OPERATION MANUAL

DIGIFORCE® 9311
PROFIBUS manual

Valid from: 05.07.2016
Applies to: DIGIFORCE® 9311-VXXX2

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The measurement solution. burster

EU-Konformitätserklärung (nach EN ISO/IEC 17050-1:2010)

EU-Declaration of conformity (in accordance with EN ISO/IEC 17050-1:2010)

Name des Ausstellers: burster präzisionsmesstechnik gmbh & co kg
Issuer's name:

Anschrift des Ausstellers: Talstr. 1-5
Issuer's address: 76593 Gernsbach, Germany

Gegenstand der Erklärung: DIGIFORCE® X/Y-Monitoring, Einpress-, Füge-, Niet- und Verstemmüberwachung
Object of the declaration: *DIGIFORCE® X/Y-Monitoring, press-fit, joining, rivet and caulking monitoring*

Modellnummer(n) (Typ): DIGIFORCE® 9311
Model number / type:

Diese Erklärung beinhaltet obengenannte Produkte mit allen Optionen
This declaration covers all options of the above product(s)

Das oben beschriebene Produkt ist konform mit den Anforderungen der folgenden Dokumente:
The object of the declaration described above is in conformity with the requirements of the following documents:

Dokument-Nr. *Documents No.*	**Titel** *Title*	**Ausgabe** *Edition*
2011/65/EU	Richtlinie zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten *Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment*	2011
2014/35/EU	Richtlinie zur Harmonisierung der Rechtsvorschriften der Mitgliedsstaaten über die Bereitstellung elektrischer Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen auf dem Markt *Directive on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits*	2014
2014/30/EU	Richtlinie zur Harmonisierung der Rechtsvorschriften der Mitgliedsstaaten über die Elektromagnetische Verträglichkeit *Directive on the harmonization of the laws of the Member States relating to electromagnetic compatibility*	2014
EN 61010-1	Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte – Teil 1: Allgemeine Anforderungen *Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements*	2010 + Cor.:2011
EN 61326-1	Elektrische Mess-, Steuer-, Regel- und Laborgeräte – EMV-Anforderungen – Teil 1: Allgemeine Anforderungen *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 1: General requirements*	2013
EN 55011	Industrielle, wissenschaftliche und medizinische Geräte – Funkstörungen – Grenzwerte und Messverfahren, Gruppe 1, Grenzwertklasse A *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement, group 1, class A*	2009 + A1: 2010

Gernsbach	01.04.2016	i.V. Christian Karius
Ort / *place*	Datum / *date*	*Quality Manager*

Dieses Dokument ist entsprechend EN ISO/IEC 17050-1:2010 Abs. 6.1g **ohne Unterschrift** gültig /
According EN ISO/IEC 17050 this document ***is valid without a signature.***

WARNHINWEIS: Dies ist ein Klasse A-Erzeugnis, vorgesehen für den Betrieb in einer industriellen Umgebung.

WARNING: This is a Class A-product, designed to operate in an industrial setting.

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Contents

1 For your safety

The following symbols on the DIGIFORCE® 9311 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.

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

Note: It is important to heed these safety notices in order to ensure you handle the DIGIFORCE® 9311 correctly.

Caution: 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
	**Hazard warning** Disconnect the power plug before opening – Follow safety instructions – Professional servicing only
Warning ! To prevent electrical shock do not open device.	**Warning of electrical shock hazard** Do not open the unit.
To prevent fire replace only with same type and rating of fuse !	**Warning of fire hazard** 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 Abbreviations

Abbreviation	Description
DGND	Data transfer potential (reference potential to VP)
GSD	Device description data
PI	PROFIBUS and PROFINET International (user organization)
RxD/TxD-N	Receive/Transmit Data-N, A-line
RxD/TxD-P	Receive/Transmit Data-P, B-line
VP	Positive supply voltage (+5 V) for the terminating resistors

2 Introduction

2.1 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 PROFIBUS interface.

NOTICE

- Install the power, signal and sensor cables so as to prevent electromagnetic interference from impairing operation of the equipment.
- Proper transportation, storage, installation and assembly plus careful operation and maintenance are essential for trouble-free and safe operation of the equipment.
- Have non-functional instruments inspected by the manufacturer.

2.2 Intended use

The DIGIFORCE® 9311 is an instrument for monitoring repetitive production processes. Its core function is to record and analyze signals from processes in which physical variables, such as force, pressure or torque, vary as a function of displacement, angle or time according to a defined curve. The resultant measurement curve is analyzed using graphical evaluation elements such as windows, envelopes and thresholds. The result of the analysis is classified as "OK" or "NOT OK" (NOK) and can be retrieved from various interfaces.

The instrument is not a substitute for a safety device; for instance it cannot be used as an emergency stop device in a press for when the pressure exceeds a set limit.

3 Technical Data

3.1 PROFIBUS DP system data

Number of devices or modules	125 with repeaters
Transmission medium	Cu cable to IEC 61158
Max. bus segment length	100 m to 1200 m (dependent on baud rate/cable)
Data transfer rates	9.6 kBaud to 12 MBaud (dependent on cable)

You will find further information about PROFIBUS DP at: www.profibus.com.

3.2 Model 9311 device data

Supported transfer rates	9.6 kBit/s	187,5 kBit/s	3000 kBit/s
	19.2 kBit/s	500 kBit/s	6000 kBit/s
	93.75 kBit/s	1500 kBit/s	12,000 kBit/s
Bus connector	9 pin SUB-D socket (female)		
ID number	0F91 Hex		
GSD file	BUR_0F91.gsd		
Adress range	1 to 125 [default adress 126]		

3.3 Electrical safety

Reverse voltage protection	Yes
Air clearance/leakage paths	To EN 61010-1:2010
Electrical isolation	Between fieldbus and internal electronics
Withstand voltage	DC 500 V

3.4 Electromagnetic compatibility

3.4.1 Interference immunity

Interference immunity to EN 61326-1:2013

Industrial locations

3.4.2 Emitted interference

Emitted interference to EN 61326-1:2013

Class A

EN 61000-3-2:2014

EN 61000-3-3:2013

3.5 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.

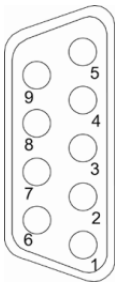
The EU declarations of conformity are available to the relevant authorities as specified in the directives. A copy of the declaration of conformity is included in the relevant equipment documentation.

4 Installation

Please note that you can download various documents such as installation guidelines and specifications about PROFIBUS at PI: www.profibus.com.

4.1 Connection of fieldbus lines

burster devices with a PROFIBUS option have a **9-pin SUB-D female** connector for the fieldbus connection.



PIN	Meaning
1	Shield
2	NC
3	RxD/TxD-P
4	NC
5	DGND
6	VP +5 V (bus termination)
7	NC
8	RxD/TxD-N
9	NC

4.2 Installation of fieldbus lines

For the PROFIBUS employing RS 485 transmission technology, all devices are connected in a line structure. The bus line is a shielded twisted pair cable.

The line used should reflect the defined parameters according to IEC 61158.

4.2.1 Cable parameter value

Characteristic impedance in Ω	135 to 165 for 3 to 30 Mhz
Effective capacitance	< 30 pF/m
Loop impedance (Ω/km)	< 110
Wire diameter (mm) *)	> 0.64
Wire cross-section (mm2) *)	> 0.34

*) The wire cross-sections used must be suitable for the connection options on the bus connector.For cable type A, the maximum cable lengths for a bus segment depend on the transfer rate.

4.2.2 Transfer rate

Transfer rate		Max. bus segment length
9.6 ... 93.75	kBaud	1200 m
187.5	kBaud	1000 m
500	kBaud	400 m
1500	kBaud	200 m
3000 / 6000 / 12000	kBaud	100 m

Commercially available connectors allow the incoming data cable to be connected directly to the outgoing data cable in the connector. This avoids stubs, and the bus connector can be connected to the bus or disconnected from the bus at any time without interrupting data traffic. These connectors include a bus termination that can be switched in or out. To avoid line reflections, connectors containing integral series inductors should be used to compensate for the capacitive load of the station. This is essential for transfer rates > 1.5 MBaud.

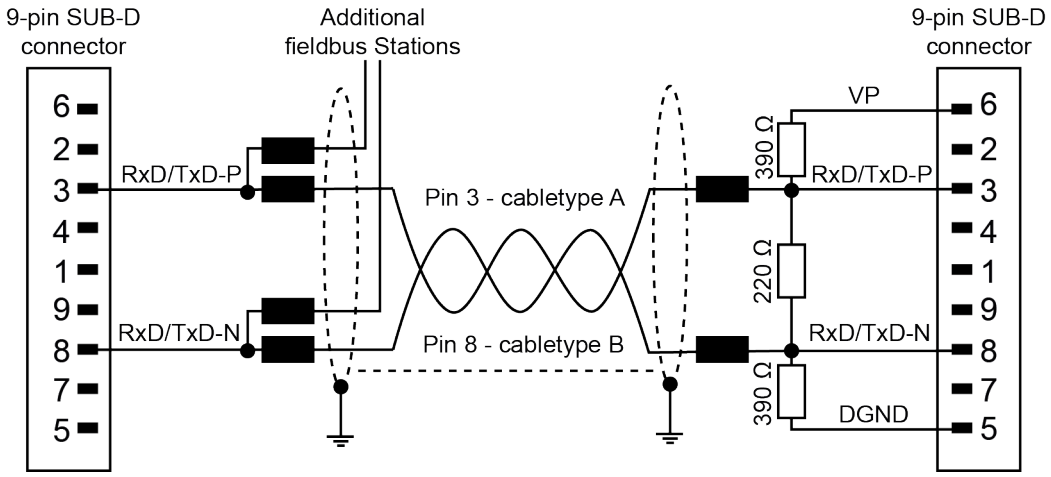


Diagram 1: Wiring of bus lines with bus termination

NOTICE

Take care not to swap over the data lines when connecting the stations.

- Always install the bus termination at the **start and end of the bus line**. The bus termination uses the supply voltage VP from the device, so ensure that the voltage supply to the slave device on which the bus termination is installed is always on. Since the connectors contain built-in series inductors, avoid fitting connectors that are not connected to field devices, because the non-existent device capacitance may cause transmission errors.
- It is essential to use a shielded PROFIBUS cable in order to achieve high system immunity to radiated electromagnetic interference. As far as possible, the shield should be connected at both ends to the protective ground via large-area shielding clamps providing good conducting contact. In addition, ensure that the cable is positioned as far as possible from all power cables. At data rates ≥ 1.5 Mbit/s, stubs must be avoided at all costs.
- An equipotential bonding conductor must be installed to reduce potential differences introduced by different network input points from different parts of the system

4.3 Configuring a PROFIBUS.DP system

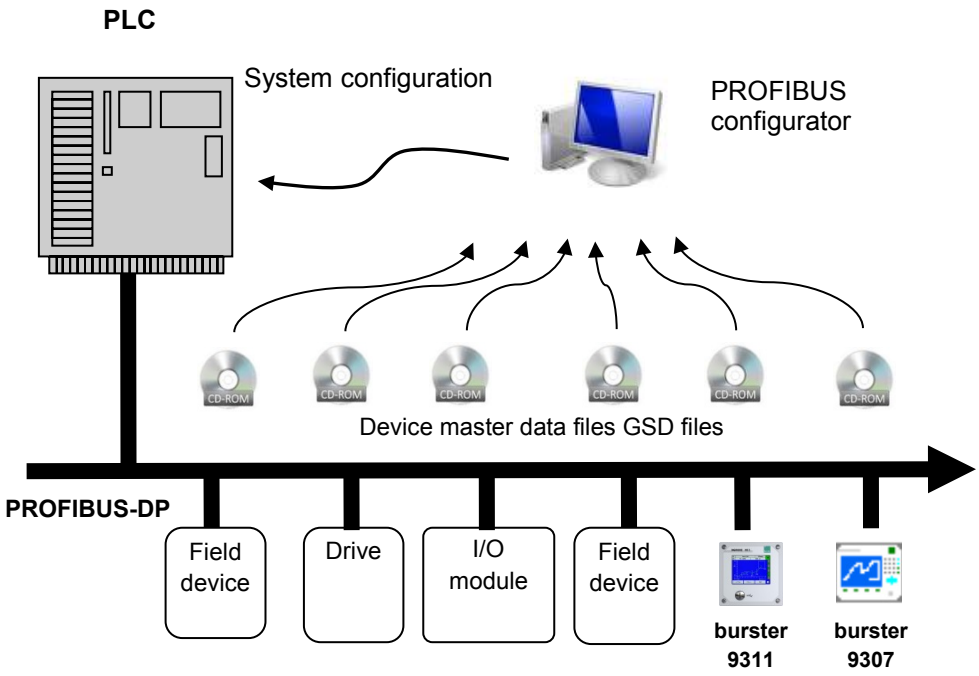


Diagram 2: Configuring a PROFIBUS.DP system

4.4 Meaning of the LED states

LED	Meaning
BF	Bus error
Boot	Boot process active
RN	PROFIBUS communication active

4.5 Configuration menu in DIGIFORCE® 9311

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.

