Command Overview
DIGIFORCE 9306

27.08.2002

CONTENTS

1 Serial Communication

There is a PC-program which is made by burster to communicate with the DIGIFORCE 9306. It is named DIGIDRAW, (order no. 9306-P001) and it is available at burster.

1.1 Serial Communication Setup

The characteristics of the serial communication can be adjusted in the menu „BASIC ADJUSTMENTS / SERIAL INTERFACE“.

Baud rate:	9600, 19200, 38400
Data bits:	8 (fix)
Stop bits:	1 (fix)
Parity:	none, even, odd
Block check	On / Off

There is no hardware handshake.

1.2 Communication protocol

The used communication protocol is ANSII X3.28-1976 subcategory 2.5, A4

Connection

Before a connection is realised the control station is master and no other station is slave. The control station can either

- poll, to pass its master status to an other station

- or determine a slave station to realize a connection.

Polling

The control station sends a "Polling Supervisory Sequence". The Polling Supervisory Sequence is used to read selected data from the 9306 . The prefix selects a single station. <ENQ> defines the end of the "Polling Supervisory Sequence":

The Polling Supervisory Sequence of the 9306 uses the following format:

<Address>po<ENQ>

- <Address> the address of the device selected in the interface menu (decimal, 0..99).

- po ASCII-character "p" and "o"

- ASCII-character <ENQ>

If a station recognize the Polling Supervisory Sequence it answers in one of two kinds.

(1) If the station has data to send it starts data transmission.
The control station gets slave.

(2) If the station has no data to transmit it sends <EOT> which ends its master status. The control station becomes master again.

If the control station receives no or an invalid answer it finishes the connection by sending <EOT>

Selection with Response

The Control Station sends a "Selection Supervisory Sequence". The Selection Supervisory Sequence is used to initialize the 9306 as slave. After this, commands can be send to the 9306 The prefix selects a single station. <ENQ> defines the end of the Selection Supervisory sequence.

The 9306 uses the following Selection Supervisory Sequence

<Address>sr<ENQ>

-<Address> device address (decimal, 0..99)

-sr ASCII-character "s" and "r"

<ENQ> ASCII-character ENQ

If a station recognize its Selection Supervisory Sequence it becomes slave and send one of two possible answers:

(1) If the station is ready to receive data it sends <ACK>. After receiving this answer the master station begins transmitting data

(2) If the station is not ready to receive data it sends <NAK>
The master station can try to select the same station again.

If the master station receives no answer it can either select the station again or finish the transmission.

Fast Selection

Alternatively to "Selection with Response" the Master Station can send a Selection Supervisory Sequence without <ENQ>. This selects a station as slave station The Master Station starts transmitting data immediately without waiting for the answer <ACK> of the selected station

Example:

Fast selection Sequence : 00sr<STX>command<ETX>

-00 Address 0 (decimal)

-<STX> ASCII-character STX

-code sequence for the command

-<ETX> ASCII-character ETX

End of connection

The Master Station sends <EOT> to signal that it has no further data to transmit. The control station becomes master again.

Data transmission

After establishing a connection, data is transmitted according to the rules of Subcategory A4. The Master Station starts transmission with the character <STX>. Then the data is transmitted. The data segment ends with <ETX>. After <ETX> a Blockcheck Character <BCC> is transmitted. It is calculated using all bytes after <STX> including <ETX> by using EXOR on all characters and or 80h to the result.

Response

The slave station responds in one of two possible kinds:.

(1) If the data is accepted and the station is ready to receive new data it sends <ACK>. The master station can then transmit new data or finish the transmission by sending <EOT>

(2) If the data is not accepted and the station is ready to receive new data it sends <NAK>. The master station can then either send other data or finish the transmission.

The following diagram shows the connection of a system host with the DIGIFORCE 9306. The DIGIFORCE uses the address 00.

Host sends " Selection Supervisory Sequence"	Master	Slave
00sr<ENQ>	Host	X
DIGIFORCE 9306 becomes Slave and sends <ACK>	Host	9306
The Host transmits a command starting with <STX> and ending with [<BCC>] Example device identification		
<STX>id<ETX>[<Bcc>]		
The 9306 sends <ACK>		
The Host closes the connection with <EOT>	Host	X

To receive the answer of the 9306 the Host sends the "Polling		
00po<ENQ>	9306	Host
The DIGIFORCE 9306 transmits the requested data		
<STX> DIGIFORCE 9306 Version: 199906 SN: 123454 Cal.Dat: 25.01.99<ETX> [<BCC>] (Optional)		
The Host answers with <ACK>		
The 9306 sends <EOT> and finishes the connection	Host	X

1.3 Commands of the DIGIFORCE 9306

1.3.1 General Advice

In the following examples the communication setup is described only in „fast selection“-mode. Of course, the „selection with response"-mode can also be used.

Meaning of the symbolic style which is used in the examples:

<Address>	device address, it consists of two numbers, e.g. 00
<STX>	ASCII-character Start of Text, 0x02
<ETX>	ASCII-character End of Text, 0x03
<ACK>	ASCII-character Acknowledged, 0x06
<NAK>	ASCII-character Not Acknowledged, 0x15
<S>	ASCII-character Space, 0x20
<EOT>	ASCII-character End of Transmission, 0x04
<ENQ>	ASCII-character Enquiry, 0x05

It is recommended to send an <EOT> character before each command sequence to reset the receive buffer of the 9306.

Caution: Do only use commands described in the user manual! Using undocumented commands may cause malfunctions of the DIGIFORCE 9306!

Caution: Some commands have changed since program version V199906. Please read the manual carefully.

1.3.2 „General Settings“ Commands

1.3.2.1 [id] Get Identification

With the id command (get identification) you can get information about serial number, software version and calibration status of the DIGIFORCE 9306

Syntax: id

Host sends: <Address>sr<STX>id<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>DIGIFORCE<S>9306<S>Version:<S>V199905<S>SN:<S>123454<S>Cal.Dat:<S>25.01.99<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

1.3.2.2 [wa] Define Access Permissions

With the wa command (write access permission) the access permissions are defined.

Syntax: wa

Host sends: <Address>sr<STX>wa<S>P1<S>P2<S>P3<S>P4<S>P5<S>P6<S>P7<S>P8<S>P9<S>P10<S>P11<S>P12<S>P13<S>P14<S>P15<S>P16<S>P17<S>P18<S>P19<S>P20<S>P21<S>P22<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value [access enable]**	**Value [access disable]**
P1	General settings user 1	1	0
P2	Channel settings user 1	1	0
P3	Calibration user 1	1	0
P4	measurement mode user 1	1	0
P5	Evaluation windows user 1	1	0
P6	Switch points user 1	1	0
P7	Test operation user 1	1	0
P8	Data output user 1	1	0
P9	Reset user 1	1	0
P10	Copy program user 1	1	0
P11	Tare enable user 1	1	0
P12	General settings user 2	1	0
P13	Channel settings user 2	1	0
P14	Calibration user 2	1	0
P15	Measurement mode user 2	1	0
P16	Evaluation windows user 2	1	0
P17	Switch points user 2	1	0
P18	Test operation user 2	1	0
P19	Data output user 2	1	0
P20	Reset user 2	1	0
P21	Copy program user 2	1	0
P22	Tare enable user 2	1	0

1.3.2.3 [ga] Get Access Permissions

With the ga command (get access permission) the access permissions are read from the DIGIFORCE 9306.

Syntax: ga

Host sends: <Address>sr<STX>ga<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<S>P4<S>P5<S>P6<S>P7<S>P8<S>
P9<S>P10<S>P11<S>P12<S>P13<S>P14<S>P15<S>P16<S>P17
<S>P18<S>P19<S>P20<S>P21<S>P22<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value [access enable]**	**Value [access disable]**
P1	General settings user 1	1	0
P2	Channel settings user 1	1	0
P3	Calibration user 1	1	0
P4	Measurement mode user 1	1	0
P5	Evaluation windows user 1	1	0
P6	Switch points user 1	1	0
P7	Test operation user 1	1	0
P8	Data output user 1	1	0
P9	Reset user 1	1	0
P10	Copy program user 1	1	0
P11	Tare enable user 1	1	0
P12	General settings user 2	1	0
P13	Channel settings user 2	1	0
P14	Calibration user 2	1	0
P15	Measurement mode user 2	1	0
P16	Evaluation windows user 2	1	0
P17	Switch points user 2	1	0
P18	Test operation user 2	1	0
P19	Data output user 2	1	0
P20	Reset user 2	1	0
P21	Copy program user 2	1	0
P22	Tare enable user 2	1	0

1.3.2.4 [wk] Define Passwords

With the wk command (write „password“) the passwords are defined.

Syntax: wk

Host sends: <Address>sr<STX>wk<S>P1<S>P2<S>P3<S>P4<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn:

Parameter	**Meaning**	**Value**
P1	Master password	0..9999
P2	Password user 1	0..9999
P3	Password user 2	0..9999
P4	Password protection	0 = Disabled 1 = Enabled

1.3.2.5 [gk] Read Passwords

With the gk command (get password“) all passwords are read from the DIGIFORCE 9306.

Syntax: gk

Host sends: <Address>sr<STX>gk<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<S>P4<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Master password	0..9999
P2	Password user 1	0..9999
P3	Password user 2	0..9999
P4	Password protection	0 = Disabled 1 = Enabled

1.3.2.6 [er] Read Error State

The er command (error status) reads the error state

Syntax: er

Host sends: <Address>sr<STX>er<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Bit coded error state	If bit *n* is set, it indicates the following error: (LSB) **Bit 0:** Wrong prefix **Bit 1:** ENQ-syntax error **Bit 2:** Block check error **Bit 3:** Command syntax error **Bit 4:** Parameter error **Bit 5:** ANSI-rec-timer error **Bit 6:** ANSI-resp-timer error **Bit 7:** Calibration error **Bit 8:** Data not available **Bit 9:** LVDT not possible **Bit 10:** Device uncelebrated **Bit 11:** not used **Bit 12:** not used **Bit 13:** not used **Bit 14:** not used **Bit 15:** not used (MSB)

The error state is set to 0x0 after every successful serial communication.

