 2500
total length 8 byte										
<b>Data record (slot 1, index 29), "SEVEN PROFITRON/HIMod parameters"</b>										
0.0	Bluetooth activated				bit	r	r	r	r	0 ... 1
0.1	USB deactivated				Bit	r	r	r	r	0 ... 1
1.0	display orientation				unsigned8	r	r	r	r	0 ... 3
	0 standard									
	1 turned 90° to the left									
	2 turned 180°									
	3 turned 90° to the right									
2.0	standby screen				unsigned8	r	r	r	r	0 ... 4
	0 standard									
	1 position									
	2 position+filling									
	3 position+bar+status									
	4 fast to LOCAL									
4.0	Mode input				unsigned8	r	r	r	r	0 ... 255
	0 no function									
	1 interlock LOCAL/REMOTE									
	2 enable motor operation									
	3 enable LOCAL									
6.0	lower limit value for wire break detection at analog inputs				unsigned8	r	r	r	r	0 ... 36 (1 = 0.1 mA)
7.0	upper limit value for wire break detection at analog inputs				unsigned8	r	r	r	r	200 ... 220 (1 = 0.1 mA)
total length 8 byte										

1) r = read; r+w = read+write

Byte.Bit	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1) 2S.70 2S.73	PROFITRON 1) 2S.70 2S.73 2S.78	HIMod	Value range
Data record (slot 1, index 30), "Data/time"									
0.0		year			unsigned8		r+W	r+W	0 ... 99
1.0		month			unsigned8		r+W	r+W	1 ... 12
2.0		day			unsigned8		r+W	r+W	1 ... 31
3.0		hours			unsigned8		r+W	r+W	0 ... 23
4.0		minutes			unsigned8		r+W	r+W	0 ... 59
5.0		seconds			unsigned8		r+W	r+W	
total length 6 byte									
Data record (slot 1, index 31), "SEVEN special parameters"									
0.0		DCS acceptance time			unsigned8	r+W	r+W	r+W	0 ... 255 (1 = 0.1 s)
2.0		deactivate "Maintenance required" signal	1 = yes; 0 = no		bit	r+W	r+W	r+W	0 ... 1
2.1		deactivate DC link voltage limitation	1 = yes; 0 = no		bit	r+W	r+W	r+W	
2.2		deactivate runtime monitoring	1 = yes; 0 = no		bit	r+W	r+W	r+W	
2.3		deactivate end position adaptation for torque-dependent cut-off	1 = yes; 0 = no		bit	r+W	r+W	r+W	
3.0		end position speed			unsigned8	r+W	r+W	r+W	0 ... 2
	0	normal							
	1	quick start							
	2	quick start/stop							
total length 4 byte									
Data record (slot 1, index 40), "Torque measurement flange: connection" 2)									
0.0		connection			unsigned8		r+W	r+W	0 ... 2
	0	not available							
	1	at analog input AI1							
	2	at analog input AI2							
1.0		measuring range			unsigned8		r+W	r+W	0 ... 2
	0	±120 Nm (2SX7100-6A..)							
	1	± 500 Nm (2SX7100-6B..)							
	2	± 1000 Nm (2SX7100-6C..)							
total length 2 byte									
Data record (slot 1, index 41), " Torque measurement flange: zero adjust" 2)									
0.0		perform zero adjustment (current torque is stored as offset)	1 = yes; 0 = no		bit		w	w	0 ... 1
0.1		reset zero adjustment (offset is set to zero)	1 = yes; 0 = no		bit		w	w	0 ... 1
total length 1 byte									
Data record (slot 1, index 42), "Torque measurement flange: current torque and offset" 2)									
0.0		current torque 2)			signed16		r	r	-32768 ... +32767
0.2		offset 2)			signed16		r	r	(1 = 0.1 Nm)
4.0		torque measurement flange + additional gear: current torque / current force (rotary gearbox and part-turn gearbox: 1 = 0.1 Nm; linear thrust unit: 1 = 0.1 kN)			signed32		r	r	-2147483648 ... +2147483647
total length 8 byte									
Data record (slot 1, index 43), "Additional gear: setting" 2) 3)									
0.0		gear type			unsigned8		r+W	r+W	0 ... 3
	0	not available							
	1	rotary gearbox							
	2	part-turn gearbox							
	3	linear thrust unit							
2.0		reduction ratio			unsigned16		r+W	r+W	100 ... 10000
		rotary gearbox (1 = 0.01)							
		part-turn gearbox (1 = 1)							

