

# OPERATION MANUAL

## Burster 2x11 EIP EtherNet/IP Manual

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## 1 For your Safety

The following symbols on the RESISTOMAT® 2x11 and in this operation manual warn of hazards.

### 1.1 Symbols used in the instruction manual

#### 1.1.1 Signal words



The following signal words are used in the operation manual according to the specified hazard classification.

	<b>DANGER</b>
High degree of risk: indicates a hazardous situation which, if not avoided, will result in death or serious injury.	
	<b>WARNING</b>
Moderate degree of risk: indicates a hazardous situation which, if not avoided, may result in death or serious injury.	
	<b>CAUTION</b>
Low degree of risk: indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.	
<b>NOTICE</b>	
Property damage to the equipment or the surroundings will result if the hazard is not avoided.	


**Hinweis:** It is important to heed these safety notices in order to ensure you handle the RESISTOMAT® 2x11 correctly.

**Note:** Follow the information given in the operation manual.

#### 1.1.2 Pictograms

Symbol	Description
	Warning concerning the use and installation of the device and software.
	Observe the advice for protecting the instrument.

## 1.2 Symbols and precautionary statements on the instrument

Symbol	Description
	<b>Hazard warning</b> Disconnect the power plug before opening – Follow safety instructions – Professional servicing only
Warning ! To prevent electrical shock do not open device.	<b>Warning of electrical shock hazard</b> Do not open the unit.
To prevent fire replace only with same type and rating of fuse !	<b>Warning of fire hazard</b> Always replace the fuse with a fuse of the same type and rating.

### 1.2.1 Conventions used in the instruction manual

Designation	Description
[Fx]	Function keys F1 to F3 on the touchscreen display
[Text]	Buttons on the touchscreen display
"Term"	Terms used in the instrument menus

## 1.3 General safety instructions

**DANGER**

**Warning concerning installation of the device and software**

Installation of the device and the interface must be carried out by qualified personnel only. Qualified personnel meets the following requirements:

- You are familiar with the safety designs used in automation engineering, and understand how to deal with them in your capacity as configuration engineer.
- You are an operator of automation systems and have been instructed in how to handle the system. You are familiar with the operation of the equipment described in this documentation.
- You are a commissioning or service engineer and have successfully completed a training course qualifying you to repair automation systems. In addition, you are authorized to commission, ground and label circuits and equipment in accordance with safety engineering standards.

Always observe the current safety and accident prevention regulations when commissioning the equipment.  
Install automation engineering equipment and installations with sufficient protection against accidental actuation.

**DANGER**

**Warning concerning use of the device**

- Take suitable precautions in both the hardware and software to prevent any undefined states of the automation installation in the event of an open circuit.
- In installations where major damage to property or even personal injury may be caused by a malfunction, take suitable precautions to establish a safe operating state in the event of a fault. This may be achieved using limit switches, mechanical interlocks etc. for example.
- Do not make unauthorized modifications to the device or to the PROFINET interface.
- Always observe the current safety and accident prevention regulations when commissioning the equipment.

Install automation engineering equipment and installations with sufficient protection against accidental actuation.

## 2 Technical data

### 2.1 Supported EtherNet/IP-Services

- Implicit Messaging
- Explicit Messaging
- Vendor Specific Services (used for Device Configuration)
- Address Conflict Detection (ACD)
- Device Level Ring (DLR)

#### Identity Class of a sample device

Identity Object ✖

Attribute	Value
Vendor ID	0x565 (1381)
Device Type	0x2B (43)
Product Code	0x04 (4)
Major Revision	0x16 (22)
Minor Revision	0x01 (1)
Summary Status	0x60 (96)
Serial Number	4711
Product Name	Burster 2x11 EIP
Present State	0x00 (0)

You will find further information about EtherNet/IP at: [www.odva.org](http://www.odva.org).

### 2.2 Model 2x11 device data

Bus connector	RJ45
EDS file	BURSTER 2x11-V0004.EDS

### 2.3 Electrical safety

Reverse voltage protection	Yes
Air clearance/leakage paths	To DIN EN 61010-1:2011
Electrical isolation	Between fieldbus and internal electronics
Withstand voltage	DC 500 V

## 2.4 Electromagnetic compatibility

### 2.4.1 Interference immunity

Interference immunity to EN 61326-1:2013

Industrial locations

### 2.4.2 Emitted interference

Emitted interference to EN 61326-1:2013

Class A

EN 61000-3-2:2014

EN 61000-3-3:2013

## 2.5 Notes on CE labeling

burster equipment carrying the CE mark meets the requirements of the EU directives and the harmonized European standards (EN) cited therein.

The EU declarations of conformity are available to the relevant authorities as specified in the directives. A copy of the declaration of conformity is included in the relevant equipment documentation.



## 3 Installation

Please note that you can download various documents such as installation guidelines and specifications about EtherNet/IP at ODVA: [www.odva.org](http://www.odva.org).

### 3.1 Connection of fieldbus lines

burster devices with a EtherNet/IP option have two **RJ 45** connectors for the fieldbus connection.

### 3.2 Meaning of LEDs states



LED	Blinking	On
ACT	Data transmission	x
LNK / LA	x	Ethernet line monitoring
MOD	Off	No power
	Green	Standby
	Red	Minor fault Incorrect or inconsistent configuration
	Green/Red	Major fault A non-recoverable fault
NET	Green/Red	Self-test
	Off	x
	Green	No connections
	Red	Connection timeout
	Green/Red	Duplicated IP
	Green/Red	Self-test
BF	x	x
BOOT	Device in boot mode	x
US1	x	Supply voltage