1.3.2.7 [wu] Serial Interface Setup

The wu command (write UART) sets the characteristics of the serial interface. The data format is always 8 data bits and 1 stop bit.

Syntax: wu

Host sends: <Address>sr<STX>wu<S>P1<S>P2<S>P3<S>P4<S>P5<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn:

Parameter	**Meaning**	**Value**
P1	Type of interface	0 = RS-232 1 = RS-485 half duplex 2 = RS-485 full duplex
P2	Baudrate	9600 19200 38400
P3	Parity	0 = even parity 1 = odd parity 2 = no parity
P4	Device address	0..99
P5	Block check	0 = disabled 1 = enabled

1.3.2.8 [gu] Read Serial Interface Characteristics

The gu command (get UART) reads the serial interface characteristics form the DIGIFORCE 9306. The data format is always 8 data bits and 1 stop bit.

Syntax: gu

Host sends: <Address>sr<STX>gu<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<S>P4<S>P5><ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Type of interface	0 = RS-232 1 = RS-485 half duplex 2 = RS-485 full duplex
P2	Baudrate	9600 19200 38400
P3	Parity	0 = even parity 1 = odd parity 2 = no parity
P4	Device address	0..99
P5	Block check	0 = disabled 1 = enabled

1.3.2.9 [st] Set Time

The st command (set time) adjusts the real time clock.

Syntax: st

Host sends: <Address>sr<STX>st<S>P1<S>P2<S>P3<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn:

Parameter	**Meaning**	**Value**
P1	Hour	0..23
P2	Minute	0..59
P3	Second	0..59

1.3.2.10 [rt] Read Time

The rt command (read time) reads the time from the real time clock.

Syntax: rt

Host sends: <Address>sr<STX>rt<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Hour	0..23
P2	Minute	0..59
P3	Second	0..59

1.3.2.11 [sd] Set Date

The sd command (set date) adjusts the date of the real time clock.

Syntax: sd

Host sends: <Address>sr<STX>sd<S>P1<S>P2<S>P3<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn:

Parameter	**Meaning**	**Value**
P1	Day	1..31
P2	Month	1..12
P3	Year	1951..2050

1.3.2.12 [rd] Read Date

The rd command (read date) reads the date from the real time clock.

Syntax: rd

Host sends: <Address>sr<STX>rd<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Day	1..31
P2	Month	1..12
P3	Year	1951..2050

1.3.2.13 [sc] Set LCD Contrast

The sc command (set contrast) sets the contrast of the LCD display.

Syntax: sc

Host sends: <Address>sr<STX>sc<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn:

Parameter	**Meaning**	**Value**
P1	LCD contrast	0..99

1.3.2.14 [rc] Read LCD Contrast

The rc command (read contrast) reads the contrast of the LCD display.

Syntax: rc

Host sends: <Address>sr<STX>rc<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	LCD contrast	0..99

1.3.2.15 [sl] Select Language

The sl command (set language) selects the user language.

Syntax: sl

Host sends: <Address>sr<STX>sl<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn:

Parameter	**Meaning**	**Value**
P1	Language	0 = German 1 = English 2 = French 3 = Spanish 4 = Italian 5 = Portuguese 6 = Czech

1.3.2.16 [rl] Read Language

The rl command (read language) displays the selected user language.

Syntax: rl

Host sends: <Address>sr<STX>rl<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Language	0 = German 1 = English 2 = French 3 = Spanish 4 = Italian 5 = Portuguese 6 = Czech

1.3.2.17 [wr] Select Reset Mode

The wr command (write reset) selects the reset mode.

Syntax: wr

Host sends: <Address>sr<STX>wr<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn:

Parameter	**Meaning**	**Value**
P1	Reset mode	0 = Power ON 1 = Manual

1.3.2.18 [rr] Read Reset Mode

The rr command (read reset mode) displays the selected reset mode.

Syntax: rr

Host sends: <Address>sr<STX>rr<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Reset mode	0 = Power ON 1 = Manual

1.3.2.19 [re] Execute Reset

The re command (reset execute) executes a reset. All statistic counters will be cleared.

Syntax: re

Host sends: <Address>sr<STX>re<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

1.3.2.20 [hs] Set Help Texts

The hs command (help text set) transmits the help texts fore each window line by line to the DIGIFORCE.

Syntax: hs

Host sends: <Address>sr<STX>hs<S>P1<S>P2<S>P3<S>P4<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Help text Program number	0..31
P2	Help text window number	1..10
P3	Help text line number	0..9
P4	Help text line	Zero-terminated string of up to 37 chars.

1.3.2.21 [hg] Get Help Texts

The hg command (help text get) reads the help text lines from the DIGIFORCE.

Syntax: hg

Host sends: <Address>sr<STX>hg<S>P1<S>P2<S>P3<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P4<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Help text Program number	0..31
P2	Help text window number	1..10
P3	Help text line number	0..9
P4	Help text line	Zero-terminated string of up to 37 chars.

1.3.2.22 [em] Enable Measurement

With the em command (enable measurement) it is possible to inhibit the device form starting a new measurement (internal or external). The problem was, while transmitting a measurement program to the DIGIFORCE it could happen because of a temporary combination of configuration values that a starting condition was fulfilled and the device started a new measurement. With this command any unwanted starts of measurement will be inhibited. You can forbid measurements at the beginning of the transmission and allow them again at the end of the transmission.
After switch-on of the device the state of this variable is set to ‚1', measurements are allowed.

Syntax: em

Host sends: <Address>sr<STX>em<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn

Parameter	Meaning	Value
P1	Inhibit measurement Allow measurement	0 1

1.3.2.23 [sr] Set Ready Mode

New in Version V200101
With the sr command (set ready mode) the behavior of the PLC output signal RADY is will be determined. There are two function modes: In the NORMAL mode (P1 = 0) the RAEDY-signal after the end of the measurement and evaluation phase. The control system (e.g. a PLC) is then allowed to start a new measurement.
In the mode PC-CONTROLLED (P1 = 1) READY will only be set again after a measurement, if a release message has been received from the PC (rf command). Thus a PC can inhibit new measurements before he has read out all information he needs.
After a restart of the device the mode is always set to NORMAL

Syntax: sr

Host sends: <Address>sr<STX>sr<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn

Parameter	Meaning	Value
P1	Choose READY mode NORMAL Choose READY mode PC-CONTROLLED	0 1

1.3.2.24 [fr] Read Ready-Mode

New in Version V200101

With the fr command (fetch Ready mode) the selected READY-mode can be read out of the device (see also sr command).
The selected READY-mode is also displayed on the 9306 in the measuring mode. The status output in the upper right corner is displayed in inverted mode.

Syntax: fr

Host sends: <Address>sr<STX>fr<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	READY mode NORMAL READY mode PC-CONTROLLED	0 1

1.3.2.25 [rf] Release Ready-Signal

New in Version V200101

With the rf command (Ready Free) the READY-signal is released. After that, the 9306 is allowed to set the READY-signal, if the device has finished the measurement and evaluation phase. The READY-signal will remain active until the next measurement begins.
This command makes only sense, when the device is in PC-CONTROLLED mode (see sr command)

Syntax: rf

Host sends: <Address>sr<STX>rf<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

1.3.2.26 [ps] Write PROFIBUS Configuration

Version FELD-V200201 and newer
Command is only available with the optional PROFIBUS-Interface

The ps command configures the PROFIBUS interface.
PLEASE NOTE: The new parameters will be transferred to the PROFIBUS interface immediately and the interface will be initialized with the new parameters. This will cut off a current PROFIBUS communication.

Syntax: ps

Host sends: <Address>sr<STX>ps<S>P1<S>P2<S>P3<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	PROFIBUS station address	0 ... 127
P2	Internal supervision	0: deactivated 1: activated
P3	Source of PLC information	1: PLC-parallel-ports 2: PROFIBUS-interface

1.3.2.27 [pf] read PROFIBUS-Configuration

Version FELD-V200201 and newer
Command is only available with the optional PROFIBUS-Interface

The pf command reads the configuration of the PROFIBUS interface.

Syntax: pf

Host sends: <Address>sr<STX>pf<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	PROFIBUS station address	0 ... 127
P2	Internal supervision	0: deactivated 1: activated
P3	Source of PLC information	1: PLC-parallel-ports 2: PROFIBUS-interface

1.3.2.28 [de] Enable/Disable LCD-Update

Version FELD-V200202 and newer

With the de command the LCD update of the device can be controlled. This can be useful during writing a backup to the device. The display will not be updated after every single interface command. It will be finally updated with the last command of the backup („de 1“). This saves a lot of time and makes the backup much faster.

Syntax: de

Host sends: <Address>sr<STX>de<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	LCD-update	0 → LCD-update disabled 1 → LCD-update enabled

1.3.2.29 [dg] Read LCD-Update

Version FELD-V200202 and newer

The dg command reads the configuration of the flag LDC-update.

Syntax: dg

Host sends: <Address>sr<STX>dg<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	LCD-update	0 → LCD-update disabled 1 → LCD-update enabled

1.3.3 Measurement Amplifier Setup Commands

1.3.3.1 [si] Adjust the Input Amplifier

The si command (set input) adjusts the input amplifiers.

Syntax: si

Host sends: <Address>si<STX>si<S>P1<S>P2<S>P3<S>P4<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of parameter P1

Parameter	Meaning	Value
P1	Channel	0 = X 1 = Y

The meanings of the parameters P2-4 are different due to a dependence to the measurement channel

Measurement channel X:

P2	Type of sensor	2 = Standard signal 3 **=** Poti 4 = LVDT 5 = DVR 6 = DC/DC 7 = Incremental sinus 8 = Incremental TTL 9 = Incremental torque
P3	Range with Poti DC/DC Range with LVDT /DVR Range with standard signal Range with incremental	0 = 5V 1 = 10V 0 = 25mV 1 = 50mV 2 = 100mV 3 = 250mV 4 = 500mV 5= 1000mV 0 = 5V 1 = 10V 0 (Don't care)
P4	Excitation LVDT/DVR and incremental	1 = 5V 2 = 10V 1 or 2 (Don't care)

Measurement channel X:

P2	Type of sensor	0 = Strain gage 1 = Piezo 2 = Standard signal
P3	Range with strain gage Range with piezo	0 = 2mV 1 = 4mV 2 = 8mV 3 = 16mV 4 = 32mV 5 = 64mV 6 = 128mV 4 = 1nC 5 = 2nC

	Range with standard signal	6 = 5nC 7 = 10nC 8 = 20nC 9 = 50nC 10 = 100nC 11 = 200nC 12 = 500nC 2 = 3V 3 = 6V 4 = 12V
P4	Excitation With piezo	0 = 2.5V 1 = 5V 0 or 1 (Don't care)

1.3.3.2 [ri] Read The Input Amplifier Adjustment

The ri command (read input) reads the adjustment of the input amplifiers.

