TWK ELEKTRONIK

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Specifications for vibration sensor NVA65-A552S-1-Bxx

(and similar designs)

Acceleration measurement for wind power plants with analogue output and programming interface standard CAN CANopen DS 301

For additional information, refer to data sheet NVA 12634 and filter specifications for each single version.

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1 General description

1.1 Design

The sensor system is intended as a component for use e.g. in wind power plants to measure and evaluate vibrations in the mast head. Registration of dynamic accelerations by means of MEMS sensors (Micro-Electro-Mechanical System) with subsequent digitisation by a controller.

The device consists of an acceleration sensors, a controller unit and three types of output interface. Data output is carried out via two analogue interfaces with 4 ... 20 mA plus CANopen and via 4 relay contacts (currently 1 error relay contact). The NVA is parameterised via the CANopen interface. This is not galvanically separated.

The sensor is equipped with a filter circuit to protect against fast transients and surge voltages of up to 2 kV in the supply. The protection types are IP 69K (housing) and IP 67 (connector/socket). With its good vibration and shock values, the sensor is suitable for use in areas with rough environmental conditions.

The vibration sensor is equipped with a stable aluminium housing (optionally stainless steel). Elongated holes are available for mechanical alignment (up to approx. ± 7.5°). Electrical connection is carried out using two connectors or two cables.

MEMS sensors are integrated circuits which are manufactured in silicon bulk micromechanics technology. Double capacities are formed with the aid of these micromechanical structures. If these structures are deflected in the case of accelerations, this leads to capacity changes which are registered using measuring technology and further processed. The sensors measure precisely, have a long service life and are very robust.

After determining the steady component and scaling, the measured values supplied by the acceleration sensor are made available to the six filter units. The steady component arises as a result of installation which is not precisely horizontal, with the result that part of the earth's gravitational field would also be measured. The offset which occurs in the measured vibration value curve (zero point shift) due to the steady component is determined by means of calculation (distribution of the positive and negative measured values around the zero point) and is subtracted. The pure alternating component is output within a matter of seconds. This calculation takes place continually.

The filter units can be individually programmed by the customer as regards their sampling frequency, whilst their filter characteristics can be programmed in the factory. Each filter unit additionally has two outputs (flags) for alarm and warning. If the amount of a filter output's measured value exceeds the set limit value the output is activated. The limit values for triggering the outputs can also be programmed by the customer.

The warning and alarm outputs can be connected to the four relay outputs via a matrix which can be programmed by the customer. Several filter outputs may additionally be connected to the relay outputs by means of an OR link.

The analogue outputs are firmly switched to filters 1 and 2. The outputs output the filtered signal supplied by the acceleration sensor. If "Momentary value" is set, this signal is signed (positive and negative acceleration). The centre (0g) lies at 12 mA. If peak ("Peak value") or "RMS (root mean square value)" are set, only positive values occur irrespective of the source which is selected. In this case, the positive values are output as of 4 mA and higher. Amplifier setting is individually possible for each channel via the CANopen interface.

Evaluation of the switching points of the alarm and warning level outputs takes place at the filter output. On evaluation of the switching points, conversion to the output value amount always takes place, irrespective of the filter's measurement type setting.

The CANopen interface can be used to set the parameters and call up the 6 filters' outputs. With the exception of the filter characteristics, all parameters are programmable.

For further information concerning the electrical and mechanical specification please refer to datasheet NVA12634, where all detailed informations are listed.

This specification describes the communication with the NVA unit via CANopen. All CANopen objects are listed in this document.

1.2 Analogue Outputs

The analogue outputs take over the filters' behaviour with regard to the polarity of the output signals. In the case of signed input or output variables, the zero point is set at the centre of the measuring range (see diagram below on the left). In the case of measured variables which supply absolute values, the zero point is set at the beginning of the measuring range (see diagram below on the right).

The following table shows the behaviour of the analogue output depending on the source setting and the measured variable type setting.

<table>
<tr><th>Input signal</th><th>Output source</th><th>Zero point position</th></tr>
<tr><td>None</td><td>Arbitrary</td><td>2 mA</td></tr>
<tr><td>X axis</td><td rowspan="2">Momentary value</td><td rowspan="2">12 mA</td></tr>
<tr><td>Y axis</td></tr>
<tr><td>X+Y</td><td>Momentary value</td><td rowspan="3">4 mA</td></tr>
<tr><td rowspan="2">X axis
Y axis
X+Y</td><td>Peak</td></tr>
<tr><td>RMS</td></tr>
</table>

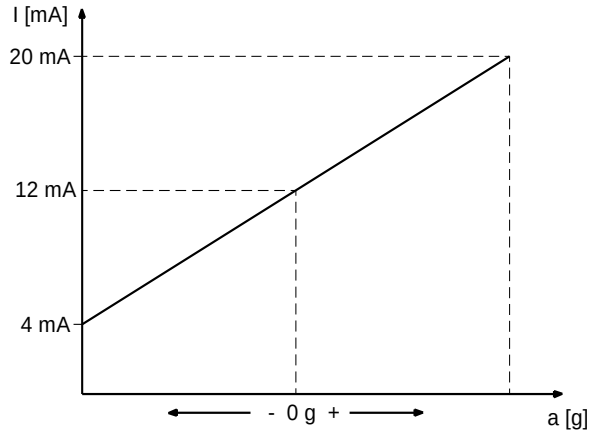
Behaviour of the analogue outputs

The current outputs query the source setting and set the offset for the zero point accordingly. If the source is set to X or Y, the zero point is set at the centre of the measuring range. On selection of the source as the geometrical sum of X and Y, the zero point is set at the beginning of the measuring range. The diagram below shows the behaviour of the outputs depending on the data source which is selected.

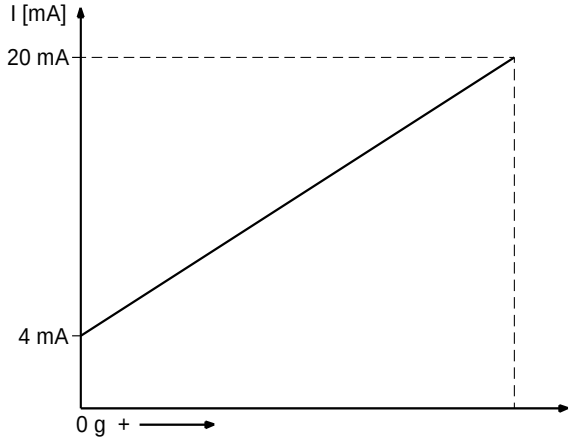
If "None" is specified as the data source, the output is set to a constant 2 mA

The standard setting for the amplification factor is: 4 … 20 mA for -1 g … +1 g. The objects for the amplification factor settings are 61A1 and 61A2.