1) r = read; w = write; r+w = read+write

2) only for 2SA7.1 ... 2SA7.6

3) can be changed for user-defined additional gear

Byte.Bit	Value	Name of parameters	Rotary actuator 2SA7	Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		PROFITRON 1)		HIMod	Value range
						2S.70 2S.73	2S.75	2S.70 2S.73	2S.75 2S.78		
4.0		factor output/input torque		rotary gearbox (1 = 0,01) part-turn gearbox (1 = 0,1)	unsigned16			r+W	r+W		10 ... 50000
6.0		max. output torque		rotary gearbox (1 = 1 Nm) part-turn gearbox (1 = 10 Nm)	unsigned16			r+W	r+W		1 ... 50000
8.0		max. input speed			unsigned16			r+W	r+W		1 ... 1000 (1 = 1 rpm)
10.0		spindle pitch		linear thrust unit	unsigned16			r+W	r+W		10 ... 1000 (1 = 0.1 mm)
12.0		factor input torque/output force		linear thrust unit	unsigned16			r+W	r+W		10 ... 1000 (1 = 0.1)
14.0		max. output force		linear thrust unit	unsigned16			r+W	r+W		1 ... 1000 (1 = 1 KN)
16.0		positioning angle		part-turn gearbox	unsigned16			r+W	r+W		1 ... 360 (1 = 1 °)
18.0		stroke		linear thrust unit	unsigned16			r+W	r+W		1 ... 10000 (1 = 1 mm)
20.0		rev./stroke		rotary gearbox	unsigned32			r+W	r+W		1 ... 99000 (1 = 0.1 rev/stroke)
total length 24 byte											

Data record (slot 1, index 44), "Additional gear: proposed signaling gear setting" 2)

Byte.Bit	Value	Name of parameters	Type	ECOTRON 1)	PROFITRON 1)	HIMod	Value range
2S.70 2S.73	2S.75	2S.78	2S.70 2S.73	2S.75	2S.78	2S.70 2S.73	2S.75 2S.78
4.0		proposed signaling gear setting	unsigned32			r	0 ... 4.294.967.295
total length 8 byte							

Data record (slot 1, index 45), "Test operation"

Byte.Bit	Value	Name of parameters	Type	ECOTRON 1)	PROFITRON 1)	HIMod	Value range
2S.70 2S.73	2S.75	2S.78	2S.70 2S.73	2S.75	2S.78	2S.70 2S.73	2S.75 2S.78
0.0		test operation	unsigned8			r+W	0 ... 1
	0	normal operation					
	1	test operation active					
1.0		runtime CLOSE	unsigned16			r+W	0 ... 65530 (1 = 0.1 sec)
3.0		pause CLOSE	unsigned16			r+W	
5.0		runtime OPEN	unsigned16			r+W	
7.0		pause OPEN	unsigned16			r+W	
total length 9 byte							

Data record (slot 1, index 46), "Speed curve – continuous speed setting"