Syntax: ri

Host sends: <Address>sr<STX>ri<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P2<S>P3<S>P4<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of parameter P1:

Parameter	**Meaning**	**Value**
P1	Channel	0 = X 1 = Y

The meanings of the parameters P2-4 are different due to a dependence to the measurement channel

Measurement channel X:

P2	Type of sensor	2 = Standard signal 3 = Poti 4 = LVDT 5 = DVR 6 = DC/DC 7 = Incremental sinus 8 = Incremental TTL 9 = Incremental torque
P3	Range with Poti DC/DC Range with LVDT /DVR Range with standard signal Range with incremental	0 = 5V 1 = 10V 0 = 25mV 1 = 50mV 2 = 100mV 3 = 250mV 4 = 500mV 5= 1000mV 0 = 5V 1 = 10V 0 (Don't care)
P4	Excitation LVDT/DVR and incremental	1 = 5V 2 = 10V 1 or 2 (Don't care)

Measurement channel Y:

P2	Type of sensor	0 = Strain gage 1 = Piezo 2 = Standard signal
P3	Range with strain gage	0 = 2mV 1 = 4mV

	Range with piezo Range with standard signal	2 = 8mV 3 = 16mV 4 = 32mV 5 = 64mV 6 = 128mV 4 = 1nC 5 = 2nC 6 = 5nC 7 = 10nC 8 = 20nC 9 = 50nC 10 = 100nC 11 = 200nC 12 = 500nC 2 = 3V 3 = 6V 4 = 12V
P4	Excitation With piezo	0 = 2.5V 1 = 5V 0 or 1 (Don't care)

1.3.4 Device Calibration Commands

1.3.4.1 [ss] Select Shunt Resistor

Caution: Changed from Version V199906!

The ss command (set shunt) selects a shunt resistor.

Syntax: ss

Host sends: <Address>sr<STX>ss<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of the parameter Pn:

Parameter	Meaning	Value
P1	Shunt resistor	0 = None 1 = 59 kOhm 2 = 80 kOhm 3 = 100 kOhm 4 = 300 kOhm

1.3.4.2 [rs] Read Shunt Resistor Value

Caution: Changed from Version V199906!

The rs command (read shunt) reads the value of the selected shunt resistor.

Syntax: rs

Host sends: <Address>sr<STX>rs<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	Meaning	Value
P1	Shunt resistor	0 = None 1 = 59 kOhm 2 = 80 kOhm 3 = 100 kOhm 4 = 300 kOhm

1.3.4.3 [mc] Measure Calibration Value

Caution: Changed from Version V199906!

The mc command (measure calibration) measures a calibration value.

Syntax: mc

Host sends: <Address>sr<STX>mc<S>P1<S>P2<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of the parameter Pn:

Parameter	Meaning	Value
P1	Measurement channel	0 = X 1 = Y
P2	Number of the calibration value	0 = Cal1 (lower value) 1 = Cal2 (upper value)

1.3.4.4 [gc] Read Calibration Data

Caution: Changed from Version V199906!

The gc command (get calibration) reads the calibration data.

Syntax: gc

Host sends: <Address>sr<STX>gc<S>P1<S>P2<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P2<S>P3<S>P4<S>P5<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

The meanings of the Parameters Pn are different due to a dependence to the measurement channel

Incremental sensors:

Parameter	Meaning	Value
P1	Measurement channel	0 = X 1 = Y
P2	Pitch	Float number (0..99999)
P3	Direction	0 = Positive 1 = Negative
P4	Reference mark	0 = Off 1 = On
P5	Reference point	Float number

Other sensors:

Parameter	Meaning	Value
P1	Measurement channel	0 = X 1 = Y
P2	Scal1 (lower scale value)	Float number

P3	Scal2 (upper scale value)	Float number
P4	Cal1 (lower cal. Value)	Float number
P5	Cal2 (upper cal. Value)	Float number

Remark: When sensors LVDT or DVR are selected, cal1 and cal2 are the binary values of the ADC. They are not scaled to any unit.

1.3.4.5 [wc] Write Calibration Data

Caution: Changed from Version V199906!

The wc command (write calibration) writes calibration data to the DIGIFORCE 9306.

Syntax: wc

Host sends: <Address>sr<STX>wc<S>P1<S>P2<S>P3<S>P4<S>P5<ETX>[<BCC>]

9306 answers: <ACK>

The meanings of the Parameters Pn are different due to a dependence to the measurement channel

Incremental sensors:

Parameter	**Meaning**	**Value**
P1	Measurement channel	0 = X 1 = Y
P2	Pitch	Float number (0..99999)
P3	Direction	0 = Positive 1 = Negative
P4	Reference mark	0 = Off 1 = On
P5	Reference point	Float number

Other sensors:

Parameter	**Meaning**	**Value**
P1	Measurement channel	0 = X 1 = Y
P2	Scal1 (lower scale value)	Float number
P3	Scal2 (upper scale value)	Float number
P4	Cal1 (lower cal. Value)	Float number
P5	Cal2 (upper cal. Value)	Float number

Remark: It is not possible to write the calibration values cal1 and cal2 when sensor LVDT or DVR are selected. The entries cal1 and cal2 will be ignored, the rest of the entries will be accepted. With these sensors the calibration values cal 1and cal2 have to be teach-in.

1.3.4.6 [dc] Execute Calibration

The dc command (do calibration) calibrates the 9306 with the selected values.

Syntax: dc

Host sends: <Address>sr<STX>dc<ETX>[<BCC>]

9306 answers: <ACK>

1.3.4.7 [su] Set Unit

The su command (set unit) selects the unit for the measurement channel.

Syntax: su

Host sends: <Address>sr<STX>su<S>P1<S>P2<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of the parameter Pn:

Parameter	Meaning	Value
P1	Unit X-channel	0..42
P2	Unit Y-channel	0..42

Valid values for units (P1,P2):

0 = "mN "	16 = "mbar"	32 = "uV "
1 = "N "	17 = "bar "	33 = "mV "
2 = "kN "	18 = "kbar"	34 = "V "
3 = "MN "	19 = "Pa "	35 = "kV "
4 = "mNm "	20 = "hPa "	36 = "uA "
5 = "Nm "	21 = "kPa "	37 = "mA "
6 = "kNm "	22 = "MPa "	38 = "A "
7 = "MNm "	23 = "GPa "	39 = "kA "
8 = "um "	24 = "PSI "	40 = "mV/V"
9 = "mm "	25 = "kPSI"	41 = User_unit1
10 = "dm "	26 = "MPSI"	42 = User_unit2
11 = "m "	27 = "mmHg"	
12 = "inch"	28 = "mWs "	
13 = "mil "	29 = "grd "	
14 = "m/s "	30 = "rad "	
15 = "m/s2"	31 = "gon "	

Please note: These are the units of the measuring channels. When selecting a measurement function, the units of the axis in the display can be changed due to the new function. If you want to read the units of the currently displayed axis, pleas use the “ae“ command (instead of the “ru“ command)

1.3.4.8 [ru] Read Unit

The ru command (read unit) reads the selected unit from each measurement channel.

Syntax: ru

Host sends: <Address>sr<STX>ru<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	Meaning	Value
P1	Unit X-channel	0..42

P2	Unit Y-channel	0..42

Valid values for units (P1,P2):
See the table at "su" command!

Please note: These are the units of the measuring channels. When selecting a measurement function, the units of the axis in the display can be changed due to the new function. If you want to read the units of the currently displayed axis, pleas use the “ae“ command (instead of the “ru“ command)

1.3.4.9 [du] Define User Defined Units

The du command (define unit) defines the user defined units.

Syntax: du

Host sends: <Address>sr<STX>du<S>P1<S>P2<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of the parameter Pn:

Parameter	**Meaning**	**Value**
P1	User defined unit 1	String (max. 4 char.)
P2	User defined unit 2	String (max. 4 char.)

1.3.4.10 [uu] Read User Defined Units

The uu command (user unit) reads the two user defined units from the 9306.

Syntax: uu

Host sends: <Address>sr<STX>uu<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	User defined unit 1	String (max. 4 char.)
P2	User defined unit 2	String (max. 4 char.)

1.3.5 Commands for determination of measurement and valuation

1.3.5.1 [ws] Adjust Switch Points

The ws command (write switch) adjusts the switch points.

Syntax: ws

Host sends: <Address>sr<STX>ws<S>P1<S>P2<S>P3<S>P4<S>P5<S>P6<S>P7<S>P8
<S>P9<S>P10<S>P11<S>P12<S>P13<S>P14<S>P15<S>P16<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of the parameter Pn:

Parameter	**Meaning**	**Value**
P1	Switch point1 threshold	Float number
P2	Switch point2 threshold	Float number
P3	Switch point3 threshold	Float number
P4	Switch point4 threshold	Float number
P5	Switch point1 channel	0 = X-Channel 1 = Y-Channel
P6	Switch point2 channel	0 = X-Channel 1 = Y-Channel
P7	Switch point3 channel	0 = X-Channel 1 = Y-Channel
P8	Switch point4 channel	0 = X-Channel 1 = Y-Channel
P9	Switch point1 logic	0 = Low active 1 = High active
P10	Switch point2 logic	0 = Low active 1 = High active
P11	Switch point3 logic	0 = Low active 1 = High active
P12	Switch point4 logic	0 = Low active 1 = High active
P13	Switch point1 reference	0 = Absolute 1 = Trigger
P14	Switch point2 reference	0 = Absolute 1 = Trigger
P15	Switch point3 reference	0 = Absolute 1 = Trigger
P16	Switch point4 reference	0 = Absolute 1 = Trigger

1.3.5.2 [gs] Read Switch Points

The gs command (get switch) reads the switch points from the 9306.