PROFIBUS settings for the DIGIFORCE® 9311 are configured via the “PROFIBUS” menu.

This is how it works

1. In measurement mode, tap anywhere on the touchscreen. The icon appears in the bottom-right corner.
2. Tap to open the "Configuration Main Menu".
3. Tap the "Basic setup" icon.
4. Tap the "PROFIBUS" icon.

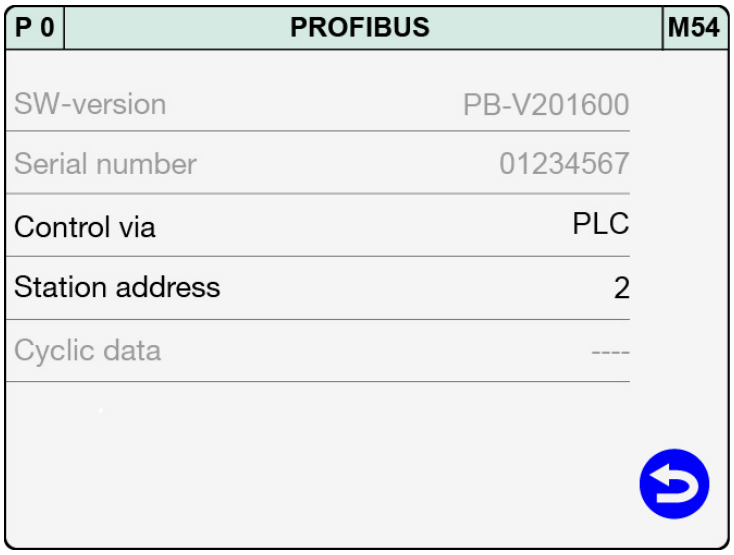


Diagram 3: PROFIBUS settings

Parameters in the "PROFIBUS" menu (M54)

SW version	Firmware version of the PROFIBUS Fieldbus module
Serial number	Serial number of the Fieldbus module
Control via	**PROFIBUS**: the DIGIFORCE® 9311 responds solely to control signals (inputs) from the PROFIBUS interface. **PLC**: the DIGIFORCE® 9311 responds solely to control signals (inputs) from the PLC I/O interface. When control via PLC I/O is selected, data is still transferred using the cyclical PROFIBUS DP-V0 protocol.
Station address	Enter here the PROFIBUS address for the instrument. Valid address range: 1 to 126.
Cyclical data	Displays the active mode in the cyclical PROFIBUS DP-V0 service. Details are provided in a separate document: The DIGIFORCE® 9311 PROFIBUS manual.

5 PROFIBUS

5.1 Overview PROFIBUS

PROFIBUS was developed as an open fieldbus. It was standardized in the German standard DIN 19 245 and was later standardized in IEC 61158. PROFIBUS is a medium for pure data transfer, like the RS232 standard for instance.

There are two different types of communication

- Cyclical services PROFIBUS DP-V0 (Distributed Peripheral)
- Acyclical services PROFIBUS DP-V1 (optional services)

PROFIBUS DP (Distributed Peripheral) is a PROFIBUS version designed to satisfy the requirements of high-speed, efficient data transfer between a controller (PLC / PC) and remote peripheral devices.

Physical design: Similar to RS 485

A DP system normally consists of one master and up to 125 slaves with the use of repeaters. In systems employing multiple masters, each master has its own permanently assigned slaves.

Master: A DP master exchanges data with the slaves via PROFIBUS DP and monitors the bus. It transfers the data between the higher-level controller and the remote peripheral devices.

Slave: The DP slaves form the link to the measurement equipment. They condition the input data from the measurement application for communication with the master, and condition the output data (control signals) from the master for forwarding to the measurement electronics

The PROFIBUS uses the master-slave technique for data transfer. The master reads the input data cyclically from the slaves and writes the output data to the slaves.

PROFIBUS DP features

- Transfer rate of 9.6 kBaud to 12 MBaud
- Fast response times and high interference immunity
- Master and slave diagnostics
- Individual slaves can fail or be switched off without interfering with bus operation.
- The whole bus configuration is saved in the master.
- Each slave has a manufacturer-specific ID assigned by the PI.
- The slaves are specified by the device description data (GSD file). This file is imported into the configuration software, simplifying slave configuration.

PROFIBUS DP-V0 data transfer

The master always transfers the same number of data bytes with each of its slaves in turn (always around a loop), thereby always keeping the total transfer time constant.

Each slave must respond within a fixed time slot.

Theoretically, 240 bytes are possible in each response.

The slave must always reply with the same data length.

PROFIBUS DP-V1 data transfer

With PROFIBUS DP-V1, a master can use acyclic bus access to access individual device parameters, retrieve them or write new values for the parameter.

DIGIFORCE® 9311 supports DP-V1 access for complete device configuration, evaluation and measurement data.

Further information

The PROFIBUS and PROFINET International (PI) provides additional documents on the Internet: www.profibus.com.

5.2 General information on PROFIBUS data transfer

For PROFIBUS DP-V0 (cyclic data traffic), one must define at the configuration stage how many bytes are transferred between master and slave during each cyclic access (GSD file).

The device is controlled using the data transferred from master to slave. This data always consists of three bytes for the DIGIFORCE® 9311 unit. The function of these three bytes is explained in chapter 6.2 “PLC inputs – Transfer from master to 9311 slave” on page 20.

The data transferred in the opposite direction from slave to master contains status information and measurement results. Since the DIGIFORCE® 9311 is a highly complex piece of test equipment, there is an extremely large amount of data that could be transferred in this case. This is not always practical however. For example, if one is only interested in the status information, it makes little sense to transfer more than 100 bytes of measurement results per access which the master makes no use of. On the other hand, there are applications in which the measurement results from a specific evaluation element need to be transferred; but this would not be possible if only the status information per interface is available

Hence in order to satisfy as many customer requirements as possible, two different combinations of different measurement results have been provided. These different options specify what information is sent to the master. The information content of the individual options ("modes") is either a simple short message or it contains PLC status and evaluation information and 20 measurement values which are user selectable within the 9311 configuration and the live values of the measurement channels. When designing the system, the user can select the option that best meets his requirements so that he receives precisely the data that he needs.

5.3 GSD file

DIGIFORCE® equipment with the PROFIBUS option is supplied with a CD. This disk includes the device description file BUR_0F91.gsd (GSD file). This GSD file describes the physical properties of the device (baud rate, specific bit times, sent/received bytes per cycle etc.).

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

The GSD 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 his master accordingly.

5.4 Data conversion

5.4.1 Handling problems that arise when reading floating-point numbers

This only concerns cases in which floating-point numbers need to be read from the DIGIFORCE® 9311 unit (in the cyclic protocol with Mode ≠ 1).

Floating-point numbers (data type REAL), according to IEEE 754, are encoded as four bytes for transfer This may create problems depending on the type of PLC used.

Cause

In the DIGIFORCE® 9311-PROFIBUS, the sign byte is transferred first. Some PLCs expect this byte in the highest of the four addresses not in the lowest address. This inevitably leads to misinterpretation of the numeric value. In this case the order of the four bytes has to be changed by the PLC as shown in the figure.

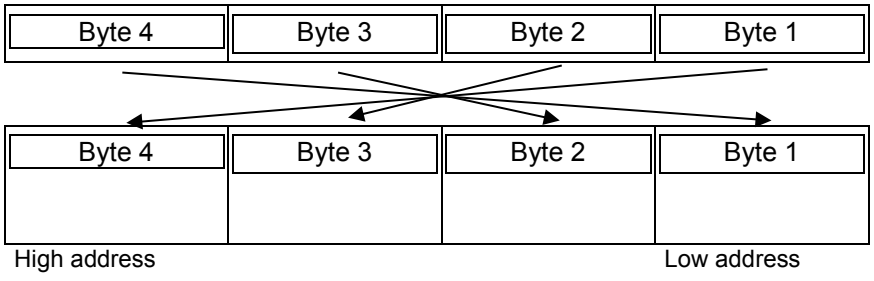


Diagram 4: Exchange of the order of bytes caused by misinterpretation of the numeric value

The order of these bytes can also be changed when setting a UserParamByte which is described in the gsd file.

6 Cyclic PROFIBUS Communication (DP-V0)

6.1 Meaning of the content of the different protocol modes

Overview of the available PROFIBUS DP-V0 modes:

DIGIFORCE® 9311 output data (transfer from 9311 to master)

Mode	Contents	Length/bytes	Bytes
1	PLC output status	2	∑ 4 bytes
	Evaluation info	2	
2	PLC output status	2	∑ 92 bytes
	Evaluation info	2	
	20 evaluation values (float) , user-defined values*	20x4	
	2 sensor live values (X, Y) *1	2x4	

* The user-defined values contain values which are defined within the DIGIFORCE® 9311 device. The following values are available:

- General curve data
- Evaluation results of each evaluation element (e.g. window entry/exit window extended evaluation results like Min/Max window limits Xmin, Xmax, Ymin, Ymax threshold crossing point)

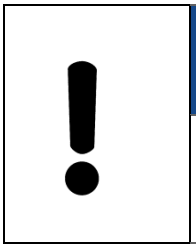
*1 The live values of the sensor channels are updated at a rate of 100 Hz. The values are only updated when the DIGIFORCE® 9311 is ready to record measurements or is actively taking a measurement.

How to define the user-defined values: The parameterization of the list is done in the configuration main menu->Program Setup->User-def. Val. (Note that this setting is specific for each measurement program. For details refer to the DIGIFORCE® 9311 operation manual, section 6.3.8 User-defined values.)

DIGIFORCE® 9311 input data (transfer from master to 9311)

In all cyclic modes, three bytes are always transferred from master to slave. These three bytes are used to control the device via PROFIBUS, and have the same meaning in all PROFIBUS DP protocol modes.

Mode	Length/bytes	Contents
All	3	3 Bytes PLC input data



NOTICE

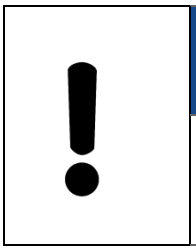
Note that the adjustable PLC inputs and outputs can be assigned with different functions. The assignment can be changed within the DIGIFORCE® 9311 “Basic setup” menu (M18) (for further information see DIGIFORCE® model 9311 operation manual).

6.2 PLC inputs – Transfer from master to 9311 slave

Three bytes of PLC-In data for the DIGIFORCE® 9311 are always transferred from the PROFIBUS master to the DIGIFORCE® 9311 slave unit. These bits have the same function as the parallel PLC inputs to the DIGIFORCE® 9311 unit. (See detailed documentation of these signals within the DIGIFORCE® 9311 operation manual, section 6.1.3 PLC inputs).

6.2.1 PLC inputs byte 0 (master to 9311 slave)

PLC inputs Byte 0 (master → slave)		
Valid values:	Adjustable input #1 (Pin 4) Default: IN_TARE_X	Bit 0 LSB
	Adjustable input #2 (Pin 5) Default: IN_RES_STAT	Bit 1
Set reserved bits to '0'	Adjustable input #3 (Pin 6) Default: IN_STEST	Bit 2
	IN_STROBE	Bit 3
	IN_AUTO	Bit 4
	Reserved	Bit 5
	Reserved	Bit 6
	Reserved	Bit 7 MSB



NOTICE

Note that the adjustable PLC inputs (Pin 4, 5 and 6) can be assigned with different functions. The assignment can be changed within the DIGIFORCE® 9311 “Basic setup” menu (M18) under “Assignment of the PLC inputs” (for further information see DIGIFORCE® model 9311 operation manual chapter 6.1.3 “PLC inputs”).