CAN specifications, acceleration sensor NVA



Zero position: 12 mA



Zero position: 4 mA

1.3 Flow diagrams

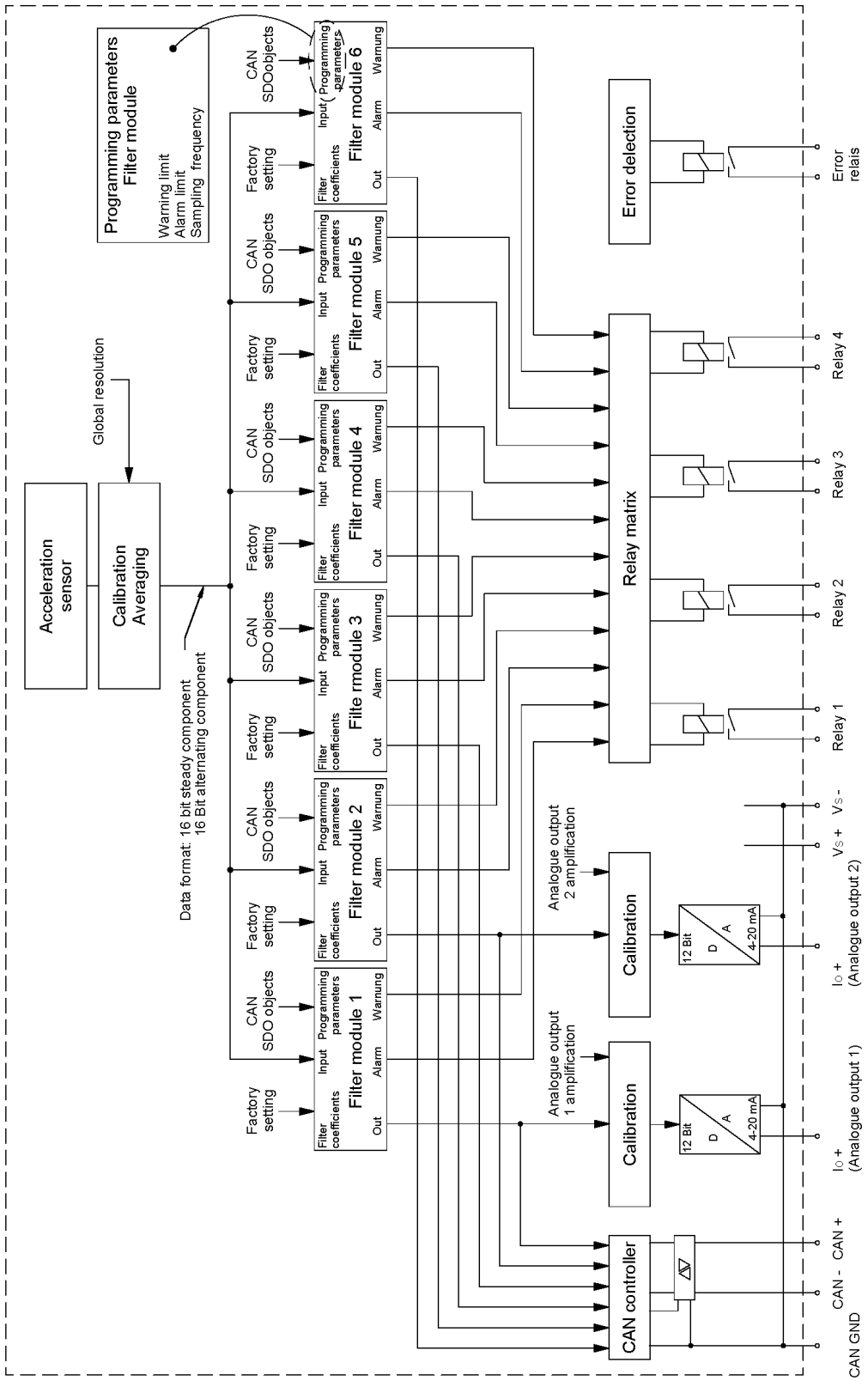


Figure 1: System in complete

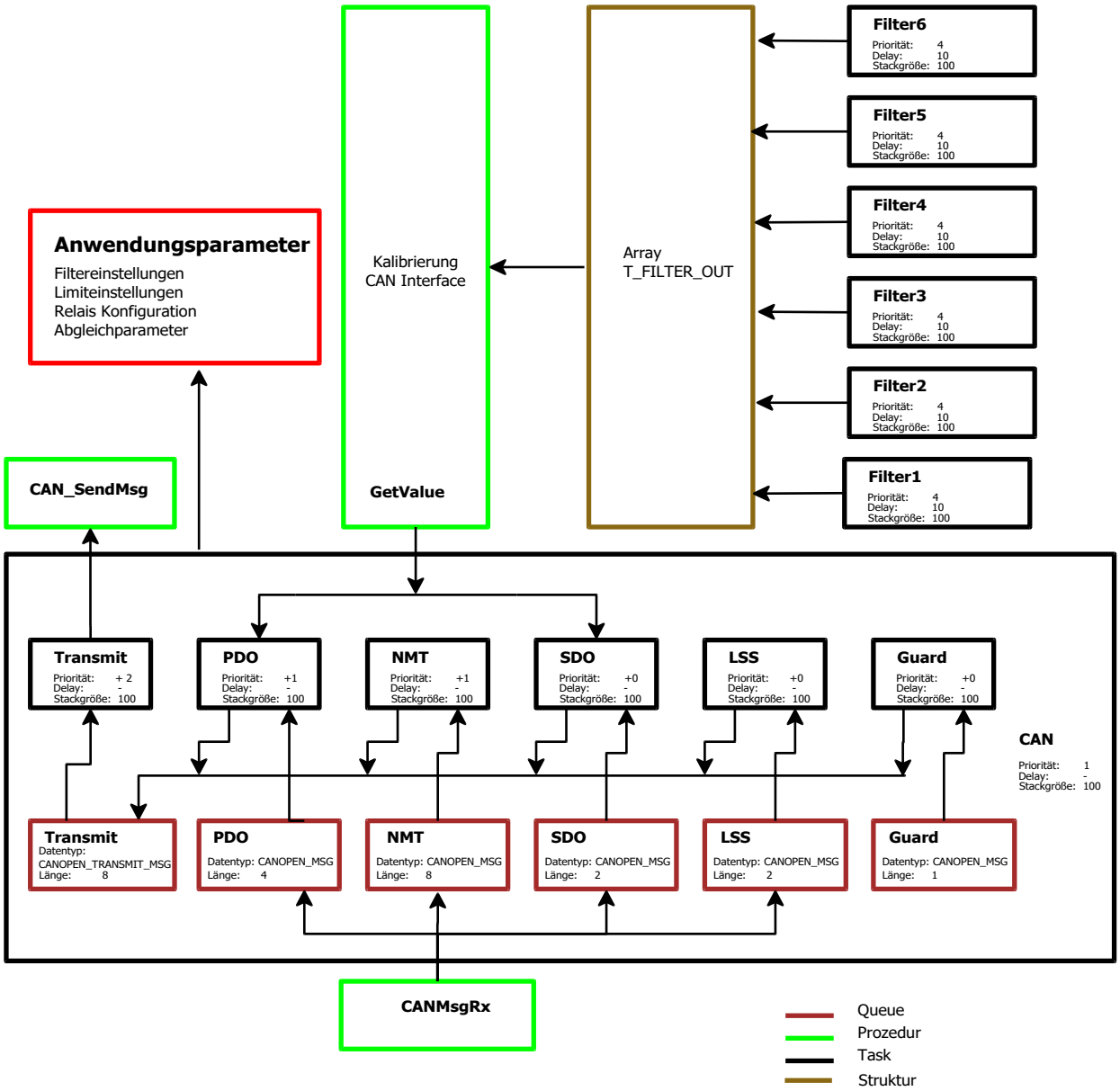


Figure 2: CANopen task system

2 CANopen functionality

2.1 General

The software is equipped with the standard CANopen stack (TWK development).

The baud rates are implemented according to the following table. The baud rate of 20 kBit/s is defined as the default setting.

Bit timing table

Oscillator [MHz]	Baud rate [kBit/s]	Number of time units	Sample point [%]	BRP R	SJW	PRS	PHS1	PHS2
50	1000	10	90	5	1	8		1
	500	10	90	10	1	8		1
	250	10	90	20	1	8		1
	125	10	90	40	1	8		1
	50	10	90	100	1	8		1
	20	**10**	**90**	**250**	**1**	**8**		**1**

Table 1 Bit timing specifications

The table contains the correct bit times according to Bosch CAN specifications. The entries in the CAN chip registries may deviate.

2.2 Error behaviour

If the vibration sensor has determined an error, an emergency message is transmitted if the node is not set to STOP status. The error code is additionally entered in the error register and object 6503. Object 1029 error behaviour is not implemented. In the event of an error, the sensor switches to the NMT status PRE-OPERATIONAL. If an error disappears (CAN channel error), an EMC message is again transmitted with a deleted error bit. The time interval between the emergency messages is determined by object 1015 inhibit time EMCY. The vibration sensor's error statuses remain in existence up to reset or power on.

The emergency message has the following structure:

Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
EMC error code		Error register	Object 6503		n.u.	n.u.	n.u.

n.u. not used

EMC error codes:

0x FFFF	Customer-specific error, error in the sensor system
0x8120	Passive error status
0x8140	Return from bus off status
0x8110	Overrun error; a message has been lost

Error register codes, see object 1001.

The data are implemented on the bus in Intel format.

A distinction is made between two types of error:

1. Error in the sensor system (error code 0xFFFF)
   All errors which render proper operation of the sensor impossible.
2. Communication error (error code 0x81xx)
   Errors due to the bus system; these are not usually caused by the sensor but indicate a malfunction in the bus system.

The user of the overall system must assess errors in the bus system and determine his reaction on this basis.

Examples:

EEPROM CRC error

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Error code		Error register	Device-specific error		Not used		
0xFF	0xFF	0x81	0x00	Obj. 6503 0x20	0x00	0x00	0x00

Passive error

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Error code		Error register	Device-specific error		Not used		
0x20	0x81	0x11	0x00	0x00	0x00	0x00	0x00

Return from bus off

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Error code		Error register	Device-specific error		Not used		
0x40	0x81	0x11	0x00	0x00	0x00	0x00	0x00

Expiry of the inhibit time is followed by the message "error-free operation":

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Error code		Error register	Device-specific error		Not used		
0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00

3 CANopen profile definition

3.1 Overview

Table of all objects contained in the profile

Index	Data type	Designation	Data length	Memory type	M / O	Page
1000	VAR	Device_type	LONG	ro	M	
1001	VAR	Error_register	BYTE	ro	M	
1005	VAR	COB-ID_SYNC	LONG	rw	O	
1008	VAR	Manufacturer_device_name	STRING	ro	O	
1009	VAR	Manufacturer_hardware_version	STRING	ro	O	
100A	VAR	Manufacturer_software_version	STRING	ro	O	
100E	ARRAY	COB ID guarding	LONG	ro	O	
1010	ARRAY	Store_parameters	LONG	-	O	
1011	ARRAY	Restore_default_parameters	LONG	-	O	
1014	VAR	COB-ID-EMCY	LONG	rw	O	
1015	VAR	Inhibit_time_EMCY	LONG	rw	O	
1017	VAR	Producer_heartbeat_time	WORD	rw	O	
1018	RECORD	Identity object		ro	M	
Transmit SRDO communication parameters						
1800	RECORD	PDO communication parameter		rw	M	
1801	RECORD	PDO communication parameter		rw	M	
Acceleration sensor objects						
6000	VAR	Resolution	WORD	rw	M	
6110	VAR	filter_1_limit_warning	WORD	rw	-	
6111	VAR	filter_1_limit_alarm	WORD	rw	-	
6112	VAR	filter_1_sample_frequency	WORD	rw	-	
6113	VAR	filter_1_source	WORD	rw	-	
6114	VAR	filter_1_out	WORD	ro	-	
6115	VAR	filter_1_out_peak	WORD	ro	-	
6116	VAR	filter_1_out_rms	WORD	ro	-	
6117	VAR	filter_1_peak_time	WORD	rw	-	
6118	VAR	filter_1_measuring_type	WORD	rw	-	
6119	VAR	filter_1_rms_time	WORD	rw	-	
6120	VAR	filter_2_limit_warning	WORD	rw	-	
6121	VAR	filter_2_limit_alarm	WORD	rw	-	
6122	VAR	filter_2_sample_frequency	WORD	rw	-	
6123	VAR	filter_2_source	WORD	rw	-	
6124	VAR	filter_2_out	WORD	ro	-	
6125	VAR	filter_2_out_peak	WORD	ro	-	
6126	VAR	filter_2_out_rms	WORD	ro	-	