### 3.3 Configuration menu in Resistomat 2x11

#### To access the menu

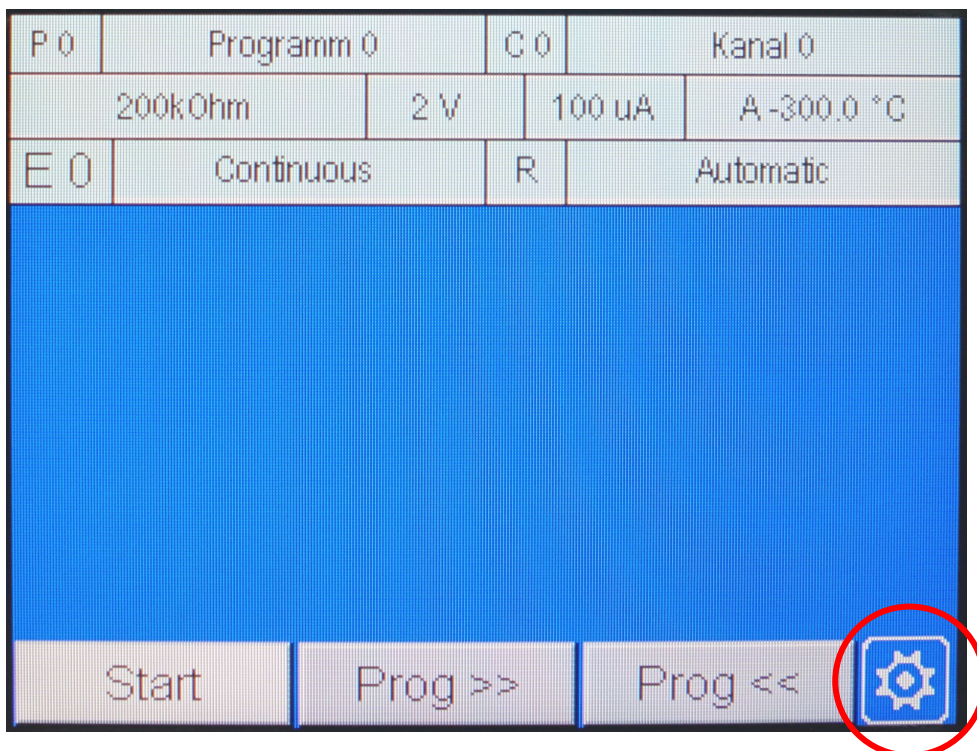
Start in measurement mode. After power on the measurement mode is always set. The display will look differently dependent on your settings or your last measurements.

You can go to "Configuration Main Menu" in measurement mode by pressing the **settings** button



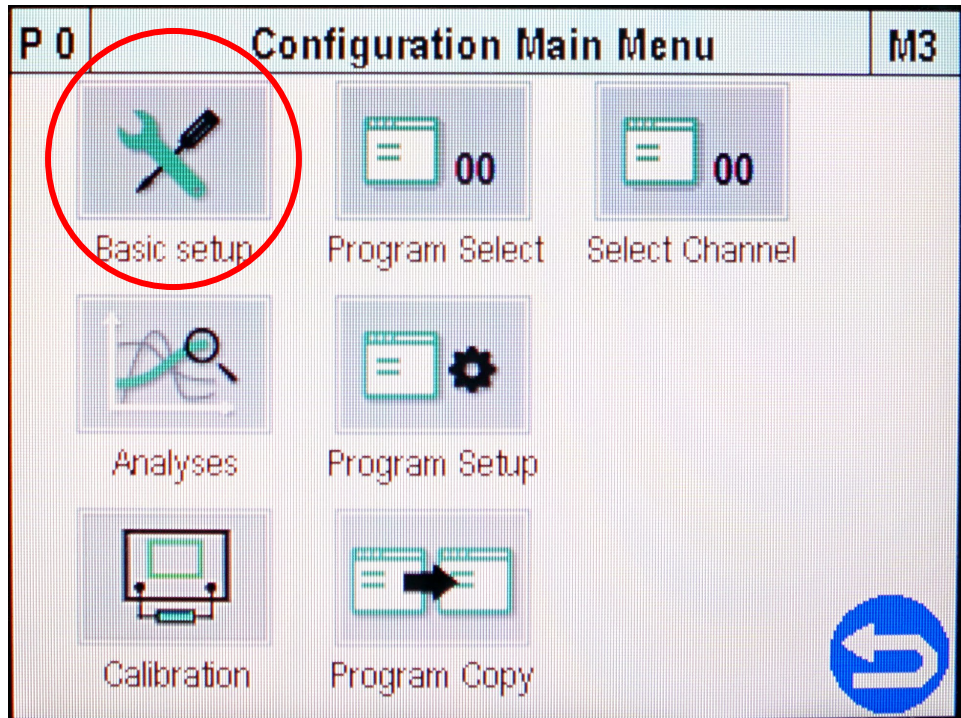
#### This is how it works

1. In measurement mode, press the **settings** button (gear wheel symbol)

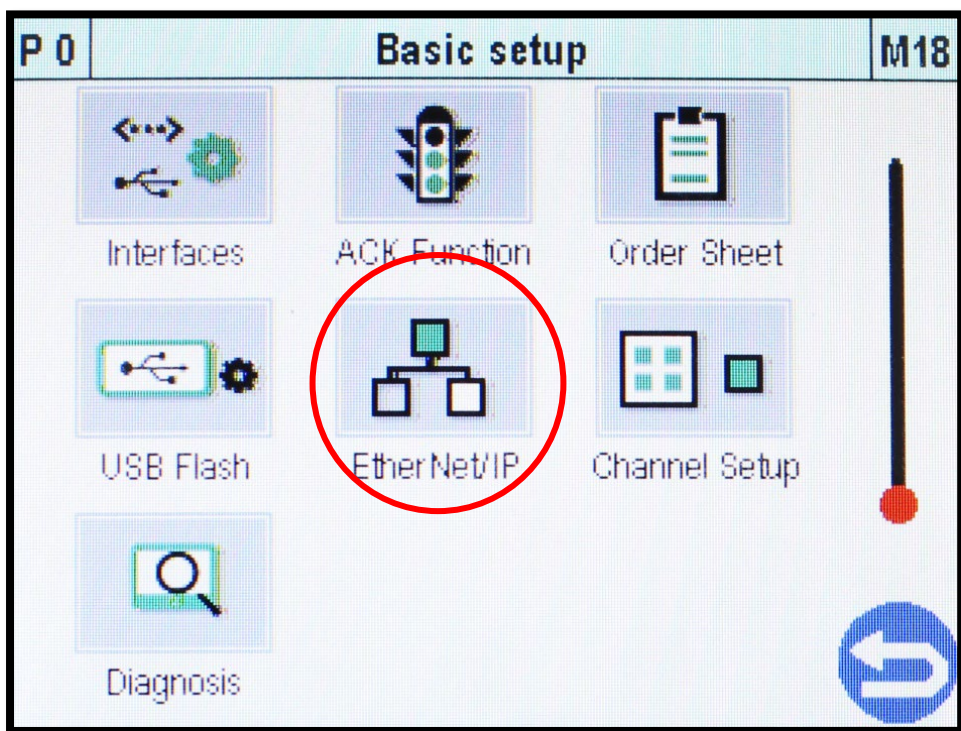





2. Go to "Basic setup menu"



3. Scroll down to "EtherNet/IP" menu:



P 0	EtherNet/IP			M77
SW-version	EIP-V1601			
Serial number				
Control via	PLC			
MAC address	00-23-6E-00-07-CB			
IP Configuration	DHCP			
IP-address	169	254	044	011
Subnet mask	255	255	255	000
Gateway	000	000	000	000