6.2.2 PLC inputs byte 1 (master to 9311 slave)

PLC inputs Byte 1 (master → slave)		
Valid values:	IN_PROG0	Bit 0 LSB
	IN_PROG1	Bit 1
Set reserved bits to '0'	IN_PROG2	Bit 2
	IN_PROG3	Bit 3
	Reserved	Bit 4
	Reserved	Bit 5
	Reserved	Bit 6
	Reserved	Bit 7 MSB

6.2.3 PLC inputs byte 2 (master to 9311 slave)

PLC inputs Byte 2 (master → slave)		
Valid values:	IN_START	Bit 0 LSB
	Reserved	Bit 1
Set reserved bits to '0'	Reserved	Bit 2
	Reserved	Bit 3
	Reserved	Bit 4
	Reserved	Bit 5
	Reserved	Bit 6
	Reserved	Bit 7 MSB

6.3 PLC outputs – Transfer from 9311 slave to master

The data refers to the PLC output of the DIGIFORCE® 9311. The data described here is the data transferred from the DIGIFORCE® 9311 to the PROFIBUS master.

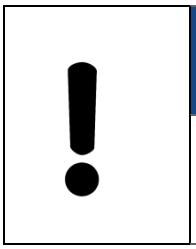
The function of the PLC-In / PLC-Out bits is identical to the parallel PLC I/O ports on the unit itself and can be found in the DIGIFORCE® 9311 operation manual for the unit. Also the signal timing is available within the DIGIFORCE® 9311 operation manual.

6.3.1 PLC outputs byte 0 (9311 slave to master)

PLC outputs Byte 0 (slave → master)		
Valid values:	OUT_READY	Bit 0 LSB
	OUT_OK	Bit 1
	OUT_NOK	Bit 2
	OUT_NOK_ONL	Bit 3
	OUT_S1	Bit 4
	OUT_S2	Bit 5
	Adjustable output #1 (Pin 20) Default: OUT_OK_STEST	Bit 6
	Adjustable output #6 (Pin 25) Default: OUT_MEAS_ACT	Bit 7 MSB

6.3.2 PLC outputs byte 1 (9311 slave to master)

PLC outputs Byte 1 (slave → master)		
Valid values:	Adjustable output #2 (Pin 21) Default: OUT_STROBE	Bit 0 LSB
	Adjustable output #3 (Pin 22) Default: OUT_PROG0	Bit 1
	Adjustable output #4 (Pin 23) Default: OUT_PROG1	Bit 2
	Adjustable output #5 (Pin 24) Default: OUT_PROG2	Bit 3
	Reserved	Bit 4
	Reserved	Bit 5
	Reserved	Bit 6
	Reserved	Bit 7 MSB



NOTICE

Note that PLC outputs [6..1] can be assigned with different functions. The assignment can be changed within the DIGIFORCE® 9311 “Basic setup” menu (M18) under "Assignment of the PLC outputs"(see DIGIFORCE® model 9311 operation manual chapter 6.1.2 “PLC outputs”).

6.4 Evaluation info – Transfer from 9311 slave to master

The evaluation info (2 bytes) contains evaluation result of each element.

6.4.1 Evaluation info byte 0 (9311 slave to master)

Evaluation info byte 0 (slave → master)		
Valid values:	Global_NOK	Bit 0 LSB
	Overload_NOK	Bit 1
	Window_1_NOK	Bit 2
	Window_2_NOK	Bit 3
	Window_3_NOK	Bit 4
	Threshold_1_NOK	Bit 5
	Threshold_2_NOK	Bit 6
	Trapezoid_1_NOK	Bit 7 MSB

6.4.2 Evaluation info byte 1 (9311 slave to master)

Evaluation info byte 1 (slave → master)		
Valid values:	Trapezoid_2_NOK	Bit 0 LSB
	Envelope_NOK	Bit 1
	Measurement w/o READY	Bit 2
	USB logging error	Bit 3
	Reserved	Bit 4
	Reserved	Bit 5
	Reserved	Bit 6
	Reserved	Bit 7 MSB

6.5 Byte reference list

6.5.1 DP-V0 I/O Mode 1

PLC inputs – Data from master to 9311 slave

Byte	Function	Section	Comments
0	PLC inputs Byte 0	6.2.1	
1	PLC inputs Byte 1	6.2.2	
2	PLC inputs Byte 2	6.2.3	

PLC inputs – Data from slave to 9311 master

Byte	Function	Section	Comments
0	PLC output Byte 0	6.3.1	
1	PLC output Byte 1	6.3.2	
2	Evaluation info Byte 0	6.4.1	
3	Evaluation info Byte 1	6.4.2	

6.5.2 DP-V0 I/O Mode 2

PLC inputs – Data from master to 9311 slave

Byte	Function	Section	Comments
0	PLC input Byte 0	6.2.1	
1	PLC input Byte 1	6.2.2	
2	PLC input Byte 2	6.2.3	

Data from device to controller

Byte	Function	Section	Comments
0	PLC outputs Byte 0	6.3.1	
1	PLC outputs Byte 1	6.3.2	
2	Evaluation info Byte 0	6.4.1	
3	Evaluation info Byte 1	6.4.2	
4	User-defined value_1 (1st Byte)	see DIGIFORCE® 9311 operation manual 6.3.8 User defined values	User defined value in DIGIFORCE® 9311 (32-Bit float)

Byte	Function	Section	Comments
5	User-defined value_1 (2nd Byte)	see above	
6	User-defined value_1 (3rd Byte)	see above	
7	User-defined value_1 (4th Byte)	see above	
8	User-defined value_2 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
9	User-defined value_2 (2nd Byte)	see above	
10	User-defined value_2 (3rd Byte)	see above	
11	User-defined value_2 (4th Byte)	see above	
12	User-defined value_3 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
13	User-defined value_3 (2nd Byte)	see above	
14	User-defined value_3 (3rd Byte)	see above	
15	User-defined value_3 (4th Byte)	see above	
16	User-defined value_4 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
17	User-defined value_4 (2nd Byte)	see above	
18	User-defined value_4 (3rd Byte)	see above	
19	User-defined value_4 (4th Byte)	see above	
20	User-defined value_5 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
21	User-defined value_5 (2nd Byte)	see above	
22	User-defined value_5 (3rd Byte)	see above	
23	User-defined value_5 (4th Byte)	see above	
24	User-defined value_6 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
25	User-defined value_6 (2nd Byte)	see above	
26	User-defined value_6 (3rd Byte)	see above	
27	User-defined value_6 (4th Byte)	see above	
28	User-defined value_7 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
29	User-defined value_7 (2nd Byte)	see above	
30	User-defined value_7 (3rd Byte)	see above	
31	User-defined value_7 (4th Byte)	see above	
32	User-defined value_8 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
33	User-defined value_8 (2nd Byte)	see above	
34	User-defined value_8 (3rd Byte)	see above	

Byte	Function	Section	Comments
35	User-defined value_8 (4th Byte)	see above	
36	User-defined value_9 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
37	User-defined value_9 (2nd Byte)	see above	
38	User-defined value_9 (3rd Byte)	see above	
39	User-defined value_9 (4th Byte)	see above	
40	User-defined value_10 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
41	User-defined value_10 (2nd Byte)	see above	
42	User-defined value_10 (3rd Byte)	see above	
43	User-defined value_10 (4th Byte)	see above	
44	User-defined value_11 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
45	User-defined value_11 (2nd Byte)	see above	
46	User-defined value_11 (3rd Byte)	see above	
47	User-defined value_11 (4th Byte)	see above	
48	User-defined value_12 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
49	User-defined value_12 (2nd Byte)	see above	
50	User-defined value_12 (3rd Byte)	see above	
51	User-defined value_12 (4th Byte)	see above	
52	User-defined value_13 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
53	User-defined value_13 (2nd Byte)	see above	
54	User-defined value_13 (3rd Byte)	see above	
55	User-defined value_13 (4th Byte)	see above	
56	User-defined value_14 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
57	User-defined value_14 (2nd Byte)	see above	
58	User-defined value_14 (3rd Byte)	see above	
59	User-defined value_14 (4th Byte)	see above	
60	User-defined value_15 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
61	User-defined value_15 (2nd Byte)	see above	
62	User-defined value_15 (3rd Byte)	see above	
63	User-defined value_15 (4th Byte)	see above	
64	User-defined value_16 (1st Byte)	see above	User defined value in

Byte	Function	Section	Comments
65	User-defined value_16 (2nd Byte)	see above	DIGIFORCE® 9311 (32-Bit float)
66	User-defined value_16 (3rd Byte)	see above	
67	User-defined value_16 (4th Byte)	see above	
68	User-defined value_17 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
69	User-defined value_17 (2nd Byte)	see above	
70	User-defined value_17 (3rd Byte)	see above	
71	User-defined value_17 (4th Byte)	see above	
72	User-defined value_18 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
73	User-defined value_18 (2nd Byte)	see above	
74	User-defined value_18 (3rd Byte)	see above	
75	User-defined value_18 (4th Byte)	see above	
76	User-defined value_19 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
77	User-defined value_19 (2nd Byte)	see above	
78	User-defined value_19 (3rd Byte)	see above	
79	User-defined value_19 (4th Byte)	see above	
80	User-defined value_20 (1st Byte)	see above	User defined value in DIGIFORCE® 9311 (32-Bit float)
81	User-defined value_20 (2nd Byte)	see above	
82	User-defined value_20 (3rd Byte)	see above	
83	User-defined value_20 (4th Byte)	see above	
84	Live value Channel X (1st Byte)		(32-Bit float) Channel X live value Updating rate of the live values $^{100}/_{sec}$.
85	Live value Channel X (2nd Byte)		
86	Live value Channel X (3rd Byte)		
87	Live value Channel X (4th Byte)		
88	Live value Channel Y (1st Byte)		(32-Bit float) Channel Y live value Updating rate of the live values $^{100}/_{sec}$.
89	Live value Channel Y (2nd Byte)		
90	Live value Channel Y (3rd Byte)		
91	Live value Channel Y (4th Byte)		

7 Acyclic PROFIBUS Communication (DP-V1)

The services are described from the point of view of the PROFIBUS master.
The acyclic PROFIBUS services allow access to following DIGIFORCE® 9311 functions:

- Complete device configuration
- Transfer of component/worker/job data for logging
- Retrieval of large amounts of process and curve data

For further information and support for Siemens PLC integration please contact our service department at service@burster.com.

7.1 Indirect slot addressing, e.g. for Siemens S7 projects

You can address the slot that you want directly if your PROFIBUS master can directly address a selected slot (e.g. SoftPLC, Beckhoff, Bosch). In some PROFIBUS masters, however, the slot is already addressed implicitly through the selected mode (e.g. on the Siemens S7).

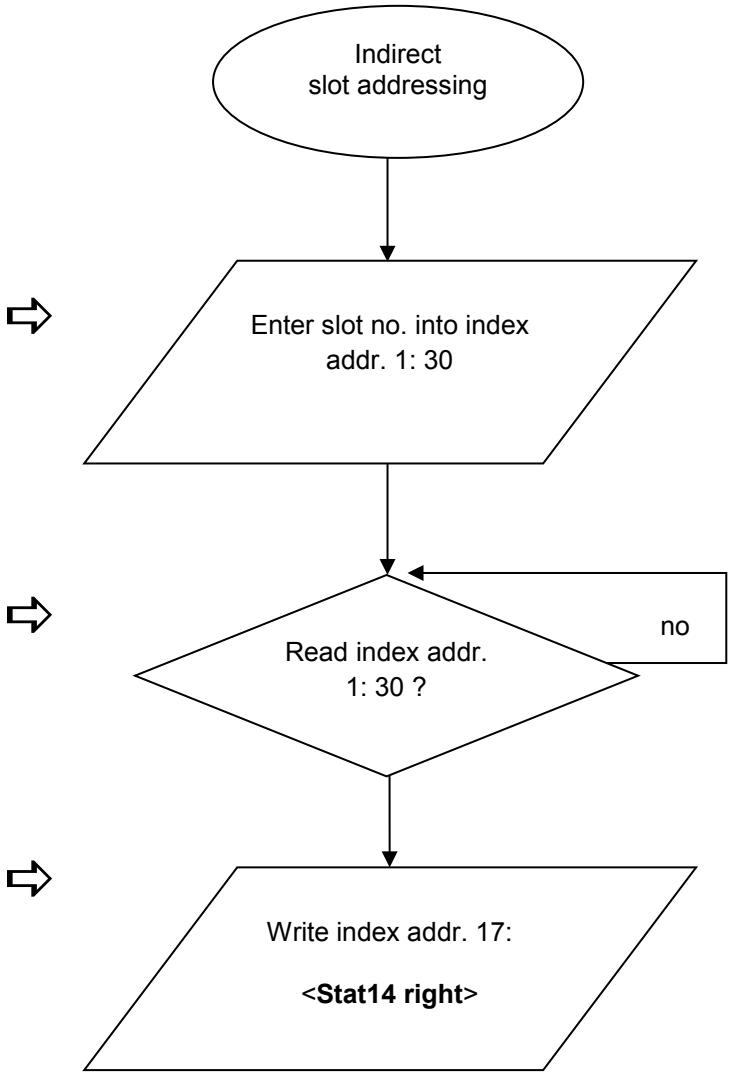
The DIGIFORCE® 9311 offers a solution for cases in which your PROFIBUS master cannot directly select a slot. You are able to link to any other desired slot from your implicitly addressed slot. The linking is possible through index 1, and is explained in the diagram below, taking slot 30 as an example. The slots < 30, and indexes < 10 are reserved for this reason, and are not available for normal access in the device settings

Example: DIGIFORCE® 9311 enter station name (slot 30 / index 17 see 7.2.2 “General settings (Slot 30)” on page 29)

Enter the slot address of the desired slot into the address 1; in this case, address 30 for general settings (see 7.2.2 “General settings (Slot 30)” on page 29).