6127	VAR	filter_2_peak_time	WORD	rw	-	
6128	VAR	filter_2_measuring_type	WORD	rw	-	
6129	VAR	filter_2_rms_time	WORD	rw	-	
Index	**Data type**	**Designation**	**Data length**	**Memory type**	**M / O**	**Page**
6130	VAR	filter_3_limit_warning	WORD	rw	-	
6131	VAR	filter_3_limit_alarm	WORD	rw	-	
6132	VAR	filter_3_sample_frequency	WORD	rw	-	
6133	VAR	filter_3_source	WORD	rw	-	
6134	VAR	filter_3_out	WORD	ro	-	
6135	VAR	filter_3_out_peak	WORD	ro	-	
6136	VAR	filter_3_out_rms	WORD	ro	-	
6137	VAR	filter_3_peak_time	WORD	rw	-	
6138	VAR	filter_3_measuring_type	WORD	rw	-	
6139	VAR	filter_3_rms_time	WORD	rw	-	
6140	VAR	filter_4_limit_warning	WORD	rw	-	
6141	VAR	filter_4_limit_alarm	WORD	rw	-	
6142	VAR	filter_4_sample_frequency	WORD	rw	-	
6143	VAR	filter_4_source	WORD	rw	-	
6144	VAR	filter_4_out	WORD	ro	-	
6145	VAR	filter_4_out_peak	WORD	ro	-	
6146	VAR	filter_4_out_rms	WORD	ro	-	
6147	VAR	filter_4_peak_time	WORD	rw	-	
6148	VAR	filter_4_measuring_type	WORD	rw	-	
6149	VAR	filter_4_rms_time	WORD	rw	-	
6150	VAR	filter_5_limit_warning	WORD	rw	-	
6151	VAR	filter_5_limit_alarm	WORD	rw	-	
6152	VAR	filter_5_sample_frequency	WORD	rw	-	
6153	VAR	filter_5_source	WORD	rw	-	
6154	VAR	filter_5_out	WORD	ro	-	
6155	VAR	filter_5_out_peak	WORD	ro	-	
6156	VAR	filter_5_out_rms	WORD	ro	-	
6157	VAR	filter_5_peak_time	WORD	rw	-	
6158	VAR	filter_5_measuring_type	WORD	rw	-	
6159	VAR	filter_5_rms_time	WORD	rw	-	
6160	VAR	filter_6_limit_warning	WORD	rw	-	
6161	VAR	filter_6_limit_alarm	WORD	rw	-	
6162	VAR	filter_6_sample_frequency	WORD	rw	-	
6163	VAR	filter_6_source	WORD	rw	-	
6164	VAR	filter_6_out	WORD	ro	-	
6165	VAR	filter_6_out_peak	WORD	ro	-	
6166	VAR	filter_6_out_rms	WORD	ro	-	
6167	VAR	filter_6_peak_time	WORD	rw	-	

6168	VAR	filter_6_measuring_type	WORD	rw	-	
6169	VAR	filter_6_rms_time	WORD	rw	-	
Analogue outputs						
61A1	VAR	Gain_analogue_1	LONG	rw	-	
61A2	VAR	Gain_analogue_2	LONG	rw	-	
Index	**Data type**	**Designation**	**Data length**	**Memory type**	**M / O**	**Page**
Manufacturer-specific objects						
6200	VAR	Cyclic timer	WORD	r/w	O	
Relays/cams						
6310	VAR	Relay_1_assign	WORD	rw	-	
6320	VAR	Relay_2_assign	WORD	rw	-	
6330	VAR	Relay_3_assign	WORD	rw	-	
6340	VAR	Relay_4_assign	WORD	rw	-	
Diagnostic objects						
6503	VAR	Alarms	WORD	ro	M	
6504	VAR	Supported alarms	WORD	ro	M 2	
6506	VAR	Supported_warnings	WORD	ro	M 2	
6507	VAR	Profile_and_software_version	LONG	ro	M 2	
6508	VAR	Operating_time	LONG	ro	M 2	
650B	VAR	Serial_number	LONG	ro	M 2	
LMT objects						
2000	VAR	Node ID	BYTE	rw	O	
2001	VAR	Bit_rate	BYTE	rw	O	
Manufacturer-specific objects for synchronisation and diagnosis						
2110	ARRAY	Adjust_filter		fp	-	
2118	ARRAY	calibration_control		fp		
2021	ARRAY	Adjust_analogue_channel_1		fp	-	
2122	ARRAY	Adjust_analogue_channel_2		fp	-	
2130	VAR	Adjust_sensor	LONG	fp	-	
Mapping objects						
1A00	ARRAY	PDO1 mapping parameters		ro	M	
1A01	ARRAY	PDO2 mapping parameters		ro	M	

The following meanings apply:

rw read/write
ro read only
fp factory programming
M mandatory according to profile
O optional according to profile

3.2 Process data objects PDO

The outputs of those filters which are not connected to an analogue output are represented in the PDOs. The data are output in Intel format.

PDO 1/2

Byte 0								Byte 1							
7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8
LSB								Filter 3						MSB	

Byte 2								Byte 3							
7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8
LSB								Filter 4						MSB	

Byte 4								Byte 5							
7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8
LSB								Filter 5						MSB	

Byte 6								Byte 7							
7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8
LSB								Filter 6						MSB	

3.3 Service data objects SDOs

3.3.1 Object 1000 device_type

The sensor types are defined as follows:

Coding	Device type designation
1800h	Vibration sensor
0005h to 0FFFh	Reserved
1000h to FFFEh	Manufacturer-specifc

Structure of device_type:

	Byte 0	Byte 1	Byte 2	Byte 3
Device type	Device profile		Sensor type	
NBN	0	0	0	01

Device_type

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
1000	0	Device_type	Long -	Long	ro	ROM	1800	-	-

3.3.2 Object 1001 error_register

Bit	M / O	Designation
0	M	Generic error
1	O	Current
2	O	Voltage
3	O	Temperature
4	O	Communication error (overrun, error state)
5	O	Device profile-specific
6	O	Reserved (always 0)
7	O	Manufacturer-specific

The error register is the global error register. It summarises all errors in bit 0.
Generic, communication and manufacturer-specific errors are supported. The generic error bit is always set in the event of an error. Which error has occurred can be seen in the alarms 6503 object.

Error_register

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
1001	0	Error_register	Byte	Byte	ro	RAM	0, 0x 41, 0x81	-	-

3.3.3 Object 1005 COB-ID-SYNC

Identifier of the sync message which is transmitted from the master.
No range or plausibility check takes place. 29-bit identifiers are not supported.

COB-ID-SYNC

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
1005	0	COB-ID-SYNC	Long	Long	rw	E²ROM	1…0x7FF	-	0x80

3.3.4 Object 1008 manufacturer_device_name

The name of the device is stored as a string and is output via SDO segment transfer.
„Acceleration NVA“

Manufacturer_device_name

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
1008	0	Manufacturer_device_name	String	String	ro	ROM	See above	-	-

3.3.5 Object 1009 manufacturer_hardware_version

Hardware version of the device. It is stored as a string
„P-0642”
It is output via SDO segment transfer.

Manufacturer_hardware_version

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
1009	0	Manufacturer_hardware_version	String	String	ro	ROM	See above	-	-

3.3.6 Object 100A manufacturer_software_version

Software version of the device. It is stored as a string
”NVA analogue standard”
It is output via SDO segment transfer.

Manufacturer_software_version

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
100A	0	Manufacturer_software_version	String	String	ro	ROM	See above	-	-

3.3.7 Object 100E COB-ID_GUARD

This object is in the object list because the guard identifier is a factory programming parameter. It is defined as read only and has no relevance to the customer.

29-bit identifiers are not supported.

COB-ID_GUARD

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
100E	0	COB-ID_GUARD	Long	Long	ro	ROM	0…0x7FF	1)	0x700+node ID

1) The node address is added to the selected identifier

3.3.8 Object 1010 store_parameters

On inputting “save” as the password in sub-index 01, all writable objects are saved to the E²PROM.
The object cannot be changed on writing. Reading the object is possible.
1 (saving via command, page 93 DS 301 4.1) is returned.

Store_parameters

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
1010	0	Largest_supported_sub-index	-	-	ro	ROM	1	-	-
	1	Save_all_parameters	Long	Long	rd / (wr)	ROM	„Save“	1)	1

1) When the correct password is input (save), parameters are backed-up in the E²PROM.

3.3.9 Object 1011 restore_default_parameters

On inputting “load” as the password in sub-index 01, the encoder’s default parameters are loaded into the RAM. Reading the object is possible.
1 (device restores parameters) is returned.

Restore_default_parameters

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
1011	0	Largest_supported_sub-index	-	-	ro	ROM	1	-	-
	1	Load_all_default_parameters	Long	Long	rd / (wr)	ROM	„Load“	1)	1

1) When the correct password is input (load), the default parameters are loaded from the ROM.

3.3.10 Object 1014 COB-ID-EMCY

Identifier for the emergency message which the encoder transmits on occurrence of an alarm.
After “load default”, the identifier is COB-ID-EMCY + node ID.
If the user changes the COB ID, the node address is no longer added.
No range or plausibility check takes place.
29-bit identifiers are not supported.

COB-ID-EMCY

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
1014	0	COB-ID-EMCY	Long	Long	rw	E²PROM	-	1)	0x80+node ID

1) Default status evaluation then addition of the node address.

3.3.11 Object 1015 inhibit_time_EMCY

Blocking time to limit bus load in the case of EMCY messages following on in quick succession.
The basic unit is 100 µs.

Inhibit_time_EMCY

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
1015	0	Inhibit_time_EMCY	Word	Word	rw	E²PROM	0…0xFFFF	-	1000

3.3.12 Object 1017 producer_heartbeat_time

If a value greater than zero is entered here, the heartbeat message on the identifier guard COB ID + node ID is transmitted in the producer_heartbeat_time interval in ms.

Producer_heartbeat_time

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
1017	0	Producer_heartbeat_time	Word	Word	rw	E²PROM	0…0xFFFF	-	0

The heartbeat message format:

Bit No.	7	6	5	4	3	2	1	0
Content	0	Subscriber status						

0: BOOTUP

4: STOPPED

5: OPERATIONAL

127: PRE-OPERATIONAL

3.3.13 Object 1018 identity_object

This object contains data assigned to the individual encoder. The object is the address for the Layer Setting Service (LSS).
The following data must be entered:

1. Manufacturer ID — Assigned by CiA
2. Product code — TWK-internal
3. Revision number — TWK software revision number
4. Serial number

In factory programming status, the serial number can be written via LSS.

Identity_object

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type				
1018	0	Largest_supported_sub-index	-	-	ro	ROM	4	-	-
	1	Vendor ID	Long	Long	ro	ROM	0x0000 010D	-	-
	2	Product_code	Long	Long	ro	ROM	0x00008800	-	-
	3	Revision_number	Long	Long	ro	ROM	0x00010001	-	-
	4	Serial_number	Long	Long	ro(rw)	E²PROM	0……	1)	-

1) Written in factory programming status.

3.4 Control of the process data objects

3.4.1 COB ID structure

The process data are output via two process data objects (PDOs).

MSB LSB

EN	x	x	x	x	x	X	x	0	COB ID High	COB ID Low

The MSB represents the enable bit.
Bit 31 = 0 PDO enabled
Bit 31 = 1 PDO disabled

The plausibility of the other bits is not checked. 29-bit identifiers are not supported.