Syntax: gs

Host sends: <Address>sr<STX>gs<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>ws<S>P1<S>P2<S>P3<S>P4<S>P5<S>P6<S>P7<S>P8
<S>P9<S>P10<S>P11<S>P12<S>P13<S>P14<S>P15<S>P16<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Switch point1 threshold	Float number
P2	Switch point2 threshold	Float number
P3	Switch point3 threshold	Float number
P4	Switch point4 threshold	Float number
P5	Switch point1 channel	0 = X-Channel 1 = Y-Channel
P6	Switch point2 channel	0 = X-Channel 1 = Y-Channel
P7	Switch point3 channel	0 = X-Channel 1 = Y-Channel
P8	Switch point4 channel	0 = X-Channel 1 = Y-Channel
P9	Switch point1 channel	0 = Low active 1 = High active
P10	Switch point2 logic	0 = Low active 1 = High active
P11	Switch point3 logic	0 = Low active 1 = High active
P12	Switch point4 logic	0 = Low active 1 = High active
P13	Switch point1 reference	0 = Absolute 1 = Trigger
P14	Switch point2 reference	0 = Absolute 1 = Trigger
P15	Switch point3 reference	0 = Absolute 1 = Trigger
P16	Switch point4 reference	0 = Absolute 1 = Trigger

1.3.5.3 [ww] Evaluation Window Setup

The ww command (write window) adjusts the evaluation windows.

Syntax: ww

Host sends: <Address>sr<STX>ww<S>P1<S>P2<S>P3<S>P4<S>P5
<S>P6<S>P7<S>P8<S>P9<ETX>[<BCC>]

9306 answers: <ACK>

Caution: This command is not allowed in measurement mode Classier-X and Classier-Y. Please use at first the gp command specify the selected measurement mode.

Meaning of the parameter P1,2:

Parameter	Meaning	Value
P1	Window number	1..10
P2	Window type	0 = Off 1 = Pass 2 = Hysteresis 3 = Gradient 4 = Online 5 = Block

The meaning of parameter P3-9 changes in dependence to the selected window type.

Window type: pass

P3	X-min	Float number
P4	X-max	Float number
P5	Y-min	Float number
P6	Y-max	Float number
P7	Entry	0 = left 1 = right 2 = top 3 = bottom 4 = don't care
P8	Exit	0 = left 1 = right 2 = top 3 = bottom 4 = don't care
P9	Direction	0 = positive 1 = negative

Window type : online

Caution: In the current program there is only one online window allowed.

P3	X-min	Float number
P4	X-max	Float number
P5	Y-min	Float number
P6	Y-max	Float number
P7	Entry	0 = only left
P8	Exit	1 = only right
P9	Direction	0 = only positive

Window type : block

Caution: In the current program there is only one block window allowed.

P3	X-min	Float number
P4	X-max	Float number
P5	Y-min	Float number
P6	Y-max	Float number
P7	Entry	0 = left 1 = right 2 = top 3 = bottom 4 = don't care
P8	Don't care	0
P9	Don't care	0

Window type: hysteresis

P3	Hysteresis point	Float number
P4	Don't care	0.0
P5	Min-hysteresis	Float number
P6	Max-hysteresis	Float number
P7	Don't care	0
P8	Don't care	0
P9	Don't care	0

Window type: gradient

P3	X1	Float number
P4	X2	Float number
P5	Min. gradient	Float number
P6	Max. gradient	Float number
P7	Don't care	0
P8	Don't care	0
P9	Direction	0 = positive 1 = negative

1.3.5.4 [gw] Read Evaluation Window

The gw command (get window) reads the evaluation window characteristics from the 9306.

Syntax: gw

Host sends: <Address>sr<STX>gw<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P2<S>P3<S>P4<S>P5
<S>P6<S>P7<S>P8<S>P9<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Caution: This command is not allowed in measurement mode Classier-X and Classier-Y. Please use at first the gp command specify the selected measurement mode.

Meaning of the parameter P1,2:

Parameter	**Meaning**	**Value**
P1	Window number	1..10
P2	Window type	0 = Off 1 = Pass 2 = Hysteresis 3 = Gradient 4 = Online 5 = Block

The meaning of parameter P3-9 changes in dependence to the selected window type.

Window type: pass

P3	X-min	Float number
P4	X-max	Float number
P5	Y-min	Float number
P6	Y-max	Float number
P7	Entry	0 = left 1 = right 2 = top 3 = bottom 4 = don't care
P8	Exit	0 = left 1 = right 2 = top 3 = bottom 4 = don't care
P9	Direction	0 = positive 1 = negative

Window type : online

Caution: In the current program there is only one online window allowed.

P3	X-min	Float number
P4	X-max	Float number
P5	Y-min	Float number
P6	Y-max	Float number
P7	Entry	0 = only left
P8	Exit	1 = only right
P9	Direction	0 = only positive

Window type : block

Caution: In the current program there is only one block window allowed.

P3	X-min	Float number
P4	X-max	Float number
P5	Y-min	Float number
P6	Y-max	Float number
P7	Entry	0 = left 1 = right 2 = top 3 = bottom 4 = don't care
P8	Don't care	0
P9	Don't care	0

Window type: hysteresis

P3	Hysteresis point	Float number
P4	Don't care	0.0
P5	Min-hysteresis	Float number
P6	Max-hysteresis	Float number
P7	Don't care	0
P8	Don't care	0
P9	Don't care	0

Window type: gradient

P3	X1	Float number
P4	X2	Float number
P5	Min. gradient	Float number
P6	Max. gradient	Float number
P7	Don't care	0
P8	Don't care	0
P9	Direction	0 = positive 1 = negative

1.3.5.5 [dk] Configuration of the dynamic statistics memory

With the dk command (dynamic statistics configuration) the already defined windows of the current program can be enabled for statistics.

Syntax: dk

Host sends: <Address>sr<STX> dk<S>P1<S>P2<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameters P1 and P2

Parameter	Meaning	Value
P1	Window number	1..10 = Number of relevant Windows
P2	Enable flag for statistics	0 = Don't store statistics for this window of the current program 1 = Store the statistics of this window

There is a maximum of 120000 entries for the statistics storage available. This maximum has to be shared by all for statistics enabled windows. Are there for example in the entire device 12 windows activated and only four of them are enabled for statistics, so 120000/4=30000 Measurements can be stored for every one of the four windows.

1.3.5.6 [df] Reading of the configuration of the dynamic statistics memory

With the df command the configuration of the dynamic statistics for every window can be read

Syntax: df

Host sends: <Address>sr<STX> df<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P2 <ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameters P1 and P2

Parameter	Meaning	Value
P1	Window number	1..10 = Number of the window
P2	Answer: current mode of the statistics storage for this window in the current program	0 = No statistics information will be stored for this window. 1 = Statistics will be stored for this window

There is a maximum of 120000 entries for the statistics storage available. This maximum has to be shared by all for statistics enabled windows. Are there for example in the entire device 12 windows activated and only four of them are enabled for statistics, so 120000/4=30000 Measurements can be stored for every one of the four windows.

1.3.5.7 [wp] Select Measurement Mode

Caution: Changed from Version V199906

The wp command (write procedure) selects the measurement mode.

Syntax: wp

Host sends: <Address>sr<STX>wp<S>P1<S>P2<S>P3<S>P4<S>P5
<S>P6<S>P7<S>P8<S>P8<S>P9<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Measurement function	0 = Y = f(X) 1 = Y = f(X,t) 2 = Y = f(t) 3 = X = f(t) 4 = Classier-X 5 = Classier-Y

The meaning of parameter P2-9 changes in dependence to the selected measurement function.

Measurement function Y=f(x)

P2	Filter	0 = off 1 = 50 Hz 2 = 400 Hz Note: from V200006 there are new filter frequencies available. There are also different filters available for X and Y-channel. *Please see the following comment about filters*
P3	Start mode	0 = extern 1 = intern X 2 = intern Y
P4	Dummy	0
P5	Reference	0 = Absolute 1 = Trigger X-channel 2 = Trigger Y-channel 3 = Final Force 4 = Block window
P6	Trigger threshold	Float number
P7	Sample rate	Float number 0.001 – 99999
P8	Start point	Float number
P9	End point	Float number

Measurement function: Y=f(x,t)

P2	Filter	0 = off 1 = 50 Hz 2 = 400 Hz Note: from V200006 there are new filter frequencies available. There are also different filters available for X and Y-channel. *Please see the following comment about filters*
P3	Start mode	0 = extern

		1 = intern X 2 = intern Y
P4	Dummy	0
P5	Reference	0 = Absolute 1 = Trigger X-channel 2 = Trigger Y-channel 3 = Final Force 4 = Block window
P6	Trigger threshold	Float number
P7	Sample rate	Float number 0.5 – 6553 ms
P8	Start point	Float number
P9	End point	Float number

Measurement function Y=f(t)

P2	Filter	0 = off 1 = 50 Hz 2 = 400 Hz Note: from V200006 there are new filter frequencies available. There are also different filters available for X and Y-channel. *Please see the following comment about filters*
P3	Start mode	0 = extern 2 = intern Y
P4	Dummy	0
P5	Reference	0 = Absolute 2 = Trigger Y-channel
P6	Trigger threshold	Float number
P7	Sample rate	Float number 0.5 – 6553 ms
P8	Start point	Float number
P9	End point	Float number

Measurement function X=f(t)

P2	Filter	0 = off 1 = 50 Hz 2 = 400 Hz Note: from V200006 there are new filter frequencies available. There are also different filters available for X and Y-channel. *Please see the following comment about filters*
P3	Start mode	0 = extern 1 = intern X
P4	Dummy	0
P5	Reference	0 = Absolute 1 = Trigger X-channel
P6	Trigger threshold	Float number
P7	Sample rate	Float number 0.5 – 6553 ms
P8	Start point	Float number
P9	End point	Float number

Measurement function KLASSIER-X, KLASSIER-Y (P1 = 4..5)

P2	Classier mode	0 = Min. value 1 = Max. value 2 = Average value 3 = Current value
P3	Don't care	0
P4	Don't care	0

P5	Don't care	0
P6	Threshold value 1	Float number
P7	Threshold value 2	Float number
P8	Threshold value 3	Float number
P9	Threshold value 4	Float number

Comment about Filter:
From software version V200006 on there is a filter for each measurement channel (displacement and force) available. Additionally, new filter frequencies are implemented. To keep the wp/gp-commands compatible with the older software versions, both filter parameters are transmitted binary coded in just one byte. The wp/gp commands can still be used as in older versions, these parameters are still valid and have still the same meaning.