As soon as the slot address has been successfully mapped in the DIGIFORCE® 9311, the slot address that has been entered can be read at the index address (type < 100 ms)

Now write the station name into index address 17, e.g. <Stat14 right> (type STR max. 15 characters).
You are able to read back index adress 17 to check the right entry.



7.2 Slot - index tables

7.2.1 Indirect slot addressing

If your PROFIBUS master in the DP-V1 service is not able to write/read arbitrary slot addresses (e.g. in the Siemens S7 environment), it is necessary to map the desired destination slot with the aid of indirect slot addressing. See chapter 7.1 ”Indirect slot addressing, e.g. for Siemens S7 projects” on page 28.

Slot	Index	Description	Possible value	Type	Len	R/W
0...29	0		[Not possible]			X
0..29	1		W: Enter the number of the slot to be linked R: Read the number of the currently linked slot (no slot linked: 0)		2	RW
0..29	1-9		[Not possible]			X
0..29	10..240	Indices of the linked slots				RW

7.2.2 General settings (Slot 30)

Slot 30, Indices 0 to 18

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
30	0		-	Not possible			X
30	1…9	Reserved	-	Not possible			X
30	10	Device detection	*DIGIFORCE model 9311*		STR 18	18	RO
30	11	Serial number	*12345678*		STR 11	11	RO
30	12	Software version	*V201600*		STR 25	25	RO
30	13	Version boot loader software	*V201500*		STR 25	25	RO
30	14	Software version Field bus interface	*PB-V201600*		STR 25	25	RO
30	15	Optional analog interface enabled	*0* *1* *2* *3*	Strain gauge+Potent. Piezo+Potentiometer Strain gauge+Increm. Piezo+Incremental	U16	2	RO
30	16	Info: Calibration date analog interface	*07.11.2016*		STR 10	10	RO
30	17	Station name	*Stat14 right*		STR 15	15	RW
30	18	reserved	-	-	-	-	-

Slot 30, Indices 19 to 35

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
30	19	Language	*0* *1* *2* *3* *4* *5*	German English French Spanish Italian Chinese	U16	2	RW
30	20	Date	*[dd.mm.yyyy]*	e.g.: 21.09.2016	STR 10	10	RW
30	21	Time	*[hh:mm:ss], 24h*	e.g.: 16:15:00	STR 8	8	RW
30	22	LCD brightness	*1 … 10*	Integer value (10 max.)	U16	2	RW
30	23	Measurement menu function key definition F1	*0* *1* *2* *3* *4* *5* *6* *7* *8* *9*	Off Meas. program incremental Meas. program decremental Tare X Tare Y Measurement Start/Stop Acknowledge OK parts Acknowledge NOK parts Sensor test Edit mode	U16	2	RW
30	24	Measurement menu function key definition F2	*0* *1* *2* *3* *4* *5* *6* *7* *8* *9*	Off Meas. program incremental Meas. program decremental Tare X Tare Y Measurement Start/Stop Acknowledge OK parts Acknowledge NOK parts Sensor test Edit mode	U16	2	RW
30	25	Measurement menu function key definition F3	*0* *1* *2* *3* *4* *5* *6* *7* *8* *9*	Off Meas. program incremental Meas. program decremental Tare X Tare Y Measurement Start/Stop Acknowledge OK parts Acknowledge NOK parts Sensor test Edit mode	U16	2	RW
30	26	Display mode of function Keys	*0* *1*	Fade out Always on	U16	2	RW
30	27	Meas. menu display control GRAPHIC	*0* *1*	Meas. menu disabled Meas. menu enabled	U16	2	RW
30	28	Meas. menu display control GENERAL CURVE DATA	*0* *1*	Meas. menu disabled Meas. menu enabled	U16	2	RW

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
30	29	Meas. menu display control TOTAL (Off/Smiley/text)	*0* *1* *2*	Meas. menu disabled Meas. menu enabled: Smiley Meas. menu enabled: Text	U16	2	RW
30	30	Meas. menu display control ENTRY/EXIT VALUES	*0* *1*	Meas. menu disabled Meas. menu enabled	U16	2	RW
30	31	Meas. menu display control USER DEFINED MEAS. VALUES	*0* *1*	Meas. menu disabled Meas. menu enabled	U16	2	RW
30	32	Meas. menu display control STATISTICS	*0* *1*	Meas. menu disabled Meas. menu enabled	U16	2	RW
30	33	Meas. menu display control ORDER SHEET	*0* *1*	Meas. menu disabled Meas. menu enabled	U16	2	RW
30	**34**	**Show/Hide of Live Values**	*0* *1*	**Show Live Values** **Hide Live Values**	**U16**	**2**	**RW**
30	35	Display the measurement menu, read the currently displayed measurement menu **Note**: The menu is selected here, but not yet displayed. Display only occurs through access to slot 30/68.	*101* *102* *103* *104* *105* *106* *107*	M1 Displaying meas. curves M2 General curve data M3 Total Result M4 Entry/Exit M5 User defined values M6 Statistics M7 Order sheet	U16	2	RW

Slot 30, Indices 36 to 51

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
30	36	Access authorisation Password protection on/off	*0* *1*	Password protection on Password protection off	U16	2	RW
30	37	Access authorisation BASIC SETUP MENU	*0* *1*	Access level disabled Access level enabled	U16	2	RW
30	38	Access authorisation PROGRAM SELECTION	*0* *1*	Access level disabled Access level enabled	U16	2	RW
30	39	Access authorisation COPY	*0* *1*	Access level disabled Access level enabled	U16	2	RW

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
		PROGRAMS					
30	40	Access authorisation CURVE ANALYSIS	*0* *1*	Access level disabled Access level enabled	U16	2	RW
30	41	Access authorisation CHANNEL SETTINGS	*0* *1*	Access level disabled Access level enabled	U16	2	RW
30	42	Access authorisation MEASUREMENT MODE	*0* *1*	Access level disabled Access level enabled	U16	2	RW
30	43	Access authorisation EVALUATION	*0* *1*	Access level disabled Access level enabled	U16	2	RW
30	44	Access authorisation REALTIME SWITSCHPOINTS	*0* *1*	Access level disabled Access level enabled	U16	2	RW
30	45	Access authorization TEST OPERATION	*0* *1*	Access level disabled Access level enabled	U16	2	RW
30	46	Access authorisation SENSOR TEST	*0* *1*	Access level disabled Access level enabled	U16	2	RW
30	47	Access authorisation USER DEFINED VALUES	*0* *1*	Access level disabled Access level enabled	U16	2	RW
30	48	Access authorisation EXTERNAL MEMORY	*0* *1*	Access level disabled Access level enabled	U16	2	RW
30	49	Master password	*0000 … 9999*		U16	2	RW
30	50	Set Master password to default	*EVENT!*	Writing an arbitrary byte initiates action	U8	1	WO
30	51	User password	*0000 … 9999*		U16	2	RW

Slot 30, Index 52 (Assignment PLC inputs 1)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
30	52	PLC input 1 (P20) (Slave to Master)	*0* *1* *2* *3* *4* *5* *6* *7* *8* *9* *10* *11* *12* *13* *14* *15* *16* *17* *18* *19*	OUT_OK_STEST OUT_STROBE OUT_PROG0 OUT_PROG1 OUT_PROG2 OUT_PROG3 OUT_MEAS_ACT OUT_S3 OUT_S4 OUT_S5 OUT_S6 OUT_TEST_OP OUT_ERROR OUT_WARN_TARE OUT_CONFIG OUT_ACK_ALARM OUT_ACK_LOCK OUT_ACK_OK OUT_ACK_NOK OUT_PC_LOG	U16	2	RW

Slot 30, Indices 53 to 57 (Assignment PLC inputs 2 to 6)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
30	53	PLC input 2 (P21) (Slave to Master)	*see index52*		U16	2	RW
30	54	PLC input 3 (P22) (Slave to Master)	*see index52*		U16	2	RW
30	55	PLC input 4 (P23) (Slave to Master)	*see index52*		U16	2	RW
30	56	PLC input 5 (P24) (Slave to Master)	*see index52*		U16	2	RW
30	57	PLC input 6 (P25) (Slave to Master)	*see index52*		U16	2	RW

Slot 30, Index 58 (Assignment PLC output 1)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
30	58	PLC output 1 (P4) (Master to Slave)	*0* *1* *2* *3* *4* *5* *6* *7* *8* *9*	IN_TARE_X IN_TARE_Y IN_TARE_X+Y IN_RES_STAT IN_STEST IN_TEST_OP IN_ACK IN_ACK_OK IN_ACK_NOK IN_ACK_ERROR	U16	2	RW

Slot 30, Indices 59 to 60 (Assignment PLC outputs 2 to 3)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
30	59	PLC output 2 (P5) (Master to Slave)	*see index58*		U16	2	RW
30	60	PLC output 3 (P6) (Master to Slave)	*see index58*		U16	2	RW

Slot 30, Indices 61 to 71

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
30	61	Order sheet: Operator	*Michael_ Mueller*		STR 64	64	RW
30	62	Order sheet: Order number	*AN_123456*		STR 64	64	RW
30	63	Order sheet: Batch	*BATCH_ 257-3*		STR 64	64	RW
30	64	Order sheet: Component	*Cylinder_righ t*		STR 64	64	RW
30	65	Order sheet: Serial number 1	*SN_1234567 8 9*		STR 64	64	RW
30	66	Order sheet: Serial number 2	*SN_9876543 2 1*		STR 64	64	RW
30	67	Acknowledgement function on/off	*0* *1*	Acknowledgement function off Acknowledgement function on	U16	2	RW
30	68	Acknowledgement function: Acknowledge OK parts on/off	*0* *1*	Not active User has to confirm OK parts (F-Key or PLC input)	U16	2	RW
30	69	Acknowledgement function: Acknowledge NOK parts on/off	*0* *1*	Not active User has to confirm NOK parts (F-Key or PLC input)	U16	2	RW
30	70	Acknowledgement function: Buzzer volume	*0 ... 10*	10: max. volume	U16	2	RW
30	71	Update display (refresh view)	*Event!*	Writing an arbitrary byte initiates action	U8	2	WO

7.2.3 Communication: Change menu, display update, fault indication (Slot 32)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
31	0	Not possible	-	-	x	x	x
31	1 - 9	Reserved	-	-	x	x	x
31	10	Go to menu	*0* *1*	Meas. Menu Graphical test menu	U16	2	WO
31	11	Initiate update of the LCD display	*EVENT!*	Writing an arbitrary byte initiates action	U8	1	WO
31	12	Fault status of the internal serial communication	*0x00000001* *0x00000002* *0x00000004* *0x00000008* *0x00000010* *0x00000020* *0x00000040* *0x00000080* *0x00000100* *0x00000400* *0x00004000* *0x00080000* *0x00100000* *0x00200000* *0x00400000* *0x00800000* *0x01000000* *0x02000000*	*PREFIX addressing fault* *Enquiry received in Device mode* *Blockcheck error* *Command fault* *Parameter error* *Timeout Receive Timer* *Timeout Response Timer* *Invalid ! or ?* *Invalid configuratio* *No valid measurements are available* *Reading out the measurement curve was interrupted by the beginning of a new measurement* *No TEDS or TEDS is not valid* *TEDS voltage too low* *TEDS ID not valid* *TEDS Version not valid* *Strain gauge sensor connected but another sensor selected* *Standard signal sensor connected but another sensor selected* *Unknown error*	U32	4	RO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
			0x04000000 *0x08000000* *0x10000000* *0x20000000*	*Sensor type is not valid* *Potentiometer sensor connected but another sensor selected* *Direction of strain gauge is not Valid* *USB Flash Error*			