## Parameters

Control via	<p><b>EtherNet/IP:</b> Resistomat 2x11 responds solely to control signals (inputs) on the EtherNet/IP interface</p> <p><b>PLC:</b> Resistomat 2x11 responds solely to control signals (inputs) on the PLC I/O interface.</p> <p>When controlled via PLC I/O, cyclic data from the device is still transferred over the EtherNet/IP bus</p>
SW-Version of Interface	Version of the field bus card software
Serial number of interface	The serial number of the field bus card
Device MAC-address	Address to identify the field bus card inside of EtherNet/IP Network
IP Configuration	<p>Network Configuration Type (BOOTP, DHCP, Static)</p> <p><b>Note:</b> This parameter cannot be changed in the device menu</p>
IP-address	<p>IP-Address</p> <p><b>Note:</b> If BOOTP/DHCP is enabled, a BOOTP/DHCP server will assign the IP-Address. The IP-Address cannot be changed in the device menu if DHCP/BOOTP is enabled</p>
Subnet mask	<p>Subnet mask</p> <p><b>Note:</b> If BOOTP/DHCP is enabled, a BOOTP/DHCP server will assign the subnet mask. The subnet mask cannot be changed in the device menu if DHCP/BOOTP is enabled</p>
Gateway	<p>Gateway</p> <p><b>Note:</b> If BOOTP/DHCP is enabled, a BOOTP/DHCP server will assign the Gateway. The Gateway cannot be changed in the device menu if DHCP/BOOTP is enabled</p>



## 4 EtherNet/IP

### 4.1 General information on EtherNet/IP data transfer

For EtherNet/IP (implicit messaging) one must define at the configuration stage how many bytes are transferred between Controller (Scanner) and Device (Adapter) during each cyclic access.

The device is controlled using the data transferred from Controller (Scanner) to Device (Adapter). This data always consists of four bytes for the Resistomat 2x11 unit. The function of these four bytes is explained in section 5.1.

The 2x11 cyclically sends 4 bytes to controller. Their function is detailed in section 5.2.

### 4.2 EDS file

The **Electronic Data Sheet** (EDS) file *BURSTER 2x11-V0004.EDS* can be downloaded from the section **Fieldbus** on our website: <https://www.burster.com/en/download-area>. This EDS file contains the EtherNet/IP configuration information for the Resistomat 2x11.

The structure, contents and encoding of this device description data is standardized so that any EtherNet/IP devices can be configured using configuration tools from various manufacturers.

The EDS file does not specify what data is transferred or how this data should be interpreted. The user must glean this information from the operating manual and program their Controller accordingly.



## 5 EtherNet/IP data protocol (real-time data)

### 5.1 PLC inputs – Transfer from Scanner to Adapter

Four bytes of PLC-In data for the 2x11 are always transferred from the EtherNet/IP Controller (Scanner) to the Resistomat 2x11 (Adapter). These bits have the same function as the parallel PLC inputs to the 2x11 unit.

(See detailed documentation of these signals within the 2x11 operation manual)

**Please Note:** Bits marked as 'reserved' should remain at 0.

#### 5.1.1 PLC inputs byte 1

PLC inputs Byte 1 (Scanner -> Adapter)	
Start/Stop measurement	Bit 0 LSB
Start/Stop comparator	Bit 1
Start/Stop max/min recording	Bit 2
Start/Stop datalogger	Bit 3
Start/Stop AUTO mode	Bit 4
Clear error bit	Bit 5
Reset comparator statistic	Bit 6
End load cooling curve	Bit 7 MSB

#### 5.1.2 PLC inputs byte 2

PLC inputs Byte 2 (Scanner -> Adapter)	
Program number - bit 0	Bit 0 LSB
Program number - bit 1	Bit 1
Program number - bit 2	Bit 2
Program number - bit 3	Bit 3
Program number - bit 4	Bit 4
reserved	Bit 5
reserved	Bit 6
Program number - strobe	Bit 7 MSB



### 5.1.3 PLC inputs byte 3

PLC inputs Byte 3 (Scanner -> Adapter)	
reserved	Bit 0 LSB
reserved	Bit 1
reserved	Bit 2
reserved	Bit 3
Input AUX0 (reserved)	Bit 4
Input AUX1 (reserved)	Bit 5
Input AUX2 (reserved)	Bit 6
Input AUX3 (reserved)	Bit 7 MSB

### 5.1.4 PLC inputs byte 4

PLC inputs Byte 4 (Scanner -> Adapter)	
reserved	Bit 0 LSB
reserved	Bit 1
reserved	Bit 2
reserved	Bit 3
reserved	Bit 4
reserved	Bit 5
reserved	Bit 6
reserved	Bit 7 MSB

## 5.2 PLC outputs – Transfer from Adapter to Scanner

The data refers to the PLC output of the Resistomat 2x11. The data described here is the data transferred from the 2x11 (Adapter) to the EtherNet/IP Controller (Scanner).

The function of the PLC-In / PLC-Out can be found in the 2x11 operation manual for the unit. In addition, the signal timing is available within the 2x11 operation manual.