Dec	MSB	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	LSB	Meaning
0	0	0	0	0	0	0	0	0	Both filters off (old)
1	0	0	0	0	0	0	0	1	Both filters 50Hz (old)
2	0	0	0	0	0	0	1	0	Both filters 400Hz (old)
	1	0	0	0	1	X	X	X	Filter X (Displ.) off
	1	0	0	1	1	X	X	X	Filter X (Displ.) 5Hz
	1	0	1	0	1	X	X	X	Filter X (Displ.) 10Hz
	1	0	1	1	1	X	X	X	Filter X (Displ.) 25Hz
	1	1	0	0	1	X	X	X	Filter X (Displ.) 50Hz
	1	1	0	1	1	X	X	X	Filter X (Displ.) 100Hz
	1	1	1	0	1	X	X	X	Filter X (Displ.) 200Hz
	1	1	1	1	1	X	X	X	Filter X (Displ.) 400Hz
	1	X	X	X	1	0	0	0	Filter Y (force) off
	1	X	X	X	1	0	0	1	Filter Y (force) 5Hz
	1	X	X	X	1	0	1	0	Filter Y (force) 10Hz
	1	X	X	X	1	0	1	1	Filter Y (force) 25Hz
	1	X	X	X	1	1	0	0	Filter Y (force) 50Hz
	1	X	X	X	1	1	0	1	Filter Y (force) 100Hz
	1	X	X	X	1	1	1	0	Filter Y (force) 200Hz
	1	X	X	X	1	1	1	1	Filter Y (force) 400Hz

Example:
If you want to filter the signal of the displacement sensor (X) with 25Hz and you want to get the signal of the force sensor unfiltered, you will have to transmit 1011 1000 bin → B8hex →184dez to the device. The´1´ at Bit MSB and at Bit 4 are only used to detect errors.

1.3.5.8 [gp] Read Measurement Mode

(Caution: Changed from Version V199906)
The gp command (get procedure) reads the current measurement mode.

Syntax: gp

Host sends: <Address>sr<STX>gp<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<S>P4<S>P5<S>P6<S>P7<S>P8<S>P9<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Measurement function	0 = Y = f(X) 1 = Y = f(X,t) 2 = Y = f(t) 3 = X = f(t) 4 = Classier-X 5 = Classier-Y

The meaning of parameter P2-9 changes in dependence to the selected measurement function.

Measurement function Y=f(x)

P2	Filter	0 = off 1 = 50 Hz 2 = 400 Hz Note: from V200006 there are new filter frequencies available. There are also different filters available for X and Y-channel. *Please see the comment about filters at the wp-command*
P3	Start mode	0 = extern 1 = intern X 2 = intern Y
P4	Dummy	0
P5	Reference	0 = Absolute 1 = Trigger X-channel 2 = Trigger Y-channel 3 = Final Force 4 = Block window
P6	Trigger threshold	Float number
P7	Sample rate	Float number 0.001 – 99999
P8	Start point	Float number
P9	End point	Float number

Measurement function: Y=f(x,t)

P2	Filter	0 = off 1 = 50 Hz 2 = 400 Hz Note: from V200006 there are new filter frequencies available. There are also different filters available for X and Y-channel. *Please see the comment about filters at the wp-command*
P3	Start mode	0 = extern 1 = intern X 2 = intern Y
P4	Dummy	0
P5	Reference	0 = Absolute 1 = Trigger X-channel 2 = Trigger Y-channel 3 = Final Force 4 = Block window
P6	Trigger threshold	Float number
P7	Sample rate	Float number 0.5 – 6553 ms
P8	Start point	Float number
P9	End point	Float number

Measurement function Y=f(t)

P2	Filter	0 = off 1 = 50 Hz 2 = 400 Hz Note: from V200006 there are new filter frequencies available. There are also different filters available for X and Y-channel. *Please see the comment about filters at the wp-command*
P3	Start mode	0 = extern 2 = intern Y
P4	Dummy	0
P5	Reference	0 = Absolute 2 = Trigger Y-channel
P6	Trigger threshold	Float number
P7	Sample rate	Float number 0.5 – 6553 ms
P8	Start point	Float number
P9	End point	Float number

Measurement function X=f(t)

P2	Filter	0 = off 1 = 50 Hz 2 = 400 Hz Note: from V200006 there are new filter frequencies available. There are also different filters available for X and Y-channel. *Please see the comment about filters at the wp-command*
P3	Start mode	0 = extern 1 = intern X
P4	Dummy	0
P5	Reference	0 = Absolute

		1 = Trigger X-channel
P6	Trigger threshold	Float number
P7	Sample rate	Float number 0.5 – 6553 ms
P8	Start point	Float number
P9	End point	Float number

Measurement function KLASSIER-X, KLASSIER-Y (P1 = 4..5)

P2	Classier mode	0 = Min. value 1 = Max. value 2 = Average value 3 = Current value
P3	Don't care	0
P4	Don't care	0
P5	Don't care	0
P6	Threshold value 1	Float number
P7	Threshold value 2	Float number
P8	Threshold value 3	Float number
P9	Threshold value 4	Float number

1.3.5.9 [tw] Write Measurement Timeout

The tw command sets the current value for the measurement timeout.

Syntax: tw

Host sends: <Address>sr<STX>tw<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of the parameter Pn:

Parameter	Meaning	Value
P1	Measurement timeout	float number 0.0: deactivate timeout 0.1 .. 64.0: timeout in seconds

1.3.5.10 [tr] Read Measurement Timeout

The command tr reads the current value of the measurement timeout

Syntax: tr

Host sends: <Address>sr<STX>tr<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn:

Parameter	Meaning	Value
P1	Measurement timeout	float number 0.0: deactivate timeout 0.1 .. 64.0: timeout in seconds

1.3.5.11 [sp] Select Measurement Program Number

The sp command (set program number) selects a measurement program.
Note that blank characters (´ ´) are not allowed in the measurement program name. They are changed automatically into underscores (´_´)!

Syntax: sp

Host sends: <Address>sr<STX>sp<S>P1<S>P2<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of the parameter Pn:

Parameter	**Meaning**	**Value**
P1	Measurement program number	0..31
P2	Measurement program name	Max. 13 ASCII characters

1.3.5.12 [rp] Get Measurement Program Number

The rp command (read program number) reads the current measurement program number and name.

Syntax: rp

Host sends: <Address>sr<STX>rp<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Measurement program number	0..31
P2	Measurement program name	Max. 13 ASCII characters

1.3.5.13 [sm] Set Curve Record Mode

The sm command (set stop mode) sets the Curve Record mode.

Syntax: sm

Host sends: <Address>sr<STX>sm<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of the parameter Pn

Parameter	Meaning	Value
P1	Curve Record Mode	0: Record complete curve 1: Record only to turning point

1.3.5.14 [gm] Read Curve Record Mode

The gm command (get stop mode) reads the Curve Record Mode.

Syntax: gm

Host sends: <Address>sr<STX>gm<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1 <ETX>[<BCC>]

Host sends:: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	Meaning	Value
P1	Curve Record Mode	0: Record complete curve 1: Record only to turning point

1.3.5.15 [sk] Set Turning Point

The sm command (set stop mode) sets the Turning Point of the curve. The turning point divides a curve into a positive part and a negative part.

Syntax: sk

Host sends: <Address>sr<STX>sk<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of the parameter Pn

Parameter	Meaning	Value
P1	Turning Point	0: Turning Point is at X-Max 1: Turning Point is at Y-Max

1.3.5.16 [fk] Read Turning Point

The gm command (get stop mode) reads the Turning Point of the curve.

Syntax: fk

Host sends: <Address>sr<STX>fk<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1 <ETX>[<BCC>]

Host sends:: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	Meaning	Value
P1	Turning Point	0: Turning Point is at X-Max 1: Turning Point is at Y-Max

1.3.6 Commands to display the results of measurement

1.3.6.1 [wz] Adjust Zoom Area

The wz command (write zoom) adjusts the zoom area in the display.

Syntax: wz

Host sends: <Address>sr<STX>wz<S>P1<S>P2<S>P3<S>P4<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of the parameter Pn:

Parameter	Meaning	Value
P1	X-min	Float number
P2	X-max	Float number
P3	Y-min	Float number
P4	Y-max	Float number

1.3.6.2 [gz] Read Zoom Area

The gz command (get zoom) reads the selected zoom area.

Syntax: gz

Host sends: <Address>sr<STX>gz<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<S>P4<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn:

Parameter	Meaning	Value
P1	X-min	Float number
P2	X-max	Float number
P3	Y-min	Float number
P4	Y-max	Float number

1.3.6.3 [wd] Select Display

The wd command (write display) selects the display.

Syntax: wd

Host sends: <Address>sr<STX>wd<S>P1<S>P2<S>P3<S>P4<S>P5<S>P6<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of the parameter Pn:

Parameter	Meaning	Display enabled	Display disabled
P1	Graphic display	1	0
P2	Numeric display 1	1	0
P3	Numeric display 2	1	0
P4	Numeric display 3	1	0
P5	Statistic display	1	0
P6	No display	1	0

Caution: There must be at least one display enabled.

1.3.6.4 [gd] Read Display

The gd command (get display) reads the enabled display modes from the 9306.

Syntax: gd

Host sends: <Address>sr<STX>gd<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<S>P4<S>P5<S>P6<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	Meaning	Display enabled	Display disabled
P1	Graphic display	1	0
P2	Numeric display 1	1	0
P3	Numeric display 2	1	0
P4	Numeric display 3	1	0
P5	Statistic display	1	0
P6	No display	1	0

1.3.6.5 [wo] Select Data Output Mode

The wo command (write output) selects the output mode for the serial interface.