Byte.Bit	Value	Name of parameters	Type	ECOTRON 1)	PROFITRON 1)	HIMod	Value range
2S.70 2S.73	2S.75	2S.78	2S.70 2S.73	2S.75	2S.78	2S.70 2S.73	2S.75 2S.78
0.0		position 1	unsigned8			r+W	0 ... 100 (% OPEN)
1.0		position 2	unsigned8			r+W	
2.0		position 3	unsigned8			r+W	
3.0		position 4	unsigned8			r+W	
4.0		position 5	unsigned8			r+W	
5.0		position 6	unsigned8			r+W	
6.0		position 7	unsigned8			r+W	
7.0		position 8	unsigned8			r+W	
8.0		position 9	unsigned8			r+W	
9.0		position 10	unsigned8			r+W	
10.0		speed/positioning time 1	unsigned16			r+W	125 ... 1000
12.0		speed/positioning time 2	unsigned16			r+W	(1 = 0.1 % $\eta_{max}$ )
14.0		speed/positioning time 3	unsigned16			r+W	
16.0		speed/positioning time 4	unsigned16			r+W	
18.0		speed/positioning time 5	unsigned16			r+W	
20.0		speed/positioning time 6	unsigned16			r+W	
22.0		speed/positioning time 7	unsigned16			r+W	
24.0		speed/positioning time 8	unsigned16			r+W	
26.0		speed/positioning time 9	unsigned16			r+W	
28.0		speed/positioning time 10	unsigned16			r+W	
total length 36 byte							

1) r = read; r+W = read+write

2) only for 2SA7.1 ... 2SA7.6

Byte.Bit	Value	Name of parameters		Part-turn actuator 2SG7 /2SQ7	Type	ECOTRON 1)		PROFITRON 1)		Value range
		Rotary actuator 2SA7				2S.70 2S.73	2S.75 2S.78	2S.70 2S.73	2S.75 2S.78	
30.0	local via speed curve				bit			r+w	r+w	0 ... 1
30.1	remote via speed curve				bit			r+w	r+w	
30.2	local via external speed setpoint				bit			r+w	r+w	
30.3	remote via external speed setpoint				bit			r+w	r+w	
30.4	external speed setpoint via analog input A11				bit			r+w	r+w	
total length 31 byte										
Data record (slot 2, index 0/2/4/6/8/10), "Output torque graph x travel position in direction CLOSE/OPEN" 2) 3)										
0.0	travel position in direction CLOSE/OPEN [0]				signed16			r	r	-50 ... 10050 (1 = 0.01% OPEN)
2.0	travel position in direction CLOSE/OPEN [1]				signed16			r	r	
n.0	travel position in direction CLOSE/OPEN [n/2]				signed16			r	r	
n+2.0	travel position in direction CLOSE/OPEN [(n+2)/2]				signed16			r	r	
218.0	travel position in direction CLOSE/OPEN [109]				signed16			r	r	
total length 220 byte										
Data record (slot 2, index 1/3/5/7/9/11), "Output torque graph x output torque in direction CLOSE/OPEN" 2) 3)										
0.0	output torque in direction CLOSE/OPEN [0]				unsigned16			r	r	0 ... 60000 (1 = 0.1Nm)
2.0	output torque in direction CLOSE/OPEN [1]				unsigned16			r	r	
n.0	output torque in direction CLOSE/OPEN [n/2]				unsigned16			r	r	
n+2.0	output torque in direction CLOSE/OPEN [(n+2)/2]				unsigned16			r	r	
218.0	output torque in direction CLOSE/OPEN [109]				unsigned16			r	r	
total length 220 byte										
Data record (slot 2, index 12), "Torque graph control" 2) 3)										
0.0	start recording				bit					0 ... 1
0.1	cancel recording				bit					
1.0	select curve No.				unsigned16					0 ... 2
total length 3 byte										
Data record (slot 2, index 13), "Torque graph recording status" 2) 3)										
0.0	graph recording possible				bit					0 ... 1
0.1	graph recording graph 1 in progress				bit					
0.2	graph recording graph 2 in progress				bit					
0.3	graph recording graph 3 in progress				bit					
1.0	number of recorded graphs (graph 1)				unsigned16					0 ... 65535
3.0	number of recorded graphs (graph 2)				unsigned16					
5.0	number of recorded graphs (graph 3)				unsigned16					
total length 7 byte										

1) r = read; w = write; r+w = read+write

2) not for 2SG7

3) not for 2SQ7