### 5.2.1 PLC outputs byte 1

PLC outputs Byte 1 (Adapter -> Scanner)	
Ready	Bit 0 LSB
Measurement running	Bit 1
Measurement result - OK	Bit 2
Measurement result - NOK	Bit 3
Error	Bit 4
reserved	Bit 5
reserved	Bit 6
reserved	Bit 7 MSB

### 5.2.2 PLC outputs byte 2

PLC outputs Byte 2 (Adapter -> Scanner)	
Current program number - bit 0	Bit 0 LSB
Current program number - bit 1	Bit 1
Current program number - bit 2	Bit 2
Current program number - bit 3	Bit 3
Current program number - bit 4	Bit 4
reserved	Bit 5
reserved	Bit 6
Current program number - strobe	Bit 7 MSB

## 5.2.3 PLC outputs byte 3

PLC outputs Byte 3 (Adapter -> Scanner)	
reserved	Bit 0 LSB
reserved	Bit 1
reserved	Bit 2
reserved	Bit 3
Output AUX0 (reserved)	Bit 4
Output AUX1 (reserved)	Bit 5
Output AUX2 (reserved)	Bit 6
Output AUX3 (reserved)	Bit 7 MSB

## 5.2.4 PLC outputs byte 4

PLC outputs Byte 4 (Adapter -> Scanner)	
Comparator >>	Bit 0 LSB
Comparator >	Bit 1
Comparator =	Bit 2
Comparator <	Bit 3
Comparator <<	Bit 4
reserved	Bit 5
reserved	Bit 6
reserved	Bit 7 MSB

## 6 Unconnected Explicit Messaging (Acyclic services)

The services are described from the point of view of the controller.

**Please Note:** The instance number always has to be set to 1.

The acyclic EtherNet/IP services allow access to following Resistomat 2x11 functions:

- Complete device configuration
- Transfer of component/worker/job data for logging
- Retrieval of measurement values and related analytical data

### 6.1 Instrument configuration

#### 6.1.1 General settings (Class 100)

Class 100, Attributes 0 to 77

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
100	0		-	Not possible	x	x	x
100	1 - 9	Reserved	-	Not possible	x	x	x
100	10	Device identifier	Resistomat Typ 2311		STR15	15	RO
100	11	Serial number	1234567890A		STR11	11	RO
100	12	Software version	V202100		STR15	15	RO
100	13	Bootloader software version	V202100		STR15	15	RO
100	14	Field bus interface software version	PN-V202110		STR15	15	RO
100	15	Reserved	-		x	x	x
100	16	Station name	Stat14 right	Device station name	STR15	15	RW
100	17	Calibration date analog interface	28.01.2021		STR10	10	RO
100	18	Language	0 1 2 3 4	German English French Spanish Italian	U16	2	RW
100	19	Date	[dd.mm.yyyy]	e.g.: 21.01.2021	STR10	10	RW
100	20	Time	[hh:mm:ss], 24h	e.g.: 16:15:00	STR8	8	RW
100	21	LCD brightness	1 ... 10	Integer value (10 max.)	U16	2	RW
100	22	Measurement menu function key definition F1	0 1 2 3 4 5 6	Off Start/Stop Meas. program + Meas. program - End Load Range + Range -	U16	2	RW

100	23	Measurement menu function key definition F2	0	Off	U16	2	RW
			1	Start/Stop			
			2	Meas. program +			
			3	Meas. program -			
			4	End Load			
			5	Range +			
6	Range -						
100	24	Measurement menu function key definition F3	0	Off	U16	2	RW
			1	Start/Stop			
			2	Meas. program +			
			3	Meas. program -			
			4	End Load			
			5	Range +			
6	Range -						
100	25	Display mode of function Keys	0	Fade out	U16	2	RW
1	Always on						
100	26	Type of measured value display	0	Ohm	U16	2	RW
			1	d%			
			2	evaluation			
100	27	Access authorization Password protection on/off	0	Password protection off	U16	2	RW
			1	Password protection on			
<b>Note:</b> If the user password is entered, attributes 28-47 control device access. Using the master password bypasses this.							
100	28	Access level: Basic setup	0	Access DENIED	U16	2	RW
			1	Access GRANTED			
100	29	Access level: Program selection	0	Access DENIED	U16	2	RW
			1	Access GRANTED			
100	30	Access level: Program copy	0	Access DENIED	U16	2	RW
			1	Access GRANTED			
100	31	Access level: Measurement mode	0	Access DENIED	U16	2	RW
			1	Access GRANTED			
100	32	Access level: Test operation	0	Access DENIED	U16	2	RW
			1	Access GRANTED			
100	33	Access level: External memory	0	Access DENIED	U16	2	RW
			1	Access GRANTED			
100	34	Access level: Comparator	0	Access DENIED	U16	2	RW
			1	Access GRANTED			
100	35	Access level: Max / Min	0	Access DENIED	U16	2	RW
			1	Access GRANTED			
100	36	Access level: Data Logger	0	Access DENIED	U16	2	RW
			1	Access GRANTED			
100	37	Access level: Temp. Compensation	0	Access DENIED	U16	2	RW
			1	Access GRANTED			
100	38	Access level: Pt100	0	Access DENIED	U16	2	RW
			1	Access GRANTED			

100	39	Access level: Volt. Input	0 1	Access DENIED Access GRANTED	U16	2	RW
100	40	Access level: Disp. Meas.	0 1	Access DENIED Access GRANTED	U16	2	RW
100	41	Reserved	-		x	x	x
100	42	Reserved	-		x	x	x
100	43	Access level: Max / Min Analysis	0 1	Access DENIED Access GRANTED	U16	2	RW
100	44	Access level: Comparator Analysis	0 1	Access DENIED Access GRANTED	U16	2	RW
100	45	Access level: Data Logger Analysis	0 1	Access DENIED Access GRANTED	U16	2	RW
100	46	Access level: Cooling Curve	0 1	Access DENIED Access GRANTED	U16	2	RW
100	47	Access level: Calibration	0 1	Access DENIED Access GRANTED	U16	2	RW
100	48	Master password  <b>Note:</b> The password is always 4 digits long, if less are supplied they are padded with 0s from the left	0000 ... 9999	4 digit master password as a U16	U16	2	RW
100	49	Reset Master password	<i>EVENT!</i>	Writing an arbitrary byte initiates action	U8	1	WO
100	50	User password  <b>Note:</b> Same conditions as with attribute 48	0000 ... 9999	4 digit user password as a U16	U16	2	RW

**Class 100, Attribute 51 (Assignment adjustable PLC output 1)**

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
100	51	adj. PLC output 1	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	OUT_READY OUT_OK OUT_NOK OUT_STROBE OUT_PROG0 OUT_PROG1 OUT_PROG2 OUT_PROG3 OUT_MEAS_ACT OUT_ERROR OUT_COMP_>> OUT_COMP_> OUT_COMP_= OUT_COMP_< OUT_COMP_<< OUT_AUX0 OUT_AUX1 OUT_AUX2 OUT_AUX3	U16	2	RW