List of transmission types

0 Take-over with sync data and output in the event of a change.
1-240 Take-over with the 1st sync data, output with the nth (1-240) sync command.
252 Take-over with sync data, output with RTR.
253 Take-over and output data with RTR.
254 Data take-over and output in the event of a change.

3.4.2 Object 1800 PDO_asynchronous

All asynchronous and cyclical results.

The cycle timer object 6200 acts on this PDO.
No synchronous data output is possible.
Data take-over can be carried out synchronously with transmission type 252.
The following applies to the PDO COB ID: input: PDO COB ID; return: PDO COB ID + node ID.
No plausibility check takes place in the case of the COB ID.

The inhibit time can be set in 100 µs steps. The minimum time which can be set is 1 ms.

Transmit PDO 1

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
1800	0	Largest sub-index	-	-	ro	ROM	3	-	-
	1	COB ID	Long	Long	rd / wr	E²PROM	-	1)	0x180
	2	Transmission type	Byte	Byte	rd / wr	E²PROM	252, 253, 254	-	253
	3	Inhibit time	Word	Word	rd / wr	E²PROM	-	-	0

1) On reading (upload), the node address is added to the selected identifier.

3.4.3 Object 1801 transmit PDO synchronously

All **synchronous** results are processed via this PDO.
The inhibit timer is not implemented for this PDO, as no bus overload can occur in the event of synchronous data output.
No plausibility check takes place in the case of the COB ID.

Transmit PDO 2

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
1801	0	Largest sub-index	-	-	ro	ROM	2	-	-
	1	COB ID	Long	Long	rd / wr	E²PROM	-	1)	0x280
	2	Transmission type	Byte	Byte	rd / wr	E²PROM	0….240	-	1

1) On reading (upload), the node address is added to the selected identifier.

3.5 Mapping objects

3.5.1 Object 1A00 transmit PDO 1 mapping

The parameter contains the following coding for each “mapping” object:

Byte 0	Byte 1	Byte 2	Byte 3
Index		Sub-index	Length

The length is specified as the hex-coded number of bits.

Transmit PDO 1 mapping

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
1A00	0	Largest sub-index	-	-	ro	ROM	4	-	-
	1	First_PDO_mapping_object	Long	Long	ro	ROM	0x6134 0010	-	-
	2	Second_PDO_mapping_object	Long	Long	ro	ROM	0x6144 0010	-	-
	3	Third_PDO_mapping_object	Long	Long	ro	ROM	0x6154 0010	-	-
	4	For_PDO_mapping_object	Long	Long	ro	ROM	0x6164 0010	-	-

3.5.2 Object 1A01 transmit PDO 2 mapping

The parameter contains the following coding for each “mapping” object:

Byte 0	Byte 1	Byte 2	Byte 3
Index		Sub-index	Length

The length is specified as the hex-coded number of bits.

Transmit PDO 2 mapping

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
1A01	0	Largest sub-index	-	-	ro	ROM	4	-	-
	1	First_PDO_mapping_object	Long	Long	ro	ROM	0x6134 0010	-	-
	2	Second_PDO_mapping_object	Long	Long	ro	ROM	0x6144 0010	-	-
	3	Third_PDO_mapping_object	Long	Long	ro	ROM	0x6154 0010	-	-
	4	For_PDO_mapping_object	Long	Long	ro	ROM	0x6164 0010	-	-

3.6 LMT objects

3.6.1 Object 2000 node ID

The node address of the sensor. The parameter only becomes effective after saving with object 1010 and a power on reset.

Node ID

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
2000	0	Node ID	Byte	Byte	rw	E²PROM	1 …127	-	0x01

3.6.2 Object 2001 bit_rate

Baud rate of the CAN bus.
This object may also be changed by means of the Layer Setting Service.
The bit rate index is set according to the following table:

Index	Baud rate [kBaud/s]
0	1000
1	500
2	500
3	250
4	125
5	125
6	50
7	**20**

The parameter only becomes effective after saving with object 1010 and a power on reset.

Bit_rate

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
2001	0	Bit_rate	Byte	Byte	rw	E²PROM	0 …7	-	7

3.7 Manufacturer-specific objects for Synchronization and diagnosis

3.7.1 Object 2110 adjust_filter

This object is used for programming the filter characteristics in the factory.
Largest_supported_sub-index = 8

3.7.2 Objekt 2118 calibration_control

This object is used for calibration in the factory.
Largest_supported_sub-index = 2

3.7.3 Object 2121 adjust_analogue_channel_1

This object is used for programming the analogue channels in the factory. It contains two sub-indices for gain and offset.
Largest_supported_sub-index = 2

3.7.4 Object 2122 adjust_analogue_channel_2

This object is used for programming the analogue channels in the factory. It contains two sub-indices for gain and offset.

Largest_supported_sub-index = 2

3.7.5 Object 2130 sensor_adjust

This object is used for programming the acceleration sensor in the factory. This object is used to calibrate the sensor to a fixed resolution of 4096 digits pro g.

The objects shown in this chapter (3.7) are not shown in the eds-file as they are for manufacturer use only.

3.8 Manufacturer-specific objects

3.8.1 Object 6200 cyclic timer

In the case of values of > 0, the object position value 6004 is cyclically transmitted with the value of the cyclic timer in ms on PDO 1.

Cyclic timer

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6200	0	Cyclic_timer	Word	Word	rw	E²PROM	0…0xFFFF	-	0

3.9 Objects according to profile definition

3.9.1 Object 6000 resolution

Resolution for the x and y axes in digits/g. The maximum value is 20,480 digits/g corresponding to 0.2 g for 4096 digits. The basic resolution of the acceleration sensor is 4096 digits/g. 4096 digits/g is selected as the default value.

Resolution

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6000	0	Resolution	Word	Word	rw	E²PROM	1…20,480	Sen	4096

3.9.2 Object 6110 filter_1_limit_warning

Warning level for the filter in digits. The resolution setting refers to the resolution of object 6000. On evaluation of the filter output, the peak value of the amount of the measured variable set by each of the source and measuring_type objects is always evaluated.

Triggering is deleted again on falling below the warning level for 10 s.

Filter_1_limit_warning

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6110	0	Filter_1_limit_warning	Word	Word	rw	E²PROM	0…65,535	Sen	t.b.d.

3.9.3 Object 6111 filter_1_limit_alarm

Alarm level for the filter in digits. The resolution setting refers to the resolution of object 6000. On evaluation of the filter output, the peak value of the amount of the measured variable set by each of the source and measuring_type objects is always evaluated.

Triggering cannot be deleted.

Filter_1_limit_alarm

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6111	0	Filter_1_limit_alarm	Word	Word	rw	E²PROM	0…65,535	Sen	t.b.d.

3.9.4 Object 6112 filter_1_sample_frequency

Sampling frequency of the filter in Hz. The sampling frequency can be used to shift the filter's pass range. The sampling frequency can be shifted in the range from 120 Hz to 800 Hz. The factor F = fg/fa is a constant factor which arises from the filter constants. The filter limit frequency can be varied by changing the sampling frequency fa.

Filter_1_sample_frequency

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6112	0	Filter_1_sample_frequency	Word	Word	rw	E²PROM	120…800	Sen	240

3.9.5 Object 6113 filter_1_source

This object selects the source for filtering. The following options are available:

Source	Code
None	0
X axis	1
Y axis	2
X and Y axis	3
X axis raw data	4
Y axis raw data	5

If the X and Y axis are selected, both axes are added vectorially.

If “None” is selected, the analogue output connected to the filter output is switched to a constant 2 mA.

The raw data involve the unscaled sensor signal. These options are implemented for diagnostic purposes.

Filter_1_source

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6113	0	filter_1_source	Word	Word	rw	E²PROM	0 …3	Sen	3

3.9.6 Object 6114 filter_1_out

Filter output value.

The acceleration value in g is obtained:

Acceleration [g] = filter_1_out [digits] / resolution [digits/g]

filter_1_out

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6114	0	filter_1_out	Word	Word	ro	RAM	0 …65,535	Sen	-

3.9.7 Object 6115 filter_1_out_peak

Filter output value as a peak value.

The acceleration value (absolute value) of the acceleration in g is obtained:

|Acceleration| [g] = |filter_1_out| [digits] / resolution [digits/g]

On determination of the peak value, a check is conducted to ascertain whether a new peak value has been registered during the updating period. If this is not the case, the stored peak value is decremented on expiry of the updating period. As a result of this, the peak value slowly approaches the level of the current peak values. This is intended to prevent the peak value from being set to this value for a long period of time in the case of a one-off, rare event (a heavy object falls down during maintenance work, for example). If the updating period is set to zero, peak value incrementation is shut off.

Write access deletes the current value. Measurement is restarted.

Filter_1_out_peak

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6115	0	filter_1_out_peak	Word	Word	rw	RAM	0 …65,535	Sen	-

3.9.8 Object 6116 filter_1_out_rms

Filter output value in the form of a root mean square value (RMS).

The acceleration value in g is obtained:

Acceleration [g] = filter_1_out [digits] / resolution [digits/g]

The measured values are recorded at the filter's sampling rate, and the root mean square is determined. At intervals of 0.2 seconds, these mean values are entered in an array with sliding mean value determination. The mean value array can accommodate 100 values. The mean value determination time is therefore 20s. To shorten the time required to achieve steady-state, 100 values are recorded at the filter's sampling rate and the mean value is determined after starting the system. The mean value array is filled with the mean value determination result. A relatively plausible measured value is therefore available after a short period of time (85 ms). The times for the RMS value can be set via object 6119.

Filter_1_out_rms

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6116	0	filter_1_out_rms	Word	Word	ro	RAM	0 …65,535	Sen	-

3.9.9 Object 6117 filter_1_peak_time

On expiry of the peak_time, the peak value is incremented as long as no new value has been stored as the peak value within this time. If a value has been stored, the timer is reset. If zero is entered, incrementation is shut off. The parameter's dimension is s (seconds).

Filter_1_peak_time

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6117	0	filter_1_peak_time	Word	Word	rw	E²PROM	0 …65,535	Sen	0

3.9.10 Object 6118 filter_1_measuring_type

Type of measurement. The set measurement type is output on the object filter_x_out. The following measurements are possible:

Value	Description
0	Output not active (output statically 0)
1	Momentary value
2	Peak value
3	RMS (root mean square value)

If "Output not active" is selected, the analogue output connected to the filter output is switched to a constant 2 mA.