7.2.4 Program Selection/Renaming & Statistics reset (Slot 32)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
32	0	Not possible	-	-	x	x	x
32	1 - 9	Reserved	-	-	x	x	x
32	10	Set program number	*0 ... 15*		U16	2	RW
32	11	Writing/Reading of the current program name	*Program name*		STR 20	20	RW
32	12	Reset statistics of measurement program	*0 ... 15*	EVENT! Selection through writing the program number	U16	2	WO
32	13	Reset statistics in all measurement programs	*EVENT!*	Writing an arbitrary byte initiates action	U8	1	WO

7.2.5 General channel settings (Slot 33)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
33	0	Not possible	-	-			X
33	1 - 9	Reserved	-	-			X
33	10	Channel settings channel X **Note**: First make the settings in indices 10, 11 then initiate with index 12!	*0* *1* *2* *3* *4* *5*	Terminals: A, Potentiometer A, standard signal B, strain gauge B, standard signal B, Piezo Time	U16	2	RW
33	11	Channel settings channel Y **Note**: First make the settings in indices 10, 11 then initiate with index 12!	*0* *1* *2* *3* *4* *5*	Terminals: A, Potentiometer A, standard signal B, strain gauge B, standard signal B, Piezo Time	U16	2	RW
33	12	Accept channel settings	*Event!*	The settings from indices 10, 11 are being stored. Writing an arbitrary byte initiates action.	U8	1	WO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
33	13	Filter channel X Not available for the channel settings "Piezo"	*0* *1* *2* *3* *4* *5* *6* *7* *8*	Off 5 Hz filter 10 Hz filter 25 Hz filter 50 Hz filter 100 Hz filter 200 Hz filter 400 Hz filter 800 Hz filter	U16	2	RW
33	14	Filter channel Y Not available for the channel settings "Piezo"	*0* *1* *2* *3* *4* *5* *6* *7* *8*	Off 5 Hz filter 10 Hz filter 25 Hz filter 50 Hz filter 100 Hz filter 200 Hz filter 400 Hz filter 800 Hz filter	U16	2	RW
33	15	Transmitter supply channel X **Note**: Entry is not available for the channel settings "Piezo" Only for 'BlackBox' devices	*0* *1*	Transmitter supply off Transmitter supply on	U16	2	RW
33	16	Transmitter supply channel Y **Note**: Entry is not available for the channel settings "Piezo" Only for 'BlackBox' devices	*0* *1*	Transmitter supply off Transmitter supply on	U16	2	RW
33	17	Set unit channel X **Note**: Entry is not available for the channel settings "Time"	*0* *1* *2* *3* *4* *5* *6* *7* *8* *9* *10* *11* *12*	User defined unit 1 User defined unit 2 User defined unit 3 mm N kN Nm Ncm grd bar V s ms	U16	2	RW
33	18	Set unit channel Y **Note**: Entry is not available for the	*0* *1* *2* *3*	User defined unit 1 User defined unit 2 User defined unit 3 mm	U16	2	RW

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
		channel settings "Time"	*4* *5* *6* *7* *8* *9* *10* *11* *12*	N kN Nm Ncm grd bar V s ms			
33	19	Set user defined unit 1	*abcd*		STR 4	4	RW
33	20	Set user defined unit 1	*abcd*		STR 4	4	RW
33	21	Set user defined unit 3	*ijkl*		STR 4	4	RW
33	22	Returns the measured value on channel X in [mV/V], [V/V], [V], according to channel setup **Note**: Entry is not available for the channel settings "Time"			FLT	4	RO
33	23	Returns the measured value on channel Y in [mV/V], [V/V], [V], according to channel setup **Note**: Entry is not available for the channel settings "Time"			FLT	4	RO
33	24	Channel to be scaled	*0* *1*	Channel X Channel Y	U 16	2	WO
33	25	Lower scale value		Concerns the channel selected under index 24	FLT	4	RW
33	26	Upper scale value		Concerns the channel selected under index 24	FLT	4	RW
33	27	Lower calibration value		Concerns the channel selected under index 24	FLT	4	RW
33	28	Upper calibration value		Concerns the channel selected under index 24	FLT	4	RW
33	29	Perform scaling (as per index 25 ... 29)	*EVENT*	Entry is not available for the channel settings "Off" and "Time"	U8	1	WO
33	**30**	**Switch between program depending and global channel settings**	*0* *1*	**Program depending** **Global** **Note**: If changing to global settings, the individual channel setting will get lost	**U 16**	**2**	**RW**

7.2.6 Channel settings “Standard signal” (Slot 34)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
34	0	Not possible	-	-			X
34	1 - 9	Reserved	-	-			X
34	10	Standard signal input channel X	*0* *1*	5 V input range 10 V input range	U16	2	RW
34	11	Standard signal input channel Y	*0* *1*	5 V input range 10 V input range	U16	2	RW

Note: This slot is only available, if the sensor type is currently selected

7.2.7 Channel settings “Strain gauge” (Slot 35)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
35	0	Not possible	-	-			X
35	1 - 9	Reserved	-	-			X
35	10	Strain gauge input range channel X	*0* *1* *2* *3* *4*	2 mV/V input range 4 mV/V input range 10 mV/V input range 20 mV/V input range 40 mV/V input range	U16	2	RW
35	11	Strain gauge input range channel Y	*0* *1* *2* *3* *4*	2 mV/V input range 4 mV/V input range 10 mV/V input range 20 mV/V input range 40 mV/V input range	U16	2	RW
35	12	Strain gauge sensitivity channel X	*0.01 ... 100.0*	IEEE754 Float	FLT	4	RW
35	13	Strain gauge sensitivity channel Y	*0.01 ... 100.0*	IEEE754 Float	FLT	4	RW
35	14	Level (elect.) strain gauge channel X	*0.01 ... 100.0*	IEEE754 Float	FLT	4	RO
35	15	Level (elect.) strain gauge channel Y	*0.01 ... 100.0*	IEEE754 Float	FLT	4	RO

Note: This slot is only available, if the sensor type is currently selected

7.2.8 Channel settings “Piezo” (Slot 36)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
36	0	Not possible	-	-			X
36	1 - 9	Reserved	-	-			X
36	10	Piezo input range channel X	*0* *1* *2* *3* *4* *5* *6* *7* *8* *9*	1nC range 2nC range 5nC range 10nC range 20nC range 40nC range 80nC range 200nC range 400nC range 1uC range	U16	2	RW
36	11	Piezo input range channel Y	*0* *1* *2* *3* *4* *5* *6* *7* *8* *9*	1nC range 2nC range 5nC range 10nC range 20nC range 40nC range 80nC range 200nC range 400nC range 1uC range	U16	2	RW
36	12	Piezo short-circuit on/to channel X	*0* *1*	Do not short-circuit piezo input Short-circuit piezo input	U16	2	WO
36	13	Piezo short-circuit on/to channel Y	*0* *1*	Do not short-circuit piezo input Short-circuit piezo input	U16	2	WO

Note: This slot is only available, if the sensor type is currently selected

7.2.9 Tare (Slot 37)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
37	0	Not possible	-	-			X
37	1 .. 9	Reserved	-	-			X
37	10	Tare at meas. start channel X	*0* *1*	off on	U16	2	RW
37	11	Tare at meas. start channel Y	*0* *1*	off on	U16	2	RW
37	12	Standard value for tare channel X	*from -9999999.0 to 9999999.0*	Float value, Float according to IEEE754	FLT	4	RW
37	13	Standard value for tare channel Y	*from -9999999.0 to 9999999.0*	Float value, Float according to IEEE754	FLT	4	RW
37	14	Tare warning on/off channel X	*0* *1*	off on	U16	2	RW
37	15	Tare warning on/off channel Y	*0* *1*	off on	U16	2	RW
37	16	Set tare warning limit channel X	*from 1.0 to 20.0*	Float value, Float according to IEEE754	FLT	4	RW
37	17	Set tare warning limit channel Y	*from 1.0 to 20.0*	Float value Float according to IEEE754	FLT	4	RW
37	18	Tare channel X	*EVENT!*	Writing an arbitrary byte initiates action	U8	1	WO
37	19	Delete tare channel X	*EVENT!*	Writing an arbitrary byte initiates action	U8	1	WO
37	20	Tare channel Y	*EVENT!*	Writing an arbitrary byte initiates action	U8	1	WO
37	21	Delete tare channel Y	*EVENT!*	Writing an arbitrary byte initiates action	U8	1	WO

7.2.10 Measurement mode (Slot 38)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
38	0	Not possible	-	-			X
38	1 .. 9	Reserved	-	-			X
38	10	X sampling off/on	*0* *1*	off on	U16	2	RW
38	11	X sample rate	*from 0.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
38	12	Y sampling off/on	*0* *1*	off on	U16	2	RW
38	13	Y sample rate	*from 0.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
38	14	Time sampling off/on	*0* *1*	off on	U16	2	RW
38	15	Time sample rate	*from 0.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
38	16	Set reference of curve **Note**: "Underrun" is not permitted if the channel concerned is set to time.	*0* *1* *2* *3* *4* *5*	Absolute Final force Y reference line overrun Y reference line underrun Y trigger overrun Y trigger underrun	U16	2	RW
38	17	Set reference line Y	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
38	18	Set trigger line Y	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
38	19	Set return point	*0* *1* *2* *3*	XMIN XMAX YMIN YMAX	U16	2	RW
38	20	Set “Record curve to“	*0* *1*	Complete curve Up to return point	U16	2	RW
38	21	Set start mode	*0* *1* *2* *3* *4*	External X internal overrun X internal underrun Y internal overrun Y internal underrun	U16	2	RW
38	22	Set stop mode	*0* *1* *2* *3* *4* *5* *6*	External X internal overrun X internal underrun Y internal overrun Y internal underrun Timeout Defined number of measured values	U16	2	RW
38	23	Set X start value for	*from*	Float value	FLT	4	RW

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
		internal start	*-9999999.0 to 9999999.0*	Float according to IEEE754			
38	24	Set Y start value for internal start	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
38	25	Set X stop value for internal stop	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
38	26	Set Y stop value for internal stop	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
38	27	Set the "stop" timeout value	*from 0.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
38	28	Set the "stop" number of measured values	*0 bis 5000*	Integer value	U16	2	RW

7.2.11 Evaluation window 1 (Slot 39)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
39	0	Not possible	-	-			X
39	1 .. 9	Reserved	-	-			X
39	10	Window 1 off/on	*0* *1*	off on	U16	2	RW
39	11	Window 1 limit Xmin **Note**: At the end, entry must be adopted through index 15.	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
39	12	Window 1 limit Xmax **Note**: At the end, entry must be adopted through index 15.	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
39	13	Window 1 limit Ymin **Note**: At the end, entry must be adopted through index 15.	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
39	14	Window 1 limit Ymax **Note**: At the end, entry must be adopted through index 15.	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
39	15	Window 1 copy limit **Note**: Values entered into indices 11, 12, 13,	*EVENT!*	Writing an arbitrary byte initiates action	U8	1	WO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
		14 are adopted					
39	16	Window 1 entry left **Note**: At the end, entry must be adopted through index 24.	*0* *1*	no yes	U16	2	RW
39	17	Window 1 entry right **Note**: At the end, entry must be adopted through index 24.	*0* *1*	no yes	U16	2	RW
39	18	Window 1 entry bottom **Note**: At the end, entry must be adopted through index 24.	*0* *1*	no yes	U16	2	RW
39	19	Window 1 entry top **Note**: At the end, entry must be adopted through index 24.	*0* *1*	no yes	U16	2	RW
39	20	Window 1 exit left **Note**: At the end, entry must be adopted through index 24.	*0* *1*	no yes	U16	2	RW
39	21	Window 1 exit right **Note**: At the end, entry must be adopted through index 24.	*0* *1*	no yes	U16	2	RW
39	22	Window 1 exit bottom **Note**: At the end, entry must be adopted through index 24.	*0* *1*	no yes	U16	2	RW
39	23	Window 1 exit top **Note**: At the end, entry must be adopted through index 24.	*0* *1*	no yes	U16	2	RW
39	24	Copy window entry/exit **Note**: Values entered into indices 16 - 23 are adopted	*EVENT!*	no yes	U8	1	WO
39	25	Window 1 curve segment for evaluation	*0* *1* *2*	Forward Return Complete curve	U16	2	RW
39	26	Window 1 online evaluation	*0* *1* *2* *3* *4*	Off left - right right - left bottom - top top - bottom	U16	2	RW