## Class 100, Attributes 52 to 61 (Assignment adjustable PLC outputs 2 to 11)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
100	52	adj. PLC output 2	<i>see attr. 51</i>		U16	2	RW
100	53	adj. PLC output 3	<i>see attr. 51</i>		U16	2	RW
100	54	adj. PLC output 4	<i>see attr. 51</i>		U16	2	RW
100	55	adj. PLC output 5	<i>see attr. 51</i>		U16	2	RW
100	56	adj. PLC output 6	<i>see attr. 51</i>		U16	2	RW
100	57	adj. PLC output 7	<i>see attr. 51</i>		U16	2	RW
100	58	adj. PLC output 8	<i>see attr. 51</i>		U16	2	RW
100	59	adj. PLC output 9	<i>see attr. 51</i>		U16	2	RW
100	60	adj. PLC output 10	<i>see attr. 51</i>		U16	2	RW
100	61	adj. PLC output 11	<i>see attr. 51</i>		U16	2	RW
100	62	adj. PLC output 12	<i>see attr. 51</i>		U16	2	RW

## Class 100, Attribute 63 (Assignment adjustable PLC input 1)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
100	63	adj. PLC input 1	0 1 2 3 4 5 6 7 8 9 10 11	SPS_IN_WHL_AUTO SPS_IN_WHL_RESET_STAT SPS_IN_WHL_STROBE SPS_IN_WHL_ACK_ERROR SPS_IN_WHL_COMP_START SPS_IN_WHL_MAX_MIN_START SPS_IN_WHL_LOGGER_START SPS_IN_WHL_END_LOAD SPS_IN_WHL_AUX0 SPS_IN_WHL_AUX1 SPS_IN_WHL_AUX2 SPS_IN_WHL_AUX3	U16	2	RW

**Class 100, Attributes 64 to 70 (Assignment adjustable PLC inputs 2 to 9)**

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
100	64	adj. PLC input 2	<i>see attr. 63</i>		U16	2	RW
100	65	adj. PLC input 3	<i>see attr. 63</i>		U16	2	RW
100	66	adj. PLC input 4	<i>see attr. 63</i>		U16	2	RW
100	67	adj. PLC input 5	<i>see attr. 63</i>		U16	2	RW
100	68	adj. PLC input 6	<i>see attr. 63</i>		U16	2	RW
100	69	adj. PLC input 7	<i>see attr. 63</i>		U16	2	RW
100	70	adj. PLC input 8	<i>see attr. 63</i>		U16	2	RW
100	71	adj. PLC input 9	<i>see attr. 63</i>		U16	2	RW

**Class 100, Attributes 72 to 78**

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
100	72	Order sheet: Operator	<i>Michael_ Mueller</i>		STR 64	64	RW
100	73	Order sheet: Order number	<i>AN_123456</i>		STR 64	64	RW
100	74	Order sheet: Batch	<i>BATCH_257-3</i>		STR 64	64	RW
100	75	Order sheet: Component	<i>Cylinder_right</i>		STR 64	64	RW
100	76	Order sheet: Serial number 1	<i>SN_12345678 9</i>		STR 64	64	RW
100	77	Order sheet: Serial number 2	<i>SN_98765432 1</i>		STR 64	64	RW
100	78	Update display (refresh view)	<i>Event!</i>	Writing an arbitrary byte initiates action	U8	1	WO

**6.1.2 Display update and fault indication (Class 101)**

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
101	0	Not possible	-	-	x	x	x
101	1 - 9	Reserved	-	-	x	x	x
101	10	Initiate update of the LCD display	<i>EVENT!</i>	Writing an arbitrary byte initiates action	U8	1	WO
101	11	Device fault status	<i>0x00000000</i>	No fault	U32	4	RO
			<i>0x00000001</i>	PREFIX addressing fault			
			<i>0x00000002</i>	Enquiry received in Device mode			



Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
			0x00000004	Block check error			
			0x00000008	Command fault			
			0x00000010	Parameter error			
			0x00000020	Timeout Receive Timer			
			0x00000040	Timeout Response Timer			
			0x00000080	Invalid ! or ?			
			0x00000100	Invalid configuration			
			0x00001000	EEPROM read error			
			0x00010000	Calibration failed			
			0x00040000	NETX Checksum error			
			0x20000000	USB flash error			

### 6.1.3 Program Selection/Renaming & comparator statistics reset (Class 102)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
102	0	Not possible	-	-	x	x	x
102	1 - 9	Reserved	-	-	x	x	x
102	10	Current program number  <b>Note:</b> The value from attribute 10 is applied through attribute 12, 13 or 14	0 ... 31		U16	2	RW
102	11	Current program name  <b>Note:</b> The value from attribute 11 is applied through attribute 12	<i>Program name</i>		STR 20	20	RW
102	12	Apply program name for selected program  <b>Note:</b> Apply program name from attribute 11 for program selected in attribute 10	<i>EVENT!</i>		U8	1	WO
102	13	Apply measurement program selection  <b>Note:</b> Value entered into attribute 10 is adopted	<i>EVENT!</i>		U8	1	WO
102	14	Reset comparator statistics of selected measurement program	<i>EVENT!</i>		U8	1	WO

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
		<b>Note:</b> Value entered into attribute 10 is adopted					

### 6.1.4 Measurement mode (Class 108)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
108	0	Not possible	-	-	x	x	x
108	1 - 9	Reserved	-	-	x	x	x
108	10	Range selection	0 1	manual automatic	U16	2	RW
108	11	Measurement range in manual range mode	1 2 3 4 5 6 7 8	20 mOhm 200 mOhm 2 Ohm 20 Ohm 200 Ohm 2 kOhm 20 kOhm 200 kOhm	U16	2	RW
108	12	Minimum range in automatic range mode  <b>Note:</b> The settings from attributes 12 - 13 are applied through attribute 14	1 2 3 4 5 6 7	20 mOhm 200 mOhm 2 Ohm 20 Ohm 200 Ohm 2 kOhm 20 kOhm	U16	2	RW
108	13	Maximum range in automatic range mode  <b>Note:</b> The writes to attributes 12 - 13 are applied through attribute 14	2 3 4 5 6 7 8	200 mOhm 2 Ohm 20 Ohm 200 Ohm 2 kOhm 20 kOhm 200 kOhm	U16	2	RW
108	14	Set range for automatic range mode  <b>Note:</b> Values entered into attributes 12 and 13 are adopted	<i>EVENT</i>	Writing an arbitrary byte initiates action	U8	1	WO
108	15	Resistance type R or Z(0-3)	0 1 2 3 4	R Z0 Weak Inductivity Z1 ... Z2 ... Z3 Strong Inductivity	U16	2	RW
108	16	Reserved	-		x	x	x
108	17	Measuring Type	0 1 2	Single Continuous N measurements	U16	2	RW