Filter_1_measuring_type

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6118	0	filter_1_measuring_type	Word	Word	rw	E²PROM	0 …3	Sen	1

3.9.11 Objekt 6119 filter_1_rms_time

Averaging time for RMS calculation. The parameter's dimension is s (seconds).

Filter_1_rms_time

Index	Sub	Description	Length COM	Length MEM	Memory Typ	Memory Ort	Range/ value	Action	Default
6119	0	filter_1_rms_time	Word	Word	rw	E²PROM	1 …20	Sen	1

3.9.12 Object 6120 filter_2_limit_warning

Warning level for the filter in digits. The resolution setting refers to the resolution of object 6000. On evaluation of the filter output, the peak value of the amount of the measured variable set by each of the source and measuring_type objects is always evaluated.

Triggering is deleted again on falling below the warning level for 10 s.

Filter_2_limit_warning

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6120	0	Filter_2_limit_warning	Word	Word	rw	E²PROM	0…65,535	Sen	t.b.d.

3.9.13 Object 6121 filter_2_limit_alarm

Alarm level for the filter in digits. The resolution setting refers to the resolution of object 6000. On evaluation of the filter output, the peak value of the amount of the measured variable set by each of the source and measuring_type objects is always evaluated.

Triggering cannot be deleted.

Filter_2_limit_alarm

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6121	0	Filter_2_limit_alarm	Word	Word	rw	E²PROM	0…65,535	Sen	t.b.d.

3.9.14 Object 6122 filter_2_sample_frequency

Sampling frequency of the filter in Hz. The sampling frequency can be used to shift the filter's pass range. The sampling frequency can be shifted in the range from 120 Hz to 800 Hz. The factor F = fg/fa is a constant factor which arises from the filter constants. The filter limit frequency can be varied by changing the sampling frequency fa.

Filter_2_sample_frequency

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6122	0	Filter_2_sample_frequency	Word	Word	rw	E²PROM	120…800	Sen	240

3.9.15 Object 6123 filter_2_source

This object selects the source for filtering. The following options are available:

Source	Code
None	0
X axis	1
Y axis	2
X and Y axis	3
X axis raw data	4
Y axis raw data	5

If the X and Y axis are selected, both axes are added vectorially.

If “None” is selected, the analogue output connected to the filter output is switched to a constant 2 mA.

The raw data involve the unscaled sensor signal. These options are implemented for diagnostic purposes.

Filter_1_source

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6113	0	filter_1_source	Word	Word	rw	E²PROM	0 …3	Sen	3

3.9.16 Object 6124 filter_2_out

Filter output value.

The acceleration value in g is obtained:

Acceleration [g] = filter_2_out [digits] / resolution [digits/g]

filter_2_out

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6124	0	filter_2_out	Word	Word	ro	RAM	0 …65,535	Sen	-

3.9.17 Object 6125 filter_2_out_peak

Filter output value as a peak value.

The acceleration value (absolute value) of the acceleration in g is obtained:

|Acceleration| [g] = |filter_2_out| [digits] / resolution [digits/g]

On determination of the peak value, a check is conducted to ascertain whether a new peak value has been registered during the updating period. If this is not the case, the stored peak value is decremented on expiry of the updating period. As a result of this, the peak value slowly approaches the level of the current peak values. This is intended to prevent the peak value from being set to this value for a long period of time in the case of a one-off, rare event (a heavy object falls down during maintenance work, for example). If the updating period is set to zero, peak value incrementation is shut off.

Write access deletes the current value. Measurement is restarted.

Filter_2_out_peak

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6125	0	filter_2_out_peak	Word	Word	rw	RAM	0 …65,535	Sen	-

3.9.18 Object 6126 filter_2_out_rms

Filter output value in the form of a root mean square value (RMS).

The acceleration value in g is obtained:

Acceleration [g] = filter_2_out [digits] / resolution [digits/g]

The measured values are recorded at the filter's sampling rate, and the root mean square is determined. At intervals of 0.2 seconds, these mean values are entered in an array with sliding mean value determination. The mean value array can accommodate 100 values. The mean value determination time is therefore 20s. To shorten the time required to achieve steady-state, 100 values are recorded at the filter's sampling rate and the mean value is determined after starting the system. The mean value array is filled with the mean value determination result. A relatively plausible measured value is therefore available after a short period of time (85 ms). The times for the RMS value can be set via object 6129.

Filter_2_out_rms

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6126	0	filter_2_out_rms	Word	Word	ro	RAM	0 …65,535	Sen	-

3.9.19 Object 6127 filter_2_peak_time

On expiry of the peak_time, the peak value is incremented as long as no new value has been stored as the peak value within this time. If a value has been stored, the timer is reset. If zero is entered, incrementation is shut off. The parameter's dimension is s (seconds).

Filter_2_peak_time

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6127	0	filter_1_peak_time	Word	Word	rw	E²PROM	0 …65,535	Sen	0

3.9.20 Object 6128 filter_2_measuring_type

Type of measurement. The set measurement type is output on the object filter_x_out. The following measurements are possible:

Value	Description
0	Output not active (output statically 0)
1	Momentary value
2	Peak value
3	RMS (root mean square value)

If "Output not active" is selected, the analogue output connected to the filter output is switched to a constant 2 mA.

Filter_2_measuring_type

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6128	0	filter_1_measuring_type	Word	Word	rw	E²PROM	0 …3	Sen	1

3.9.21 Objekt 6129 filter_2_rms_time

Averaging time for RMS calculation. The parameter's dimension is s (seconds).

Filter_2_rms_time

Index	Sub	Description	Length COM	Length MEM	Memory Typ	Memory Ort	Range/ value	Action	Default
6129	0	filter_2_rms_time	Word	Word	rw	E²PROM	1 …20	Sen	1

3.9.22 Object 6130 filter_3_limit_warning

Warning level for the filter in digits. The resolution setting refers to the resolution of object 6000. On evaluation of the filter output, the peak value of the amount of the measured variable set by each of the source and measuring_type objects is always evaluated.

Triggering is deleted again on falling below the warning level for 10 s.

Filter_3_limit_warning

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6130	0	Filter_3_limit_warning	Word	Word	rw	E²PROM	0…65,535	Sen	t.b.d.

3.9.23 Object 6131 filter_3_limit_alarm

Alarm level for the filter in digits. The resolution setting refers to the resolution of object 6000. On evaluation of the filter output, the peak value of the amount of the measured variable set by each of the source and measuring_type objects is always evaluated.

Triggering cannot be deleted.

Filter_3_limit_alarm

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6131	0	Filter_3_limit_alarm	Word	Word	rw	E²PROM	0…65,535	Sen	t.b.d.

3.9.24 Object 6132 filter_3_sample_frequency

Sampling frequency of the filter in Hz. The sampling frequency can be used to shift the filter's pass range. The sampling frequency can be shifted in the range from 120 Hz to 800 Hz. The factor F = fg/fa is a constant factor which arises from the filter constants. The filter limit frequency can be varied by changing the sampling frequency fa.

Filter_3_sample_frequency

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6132	0	Filter_3_sample_frequency	Word	Word	rw	E²PROM	120…800	Sen	240

3.9.25 Object 6133 filter_3_source

This object selects the source for filtering. The following options are available:

Source	Code
None	0
X axis	1
Y axis	2
X and Y axis	3
X axis raw data	4
Y axis raw data	5

If the X and Y axis are selected, both axes are added vectorially.

If “None” is selected, the analogue output connected to the filter output is switched to a constant 2 mA.

The raw data involve the unscaled sensor signal. These options are implemented for diagnostic purposes.

Filter_1_source

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6113	0	filter_1_source	Word	Word	rw	E²PROM	0 …3	Sen	3

3.9.26 Object 6134 filter_3_out

Filter output value.

The acceleration value in g is obtained:

Acceleration [g] = filter_3_out [digits] / resolution [digits/g]

filter_3_out

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6134	0	filter_3_out	Word	Word	ro	RAM	0 …65,535	Sen	-

3.9.27 Object 6135 filter_3_out_peak

Filter output value as a peak value.

The acceleration value (absolute value) of the acceleration in g is obtained:

Acceleration| [g] = |filter_3_out| [digits] / resolution [digits/g]

On determination of the peak value, a check is conducted to ascertain whether a new peak value has been registered during the updating period. If this is not the case, the stored peak value is decremented on expiry of the updating period. As a result of this, the peak value slowly approaches the level of the current peak values. This is intended to prevent the peak value from being set to this value for a long period of time in the case of a one-off, rare event (a heavy object falls down during maintenance work, for example). If the updating period is set to zero, peak value incrementation is shut off.

Write access deletes the current value. Measurement is restarted.

Filter_3_out_peak

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6135	0	filter_3_out_peak	Word	Word	rw	RAM	0 …65,535	Sen	-

3.9.28 Object 6136 filter_3_out_rms

Filter output value in the form of a root mean square value (RMS).

The acceleration value in g is obtained:

Acceleration [g] = filter_3_out [digits] / resolution [digits/g]

The measured values are recorded at the filter's sampling rate, and the root mean square is determined. At intervals of 0.2 seconds, these mean values are entered in an array with sliding mean value determination. The mean value array can accommodate 100 values. The mean value determination time is therefore 20s. To shorten the time required to achieve steady-state, 100 values are recorded at the filter's sampling rate and the mean value is determined after starting the system. The mean value array is filled with the mean value determination result. A relatively plausible measured value is therefore available after a short period of time (85 ms). The times for the RMS value can be set via object 6139.

Filter_3_out_rms

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6136	0	filter_3_out_rms	Word	Word	ro	RAM	0 …65,535	Sen	-

3.9.29 Object 6137 filter_3_peak_time

On expiry of the peak_time, the peak value is incremented as long as no new value has been stored as the peak value within this time. If a value has been stored, the timer is reset. If zero is entered, incrementation is shut off. The parameter's dimension is s (seconds).