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
39	27	Window 1 Online signal level	*0* *1*	Low active High active	U16	2	RW

7.2.12 Evaluation window 2 (Slot 40)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
40	0	Not possible	-	-			X
40	1 .. 9	Reserved	-	-			X
40	10 ...	See slot 39					

7.2.13 Evaluation window 3 (Slot 41)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
41	0	Not possible	-	-			X
41	1 .. 9	Reserved	-	-			X
41	10 ...	See slot 39					

7.2.14 Evaluation trapezoid window 1 (Slot 42)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
42	0	Not possible	-	-			X
42	1 .. 9	Reserved	-	-			X
42	10	Trapezoid 1 off/on	*0* *1*	off on	U16	2	RW
42	**11**	**Trapezoid type X/Y**	*0* *1*	**Type X-Trapezoid** **Type Y-Trapezoid**			
42	12	Trapezoid 1 limit **Type X:** Xmin **Type Y:** Ymin **Note**: At the end, entry must be adopted through index 18	*from* *-9999999.0* *to* *9999999.0*	Float value Float according to IEEE754	FLT	4	RW
42	13	Trapezoid 1 limit **Type X:** Xmax **Type Y:** Ymax **Note**: At the end, entry must be adopted through index 18.	*from* *-9999999.0* *to* *9999999.0*	Float value Float according to IEEE754	FLT	4	RW
42	14	Trapezoid 1 limit **Type X:** Ymin left	*from* *-9999999.0* *to*	Float value Float according to IEEE754	FLT	4	RW

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
		Type Y: Xmin bottom **Note**: At the end, entry must be adopted through index 18.	*9999999.0*				
42	15	Trapezoid 1 limit **Type X:** Ymax left **Type Y:** Xmax bottom **Note**: At the end, entry must be adopted through index 18.	*from* *-9999999.0* *to* *9999999.0*	Float value Float according to IEEE754	FLT	4	RW
42	16	Trapezoid 1 limit **Type X:** Ymin right **Type Y:** Xmin top **Note**: At the end, entry must be adopted through index 18.	*from* *-9999999.0* *to* *9999999.0*	Float value Float according to IEEE754	FLT	4	RW
42	17	Trapezoid 1 limit **Type X:** Ymax right **Type Y:** Xmax top **Note**: At the end, entry must be adopted through index 18.	*from* *-9999999.0* *to* *9999999.0*	Float value Float according to IEEE754	FLT	4	RW
42	18	Trapezoid 1 copy the limits **Note**: Values entered into indices 12 - 17 are adopted	*EVENT*	Writing an arbitrary byte initiates action	U8	1	WO
42	19	Trapezoid 1 entry **Type X:** entry left **Type Y:** entry bottom **Note**: At the end, entry must be adopted through index 23.	*0* *1*	no yes	U16	2	RW
42	20	Trapezoid 1 entry **Type X:** entry right **Type Y:** entry top **Note**: At the end, entry must be adopted through index 23.	*0* *1*	no yes	U16	2	RW

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
42	21	Trapezoid 1 exit **Type X:** exit left **Type Y:** exit bottom **Note**: At the end, entry must be adopted through index 23	*0* *1*	no yes	U16	2	RW
42	22	Trapezoid 1 exit **Type X:** exit right **Type Y:** exit top **Note**: At the end, entry must be adopted through index 23	*0* *1*	no yes	U16	2	RW
42	23	Trapezoid 1 copy entry/exit **Note**: Values entered into indices 19- 22 are adopted.	*EVENT*	Writing an arbitrary byte initiates action	U8	1	WO
42	24	Trapezoid 1 curve segment for evaluation	*0* *1* *2*	Forward Return Complete curve	U16	2	RW

7.2.15 Evaluation trapezoid window 2 (Slot 43)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
43	0	Not possible	-	-			X
43	1 .. 9	Reserved	-	-			X
43	10 ...	See slot 42					

7.2.16 Evaluation threshold 1 (Slot 44)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
44	0	Not possible	-	-			X
44	1 .. 9	Reserved	-	-			X
44	10	Threshold 1 off/on	*0* *1*	off on	U16	2	RW
44	11	Threshold 1 type of threshold	*0* *1*	Type X (vertical) Type Y (horizontal)	U16	2	RW
44	12	Threshold 1 position **Type X**: X value **Type Y**: Y value **Note**: At the end, entry must be adopted	*from* *-9999999.0* *to* *9999999.0*	Float value Float according to IEEE754	FLT	4	RW

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
		through index 15.					
44	13	Threshold 1 limit **Type X**: Ymin **Type Y**: Xmin **Note**: At the end, entry must be adopted through index 15.	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
44	14	Threshold 1 limit **Type X**: Ymax **Type Y**: Xmax **Note**: At the end, entry must be adopted through index 15.	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
44	15	Threshold 1 copy position and limits **Note**: Values entered into indices 11 - 14 are adopted	*EVENT*	Writing an arbitrary byte initiates action	U8	1	WO
44	16	Threshold 1 passage **Type X**: left > right **Type Y**: bottom > top **Note**: At the end, entry must be adopted through index 18.	*0* *1*	no yes	U16	2	RW
44	17	Threshold 1 passage **Type X**: right > left **Type Y**: top > bottom **Note**: At the end, entry must be adopted through index 18.	*0* *1*	no yes	U16	2	RW
44	18	Threshold 1 Copy passage **Note**: Values entered into indices 16 - 17 are adopted	*EVENT*	Writing an arbitrary byte initiates action	U8	1	WO
44	19	Threshold 1 Curve segment for evaluation	*0* *1* *2*	Forward Return Complete curve	U16	2	RW

7.2.17 Evaluation threshold 2 (Slot 45)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
45	0	Not possible	-	-			X
45	1 .. 9	Reserved	-	-			X
45	10 ...	See slot 44					

7.2.18 Evaluation envelope (Slot 46 to 50)

Slot/index data on request

7.2.19 Tolerance band for evaluation elements (Slot 51)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
51	0	Not possible	-	-			X
51	1 .. 9	Reserved	-	-			X
51	10	Tolerance band X **Note**: At the end, entry must be adopted through index 12.	*from 0.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
51	11	Tolerance band Y **Note**: At the end, entry must be adopted through index 12.	*from 0.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
51	12	Store tolerance bands **Note**: Values entered into indices 10 - 11 are adopted.	*EVENT*	Writing an arbitrary byte initiates action	U8	1	WO

7.2.20 Realtime switchpoints S1 (Slot 52)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
52	0	Not possible	-	-			X
52	1 .. 9	Reserved	-	-			X
52	10	Switchpoint S1 value **Note**: At the end, entry must be adopted through index 14.	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
52	11	Switchpoint S1 channel **Note**: At the end, entry	*0* *1*	Channel X Channel Y	U16	2	RW

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
		must be adopted through index 14.					
52	12	Switchpoint S1 level **Note**: At the end, entry must be adopted through index 14.	*0* *1*	Low active High active	U16	2	RW
52	13	Switchpoint 1 reference **Note**: At the end, entry must be adopted through index 14.	*0* *1*	Absolute reference Trigger reference (only if Channel == Y)	U16	2	RW
52	14	Switchpoint 1 Store settings **Note**: Values entered into indices 10 - 13 are adopted.	*EVENT*	Writing an arbitrary byte initiates action	U8	1	WO

7.2.21 Realtime switchpoints S2 (Slot 53)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
53	0	Not possible	-	-			X
53	1 .. 9	Reserved	-	-			X
53	10..	See slot 52					

7.2.22 Realtime switchpoints S3 (Slot 54)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
54	0	Not possible	-	-			X
54	1 .. 9	Reserved	-	-			X
54	10..	See slot 52					

7.2.23 Realtime switchpoints S4 (Slot 55)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
55	0	Not possible	-	-			X
55	1 .. 9	Reserved	-	-			X
55	10..	See slot 52					

7.2.24 Realtime switchpoints S5 (Slot 56)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
56	0	Not possible	-	-			X
56	1 .. 9	Reserved	-	-			X
56	10..	See slot 52					

7.2.25 Realtime switchpoints S6 (Slot 57)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
57	0	Not possible	-	-			X
57	1 .. 9	Reserved	-	-			X
57	10..	See slot 52					

7.2.26 Sensortest (Slot 58)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
58	0	Not possible	-	-			X
58	1 .. 9	Reserved	-	-			X
58	10	Sensor test Channel X on/off	*0* *1*	off on	U16	2	RW
58	11	Sensor test Channel Y on/off	*0* *1*	off on	U16	2	RW
58	12	Sensor test Channel X measure reference value	*EVENT*	Writing an arbitrary byte initiates action	U8	1	WO
58	13	Sensor test Channel Y measure reference value	*EVENT*	Writing an arbitrary byte initiates action	U8	1	WO
58	14	Sensor test Channel X reference value	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
58	15	Sensor test Channel Y reference value	*from -9999999.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
58	16	Sensor test Channel X allowed deviation	*from 0.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
58	17	Sensor test Channel Y allowed deviation	*from 0.0 to 9999999.0*	Float value Float according to IEEE754	FLT	4	RW
58	18	Initiate sensor test **Note**: Read access	*0* *1*	NOK OK	U16	2	RO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
		initiates the sensor test and delivers the result.					

7.2.27 Setup user-defined values (Slot 59)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
59	0	Not possible	-	-			X
59	1 .. 9	Reserved	-	-			X
59	10	User-defined values value 1	*Integer value*	See operand table in appendix	U16	2	RW
59	11	User-defined values value 2	*Integer value*	See operand table in appendix	U16	2	RW
59	12	User-defined values value 3	*Integer value*	See operand table in appendix	U16	2	RW
59	13	User-defined values value 4	*Integer value*	See operand table in appendix	U16	2	RW
59	14	User-defined values value 5	*Integer value*	See operand table in appendix	U16	2	RW
59	15	User-defined values value 6	*Integer value*	See operand table in appendix	U16	2	RW
59	16	User-defined values value 7	*Integer value*	See operand table in appendix	U16	2	RW
59	17	User-defined values value 8	*Integer value*	See operand table in appendix	U16	2	RW
59	18	User-defined values value 9	*Integer value*	See operand table in appendix	U16	2	RW
59	19	User-defined values value 10	*Integer value*	See operand table in appendix	U16	2	RW
59	20	User-defined values value 11	*Integer value*	See operand table in appendix	U16	2	RW
59	21	User-defined values value 12	*Integer value*	See operand table in appendix	U16	2	RW
59	22	User-defined values value 13	*Integer value*	See operand table in appendix	U16	2	RW
59	23	User-defined values value 14	*Integer value*	See operand table in appendix	U16	2	RW
59	24	User-defined values value 15	*Integer value*	See operand table in appendix	U16	2	RW
59	25	User-defined values value 16	*Integer value*	See operand table in appendix	U16	2	RW
59	26	User-defined values value 17	*Integer value*	See operand table in appendix	U16	2	RW
59	27	User-defined values value 18	*Integer value*	See operand table in appendix	U16	2	RW
59	28	User-defined values value 19	*Integer value*	See operand table in appendix	U16	2	RW
59	29	User-defined values value 20	*Integer value*	See operand table in appendix	U16	2	RW

7.2.28 Copy/initialize measurement programs (Slot 60)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
60	0	Not possible	-	-		X	X
60	1 .. 9	Reserved	-	-		X	X
60	10	Meas. program number source **Note**: The settings from indices 10 - 12 are being adopted through indices 13, 14 or 15.	*0 ... 15*		U16	2	WO
60	11	Meas. program number Target start **Note**: The settings from indices 10 - 12 are being adopted through indices 13, 14 or 15.	*0 ... 15*		U16	2	WO
60	12	Meas. program number Target end **Note**: The settings from indices 10 - 12 are being adopted through indices 13, 14 or 15.	*0 ... 15*		U16	2	WO
60	13	Copy whole program setup **Note**: Copy according to entries in indices 10 - 12.	*EVENT*	Writing an arbitrary byte initiates action	U8	1	WO
60	14	Copy sensor setup **Note**: Copy according to entries in indices 10 - 12.	*EVENT*	Writing an arbitrary byte initiates action	U8	1	WO
60	15	Initialize selected programs **Note**: Initializing according to indices 11 - 12.	*EVENT*	Writing an arbitrary byte initiates action	U8	1	WO
60	16	Initialize all measurement programs and device parameters	*EVENT*	Writing an arbitrary byte initiates action	U8	1	WO

7.2.29 Reference curve (Slot 61 to 63)

Slot/index data on request

7.2.30 Test operation (Slot 64)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
64	0	Not possible					
64	1…9	Reserved					
64	10	Current measurement value channel X	*Float value*	Float according to IEEE754	FLT	4	RO
64	11	Current measurement value channel Y	*Float value*	Float according to IEEE754	FLT	4	RO