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
108	18	Cable break test	0 1 2	Off Once Always	U16	2	RW
108	19	Number of measurements until stop	1 ... 20		U16	2	RW
108	20	Number of mean values	1 ... 100		U16	2	RW
108	21	Type of averaging: renewing/moving	0 1	Renewing Moving	U16	2	RW
108	22	Voltage limiting	0 1 2	Off 18 mV 2V	U16	2	RW
108	23	Number of conversions	0 1 2 3	Standard Minimal Medium Maximum	U16	2	RW
108	24	Measuring Process	0 1 2 3 4	Standard Comp. once Without com. Ref comp. Current test	U16	2	RW
108	25	Measuring current: large/small	0 1	Large Small	U16	2	RW
108	26	Resolution 2000/20000 digits	0 1	2000 digits 20000 digits	U16	2	RW
108	27	Behavior in case of measuring error	0 1	stop measuring continue measuring	U16	2	RW

## 6.1.5 Copy/initialize measurement programs (Class 109)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
109	0	Not possible	-	-	x	x	x
109	1 - 9	Reserved	-	-	x	x	x
109	10	Meas. program number source  <b>Note:</b> The writes to attributes 10 - 12 are being adopted through attributes 13 - 14	0 ... 31		U16	2	WO
109	11	Meas. program number Target start  <b>Note:</b> The writes to attributes 10 - 12 are being adopted through attributes	0 ... 31		U16	2	WO

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
		13 - 14					
109	12	Meas. program number Target end  <b>Note:</b> The writes to attributes 10 - 12 are being adopted through attributes 13 - 14	0 ... 31		U16	2	WO
109	13	Copy whole program setup  <b>Note:</b> Copy according to entries in attributes 10 - 12. Copies only if all attributes from 10-12 are entered.	EVENT	Writing an arbitrary byte initiates action	U8	1	WO
109	14	Initialize selected programs  <b>Note:</b> Initializing according to attributes 11 - 12.	EVENT	Writing an arbitrary byte initiates action	U8	1	WO
109	15	Initialize all measurement programs and device parameters	EVENT	Writing an arbitrary byte initiates action	U8	1	WO

### 6.1.6 USB-Logging (Class 110)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
110	0	Not possible	-	-	x	x	x
110	1 - 9	Reserved	-	-	x	x	x
110	10	USB-Logging on/off	0 1	Off On	U16	2	RW
110	11	Logging of timestamp	0 1	Off On	U16	2	RW
110	12	Logging of numerator	0 1	Off On	U16	2	RW
110	13	Logging of order sheet	0 1	Off On	U16	2	RW
110	14	Delta t – Hours  <b>Note:</b> The writes to attributes 14 - 16 are	0 ... 99		U16	2	RW

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
		being adopted through attribute 17					
110	15	Delta t – Minutes  <b>Note:</b> The writes to attributes 14 - 16 are being adopted through attribute 17	0 ... 59		U16	2	RW
110	16	Delta t – Seconds  <b>Note:</b> The writes to attributes 14 - 16 are being adopted through attribute 17	0 ... 59		U16	2	RW
110	17	Set Delta t  <b>Note:</b> Values entered into attributes 14, 15, 16 are adopted. Adoptes only if all attributes from 14-16 are entered.	<i>EVENT!</i>	Writing an arbitrary byte initiates action	U8	1	WO
110	18	Readings per header	1 ... 10000		U16	2	RW
110	19	State of USB-Drive	0 1 2 3	State couldn't be read Not attached Attached but not mounted Attached and mounted	U16	2	RO
110	20	Free space on USB-Drive	<i>String</i>	If USB Drive is not attached or not mounted (see attr. 12) "0,000 MB" will be returned	STR 15	15	RO
110	21	Format USB Drive	<i>String</i> <i>formatusb</i>	"formatusb" works as a password here	STR 9	9	WO
110	22	READY-Control	0 1	off on	U16	2	RW

## 6.1.7 Data-Logging (Class 111)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
111	0	Not possible	-	-	x	x	x
111	1 - 9	Reserved	-	-	x	x	x
111	10	Data logger on/off	0 1	Off On	U16	2	RW
111	11	Data logger filter	0 1 2 3 4 5	Record all values Record only OK values Record only NOK values Record every n. value Record if time > Delta t Record if   value(i) – value(i-1)   >= Delta R	U16	2	RW

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
111	12	N. Value	2 ... 200		U16	2	RW
111	13	Delta t – Hours <b>Note:</b> The writes to attributes 13 - 15 are being adopted through attribute 16	0 ... 99		U16	2	RW
111	14	Delta t – Minutes <b>Note:</b> The writes to attributes 13 - 15 are being adopted through attribute 17	0 ... 59		U16	2	RW
111	15	Delta t – Seconds <b>Note:</b> The writes to attributes 13 - 15 are being adopted through attribute 17	0 ... 59		U16	2	RW
111	16	Set Delta t <b>Note:</b> Values entered into attributes 13, 14, 15 are adopted. Adopts only if all attributes from 14-16 are entered.	<i>EVENT!</i>	Writing an arbitrary byte initiates action	U8	1	WO
111	17	Delta R (Filter Parameter)	0 ... 200000		U16	2	RW
111	18	Designation	<i>String</i>		STR 50	50	RW
111	19	Free data logger space			U16	2	RO
111	20	Number of stored values			U16	2	RO
111	21	Storage number of value to be read <b>Note:</b> the actual read is performed at attribute 22			U16	2	WO
111	22	Stored measurement values <b>Note:</b> the storage number has to be set at attribute 21 first	<i>String</i>	<b>Format:</b> <i>dd.mm.yyyy, hh:mm:ss, delta in ms, state*, resistance</i> <b>*state</b> (bit coded): Logical OR combined status: 0: No Error 1: Measurement range exceeded 2: Current overflow 4: Voltage overflow 8: Temperature compensation error 16: PT100 Measurement error	STR 64	64	RO