Filter_3_peak_time

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6137	0	filter_3_peak_time	Word	Word	rw	E²PROM	0 …65,535	Sen	0

3.9.30 Object 6138 filter_3_measuring_type

Type of measurement. The set measurement type is output on the object filter_x_out. The following measurements are possible:

Value	Description
0	Output not active (output statically 0)
1	Momentary value
2	Peak value
3	RMS (root mean square value)

If “Output not active” is selected, the analogue output connected to the filter output is switched to a constant 2 mA.

Filter_3_measuring_type

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6138	0	filter_3_measuring_type	Word	Word	rw	E²PROM	0 …3	Sen	1

3.9.31 Objekt 6139 filter_3_rms_time

Averaging time for RMS calculation. The parameter’s dimension is s (seconds).

Filter_3_rms_time

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Typ	Ort			
6139	0	filter_3_rms_time	Word	Word	rw	E²PROM	1 …20	Sen	1

3.9.32 Object 6140 filter_4_limit_warning

Warning level for the filter in digits. The resolution setting refers to the resolution of object 6000. On evaluation of the filter output, the peak value of the amount of the measured variable set by each of the source and measuring_type objects is always evaluated.

Triggering is deleted again on falling below the warning level for 10 s.

Filter_4_limit_warning

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6140	0	Filter_4_limit_warning	Word	Word	rw	E²PROM	0…65,535	Sen	t.b.d.

3.9.33 Object 6141 filter_4_limit_alarm

Alarm level for the filter in digits. The resolution setting refers to the resolution of object 6000. On evaluation of the filter output, the peak value of the amount of the measured variable set by each of the source and measuring_type objects is always evaluated.

Triggering cannot be deleted.

Filter_4_limit_alarm

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6141	0	Filter_4_limit_alarm	Word	Word	rw	E²PROM	0…65,535	Sen	t.b.d.

3.9.34 Object 6142 filter_4_sample_frequency

Sampling frequency of the filter in Hz. The sampling frequency can be used to shift the filter's pass range. The sampling frequency can be shifted in the range from 120 Hz to 800 Hz. The factor F = fg/fa is a constant factor which arises from the filter constants. The filter limit frequency can be varied by changing the sampling frequency fa.

Filter_4_sample_frequency

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6142	0	Filter_4_sample_frequency	Word	Word	rw	E²PROM	120…800	Sen	240

3.9.35 Object 6143 filter_4_source

This object selects the source for filtering. The following options are available:

Source	Code
None	0
X axis	1
Y axis	2
X and Y axis	3
X axis raw data	4
Y axis raw data	5

If the X and Y axis are selected, both axes are added vectorially.

If "None" is selected, the analogue output connected to the filter output is switched to a constant 2 mA.

The raw data involve the unscaled sensor signal. These options are implemented for diagnostic purposes.

Filter_1_source

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6113	0	filter_1_source	Word	Word	rw	E²PROM	0 …3	Sen	3

3.9.36 Object 6144 filter_4_out

Filter output value.

The acceleration value in g is obtained:

Acceleration [g] = filter_4_out [digits] / resolution [digits/g]

filter_4_out

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6144	0	filter_4_out	Word	Word	ro	RAM	0 …65,535	Sen	-

3.9.37 Object 6145 filter_4_out_peak

Filter output value as a peak value.

The acceleration value (absolute value) of the acceleration in g is obtained:

|Acceleration| [g] = |filter_4_out| [digits] / resolution [digits/g]

On determination of the peak value, a check is conducted to ascertain whether a new peak value has been registered during the updating period. If this is not the case, the stored peak value is decremented on expiry of the updating period. As a result of this, the peak value slowly

approaches the level of the current peak values. This is intended to prevent the peak value from being set to this value for a long period of time in the case of a one-off, rare event (a heavy object falls down during maintenance work, for example). If the updating period is set to zero, peak value incrementation is shut off.

Write access deletes the current value. Measurement is restarted.

Filter_4_out_peak

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6145	0	filter_4_out_peak	Word	Word	rw	RAM	0 …65,535	Sen	-

3.9.38 Object 6146 filter_4_out_rms

Filter output value in the form of a root mean square value (RMS).

The acceleration value in g is obtained:

Acceleration [g] = filter_4_out [digits] / resolution [digits/g]

The measured values are recorded at the filter's sampling rate, and the root mean square is determined. At intervals of 0.2 seconds, these mean values are entered in an array with sliding mean value determination. The mean value array can accommodate 100 values. The mean value determination time is therefore 20s. To shorten the time required to achieve steady-state, 100 values are recorded at the filter's sampling rate and the mean value is determined after starting the system. The mean value array is filled with the mean value determination result. A relatively plausible measured value is therefore available after a short period of time (85 ms). The times for the RMS value can be set via object 6149.

Filter_4_out_rms

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6146	0	filter_4_out_rms	Word	Word	ro	RAM	0 …65,535	Sen	-

3.9.39 Object 6147 filter_4_peak_time

On expiry of the peak_time, the peak value is incremented as long as no new value has been stored as the peak value within this time. If a value has been stored, the timer is reset. If zero is entered, incrementation is shut off. The parameter's dimension is s (seconds).

Filter_4_peak_time

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6147	0	filter_4_peak_time	Word	Word	rw	E²PROM	0 …65,535	Sen	0

3.9.40 Object 6148 filter_4_measuring_type

Type of measurement. The set measurement type is output on the object filter_x_out. The following measurements are possible:

Value	Description
0	Output not active (output statically 0)
1	Momentary value
2	Peak value
3	RMS (root mean square value)

If "Output not active" is selected, the analogue output connected to the filter output is switched to a constant 2 mA.

Filter_4_measuring_type

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6148	0	filter_4_measuring_type	Word	Word	rw	E²PROM	0 …3	Sen	1

3.9.41 Objekt 6149 filter_4_rms_time

Averaging time for RMS calculation. The parameter's dimension is s (seconds).

Filter_4_rms_time

Index	Sub	Description	Length COM	Length MEM	Memory Typ	Memory Ort	Range/ value	Action	Default
6149	0	filter_4_rms_time	Word	Word	rw	E²PROM	1 …20	Sen	1

3.9.42 Object 6150 filter_5_limit_warning

Warning level for the filter in digits. The resolution setting refers to the resolution of object 6000. On evaluation of the filter output, the peak value of the amount of the measured variable set by each of the source and measuring_type objects is always evaluated.

Triggering is deleted again on falling below the warning level for 10 s.

Filter_5_limit_warning

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6150	0	Filter_5_limit_warning	Word	Word	rw	E²PROM	0…65,535	Sen	t.b.d.

3.9.43 Object 6151 filter_5_limit_alarm

Alarm level for the filter in digits. The resolution setting refers to the resolution of object 6000. On evaluation of the filter output, the peak value of the amount of the measured variable set by each of the source and measuring_type objects is always evaluated.

Triggering cannot be deleted.

Filter_5_limit_alarm

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6151	0	Filter_5_limit_alarm	Word	Word	rw	E²PROM	0…65,535	Sen	t.b.d.

3.9.44 Object 6152 filter_5_sample_frequency

Sampling frequency of the filter in Hz. The sampling frequency can be used to shift the filter's pass range. The sampling frequency can be shifted in the range from 120 Hz to 800 Hz. The factor F = fg/fa is a constant factor which arises from the filter constants. The filter limit frequency can be varied by changing the sampling frequency fa.

Filter_5_sample_frequency

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6152	0	Filter_5_sample_frequency	Word	Word	rw	E²PROM	120…800	Sen	240

3.9.45 Object 6153 filter_5_source

This object selects the source for filtering. The following options are available:

Source	Code
None	0
X axis	1
Y axis	2
X and Y axis	3
X axis raw data	4
Y axis raw data	5

If the X and Y axis are selected, both axes are added vectorially.

If “None” is selected, the analogue output connected to the filter output is switched to a constant 2 mA.

The raw data involve the unscaled sensor signal. These options are implemented for diagnostic purposes.

Filter_1_source

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6113	0	filter_1_source	Word	Word	rw	E²PROM	0 …3	Sen	3

3.9.46 Object 6154 filter_5_out

Filter output value.

The acceleration value in g is obtained:

Acceleration [g] = filter_5_out [digits] / resolution [digits/g]

filter_5_out

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6154	0	filter_5_out	Word	Word	ro	RAM	0 …65,535	Sen	-

3.9.47 Object 6155 filter_5_out_peak

Filter output value as a peak value.

The acceleration value (absolute value) of the acceleration in g is obtained:

|Acceleration| [g] = |filter_5_out| [digits] / resolution [digits/g]

On determination of the peak value, a check is conducted to ascertain whether a new peak value has been registered during the updating period. If this is not the case, the stored peak value is decremented on expiry of the updating period. As a result of this, the peak value slowly approaches the level of the current peak values. This is intended to prevent the peak value from being set to this value for a long period of time in the case of a one-off, rare event (a heavy object falls down during maintenance work, for example). If the updating period is set to zero, peak value incrementation is shut off.

Write access deletes the current value. Measurement is restarted.

Filter_5_out_peak

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6155	0	filter_5_out_peak	Word	Word	rw	RAM	0 …65,535	Sen	-

3.9.48 Object 6156 filter_5_out_rms

Filter output value in the form of a root mean square value (RMS).

The acceleration value in g is obtained:

Acceleration [g] = filter_5_out [digits] / resolution [digits/g]

The measured values are recorded at the filter's sampling rate, and the root mean square is determined. At intervals of 0.2 seconds, these mean values are entered in an array with sliding mean value determination. The mean value array can accommodate 100 values. The mean value determination time is therefore 20s. To shorten the time required to achieve steady-state, 100 values are recorded at the filter's sampling rate and the mean value is determined after starting the system. The mean value array is filled with the mean value determination result. A relatively plausible measured value is therefore available after a short period of time (85 ms). The times for the RMS value can be set via object 6159.

Filter_5_out_rms

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6156	0	filter_5_out_rms	Word	Word	ro	RAM	0 …65,535	Sen	-

3.9.49 Object 6157 filter_5_peak_time

On expiry of the peak_time, the peak value is incremented as long as no new value has been stored as the peak value within this time. If a value has been stored, the timer is reset. If zero is entered, incrementation is shut off. The parameter's dimension is s (seconds).

Filter_5_peak_time

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6157	0	filter_5_peak_time	Word	Word	rw	E²PROM	0 …65,535	Sen	0

3.9.50 Object 6158 filter_5_measuring_type

Type of measurement. The set measurement type is output on the object filter_x_out. The following measurements are possible:

Value	Description
0	Output not active (output statically 0)
1	Momentary value
2	Peak value
3	RMS (root mean square value)

If "Output not active" is selected, the analogue output connected to the filter output is switched to a constant 2 mA.