7.2.31 Zoom and autoscale (Slot 65)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
65	0	Not possible	-	-		X	X
65	1…9	Reserved	-	-		X	X
65	10	Switching autoscale/fix scale	*0* *1*	Autoscale off Autoscale on	U16	2	RW
65	11	Fix scale Xmin **Note**: At the end, entry must be adopted through index 15.	*Float value*	Float according to IEEE754	FLT	4	RW
65	12	Fix scale Xmax **Note**: At the end, entry must be adopted through index 15.	*Float value*	Float according to IEEE754	FLT	4	RW
65	13	Fix scale Ymin **Note**: At the end, entry must be adopted through index 15.	*Float value*	Float according to IEEE754	FLT	4	RW
65	14	Fix scale Ymax **Note**: At the end, entry must be adopted through index 15.	*Float value*	Float according to IEEE754	FLT	4	RW
65	15	Store fix scale **Note**: Values entered into indices 11 - 14 are adopted.	*EVENT!*	Writing an arbitrary byte initiates action	U8	1	WO

7.2.32 USB-Logging (Slot 66)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
66	0	Not possible	-	-		X	X
66	1…9	Reserved	-	-		X	X
66	**10**	USB-Logging on/off	0 1	off on	U16	2	RW
66	**11**	Designation of file name	0 1	Program name Order sheet	U16	2	RW
66	**12**	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
66	**13**	Free space on USB-Drive	String	If USB Drive is not attached or not mounted (see index 12) "0,000 MB" will be returned	STR 15	15	RO
66	**14**	Format USB Drive	String "formatusb"	"formatusb" works as a password here	STR 9	9	WO
66	**15**	READY-Control	0 1	off on	FLT	4	RW

7.2.33 TEDS-Sensors (Slot 67)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
67	0	Not possible	-	-		X	X
67	1…9	Reserved	-	-		X	X
67	10	Connector	0 1	A B	U16	2	WO
67	11	Direction **Note**: applicable for strain gauge sensors only	0 1	Preferred direction Against preferred direction	U16	2	WO
67	12	Read TEDS electronic data sheet from Connector specified at Index 10 with measurement direction according to Index11	EVENT!	Writing an arbitrary byte initiates action	U8	1	WO

7.2.34 Reserved slots (Slots 68…99)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
68… 99	XX	Not possible	-	-	X	X	X

7.3 Measurement results

7.3.1 Status of measurement (Slot 100)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
100	0	Not possible	-	-		X	X
100	1…9	Reserved				X	X
100	10	Index of the last measured value of the current curve **Caution**: The number of the pair of values is shown on the display. The index begins at 0, the number at 1!	*16 Bit Integer value*	0 means that there is no measurement curve	U16	2	RO
100	11	Running measurement curve counter [only relevant for Digicontrol usage]	*32 Bit Integer value*	This counter is incremented by 1 when a measurement curve is newly acquired in any menu	U32	4	RO
100	12	Amount of curves in current array of curves	*0…10*	Integer value from 0 to 10	U16	2	RO

7.3.2 Further information for current measurement curve (Slot 101)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
101	0	Not possible	-	-		X	X
101	1…9	Reserved	-	-		X	X
101	10	Piece Counter	*32 Bit Integer value*		U32	4	RO
101	11	NOK counter (sum)	*32 Bit Integer value*		U32	4	RO
101	12	Total evaluation	*0* *1*	NOK OK	U16	2	RO
101	13	Index of the curve´s return point **Caution**: The number of the pair of values is shown on the display. The index begins at 0, the number at 1!	*16 Bit Integer value*		U16	2	RO
101	14	Index of the last measured value of the curve **Caution**: The number of the pair of values is shown on the display. The index begins at 0,	*16 Bit Integer value*		U16	2	RO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
		the number at 1!					
101	15	Status overdrive of the A/D converter	*0* *1*	No overdrive Overdrive	U16	2	RO
101	16	Date of recording	*String in format dd.mm.yyyy*		STR 10	10	RO
101	17	Time of recording hh:mm:ss	*String in format hh:mm:ss*		STR 8	8	RO
101	18	Unit channel X	*String with max. 4 characters, e.g. "N" or "inch"*		STR 4	4	RO
101	19	Unit channel Y	*String with max. 4 characters, e.g. "N" or "inch"*		STR 4	4	RO

7.3.3 General curve data (Slot 102)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
102	0	Not possible	-	-		X	X
102	1…9	Reserved	-	-		X	X
102	10	X-minimum, X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
102	11	X-minimum, Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
102	12	X-maximum, X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
102	13	X-maximum, Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
102	14	Y-minimum, X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
102	15	Y-minimum, Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
102	16	Y-maximum, X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
102	17	Y-maximum, Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
102	18	First value X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
102	19	First value Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
102	20	Last value X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
102	21	Last value Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
102	22	Return point X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
102	23	Return point Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO

7.3.4 Request measurement results of user-defined values (Slot 103)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
103	0	Not possible	-	-		X	X
103	1…9	Reserved	-	-		X	X
103	10	User-defined value 1 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	11	User-defined value 1 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	12	User-defined value 1 unit	*String with max. 4 characters, e.g. "N" or "inch"*	See operand table in appendix.	STR 4	4	RO
103	13	User-defined value 2 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	14	User-defined value 2 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	15	User-defined value 2 unit	*String with max. 4 characters, e.g. "N" or "inch"*	See operand table in appendix.	STR 4	4	RO
103	16	User-defined value 3 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	17	User-defined value 3 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	18	User-defined value 3 unit	*String with max. 4 characters, e.g. "N" or "inch"*	See operand table in appendix.	STR 4	4	RO
103	19	User-defined value 4 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	20	User-defined value 4 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	21	User-defined value 4 unit	*String with max. 4 characters, e.g. "N" or "inch"*	See operand table in appendix.	STR 4	4	RO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
103	22	User-defined value 5 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	23	User-defined value 5 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	24	User-defined value 5 unit	*String with max. 4 characters, e.g. "N" or "inch"*	See operand table in appendix.	STR 4	4	RO
103	25	User-defined value 6 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	26	User-defined value 6 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	27	User-defined value 6 unit	*String with max. 4 characters, e.g. "N" or "inch"*	See operand table in appendix.	STR 4	4	RO
103	28	User-defined value 7 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	29	User-defined value 7 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	30	User-defined value 7 unit	*String with max. 4 characters, e.g. "N" or "inch"*	See operand table in appendix.	STR 4	4	RO
103	31	User-defined value 8 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	32	User-defined value 8 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	33	User-defined value 8 unit	*String with max. 4 characters, e.g. "N" or "inch"*	See operand table in appendix.	STR 4	4	RO
103	34	User-defined value 9 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	35	User-defined value 9 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	36	User-defined value 9 unit	*String with max. 4 characters, e.g. "N" or*	See operand table in appendix.	STR 4	4	RO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
			"inch"				
103	37	User-defined value 10 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	38	User-defined value 10 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	39	User-defined value 10 unit	*String with max. 4 characters, e.g. "N" or "inch"*	See operand table in appendix.	STR 4	4	RO
103	40	User-defined value 11 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	41	User-defined value 11 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	42	User-defined value 11 unit	*String with max. 4 characters, e.g. "N" or "inch"*	See operand table in appendix.	STR 4	4	RO
103	43	User-defined value 12 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	44	User-defined value 12 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	45	User-defined value 12 unit	*String with max. 4 characters, e.g. "N" or "inch"*	See operand table in appendix.	STR 4	4	RO
103	46	User-defined value 13 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	47	User-defined value 13 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	48	User-defined value 13 unit	*String with max. 4 characters, e.g. "N" or "inch"*	See operand table in appendix.	STR 4	4	RO
103	49	User-defined value 14 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	50	User-defined value 14 measurement value	*Float value*	Float according to IEEE754	FLT	4	RO
103	51	User-defined value 14 unit	*String with max. 4 characters,*	See operand table in appendix.	STR 4	4	RO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
			e.g. "N" or "inch"				
103	52	User-defined value 15 name	*String with the designator of the value*	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	53	User-defined value 15 measurement value	Float value	Float according to IEEE754	FLT	4	RO
103	54	User-defined value 15 unit	String with max. 4 characters, e.g. "N" or "inch"	See operand table in appendix.	STR 4	4	RO
103	55	User-defined value 16 name	String with the designator of the value	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	56	User-defined value 16 measurement value	Float value	Float according to IEEE754	FLT	4	RO
103	57	User-defined value 16 unit	String with max. 4 characters, e.g. "N" or "inch"	See operand table in appendix.	STR 4	4	RO
103	58	User-defined value 17 name	String with the designator of the value	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	59	User-defined value 17 measurement value	Float value	Float according to IEEE754	FLT	4	RO
103	60	User-defined value 17 unit	String with max. 4 characters, e.g. "N" or "inch"	See operand table in appendix.	STR 4	4	RO
103	61	User-defined value 18 name	String with the designator of the value	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	62	User-defined value 18 measurement value	Float value	Float according to IEEE754	FLT	4	RO
103	63	User-defined value 18 unit	String with max. 4 characters, e.g. "N" or "inch"	See operand table in appendix.	STR 4	4	RO
103	64	User-defined value 19 name	String with the designator of the value	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	65	User-defined value 19 measurement value	Float value	Float according to IEEE754	FLT	4	RO
103	66	User-defined value 19 unit	String with max. 4	See operand table in appendix.	STR 4	4	RO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
			characters, e.g. "N" or "inch"				
103	67	User-defined value 20 name	String with the designator of the value	Designator = "0" means that no value is defined for this value number	STR 16	16	RO
103	68	User-defined value 20 measurement value	Float value	Float according to IEEE754	FLT	4	RO
103	69	User-defined value 20 unit	*String with max. 4 characters, e.g. "N" or "inch"*	See operand table in appendix.	STR 4	4	RO

7.3.5 Read-out X-coordinates of current measurement curve (Slot 104)

It is possible to access the coordinates of measurement curves in curve groups of 200 coordinates each.

Note: DIGIFORCE® 9311 has to load these curve groups first. Thereafter, the coordinates can be read out. The reading process is performed in a single float access at index address 20 … 219.

Sequence to read the curve coordinates

1. Load the curve into the fieldbus card through a write access to index 10.
2. Query the last measured value for the curve (→end of the curve) through a read access to index 10.
3. The curve can now be read out in coordinate groups of up to 200 coordinates each:
   Coordinate group 0: Measured value 0 … 199
   Coordinate group 1: Measured value 200 … 399
   Coordinate group 2: Measured value 400 … 599 … etc.
4. The number of the desired coordinate group is entered through a write access to index 19. Since we want to read the beginning of the curve, we enter a 0.

   It is now possible to read curve values no. 0 … 199 (at present we have selected coordinate group 0) at the indices 20 … 219.
5. Coordinate group 1 (values 200 … 399) is now read under index 19.
   It is now possible to read curve values no. 200 … 399 at indices 20 … 219.
6. After this, coordinate group 2 (values 400 … 599) is read under index 19.
   It is now possible to read curve values no. 400 … 599 at indices 20 … 219, and so forth.
7. The coordinate groups can be read out in any desired sequence.
8. Only curve values that are smaller than or equal to the number of the last measured value (which was read at index 10) may be read out.