Syntax: wo

Host sends: <Address>sr<STX>wo<S>P1<S>P2<S>P3<S>P4<S>P5<S>P6<S>
P7<S>P8<S>P9<S>P10<S>P11<ETX>[<BCC>]

9306 answers: <ACK>

Meaning of the parameter Pn:

Parameter	**Meaning**	**Value**
P1	Output device	1 = Printer 2 = PC 3 = DIGIDRAW
P2	Output data	1 = Graphic 2 = Numeric data 3 = Graphic and numeric data
P3	Output filter	1 = All 2 = NOK 3 = OK
P4	Output interval	1..9999
P5	Printer delay	0..99 ms
P6	Y-minimum	0 = Not selected 1 = Selected
P7	Y-maximum	0 = Not selected 1 = Selected
P8	X-maximum	0 = Not selected 1 = Selected
P9	Last value	0 = Not selected 1 = Selected
P10	Entry / exit	0 = Not selected 1 = Selected
P11	Min / max	0 = Not selected 1 = Selected

1.3.6.6 [go] Read Data Output Mode

The go command (get output) reads the current data output mode.

Syntax: go

Host sends: <Address>sr<STX>go<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX> P1<S>P2<S>P3<S>P4<S>P5<S>P6<S>P7<S>P8<S>P9<S>
P10<S>P11<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Output device	1 = Printer 2 = PC 3 = DIGIDRAW
P2	Output data	1 = Graphic 2 = Numeric data 3 = Graphic and numeric data
P3	Output filter	1 = All 2 = NOK 3 = OK
P4	Output interval	1..9999
P5	Printer delay	0..99 ms
P6	Y-minimum	0 = Not selected 1 = Selected
P7	Y-maximum	0 = Not selected 1 = Selected
P8	X-maximum	0 = Not selected 1 = Selected
P9	Last value	0 = Not selected 1 = Selected
P10	Entry / exit	0 = Not selected 1 = Selected
P11	Min / max	0 = Not selected 1 = Selected

1.3.6.7 [as] Auto scaling the Display

The as command (auto scale) starts the auto scale function of the graphic display.

Syntax: as

Host sends: <Address>sr<STX>as<ETX>[<BCC>]

9306 answers: <ACK>

1.3.6.8 [ae] Read Display Units

With the ae command the units which are shown on the display can be read out. (With some measuring functions this can be an other unit than it was selected with the ru/su-command)

Syntax: ae

Host sends: <Address>sr<STX>ae<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameters:

Parameter	**Meaning**	**Value**
P1	Unit X-Axis	0..43, 99
P2	Unit Y-Axis	0..43, 99

Valid values for units (P1,P2):

0 = "mN "	16 = "mbar"	32 = "uV "
1 = "N "	17 = "bar "	33 = "mV "
2 = "kN "	18 = "kbar"	34 = "V "
3 = "MN "	19 = "Pa "	35 = "kV "
4 = "mNm "	20 = "hPa "	36 = "uA "
5 = "Nm "	21 = "kPa "	37 = "mA "
6 = "kNm "	22 = "MPa "	38 = "A "
7 = "MNm "	23 = "GPa "	39 = "kA "
8 = "um "	24 = "PSI "	40 = "mV/V"
9 = "mm "	25 = "kPSI"	41 = User_unit1
10 = "dm "	26 = "MPSI"	42 = User_unit2
11 = "m "	27 = "mmHg"	43 = “s “
12 = "inch"	28 = "mWs "	
13 = "mil "	29 = "grd "	99 = no unit available (e.g. at the
14 = "m/s "	30 = "rad "	measuring function „classier“
15 = "m/s2"	31 = "gon "	the 2. channel)

The values 43 and 99 are only available at the “ae“-command, not at the commands “ru“/“su“!

1.3.6.9 [ei] Read Display Units as Strings

With the ei command the units which are shown on the display can be read out as character strings. (With some measuring functions this can be an other unit than it was selected with the ru/su-command)

Syntax: ei

Host sends: <Address>sr<STX>ei<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameters:

Parameter	**Meaning**	**Value**
P1	Unit X-Axis	string (4 characters)
P2	Unit Y-Axis	string (4 characters)

1.3.6.10 [gv] Read Measurement Curve

The gv command (get values) transmits all values of the current measurement curve.

Syntax: gv

Host sends: <Address>sr<STX>gv<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<S>P4<S>P5<S>P6<S>P7<S>P8<S>P9<S>
P10<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <STX>X1<S>Y1<S> X2<S>Y2<S>...X9<S>Y9<S> X10<S>Y10<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <STX>X11<S>Y11<S> X12<S>Y12<S>...X19<S>Y19<S>X20<S>Y20<ETX>[<BCC>]

Host sends: <ACK>

The measurement values are transmitted in hex data format. The data sending part of communication procedure will be repeated, until there are no more measurement points left. The measurement points will be transmitted in blocks of ten pairs of measurement values (X,Y). If the last measurement point does not complete the last block of ten measurement points, the last point (X,Y) will be repeated until the block is completed.

Host sends:<ACK>

9306 answers: <EOT>

Meaning of the parameters:

Parameter	**Meaning**	**Value**
P1	Program number	0..31
P2	Unit X-channel	Zero terminated String (4 characters)
P3	Unit Y-channel	Zero terminated String (4 characters)
P4	Mx X-channel	Float number
P5	My Y- channel	Float number
P6	Kx X- channel	Float number
P7	Ky Y- channel	Float number
P8	Tare X X- channel	Float number
P9	Tare Y Y- channel	Float number
P10	Number of measurement points	0..8000

The measurement value can be calculated with the equation (e.g. X-Channel)

((Xn+M)*K) -Tare [Unit X-channel]

1.3.7 Commands for Interrogation of measurement Results

1.3.7.1 [ge] Get Evaluation

(Old version, still kept in the manual for compatibility reasons)
The ge command (get evaluation) reads the evaluation results of the last measurement.

Syntax: ge

Host sends: <Address>sr<STX>ge<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<S>P4<S>$P1_1$<S>$P1_2$... <S>$P10_1$<S>$P10_2$<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Number of measurement	Integer number
P2	Current program number	0..31
P3	Number of NOK measurements	Integer number
P4	Evaluation of current measurement	0 =OK 1 =NOK
P4	$P1_1$ to $P\ 10_1$	Window entry value (Float number)
P4	$P1_2$ to $P10_2$	Window exit value (Float number)

1.3.7.2 [gr] Get Evaluation

The gr commant (get results) reads the evaluation results of the last measurement.

Syntax: gr

Host sends: <Address>sr<STX>gr <S>P1><ETX>[<BCC>]

9306 answers: <ACK>

Parameter	**Meaning**	**Value**
P1	Window number	1-10

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<S>P4<S>P5<S> P6<S> P7<S> P8<S> P9 <S> P10<S> P11< ETX>

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Window type	0 = Off 1 = Pass 2 = Hysteresis 3 = Gradient 4 = Online 5 = Block
P2	Evaluation	0 = OK 1 = NOK
P3	Entry value X	Float number
P4	Entry value Y	Float number
P5	Exit value X	Float number
P6	Exit value Y	Float number
P7	X minimum in window	Float number
P8	Y minimum in window	Float number
P9	X maximum in window	Float number
P10	Y maximum in window	Float number
P11	With gradient window: gradient With hysteresis window: Y-difference	Float number

The parameters are only relevant at the following window types:

Window type	*Pass/Online*	*Block*	*Gradient*	*Hysteresis*
P3	relevant	relevant	relevant	relevant
P4	relevant	relevant	relevant	relevant
P5	relevant	don't care	relevant	relevant
P6	relevant	don't care	relevant	relevant
P7	relevant	don't care	don't care	don't care
P8	relevant	don't care	don't care	don't care
P9	relevant	relevant (block X)	don't care	don't care
P10	relevant	relevant (block Y)	don't care	don't care
P11	don't care	don't care	relevant	relevant

1.3.7.3 [fc] Read Measurement Curve Data

(New Version)

The fc command (fetch curve results) reads the evaluation result of the current measurement.
If there is no current measurement, the DIGIFORCE will answer with <NAK> and will set the corresponding error bit (see command „er“).

Syntax: fc

Host sends: <Address>sr<STX>fc <ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<S>P4<S>P5<S> P6<S> P7<S> P8<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Last curve point X	Float number
P2	Last curve point Y	Float number
P3	Maximum X value of the curve (X)	Float number
P4	Maximum X value of the curve (Y)	Float number
P5	Minimum Y value of the curve (X)	Float number
P6	Minimum Y value of the curve (Y)	Float number
P7	Maximum Y value of the curve (X)	Float number
P8	Maximum Y value of the curve (Y)	Float number

1.3.7.4 [gx] Get Statistic Data

The gx command (get statistics) reads the statistic data. This command will be answered with NAK, if there are less than two measurements.

Syntax: gx

Host sends: <Address>sr<STX>gx<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the Parameter:

Parameter	**Meaning**	**Value**
P1	Window / function number	0: NIO-Info for all windows 1-10: Window number

Host sends: <Address>po<ENQ>

9306 answers: <STX>P2<S>P3<S>P4<S>P5<S>P6<S>P7<S>P8<S>P9<S>P10
<S>P11<S>P12<S>P13<S>P14<ETX> [<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the Parameters:

Parameter P1 = 0:

P2	Total number of measurements	0..2^32
P3	Total Number of NOK evaluations	0..2^32
P4	Dummy	0
P5	Percent part of the measurements from P1 in which window 1 was NOK	Float number
P6	Percent part of the measurements from P1 in which window 2 was NOK	Float number
P7	Percent part of the measurements from P1 in which window 3 was NOK	Float number
P8	Percent part of the measurements from P1 in which window 4 was NOK	Float number
P9	Percent part of the measurements from P1 in which window 5 was NOK	Float number
P10	Percent part of the measurements from P1 in which window 6 was NOK	Float number
P11	Percent part of the measurements from P1 in which window 7 was NOK	Float number
P12	Percent part of the measurements from P1 in which window 8 was NOK	Float number
P13	Percent part of the measurements from P1 in which window 9 was NOK	Float number

P14	Percent part of the measurements from P1 in which window 10 was NOK	Float number

Parameter P1 = 1:

Parameter	Meaning	Value
P2	Number of measurement in the statistic	0 .. 255
P3	Number of NOK-measurements (only current window) of P2 in the statistic	0 .. 255
P4	Window Type	0 = Off 1 = Pass 2 = Hysteresis 3 = Gradient 4 = Online 5 = Block

The meaning of parameter P5-14 changes in dependence to the selected window type.