Filter_1_measuring_type

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6158	0	filter_5_measuring_type	Word	Word	rw	E²PROM	0 …3	Sen	1

3.9.51 Objekt 6159 filter_5_rms_time

Averaging time for RMS calculation. The parameter's dimension is s (seconds).

Filter_5_rms_time

Index	Sub	Description	Length COM	Length MEM	Memory Typ	Memory Ort	Range/ value	Action	Default
6159	0	filter_5_rms_time	Word	Word	rw	E²PROM	1 …20	Sen	1

3.9.52 Object 6160 filter_6_limit_warning

Warning level for the filter in digits. The resolution setting refers to the resolution of object 6000. On evaluation of the filter output, the peak value of the amount of the measured variable set by each of the source and measuring_type objects is always evaluated.

Triggering is deleted again on falling below the warning level for 10 s.

Filter_6_limit_warning

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6160	0	Filter_6_limit_warning	Word	Word	rw	E²PROM	0…65,535	Sen	t.b.d.

3.9.53 Object 6161 filter_6_limit_alarm

Alarm level for the filter in digits. The resolution setting refers to the resolution of object 6000. On evaluation of the filter output, the peak value of the amount of the measured variable set by each of the source and measuring_type objects is always evaluated.

Triggering cannot be deleted.

Filter_6_limit_alarm

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6161	0	Filter_6_limit_alarm	Word	Word	rw	E²PROM	0…65,535	Sen	t.b.d.

3.9.54 Object 6162 filter_6_sample_frequency

Sampling frequency of the filter in Hz. The sampling frequency can be used to shift the filter's pass range. The sampling frequency can be shifted in the range from 120 Hz to 800 Hz. The factor F = fg/fa is a constant factor which arises from the filter constants. The filter limit frequency can be varied by changing the sampling frequency fa.

Filter_6_sample_frequency

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6162	0	Filter_6_sample_frequency	Word	Word	rw	E²PROM	120…800	Sen	240

3.9.55 Object 6163 filter_6_source

This object selects the source for filtering. The following options are available:

Source	Code
None	0
X axis	1
Y axis	2
X and Y axis	3
X axis raw data	4
Y axis raw data	5

If the X and Y axis are selected, both axes are added vectorially.

If “None” is selected, the analogue output connected to the filter output is switched to a constant 2 mA.

The raw data involve the unscaled sensor signal. These options are implemented for diagnostic purposes.

Filter_1_source

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6113	0	filter_1_source	Word	Word	rw	E²PROM	0 …3	Sen	3

3.9.56 Object 6164 filter_6_out

Filter output value.

The acceleration value in g is obtained:

Acceleration [g] = filter_6_out [digits] / resolution [digits/g]

filter_6_out

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6164	0	filter_6_out	Word	Word	ro	RAM	0 …65,535	Sen	-

3.9.57 Object 6165 filter_6_out_peak

Filter output value as a peak value.

The acceleration value (absolute value) of the acceleration in g is obtained:

|Acceleration| [g] = |filter_6_out| [digits] / resolution [digits/g]

On determination of the peak value, a check is conducted to ascertain whether a new peak value has been registered during the updating period. If this is not the case, the stored peak value is decremented on expiry of the updating period. As a result of this, the peak value slowly approaches the level of the current peak values. This is intended to prevent the peak value from being set to this value for a long period of time in the case of a one-off, rare event (a heavy object falls down during maintenance work, for example). If the updating period is set to zero, peak value incrementation is shut off.

Write access deletes the current value. Measurement is restarted.

Filter_6_out_peak

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6165	0	filter_6_out_peak	Word	Word	rw	RAM	0 …65,535	Sen	-

3.9.58 Object 6166 filter_6_out_rms

Filter output value in the form of a root mean square value (RMS).

The acceleration value in g is obtained:

Acceleration [g] = filter_6_out [digits] / resolution [digits/g]

The measured values are recorded at the filter's sampling rate, and the root mean square is determined. At intervals of 0.2 seconds, these mean values are entered in an array with sliding mean value determination. The mean value array can accommodate 100 values. The mean value determination time is therefore 20s. To shorten the time required to achieve steady-state, 100 values are recorded at the filter's sampling rate and the mean value is determined after starting the system. The mean value array is filled with the mean value determination result. A relatively plausible measured value is therefore available after a short period of time (85 ms). The times for the RMS value can be set via object 6169.

Filter_6_out_rms

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6166	0	filter_6_out_rms	Word	Word	ro	RAM	0 …65,535	Sen	-

3.9.59 Object 6167 filter_6_peak_time

On expiry of the peak_time, the peak value is incremented as long as no new value has been stored as the peak value within this time. If a value has been stored, the timer is reset. If zero is entered, incrementation is shut off. The parameter's dimension is s (seconds).

Filter_6_peak_time

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6167	0	filter_6_peak_time	Word	Word	rw	E²PROM	0 …65,535	Sen	0

3.9.60 Object 6168 filter_6_measuring_type

Type of measurement. The set measurement type is output on the object filter_x_out. The following measurements are possible:

Value	Description
0	Output not active (output statically 0)
1	Momentary value
2	Peak value
3	RMS (root mean square value)

If "Output not active" is selected, the analogue output connected to the filter output is switched to a constant 2 mA.

Filter_6_measuring_type

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6168	0	filter_6_measuring_type	Word	Word	rw	E²PROM	0 …3	Sen	1

3.9.61 Objekt 6169 filter_6_rms_time

Averaging time for RMS calculation. The parameter's dimension is s (seconds).

Filter_6_rms_time

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Typ	Ort			
6169	0	filter_6_rms_time	Word	Word	rw	E²PROM	1 …20	Sen	1

3.9.62 Object 61A1 gain_analogue_1

This object can be used to set the gain for analogue channel 1. The amplitude of the filter's output signal may be significantly lower than the input level. A separate gain setting is therefore provided for the analogue channel. This enables the analogue output to be adapted to the signal level.

The gain factor k is calculated as follows:

$$gain\_analogue\_1 = k \cdot 2^{16}$$

Example: desired gain 2.25;

value for object 61A1 → 2.25 * 2^{16} = 147,456 or 0x24,000.

The default value is 1.0 = 0x10,000 (e.g. 4 … 20 mA for -1 g to +1 g at momentary value x or y).

(Use 0x8,000 for 4 … 20 mA for -0.5 g to +0.5 g at momentary value x or y)

Gain_analogue_1

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
61A1	0	Gain_analogue_1	LONG	LONG	rw	E²PROM	1…0xFFFFFFFF	Sen	0x10,000

3.9.63 Object 61A2 gain_analogue_2

This object can be used to set the gain for analogue channel 2. The amplitude of the filter's output signal may be significantly lower than the input level. A separate gain setting is therefore provided for the analogue channel. This enables the analogue output to be adapted to the signal level.

The gain factor k is calculated as follows:

$$gain\_analogue\_2 = k \cdot 2^{16}$$

Example: desired gain 2.25;

value for object 61A2 → 2.25 * 2^{16} = 147,456 or 0x24,000.

The default value is 1.0 = 0x10,000 (e.g. 4 … 20 mA for -1 g to +1 g at momentary value x or y).

(Use 0x8,000 for 4 … 20 mA for -0.5 g to +0.5 g at momentary value x or y)

Gain_analogue_2

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
61A2	0	Gain_analogue_2	LONG	LONG	rw	E²PROM	1…0xFFFFFFFF	Sen	0x10,000

3.9.64 Object 6310 relay_1_assign

Defines the assignment of the source for the relay.

The source to be connected to the relay must be set to 1. Several sources may be active. If the source's set limit value is exceeded, the output is set to 1. A screen is formed from this object's data item. The non-active sources are hidden. If the result is greater than zero, the relay is activated.

If a zero is entered in the object, the relay is inactive.

Filter No.	Function	Active	Bit	Byte
Filter 6	Alarm		3	1
	Warning		2	
Filter 5	Alarm		1	
	Warning		0	
Filter 4	Alarm		7	0
	Warning		6	
Filter 3	Alarm		5	
	Warning		4	
Filter 2	Alarm		3	
	Warning		2	
Filter 1	Alarm		1	
	Warning		0	

Relay_1_assign

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6310	0	Relay_1_assign	Word	Word	rw	E²PROM	0…4096	Sen	2

How to get the values for input (Valid for objects 6320, 6330 and 6340)

Example: Relay 1 activated by filter 1 as alarm relay and by filter 3 as warning relay.

Filter	Function	aktive	Bit	Byte	
Filter 6	Alarm		3	1	0
	Warning		2		0
Filter 5	Alarm		1		0
	Warning		0		0
Filter 4	Alarm		7	0	0
	Warning		6		0
Filter 3	Alarm		5		0
	Warning		4		1
Filter 2	Alarm		3		0
	Warning		2		0
Filter 1	Alarm		1		1
	Warning		0		0

Leading 0

Read in this direction

Read in this direction ←

Value: 10010 binary = 18 decimal = 12 hexadecimal (Leading 0 omitted)

3.9.65 Object 6320 relay_2_assign

Defines the assignment of the source for the relay.

The source to be connected to the relay must be set to 1. Several sources may be active. If the source's set limit value is exceeded, the output is set to 1. A screen is formed from this object's data item. The non-active sources are hidden. If the result is greater than zero, the relay is activated.

If a zero is entered in the object, the relay is inactive.

Filter No.	Function	Active	Bit	Byte
Filter 6	Alarm		3	1
	Warning		2	
Filter 5	Alarm		1	
	Warning		0	
Filter 4	Alarm		7	0
	Warning		6	
Filter 3	Alarm		5	
	Warning		4	
Filter 2	Alarm		3	
	Warning		2	
Filter 1	Alarm		1	
	Warning		0	

Relay_2_assign

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6320	0	Relay_2_assign	Word	Word	rw	E²PROM	0…4096	Sen	1

3.9.66 Object 6330 relay_3_assign

Defines the assignment of the source for the relay.

The source to be connected to the relay must be set to 1. Several sources may be active. If the source's set limit value is exceeded, the output is set to 1. A screen is formed from this object's data item. The non-active sources are hidden. If the result is greater than zero, the relay is activated.