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
				32: Cable break 64: Cooling Curve enabled 128: First Value since Start of Measurement 256: USB-Error			
111	23	Clear data logger	<i>EVENT!</i>	Writing an arbitrary byte initiates action	U8	1	WO

## 6.1.8 Comparator (Class 112)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
112	0	Not possible	-	-	x	x	x
112	1 - 9	Reserved	-	-	x	x	x
112	10	Comparator on/off	0 1	Off On	U16	2	RW
112	11	Number of limits	2 or 4		U16	2	RW
112	12	Behavior if error	0 1	Not used > or >>	U16	2	RW
112	13	Limit value <<  <b>Note:</b> The writes to attributes 13 - 16 are being adopted through attribute 17		Float value Float according to IEEE754	FLT	4	RW
112	14	Limit value <  <b>Note:</b> The writes to attributes 13 - 16 are being adopted through attribute 17		Float value Float according to IEEE754	FLT	4	RW
112	15	Limit value >  <b>Note:</b> The writes to attributes 13 - 16 are being adopted through attribute 17		Float value Float according to IEEE754	FLT	4	RW
112	16	Limit value >>  <b>Note:</b> The writes to attributes 13 - 16 are being adopted through attribute 17		Float value Float according to IEEE754	FLT	4	RW
112	17	Set limits  <b>Note:</b> Values entered into attributes 13, 14, 15, 16 are adopted	<i>EVENT!</i>	Writing an arbitrary byte initiates action	U8	1	WO

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
112	18	Number of values < limit_<<  <b>If 2 limits:</b> not relevant			U16	1	RO
112	19	Number of values > limit_<< and < limit_<  <b>If 2 limits:</b> < Limit_<			U16	1	RO
112	20	Number of values > limit_< and < limit_>  <b>If 2 limits:</b> > limit_< and < limit_>			U16	1	RO
112	21	Number of values > limit_> and < limit_>>  <b>If 2 limits:</b> > limit_>			U16	1	RO
112	22	Number of values > limit_>>  <b>If 2 limits:</b> not relevant			U16	1	RO
112	23	Total number of values			U16	1	RO
112	24	Reset statistic values	<i>EVENT!</i>	Writing an arbitrary byte initiates action	U8	1	WO

### 6.1.9 Max / Min Values (Class 113)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
113	0	Not possible	-	-	x	x	x
113	1 - 9	Reserved	-	-	x	x	x
113	10	Max / Min on/off	0 1	Off On	U16	2	RW
113	11	Minimum value		Float value Float according to IEEE754	FLT	4	RO
113	12	Maximum value		Float value Float according to IEEE754	FLT	4	RO
113	13	Maximum – Minimum value		Float value Float according to IEEE754	FLT	4	RO
113	14	Reset Max / Min values	<i>EVENT!</i>	Writing an arbitrary byte initiates action	U8	1	WO

### 6.1.10 PT100 (Class 114)



Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
114	0	Not possible	-	-	x	x	x
114	1 - 9	Reserved	-	-	x	x	x
114	10	Coefficient Ro of the Pt100 formula	90 ... 110	Float value Float according to IEEE754	FLT	4	RW
114	11	Coefficient A of Pt100 formula	3.0E-3 ... 6.0E-3	Float value Float according to IEEE754	FLT	4	RW
114	12	Coefficient B of Pt100 formula	-5.0E-6 ... 5.0E-6	Float value Float according to IEEE754	FLT	4	RW
114	13	Resets the coefficients to their default values	EVENT!	Writing an arbitrary byte initiates action	U8	1	WO

### 6.1.11 Temperature compensation (Class 115)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
115	0	Not possible	-	-	x	x	x
115	1 - 9	Reserved	-	-	x	x	x
115	10	Temperature compensation On/Off	0 1	Off On	U16	2	RW
115	11	Detection of temperature	0 1 2	Manual Pt100 U Input	U16	2	RW
115	12	Manual temperature if manual temperature detection	-200 ... 999	Float value Float according to IEEE754	FLT	4	RW
115	13	Reference temperature	-200 ... 999	Float value Float according to IEEE754	FLT	4	RW
115	14	Temperature coefficient	0 1 2 3 4 5 6 7 8 9	1600 ppm/K 1700 ppm/K 2400 ppm/K 3100 ppm/K 3930 ppm/K 4030 ppm/K 4500 ppm/K 4800 ppm/K 6000 ppm/K 6500 ppm/K	U16	2	RW
115	15	User defined temperature coefficient	1000 ... 9999		U16	2	RW

### 6.1.12 Scaling of voltage input (Class 116)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
116	0	Not possible	-	-	x	x	x

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
116	1 - 9	Reserved	-	-	x	x	x
116	10	Lower voltage	0 ... 11	Float value Float according to IEEE754	FLT	4	RW
116	11	Higher voltage	0 ... 11	Float value Float according to IEEE754	FLT	4	RW
116	12	Lower temperature	-200 ... 800	Float value Float according to IEEE754	FLT	4	RW
116	13	Higher temperature	-200 ... 800	Float value Float according to IEEE754	FLT	4	RW

### 6.1.13 Cooling curve (Class 117)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
117	0	Not possible	-	-	x	x	x
117	1 - 9	Reserved	-	-	x	x	x
117	10	Cooling curve On/Off	0 1	Off On	U16	2	RW
117	11	Interval time	1 ... 100		U16	2	RW
117	12	Settling time	1 ... 100		U16	2	RW
117	13	Measuring end time	10 ... 100000		U16	2	RW
117	14	End load	EVENT!	Writing an arbitrary byte initiates action	U8	1	WO
117	15	Number of stored measurement value  <b>Note:</b> the actual read is performed at attribute 16	0 ... 900		U16	2	WO
117	16	Stored measurement value  <b>Note:</b> the number of the measurement value to read has to be set at attribute 15 first	String	<b>Format:</b> <i>timestamp in seconds, state*, resistance with unit</i> <i>*state</i> (bit coded): 8 bit value Logical OR combined status: 0: No Error 1: Measurement range exceeded 2: Current overflow 4: Voltage overflow 8: Temperature compensation error 16: PT100 Measurement error 32: Cable break 64: Cooling Curve enabled	STR64	64	RO