Window type ONLINE, PASS:

P5	Entry minimum value	Float number
P6	Entry maximum value	Float number
P7	Entry arithmetic mean value	Float number
P8	Entry standard deviation	Float number
P9	Entry Cpk value	Float number
P10	Exit minimum value	Float number
P11	Exit maximum value	Float number
P12	Exit arithmetic mean value	Float number
P13	Exit standard deviation	Float number
P14	Exit Cpk value	Float number

Window type BLOCK:

P5	Block value y minimum	Float number
P6	Block value y maximum	Float number
P7	Block value y arithmetic mean value	Float number
P8	Block value y standard deviation	Float number
P9	Block value y Cpk	Float number
P10	Block value x minimum	Float number
P11	Block value x maximum	Float number
P12	Block value x arithmetic mean value	Float number
P13	Block value x standard deviation	Float number
P14	Block value x Cpk	Float number

Window Type HYSTERESIS:

P5	Minimum value hysteresis	Float number
P6	Maximum value hysteresis	Float number
P7	Arithmetic mean value	Float number
P8	Standard deviation	Float number
P9	Cpk value	Float number
P10	Don't care	0.0
P11	Don't care	0.0
P12	Don't care	0.0
P13	Don't care	0.0
P14	Don't care	0.0

Window Type GRADIENT:

P5	Minimum gradient value	Float number
P6	Maximum gradient value	Float number
P7	Arithmetic mean value	Float number
P8	Standard deviation	Float number
P9	Cpk value	Float number
P10	Don't care	0.0
P11	Don't care	0.0
P12	Don't care	0.0
P13	Don't care	0.0
P14	Don't care	0.0

1.3.7.5 [ms] Read Measurement Status

The ms command (measurement status) reads the current status of the measurement.

Syntax: ms

Host sends: <Address>sr<STX>ms<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Measurement status	0 = No new measurement values available 1 = Measurement has finished, new measurement values are available 2 = No data available at all, there has not been a measurement

1.3.7.6 [dr] Read single values out of the statistics storage

With the dr command (statistics data read) the single statistics values can be read. The statistics results are calculated from these values. General statistics information can also be read with this command.

Syntax: dr

Host sends: <Address>sr<STX> dr<S>P1<S>P2<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P3<S>P4<S>P5<S>P6<S>P7<S>P8<S>P9<S>P10<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameters P1 and P2

Parameter	**Meaning**	**Value**
P1	Window number	0 = Request to the general statistics data like calibration data or number of measurements (see below) In this case P2 is don‘t care and should be set to ‚0‘ 1..10 = Number of the window
P2	Number of the measurement which shall be read out	0 = Request for the general window data for this window (number of statistics values for this window, OK/NOK...) 1 ... 120000(maximum) = Number of the requested measurement in the statistics

In dependence to the values of parameter P1 and P2 changes the number of answer parameters

P1=0, P2 = don‘t care : Reading of the general data
In this case there are 8 answer parameters.

P3	Unit X-channel	Zero terminated String (4 characters)
P4	Unit Y-channel	Zero terminated String (4 characters)
P5	Mx X-channel	Float number
P6	My Y- channel	Float number
P7	Kx X- channel	Float number
P8	Ky Y- channel	Float number
P9	Tare X X- channel	Float number
P10	Tare Y Y- channel	Float number

The measurement value has to be calculated with the equation (e.g. X-Channel)
((Xn+Mx)*Kx) -Tare X [Unit X-channel]
The measurement value of a gradient window has to be calculated with the equation
(Yn*Ky)/(Xn*Kx) [Unit Y-channel / Unit X-channel]

P1=1..10, P2 = 0: Reading of the general window data for window P1
In this case there are 6 answer parameters.

P3	Program number	0..31
P4	Statistics status of this window	0: FALSE, no statistics will be stored for this window 1: TRUE, statistics will be stored for this window
P5	Maximum possible number of values which can be stored for this window	Max. 120000 = (120000 / [Number of windows with enabled statistics in the complete device])
P6	Number of statistics measurements stored for this window	0 ... (P5)
P7	Number of valid measurements in P6 for this window	0 ... (P6)
P8	Number of NOK-measurements in P7 for this window	0 ... (P7)

P1=1..10, P2 > 0: Reading of the single statistics values of window number P1

In this case there are 3 answer parameters.

P3	Error status of this statistics entry	0: No error, value is valid 1..7: NOK-measurement, but with useful information, so it is valid for statistics, >8: NOK-measurement, no useful information for statistics could be recorded. P4, P5 are don't care values
P4	Statistics raw value 1	-32765 ... 32764
P5	Statistics raw value 2	-32765 ... 32764

Meaning of the statistics raw values:

With measurement function Y=f(x) and Y=f(x,t):

Window type	**Meaning raw value 1**	**Meaning raw value 2**
Pass	Entry = left, right: Entry value Y-coordinate Entry = top, bottom Entry value X-coordinate Entry = don't care No statistics available	Exit = left, right: Exit value Y-coordinate Exit = top, bottom: Exit value X-coordinate Exit = don't care No statistics available
Online	Entry always on the left side → Entry value Y-coordinate	Entry always on the right side → Exit value Y-coordinate
Block	Block value X-coordinate	Block value Y-coordinate
Gradient	Difference Y (Yn, see below)	Difference X (Xn, see below.)
Hysteresis	Y-Difference → Hysteresis	Don't care

The measurement value has to be calculated with the equation (e.g. X-Channel)

((Xn+Mx)*Kx) -Tare X [Unit X-channel]

The measurement value of a gradient window has to be calculated with the equation

(Yn*Ky)/(Xn*Kx) [Unit Y-channel / Unit X-channel]

With measurement function Y=f(t):

Window type	**Meaning raw value 1**	**Meaning raw value 2**
Pass	Entry = left, right: Entry value Y-coordinate Entry = top, bottom Entry value X-coordinate (→ time) Entry = don't care No statistics available	Exit = left, right: Exit value Y-coordinate Exit = top, bottom: Exit value X-coordinate (→ time) Exit = don't care No statistics available
Online	Entry always on the left side → Entry value Y-coordinate	Entry always on the right side → Exit value Y-coordinate
Block	Block value X-coordinate (→ time)	Block value Y-coordinate
Gradient	Difference Y (Yn, see below)	Difference X (Xn, see below) (→ time)
Hysteresis	At Y=f(t) not possible → don't care (because there is no returning part of the curve to calculate a hysteresis)	At Y=f(t) not possible→ don't care (because there is no returning part of the curve to calculate a hysteresis)

The measurement value has to be calculated with the equation (e.g. X-Channel)

((Xn+Mx)*Kx) -Tare X [Unit X-channel]

The measurement value of a gradient window has to be calculated with the equation

(Yn*Ky)/(Xn*Kx) [Unit Y-channel / Unit X-channel]

With measurement function X=f(t):

In this measurement function the displacement channel will be displayed on the Y-axis.

Window type	**Meaning raw value 1**	**Meaning raw value 2**
Pass	Entry = left, right: Entry value Y-coordinate (→ displacement) Entry = top, bottom Entry value X-coordinate (→ time) Entry = don't care No statistics available	Exit = left, right: Exit value Y-coordinate (→ displacement) Exit = top, bottom: Exit value X-coordinate (→ time) Exit = don't care No statistics available
Online	Entry always on the left side → Entry value Y-coordinate (→ displacement)	Entry always on the right side → Exit value Y-coordinate (→ displacement)
Block	Block value X-coordinate (→ time)	Block value Y-coordinate (→ displacement)
Gradient	Difference Y (Yn, see below)(→displacement)	Difference X (Xn, see below) (→time)
Hysteresis	At X=f(t) not possible → don't care (because there is no returning part of the curve to calculate a hysteresis)	At X=f(t) not possible→ don't care (because there is no returning part of the curve to calculate a hysteresis)

The measurement value has to be calculated with the equation (e.g. X-Channel)

((Xn+Mx)*Kx) -Tare X [Unit X-channel]

The measurement value of a gradient window has to be calculated with the equation

(Yn*Ky)/(Xn*Kx) [Unit Y-channel / Unit X-channel]

1.3.7.7 [rk] Read KLASSIER-Results

With the rk-command (read classier) the results of a KLASSIER-measurement can be read out of the device. This command is only available, when the measurement function Classier-X or Classier-Y is selected. To ensure, that measurement values are available, the „Total number of measurements“-counter has to be > 0.

Syntax: rk

Host sends: <Address>sr<STX>rk<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<S>P4<S>P5<S>P6
<S>P7<S>P8<S>P9<S>P10<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	„Total number of measurements“-counter	0 .. (2^{32}-1)
P2	Result Class 0	0 .. 65535
P3	Result Class 1	0 .. 65535
P4	Result Class 2	0 .. 65535
P5	Result Class 3	0 .. 65535
P6	Result Class 4	0 .. 65535
P7	Last measurement value of the last measurement	Float number
P8	Minimum of the last measurement	Float number
P9	Maximum of the last measurement	Float number
P10	Mean value of the last measurement	Float number

1.3.7.8 [br] read basic results

Version V200101 and newer

With the br command (basic results) a combination of basic results can be read out of the device. You can read most of the information also with other commands.

Syntax: br

Host sends: <Address>sr<STX>br<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P1<S>P2<S>P3<S>P4<S>P5<S>P6<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Current program number	0..31
P2	Name of the current program	Zero terminated String of characters with maximal 12+1 Chars. Longer strings will be cut off and terminated with zero after 12 chars
P3	Number of measurement	0 .. 2^{32}
P4	Evaluation	0 =IO 1 =NIO
P5	Data field A	Zero terminated String of characters with maximal 12+1 Chars. Longer strings will be cut off and terminated with zero after 12 chars
P6	Data field B	Zero terminated String of characters with maximal 12+1 Chars. Longer strings will be cut off and terminated with zero after 12 chars

Customer specific data additional to the current measurement can be stored in the Data fields A and B. You can only write information into the data fields with the corresponding commands qa and qb. The data field depend not to the current program, they exist only once in the whole device.