If a zero is entered in the object, the relay is inactive.

Filter No.	Function	Active	Bit	Byte
Filter 6	Alarm		3	1
	Warning		2	
Filter 5	Alarm		1	
	Warning		0	
Filter 4	Alarm		7	0
	Warning		6	
Filter 3	Alarm		5	
	Warning		4	
Filter 2	Alarm		3	
	Warning		2	
Filter 1	Alarm		1	
	Warning		0	

Relay_3_assign

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6330	0	Relay_3_assign	Word	Word	rw	E²PROM	0…4096	Sen	8

3.9.67 Object 6340 relay_4_assign

Defines the assignment of the source for the relay.

The source to be connected to the relay must be set to 1. Several sources may be active. If the source's set limit value is exceeded, the output is set to 1. A screen is formed from this object's data item. The non-active sources are hidden. If the result is greater than zero, the relay is activated.

If a zero is entered in the object, the relay is inactive.

Filter No.	Function	Active	Bit	Byte
Filter 6	Alarm		3	1
	Warning		2	
Filter 5	Alarm		1	
	Warning		0	
Filter 4	Alarm		7	0
	Warning		6	
Filter 3	Alarm		5	
	Warning		4	
Filter 2	Alarm		3	
	Warning		2	
Filter 1	Alarm		1	
	Warning		0	

Relay_4_assign

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6340	0	Relay_4_assign	Word	Word	rw	E²PROM	0…4096	Sen	4

3.10 Diagnostic objects

3.10.1 Object 6503 alarms

Internally, there is only one error byte. If an alarm occurs, an emergency message is transmitted.
On SDO upload, the error byte is loaded into the object's MSB.
The following errors are evaluated:

Bit	Error type
0 – 1	Not used
2	Not used
3	Internal coding error
4	Not used
5	EEPROM CRC error
6	Not used
7	Sensor error

Internal coding error:

ROM, RAM, error, communication error between sensor and controller

Alarms

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6503	0	Alarms	Word	Byte	ro	RAM	-	See above	-

3.10.2 Object 6504 supported_alarms

Supported alarm messages.
This is a representation of the possible error displays in index 6503.

Supported_alarms

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6504	0	Supported alarms	Word	Word	ro	ROM	0xF800	-	-

3.10.3 Object 6506 supported_warnings

Supported warning messages.
No warnings are supported. Object 6505 can therefore be omitted.

Supported_warnings

Index	Sub	Description	Length		Memory		Range/ value	Action	Default
			COM	MEM	Type	Location			
6506	0	Supported_warnings	Word	Word	ro	ROM	0	-	-

3.10.4 Object 6507 profile_and_software_version

The profile and software version of the encoder.
The versions are each BCD-coded by byte.
Version 2.05 results in 0x0205.

Profile version		Software version	
Byte 0	Byte 1	Byte 2	Byte 3
Bits 7 – 0	Bits 15 – 8	Bits 7 – 0	Bits 15 – 8

Profile_and_software_version

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6507	0	Profile_and_software_version	Long	Long	ro	ROM	0x0102 0100	-	-

3.10.5 Object 6508 operating time

Not used.

Operating time

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
6508	0	Operating time	Long	Long	ro	ROM	0xFFFF FFFF	-	-

3.10.6 Object 650B serial_number

The serial number is written during programming in the factory. The serial number is entered in bit inverted form in the case of the redundant node.

Serial_number

Index	Sub	Description	Length COM	Length MEM	Memory Type	Memory Location	Range/ value	Action	Default
650B	0	Serial_number	Long	Long	ro(rw)	E²PROM	0….	1)	-

1) Written in factory programming status.

3.11 Table with all Objects and default values

Listing of objects with default values			
Number of object	**Type**	**Description**	**Default value**
1000	VAR	Device Type	0x18000000
1001	VAR	Error Register	0x0
1005	VAR	COB-ID-SYNC	0x80
1008	VAR	Manufacturer device name	Acceleration NVA
1009	VAR	Manufacturer hardware version	P-0642
100A	VAR	Manufacturer software version	NVA analog Standard
1010	ARRAY	Store parameters	0x1
1010/01	ARRAY		0x1
1011	ARRAY	Restore default parameters	0x1
1011/01	ARRAY		0x1
1014	VAR	COB-ID-EMCY	0x81
1015	VAR	Inhibit time EMCY	0x3e8
1017	VAR	Producer heartbeat time	0x0
1018/00	RECORD	Identity object	0x4
1018/01	RECORD	Manufacturer ID	0x10d
1018/02	RECORD	Product ID	0x8800
1018/03	RECORD	Revision No.	0x10001
1018/04	RECORD	Serial No.	0x91d3a
1800	RECORD	1.Transmit PDO	0x3
1800/01	RECORD	COB-ID	0x181
1800/02	RECORD	Transmissions Type	0xfd
1800/03	RECORD	Inhibit Time	0x0
1801	RECORD	2.Transmit PDO	0x2
1801/01	RECORD	COB-ID	0x281
1801/02	RECORD	Transmissions Type	0x1
1A00	RECORD	1.Transmit PDO mapping	0x4
1A00/01	RECORD	PDO Mapping Entry 1	0x61340010
1A00/02	RECORD	PDO Mapping Entry 2	0x61440010
1A00/03	RECORD	PDO Mapping Entry 3	0x61540010
1A00/03	RECORD	PDO Mapping Entry 4	0x61640010
1A01	RECORD	2.Transmit PDO mapping	0x4
1A01/01	RECORD	PDO Mapping Entry 1	0x61340010
1A01/02	RECORD	PDO Mapping Entry 2	0x61440010
1A01/03	RECORD	PDO Mapping Entry 3	0x61540010
1A01/03	RECORD	PDO Mapping Entry 3	0x61640010
2000	VAR	Node ID	0x1
2001	VAR	Bit_rate	0x7
2110	VAR	Filter adjust	Diverse Abgleichwerte in hex
2118	VAR	Calibration control	0x1
2118/01	VAR	Calibration mode	0x0
2121	VAR	Adjust analog channel 1	0x3
2121/01	VAR	Adjust gain	0xc5a6
2121/02	VAR	Adjust offset	0x3161781
2121/03	VAR	Adjust dac value	0xfffffffe
2122	VAR	Adjust analog channel 2	0x3
2122/01	VAR	Adjust gain	0xc593

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2122/02	VAR	Adjust offset	0x315c129
2122/03	VAR	Adjust dac value	0x5
2130	VAR	Sensor adjust	0x10000000
6000	VAR	Resolution	0x1000
6110	VAR	Filter 1 limit warning	0x800
6111	VAR	Filter 1 limit alarm	0xccd
6112	VAR	Filter 1 sample frequency	0xee
6113	VAR	Filter 1 source	0x1
6114	VAR	Filter 1 out	0xffef
6115	VAR	Filter 1 peak	0xa75
6116	VAR	Filter 1 rms	0x7
6117	VAR	Filter 1 peak gatetime	0x0
6118	VAR	Filter 1 measuring type	0x1
6119	VAR	Filter 1 rms time	0x1
6120	VAR	Filter 2 limit warning	0x800
6121	VAR	Filter 2 limit alarm	0xccd
6122	VAR	Filter 2 sample frequency	0xee
6123	VAR	Filter 2 source	0x2
6124	VAR	Filter 2 out	0x2
6125	VAR	Filter 2 peak	0x606
6126	VAR	Filter 2 rms	0x7
6127	VAR	Filter 2 peak gatetime	0x0
6128	VAR	Filter 2 measuring type	0x1
6129	VAR	Filter 2 rms time	0x1
6130	VAR	Filter 3 limit warning	0x800
6131	VAR	Filter 3 limit alarm	0xccd
6132	VAR	Filter 3 sample frequency	0x95
6133	VAR	Filter 3 source	0x3
6134	VAR	Filter 3 out	0x9
6135	VAR	Filter 3 peak	0xa65
6136	VAR	Filter 3 rms	0x7
6137	VAR	Filter 3 peak gatetime	0x0
6138	VAR	Filter 3 measuring type	0x1
6139	VAR	Filter 3 rms time	0x1
6140	VAR	Filter 4 limit warning	0x800
6141	VAR	Filter 4 limit alarm	0xccd
6142	VAR	Filter 4 sample frequency	0xee
6143	VAR	Filter 4 source	0x3
6144	VAR	Filter 4 out	0x0
6145	VAR	Filter 4 peak	0x528
6146	VAR	Filter 4 rms	0x9
6147	VAR	Filter 4 peak gatetime	0x0
6148	VAR	Filter 4 measuring type	0x1
6149	VAR	Filter 4 rms time	0x1
6150	VAR	Filter 5 limit warning	0x800
6151	VAR	Filter 5 limit alarm	0xccd
6152	VAR	Filter 5 sample frequency	0xee
6153	VAR	Filter 5 source	0x1
6154	VAR	Filter 5 out	0xfffd
6155	VAR	Filter 5 peak	0x533
6156	VAR	Filter 5 rms	0x9

6157	VAR	Filter 5 peak gatetime	0x0
6158	VAR	Filter 5 measuring type	0x1
6159	VAR	Filter 5 rms time	0x1
6160	VAR	Filter 6 limit warning	0xfff
6161	VAR	Filter 6 limit alarm	0xfff
6162	VAR	Filter 6 sample frequency	0xee
6163	VAR	Filter 6 source	0x1
6164	VAR	Filter 6 out	0x1
6165	VAR	Filter 6 peak	0x726
6166	VAR	Filter 6 rms	0x9
6167	VAR	Filter 6 peak gatetime	0x0
6168	VAR	Filter 6 measuring type	0x1
6169	VAR	Filter 6 rms time	0x1
61a1	VAR	Gain analog 1	0x8000
61a2	VAR	Gain analog 2	0x8000
6310	VAR	Relay 1 assign	0x50
6320	VAR	Relay 2 assign	0xa0
6330	VAR	Relay 3 assign	0x100
6340	VAR	Relay 4 assign	0x200
6503	VAR	Alarms	0x0
6504	VAR	Supported alarms	0xf800
6506	VAR	Supported warnings	0x0
6507	VAR	Profile and software version	0x1010100
6508	VAR	Operating time	0xffffffff
650B	VAR	Serial number	0x91d3a