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
				128: First Value since Start of Measurement 256: USB-Error			

## 6.1.14 Current measurement values (Class 118)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
118	0	Not possible	-	-	x	x	x
118	1 - 9	Reserved	-	-	x	x	x
118	10	Measurement running state	0 1	Measurement is stopped Measurement is running	U16	2	RO
118	11	Measurement counter	0 ... 65536		U16	2	RO
118	12	Measurement status		Logical <b>OR</b> combined status:  0: No Error 1: Measurement range exceeded 2: Current overflow 4: Voltage overflow 8: Temperature compensation error 16: PT100 Measurement error 32: Cable break 64: Cooling Curve enabled 128: First Value since Start of Measurement 256: USB-Error	U16	2	RO
118	13	Result of Evaluation	String		STR64	64	RO
118	14	Delta % of Set Point	String		STR64	64	RO
118	15	Resistance	String	Value plus appropriate Ohm unit	STR64	64	RO
118	16	Range	String	Value plus appropriate Ohm unit	STR64	64	RO
118	17	Current	String	Value plus unit	STR64	64	RO
118	18	Voltage	String	Value plus unit	STR64	64	RO
118	19	Temperature	String	Value in °C	STR64	64	RO

## 6.1.15 Record errors/events in the logfile (Class 119)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
119	0	Not possible	-	-	x	x	x

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
119	1 - 9	Reserved	-	-	x	x	x
119	10	Index of last entry	0 ... 255		U16	2	RO
119	11	Entry index  <b>Note:</b> the actual read is performed at attribute 12	0 ... 255		U16	2	WO
119	12	Log entry  <b>Note:</b> the index of the measurement value to read has to be set at attribute 11 first	String	<p><b>Format:</b> entry code*,program number,access**,year,month,day,hour,minute,second, repetitions</p> <p>*entry code:            0 -&gt; no error            1 -&gt; Memory error detected            4 -&gt; Main analog board EEPROM error detected            39 -&gt; Start of measurement without READY            40 -&gt; Change of analog interface            42 -&gt; Device power up            130 -&gt; Menu: Measurement mode            136 -&gt; Menu: Assignment PLC-Outputs            137 -&gt; Menu: Assignment PLC-Inputs            139 -&gt; Menu: Interface USB            140 -&gt; Menu: Interface Ethernet            141 -&gt; Copy Measurement setup            142 -&gt; Initialize target program(s)            143 -&gt; Copy whole setup            145 -&gt; Menu: Comparator            146 -&gt; Menu: Max / Min            147 -&gt; Menu: Datalogger            148 -&gt; Menu: Temp. Comp.            149 -&gt; Menu: Pt100            150 -&gt; Menu: Volt Input            151 -&gt; Menu: Disp. Meas.            152 -&gt; Menu: Cooling Curve            153 -&gt; Menu: USB-Logging</p> <p>**access:            0 -&gt; No access protection            1 -&gt; Master access            2 -&gt; User access            4 -&gt; Access via port</p>	STR64	64	RO

## 6.1.16 General Purpose (Class 130-140)

Class	Attr.	Description	Value	Meaning of value	Type	Len	R/W
130	0	Not possible	-	-	x	x	x
130	1 - 9	Reserved	-	-	x	x	x
130	10	Generic Value 1	<i>EVENT!</i>	Writing an arbitrary byte initiates action	U8	1	WO
130	11	Generic Value 2	<i>EVENT!</i>	Writing an arbitrary byte initiates action	U8	1	WO
130	12	Generic Value 3	<i>EVENT!</i>	Writing an arbitrary byte initiates action	U8	1	WO
130	13	Generic Value 4	<i>EVENT!</i>	Writing an arbitrary byte initiates action	U8	1	WO
130	14	Generic Value 5	<i>EVENT!</i>	Writing an arbitrary byte initiates action	U8	1	WO
130	15	Generic Value 6			U16	2	RW
130	16	Generic Value 7			U16	2	RW
130	17	Generic Value 8			U16	2	RW
130	18	Generic Value 9			U16	2	RW
130	19	Generic Value 10			U16	2	RW
130	20	Generic Value 11			U32	4	RW
130	21	Generic Value 12			U32	4	RW
130	22	Generic Value 13			U32	4	RW
130	23	Generic Value 14			U32	4	RW
130	24	Generic Value 15			U32	4	RW
130	25	Generic Value 16		Float value Float according to IEEE754	FLT	4	RW
130	26	Generic Value 17		Float value Float according to IEEE754	FLT	4	RW
130	27	Generic Value 18		Float value Float according to IEEE754	FLT	4	RW
130	28	Generic Value 19		Float value Float according to IEEE754	FLT	4	RW
130	29	Generic Value 20		Float value Float according to IEEE754	FLT	4	RW
130	30	Generic Value 21			STR64	64	RW
130	31	Generic Value 22			STR64	64	RW
130	32	Generic Value 23			STR64	64	RW
130	33	Generic Value 24			STR64	64	RW
130	34	Generic Value 25			STR64	64	RW

**General Purpose (Classes 131-140)**

See Class 130.

## 7 Error Codes

Error Code	Description
0x00	<b>GSR_SUCCESS</b> <i>No error, write/read successful.</i>
0x05	<b>EIP_GSR_BAD_CLASS_INSTANCE</b> <i>This class/instance is not specified.</i> <b>Note:</b> Only instance 1 is supported
0x09	<b>EIP_GSR_BAD_ATTR_DATA</b> <i>The write request has been declined.</i> <i>Please check your data and data length here</i>
0x0F	<b>EIP_GSR_PERMISSION_DENIED</b> <i>Reading /Writing of this attribute is not supported.</i>
0x14	<b>EIP_GSR_UNDEFINED_ATTR</b> <i>This attribute is not implemented by the firmware. Please refer to operation manual to check whether the attribute number is correct.</i>
0x1E	<b>EIP_GSR_SERVICE_ERROR</b> <i>Read/Write request has been declined by device. Please refer to device operation manual to check if this parameter is writeable/readable.</i>
0xB2	<b>EIP_GSR_RESERVED_CLASS</b> <i>Read/Write from/to this class is not supported.</i>