1.3.7.9 [qa] Write Data filed A

Version V200101 and newer

With the qa command you can write a character string into data field A. This String may obtain customer specific information about the current measurement. It should be used as data storage, the device will not modify the information. The information can be read out with the Best regards command
Note that blank characters (´ ´) are not allowed in the data field string. They are changed automatically into underscores (´_´)!

Syntax: qa

Host sends: <Address>sr<STX>qa<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn

Parameter	Meaning	Value
P1	Data field A	Zero terminated String of characters with maximal 12+1 Chars. Longer strings will be cut off and terminated with zero after 12 chars No blanks allowed, they will be changed to ´_´.

1.3.7.10 [qb] Write Data filed B

Version V200101 and newer

With the qb command you can write a character string into data field B. This String may obtain customer specific information about the current measurement. It should be used as data storage, the device will not modify the information. The information can be read out with the Best regards command
Note that blank characters (´ ´) are not allowed in the data field string. They are changed automatically into underscores (´_´)!

Syntax: qb

Host sends: <Address>sr<STX>qb<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn

Parameter	Meaning	Value
P1	Data field B	Zero terminated String of characters with maximal 12+1 Chars. Longer strings will be cut off and terminated with zero after 12 chars No blanks allowed, they will be changed to ´_´.

1.3.7.11 [rg] Read Settings for Numerical Display in Graphics Menu

Version V200201 and newer

The rg command reads the current settings of the display of numerical values in the graphics display.

Syntax: rg

Host sends: <Address>sr<STX>rg<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P2<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Number of display field	1: Left 2: Middle 3: Right
P2	Measurement value to be displayed	0: No display 1...88: See table

- One measurement value can be displayed in different fields at the same time
- If no measurement value is available (e.g. the corresponding window is not defined), XXX will be displayed
- The values will only be displayed, if there is at least one measurement available.

Table of available Measurement values

Number	**Displayed value**
0	No display
1	Y-Minimum, X-Coordinate
2	Y-Minimum, Y-Coordinate
3	Y-Maximum, X-Coordinate
4	Y-Maximum, Y-Coordinate
5	X-Maximum, X-Coordinate
6	X-Maximum, Y-Coordinate
7	Last value, X-Coordinate
8	Last value, Y-Coordinate
9	Window 1, Entry, X-Coordinate
10	Window 1, Entry, Y-Coordinate
11	Window 1, Exit, X-Coordinate
12	Window 1, Exit, Y-Coordinate
13	Window 1, Minimum, X-Coordinate
14	Window 1, Minimum, Y-Coordinate
15	Window 1, Maximum, X-Coordinate
16	Window 1, Maximum, Y-Coordinate
17	Window 2, Entry, X-Coordinate
18	Window 2, Entry, Y-Coordinate
19	Window 2, Exit, X-Coordinate
20	Window 2, Exit, Y-Coordinate
21	Window 2, Minimum, X-Coordinate
22	Window 2, Minimum, Y-Coordinate
23	Window 2, Maximum, X-Coordinate
24	Window 2, Maximum, Y-Coordinate
25	Window 3, Entry, X-Coordinate
26	Window 3, Entry, Y-Coordinate
27	Window 3, Exit, X-Coordinate
28	Window 3, Exit, Y-Coordinate

29	Window 3, Minimum, X-Coordinate
30	Window 3, Minimum, Y-Coordinate
31	Window 3, Maximum, X-Coordinate
32	Window 3, Maximum, Y-Coordinate
33	Window 4, Entry, X-Coordinate
34	Window 4, Entry, Y-Coordinate
35	Window 4, Exit, X-Coordinate
36	Window 4, Exit, Y-Coordinate
37	Window 4, Minimum, X-Coordinate
38	Window 4, Minimum, Y-Coordinate
39	Window 4, Maximum, X-Coordinate
40	Window 4, Maximum, Y-Coordinate
41	Window 5, Entry, X-Coordinate
42	Window 5, Entry, Y-Coordinate
43	Window 5, Exit, X-Coordinate
44	Window 5, Exit, Y-Coordinate
45	Window 5, Minimum, X-Coordinate
46	Window 5, Minimum, Y-Coordinate
47	Window 5, Maximum, X-Coordinate
48	Window 5, Maximum, Y-Coordinate
49	Window 6, Entry, X-Coordinate
50	Window 6, Entry, Y-Coordinate
51	Window 6, Exit, X-Coordinate
52	Window 6, Exit, Y-Coordinate
53	Window 6, Minimum, X-Coordinate
54	Window 6, Minimum, Y-Coordinate
55	Window 6, Maximum, X-Coordinate
56	Window 6, Maximum, Y-Coordinate
57	Window 7, Entry, X-Coordinate
58	Window 7, Entry, Y-Coordinate
59	Window 7, Exit, X-Coordinate
60	Window 7, Exit, Y-Coordinate
61	Window 7, Minimum, X-Coordinate
62	Window 7, Minimum, Y-Coordinate
63	Window 7, Maximum, X-Coordinate
64	Window 7, Maximum, Y-Coordinate
65	Window 8, Entry, X-Coordinate
66	Window 8, Entry, Y-Coordinate
67	Window 8, Exit, X-Coordinate
68	Window 8, Exit, Y-Coordinate
69	Window 8, Minimum, X-Coordinate
70	Window 8, Minimum, Y-Coordinate
71	Window 8, Maximum, X-Coordinate
72	Window 8, Maximum, Y-Coordinate
73	Window 9, Entry, X-Coordinate
74	Window 9, Entry, Y-Coordinate
75	Window 9, Exit, X-Coordinate
76	Window 9, Exit, Y-Coordinate
77	Window 9, Minimum, X-Coordinate
78	Window 9, Minimum, Y-Coordinate
79	Window 9, Maximum, X-Coordinate
80	Window 9, Maximum, Y-Coordinate
81	Window 10, Entry, X-Coordinate
82	Window 10, Entry, Y-Coordinate
83	Window 10, Exit, X-Coordinate
84	Window 10, Exit, Y-Coordinate
85	Window 10, Minimum, X-Coordinate
86	Window 10, Minimum, Y-Coordinate
87	Window 10, Maximum, X-Coordinate
88	Window 10, Maximum, Y-Coordinate

1.3.7.12 [wg] Write Settings for Numerical Display in Graphics Menu

Version V200201 and newer

The wg command defines the settings of the display of numerical values in the graphics display.

Syntax: wg

Host sends: <Address>sr<STX>wg<S>P1<S>P2<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Number of display field	1: Left 2: Middle 3: Right
P2	Measurement value to be displayed	0: No display 1...88: See table at the rg-command

- One measurement value can be displayed in different fields at the same time
- If no measurement value is available (e.g. the corresponding window is not defined), XXX will be displayed
- The values will only be displayed, if there is at least one measurement available.

1.3.7.13 [rn] Read Settings for Numerical Display in Menu NUMERIC 4

Version V200201 and newer

The rn command reads the current settings of the display of numerical values in the menu NUMERIC 4.

Syntax: rn

Host sends: <Address>sr<STX>rn<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P2<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Number of display field	1 ... 10
P2	Measurement value to be displayed	0: No display 1...88: See table at the rg-command

- One measurement value can be displayed in different fields at the same time
- If no measurement value is available (e.g. the corresponding window is not defined), XXX will be displayed
- The values will only be displayed, if there is at least one measurement available.

1.3.7.14 [wn] Write Settings for Numerical Display in Menu NUMERIC 4

Version V200201 and newer

The wn command defines the settings of the display of numerical values in the menu NUMERIC 4.

Syntax: wn

Host sends: <Address>sr<STX>wn<S>P1<S>P2<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Number of display field	1 ... 10
P2	Measurement value to be displayed	0: No display 1...88: See table at the rg-command

- One measurement value can be displayed in different fields at the same time
- If no measurement value is available (e.g. the corresponding window is not defined), XXX will be displayed
- The values will only be displayed, if there is at least one measurement available.

1.3.7.15 [zz] Read Numerical Data Of Measurement Menu NUMERIC 4

Version FELD-V200201 and newer

With the zz command all in the menu „numeric 4“displayed numerical values can be read out via serial interface. The user can select his own customer specific combination of measurement results as defined in menu 72 or with the wn command. All these values (max. 10) can be read out with one single command.
The output will have the same order as in the display page „NUMERIC 4“. If one line in the display was not used (defined as „DISPLAY OFF“), it will be ignored in the zz command. If no measurement value was available, the device will send a „x“ instead. If no value was selected in menu 72 at all, the device will send an empty frame (<STX><ETX>), but this will not be interpreted as an error. (It only makes no sense, but it is not an error)

In the configuration for the measurement page „NUMARIC 4“ in menu 72 max. 10 values can be selected, therefore max. 10 values can be read out with the zz command. The actual number of parameters in the zz command depends on the definition in menu 72.

Syntax:	zz	
Host sends:	<Address>sr<STX>zz<ETX>[<BCC>]	
9306 answers:	<ACK>	
Host sends:	<EOT>	
Host sends:	<Address>po<ENQ>	
9306 answers:	<STX>P1<S> .....<S>P_n<ETX>[<BCC>]	with n <= 10
Host sends:	<ACK>	
9306 answers:	<EOT>	

The number of parameters depends on the definition in menu 72 and is between 0 and 10.

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1 ... P10	numerical measurement result as defined in menu „DATA OUTPUT →F3(menu 72) or with the wn command	float number without unit

1.3.7.16 [av] Read any value

Version FELD-V200202 and newer

With the av command any value which is described in the list of the rg command can be read out via serial interface. If no measurement value was available, the device will send a „x“ instead.

Syntax: av

Host sends: <Address>sr<STX>av<S>P1<ETX>[<BCC>]

9306 answers: <ACK>

Host sends: <EOT>

Host sends: <Address>po<ENQ>

9306 answers: <STX>P2<ETX>[<BCC>]

Host sends: <ACK>

9306 answers: <EOT>

Meaning of the parameter Pn

Parameter	**Meaning**	**Value**
P1	Number of desired value as described in the list with the rg command	1..88
P2	numerical measurement result	float number without unit