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
104	0	Not possible	-	-		X	X
104	1…9	Reserved	-	-		X	X
104	10	Write access: If a curve is to be read, it must be prepared through a write access before the curve is first read. Read access: Index of the last coordinate; if 0, there is no curve	*EVENT!* *Writing any two arbitrary bytes initiates action* *Integer value 0…4999*		U16 U16	2 2	W_ R_
104	11…18	Reserved	-	-		X	X
104	19	Write access: Desired group of 200 coordinates. For example, if coordinates 600 … 799 are to be	*Integer value 0 … 24*		U16	2	W_

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
		displayed, there must be a 3 here. Query the maximum number of value pairs under slot 132/10. Read access: Group of 200 coordinates currently displayed.	*Integer value 0 … 24*		U16	2	R_
104	20	0. coordinate of group of coordinates	*Float value*	Float according to IEEE754	FLT	4	RO
104	21	1. coordinate of group of coordinates	*Float value*	Float according to IEEE754	FLT	4	RO
104	22	2. coordinate of group of coordinates	*Float value*	Float according to IEEE754	FLT	4	RO
104	23	3. coordinate of group of coordinates	*Float value*	Float according to IEEE754	FLT	4	RO
104	…	…	…	…	…	…	…
104	217	197. coordinate of group of coordinates	*Float value*	Float according to IEEE754	FLT	4	RO
104	218	198. coordinate of group of coordinates	*Float value*	Float according to IEEE754	FLT	4	RO
104	219	199. coordinate of group of coordinates	*Float value*	Float according to IEEE754	FLT	4	RO

7.3.6 Read-out Y-coordinates of current measurement curve (Slot 105)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
105	0	Not possible	-	-		X	X
105	1…9	Reserved	-	-		X	X
105	10…	See slot 104				X	X

7.3.7 Evaluation results window 1 (Slot 106)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
106	0	Not possible	-	-		X	X
106	1…9	Reserved	-	-		X	X
106	10	Window 1 evaluation results OK/NOK	*0* *1*	NOK OK	U16	2	RO
106	11	Window 1 NOK counter	*32bit-Integer value >= 0*		U32	4	RO
106	12	Window 1 entry of curve X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
106	13	Window 1 entry of curve Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
106	14	Window 1 exit of curve X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
106	15	Window 1 exit of curve Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
106	16	Window 1 absolute Y- maximum in window X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
106	17	Window 1 absolute Y-maximum in window Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
106	18	Window 1 absolute Y-minimum in window X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
106	19	Window 1 absolute Y-minimum in window Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO

7.3.8 Evaluation results window 2 (Slot 107)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
107	0	Not possible	-	-		X	X
107	1…9	Reserved	-	-		X	X
107	10…	See slot 106				X	X

7.3.9 Evaluation results window 3 (Slot 108)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
108	0	Not possible	-	-		X	X
108	1…9	Reserved	-	-		X	X
108	10…	See slot 106				X	X

7.3.10 Evaluation results threshold 1 (Slot 109)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
109	0	Not possible	-	-		X	X
109	1…9	Reserved	-	-		X	X
109	10	Threshold 1 evaluation result OK/NOK	*0* *1*	NOK OK	U16	2	RO
109	11	Threshold 1 NOK counter	*32bit-Integer value >= 0*		U32	4	RO
109	12	Threshold intersection point X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
109	13	Threshold intersection point Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO

7.3.11 Evaluation results threshold 2 (Slot 110)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
110	0	Not possible	-	-		X	X
110	1…9	Reserved	-	-		X	X
110	10…	See slot 109				X	X

7.3.12 Evaluation results trapezoid window 1 (Slot 111)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
111	0	Not possible	-	-		X	X
111	1…9	Reserved	-	-		X	X
111	10	Trapezoid 1 evaluation result OK/NOK	*0* *1*	NOK OK	U16	2	RO
111	11	Trapezoid 1 NOK counter	*32bit-Integer value >= 0*		U32	4	RO
111	12	Trapezoid 1 entry coordinate X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
111	13	Trapezoid 1 entry coordinate Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
111	14	Trapezoid 1 exit coordinate X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
111	15	Trapezoid 1 exit coordinate Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
111							

7.3.13 Evaluation results trapezoid window 2 (Slot 112)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
112	0	Not possible	-	-		X	X
112	1…9	Reserved	-	-		X	X
112	10…	See slot 111				X	X

7.3.14 Evaluation results envelope (Slot 113)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
113	0	Not possible	-	-		X	X
113	1…9	Reserved	-	-		X	X
113	10	Envelope 1 evaluation result OK/NOK	*0* *1*	NOK OK	U16	2	RO
113	11	Envelope 1 NOK counter	*32bit-Integer value >= 0*		U32	4	RO
113	12	Envelope 1 entry coordinate X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
113	13	Envelope 1 entry coordinate Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
113	14	Envelope 1 exit coordinate X-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO
113	15	Envelope 1 exit coordinate Y-coordinate	*Float value*	Float according to IEEE754	FLT	4	RO

7.3.15 Combined results (common curve data and evalution elements – Slot 114)

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
114	0	Not possible	-			X	X
114	1…9	Reserved	-			X	X
114	10	Combined results: general curve data	*The data is bit coded and transmitted as STRUCT.* [Bytes] [0-3] X-min. X-coord. (FL) [4-7] X-min Y-coord. (FL) [8-11] X-max X-coord. (FL) [12-15] X-max Y-coord. (FL) [16-19] Y-min X-coord. (FL) [20-23] Y-min Y-coord.(FL) [24-27] Y-max X-coord. (FL) [28-31] Y-max Y-coord.(FL) [32-35] First val X-coord. (FL) [36-39] First val Y-coord. (FL) [40-43] Last val X-coord. (FL) [44-47] Last val Y-coord. (FL) [48-51] Return pnt X-coord. (FL) [52-55] Return pnt Y-coord. (FL)		STRUCT OF FLOATS	56	RO
114	11	Combined results: window 1	*The data is bit coded and transmitted as STRUCT.* [Bytes] [0-3] Evaluation result (UINT32):		STRUCT	52	RO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
			0: NOK **1**: OK [4-7] Entry X-coordinate (FL) [8-11] Entry Y-coordinate (FL) [12-15] Exit X-coordinate (FL) [16-19] Exit Y-coordinate (FL) [20-23] Abs max X-coord. (FL) [24-27] Abs max Y- coord.(FL) [28-31] Abs min X- coord. (FL) [32-35] Abs min Y- coord. (FL) [26-39] Window min coord. (FL) [40-43] Windw max coord. (FL) [44-47] Window min coord. (FL) [48-51] Window max coord. (FL)				
114	12	Combined results: window 2	*See index 11*		STRUCT	52	RO
114	13	Combined results: window 3	*See index 11*		STRUCT	52	RO
114	14	Combined results: threshold 1	*The data is bit coded and transmitted as STRUCT:* [Bytes] [0-3] Evaluation result (UINT32): **0**: NOK **1**: OK [4-7] Threshold type (UINT32): 0: Type X-Threshold 1: Type Y-Threshold [8-11] Threshold pass X (FL) [12-15] Threshold pass Y (FL) [16-19] **Type X**: Position X value (FL) **Type Y**: Position Y value (FL) [20-23] **Type X**: Ymin value (FL) **Type Y**: Xmin value (FL) [24-28] **Type X**: Ymax value (FL) **Type Y**: Xmax value (FL)		STRUCT	28	RO
114	15	Combined results: threshold 2	See index 14		STRUCT	28	RO

Slot	Index	Description	Value	Meaning of value	Type	Len	R/W
114	16	Combined results: trapezoid window 1	*The data is bit coded and transmitted as STRUCT:* [Bytes] [0-3] Evaluation result (UINT32) **0**: NOK 1: OK [4-7] Threshold type (UINT32) **0**: Type X-Trapezoid **1**: Type Y-Trapezoid [8-11] Entry X-coord. (FL) [12-15] Entry Y-coord. (FL) [16-19] Exit X-coord. (FL) [20-23] Exit Y-coord. (FL) [24-27] **Type X**: Xmin (FL) **Type Y**: Ymin (FL) [28-31] **Type X**: Xmax (FL) **Type Y**: Ymax (FL) [32-35] **Type X**: Ymin left (FL) **Type Y**: Xmin bottom (FL) [36-39] **Type X**: Ymax left (FL) **Type Y**: Xmax bottom (FL) [40-43] **Type X**: Ymin right (FL) **Type Y**: Xmin top (FL) [44-47] **Type X:** Ymax right (FL) Type Y: Xmax top (FL)		STRUCT	48	RO
114	17	Combined results: trapezoid window 2	*See index 16*		STRUCT	48	RO
114	18	Combined results: envelope	*The data is bit coded and transmitted as STRUCT:* Evaluation result (UINT32): **0**: NOK **1**: OK Entry X-coordinate (FL) Entry Y-coordinate (FL) Exit X-coordinate (FL) Exit Y-coordinate (FL) Envelope start (FL) Envelope end (FL) Delta min (FL) Delta max (FL)		STRUCT	36	RO

8 Appendix

8.1 Operand table

Number	ID of operand
0	OFF
100	General curve data – Start X
101	General curve data – Start Y
102	General curve data – End X
103	General curve data – End Y
104	General curve data – Abs. Xmax X-coordinate
105	General curve data – Abs. Xmax Y-coordinate
106	General curve data – Abs. Xmin X-coordinate
107	General curve data – Abs. Xmin Y-coordinate
108	General curve data – Abs. Ymax X-coordinate
109	General curve data – Abs. Ymax Y-coordinate
110	General curve data – Abs. Ymin X-coordinate
111	General curve data – Abs. Ymin Y-coordinate
112	General curve data – Return point X-coordinate
113	General curve data – Return point Y-coordinate
200	Window 1 – Entry X
201	Window 1 – Entry Y
202	Window 1 – Exit X
203	Window 1 – Exit Y
204	Window 1 – Abs. minimum X
205	Window 1 – Abs. minimum Y
206	Window 1 – Abs. maximum X
207	Window 1 – Abs. maximum Y
208	Window 1 – Coordinate Xmin
209	Window 1 – Coordinate Xmax

Number	ID of operand
210	Window 1 – Coordinate Ymin
211	Window 1 – Coordinate Ymax
300	Window 2 – Entry X
301	Window 2 – Entry Y
302	Window 2 – Exit X
303	Window 2 – Exit Y
304	Window 2 – Abs. minimum X
305	Window 2 – Abs. minimum Y
306	Window 2 – Abs. maximum X
307	Window 2 – Abs. maximum Y
308	Window 2 – Coordinate Xmin
309	Window 2 – Coordinate Xmax
310	Window 2 – Coordinate Ymin
311	Window 2 – Coordinate Ymax
400	Window 3 – Entry X
401	Window 3 – Entry Y
402	Window 3 – Exit X
403	Window 3 – Exit Y
404	Window 3 – Abs. minimum X
405	Window 3 – Abs. minimum Y
406	Window 3 – Abs. maximum X
407	Window 3 – Abs. maximum Y
408	Window 3 – Coordinate Xmin
409	Window 3 – Coordinate Xmax
410	Window 3 – Coordinate Ymin
411	Window 3 – Coordinate Ymax
500	Trapezoid window 1 – Entry X

Number	ID of operand
501	Trapezoid window 1 – Entry Y
502	Trapezoid window 1– Exit X
503	Trapezoid window 1 – Exit Y
504	Trapezoid window 1 – Coordinate **Type X**: Xmin **Type Y**: Ymin
505	Trapezoid window 1 – Coordinate **Type X**: Xmax **Type Y**: Ymax
506	Trapezoid window 1 – Coordinate **Type X**: Ymin left **Type Y**: Xmin bottom
507	Trapezoid window 1 – Coordinate **Type X**: Ymax left **Type Y**: Xmax bottom
508	Trapezoid window 1 – Coordinate **Type X**: Ymin right **Type Y**: Xmin top
509	Trapezoid window 1 – Coordinate **Type X**: Ymax right **Type Y**: Xmax top
600	Trapezoid window 2 – Entry X
601	Trapezoid window 2 – Entry Y
602	Trapezoid window 2 – Exit X
603	Trapezoid window 2 – Exit Y
604	Trapezoid window 2 – Coordinate **Type X**: Xmin **Type Y**: Ymin
605	Trapezoid window 2 – Coordinate **Type X**: Xmax **Type Y**: Ymax
606	Trapezoid window 2 – Coordinate **Type X**: Ymin left **Type Y**: Xmin bottom
607	Trapezoid window 2 – Coordinate **Type X**: Ymax left **Type Y**: Xmax bottom
608	Trapezoid window 2 – Coordinate **Type X**: Ymin right **Type Y**: Xmin top
609	Trapezoid window 2 – Coordinate **Type X**: Ymax right **Type Y**: Xmax top
700	Threshold 1 – Pass X

Number	ID of operand
701	Threshold 1 – Pass Y
702	Threshold 1 – Coordinate **Type X**: Position X value **Type Y**: Position Y value
703	Threshold 1 – Coordinate **Type X**: Ymin value **Type Y**: Xmin value
704	Threshold 1 – Coordinate **Type X**: Ymax value **Type Y**: Xmax value
800	Threshold 2 – Pass X
801	Threshold 2 – Pass Y
802	Threshold 2 – Coordinate **Type X**: Position X value **Type Y**: Position Y value
803	Threshold 2 – Coordinate **Type X**: Ymin value **Type Y**: Xmin value
804	Threshold 2 – Coordinate **Type X**: Ymax value **Type Y**: Xmax value
900	Envelope – Entry X
901	Envelope – Entry Y
902	Envelope – Exit X
903	Envelope – Exit Y
904	Envelope – Coordinate Start X
905	Envelope – Coordinate End X