AK-Protocol

CAI – NDIR-Analyzer

Version 1.7 01.10.2004
Program Version: 3Main.mpa 1.025

Title: AK-Protocol specification for CAI-NDIR analyzer	
Project: CAI	
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Version	Release Date	Changed Sections	Reason of Change
1.0	xx/xx/xxxx		First public release
1.1	xx/xx/xxxx		New features implemented
1.2	11/22/2002	Chapter 1 2.1.7 ASTF Error status	Added chapter 1 Additional errors
1.3	11/26/2003	2.1.7 ASTF Error status 2.1.10 ATEM 2.1.11 ADRU 2.1.21 ADAL 2.1.24 AVER 2.1.25 AH2O 2.1.26 ACO2 2.1.27 AUDP 2.2.16 SUDP 2.3.11 EDAL 2.3.13 EH20 2.3.14 ECO2 2.3.15 EUDP	Additional errors Added new temperatures Added new EPC voltages Additional alarm limits New: Version numbers New: Query H_2O parameter New: Query CO_2 parameter New: Query UDP streaming New: UDP on/off Added new alarm limits New: Set H_2O parameter New: Set CO_2 parameter New: Set UDP streaming
1.4	01/13/2004	2.3.11 EDAL 2.3.15 EUDP	Changed functionality Parameter change
1.5	03/19/2004	2.1.28 ARAW 2.1.29 AGRW 2.2.17 SFGR 2.3.16 EGRW	New command New command New command New command
1.6	06/25/2004	2.1.10 ATEM 2.1.11 ADRU 2.1.27 AUDP	changed format changed format changed format
1.7	10/01/2004	2.1.25 AH2O 2.1.26 ACO2	Changed format Changed format

Addressee	Return Until	Expected Problems	

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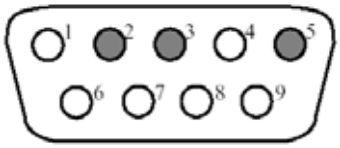
1 Communication Master Computer / Analyzer

The communication between master computer and analyzer is accomplished via serial interface. The data transmission as well as starting or ending functions is exclusively performed at command of the master computer. The master sends an instruction telegram and the driver's aid answers with an acknowledgment telegram. The protocol, which is to be kept necessarily, has been implemented according to the standards of the „Standardisierung Abgasmesstechnik“ (association of the German automobile industry). In the following, this protocol is briefly called AK protocol.

1.1 Interface Specifications

The serial interface is a RS 232C (V24) interface. At the back of the analyzer, a 9-pin D-sub female connector (see Figure 1-1) serves for connecting a master computer.



Pin number	Signal name
2	RxD (input)
3	TxD (output)
5	GND

Figure 1-1: Front view serial interface

Type	RS232
Speed	9600 bps
Character length	1 start bit
	8 data bits
	1 stop bit
Parity	none
Handshake	no

Table 1-1: Interface Specifications

1.2 Protocol Description

1.2.1 Instruction Telegram

	Character	Explanation
1st Byte	STX	ASCII code 02
2nd Byte	DON´T CARE	any ASCII code
3rd Byte	FUNCTION CODE 1	AK instruction e.g.: ASTF
4th Byte	FUNCTION CODE 2	
5th Byte	FUNCTION CODE 3	
6th Byte	FUNCTION CODE 4	
7th Byte	BLANK	
8th Byte	K	
9th Byte	0	channel number
10th Byte	BLANK	
	D	AK instruction parameters, length is variable
	A	
	T	
	A	
nth Byte	ETX	ASCII code 03

Table 1-2: Structure of an instruction telegram

1.2.2 Acknowledgment Telegram

	Character	Explanation
1st Byte	STX	ASCII code 02
2nd Byte	DON´T CARE	any ASCII code
3rd Byte	FUNCTION CODE 1	Echo of the AK command
4th Byte	FUNCTION CODE 2	
5th Byte	FUNCTION CODE 3	
6th Byte	FUNCTION CODE 4	
7th Byte	BLANK	
8th Byte	ERROR STATUS	error status byte
9th Byte	BLANK	
	D	AK acknowledgement parameters, length is variable
	A	
	T	
	A	
nth Byte	ETX	ASCII code 03

Table 1-3: Structure of an acknowledgment telegram

1.2.3 Data Description

Each telegram begins with **STX** (**S**tart of **Te**x**t**) in the fist byte. The “don't care” byte can be any ASCII character. Generally, a blank or an underscore (_) is used for readability reasons. The four function bytes represent the AK command. A blank comes next, followed by **K** and the channel number. The

analyzer is a single-channel device, and because of that the channel number is almost always **0**. For delimiting the command parameters from the channel number another blank follows. This may be followed by command parameters with a variable length. Every telegram ends with the **ETX** (**E**nd of **T**e**x**t) character.

The error status byte in the acknowledgment telegram signals if internal errors in the analyzer occurred. It is zero when no error appeared, and it is unequal zero when one or more errors occurred. Every time a change in the errors happened the error status byte is incremented by one, no matter if one or several errors disappeared or were added. If it had the value 10 it would be reset to 1. The error status byte does not indicate the real number of errors. If the analyzer does not have errors, the error status byte contains the value 0.

In general, AK commands are subdivided into three classes:

- Control commands (**S**xxx)
- Inquiry commands (**A**xxx)
- Configuration commands (**E**xxx)

1.2.4 Error Handling

It might happen that an unknown instruction is sent, that the analyzer is busy with a function which is not the desired one, or that an error occurred in the command parameters. Table 1-4 summarizes all errors that can appear upon any master instruction.

Analyzers Acknowledgment	Explanation
???? f[1]	Analyzer does not know the instruction sent.
xxxx[2] f BS	Analyzer is busy with another function.
xxxx f SE	Syntax error within command parameters or incomplete command.
xxxx f NA	Requested function or data are not available.
xxxx f DF	Data error: The kind or number of given parameters are not valid.
xxxx f OF	Offline: Analyzer is offline, i.e. analyzer is in local mode. Only inquiry commands and SREM (set analyzer in remote mode) are allowed.

Table 1-4: Acknowledgment telegram in case of error

[1] f stands for the error status byte

[2] xxxx stands for the function code of the sent master command

2 AK-Commands

2.1 Scans

2.1.1 AKON: Measured concentration value

Command	Response	Description
_AKON_K0	_AKON_s_z.z_z.z_z.z_t	Measured concentration value of all channels is responded t = Timestamp (1/10 sec)
_AKON_Km	_AKON_s_z.z_t	Measured concentration value of channel m is responded t = Timestamp (1/10 sec)

2.1.2 AEMB: Get measuring range

Command	Response	Description
_AEMB_K0	_AEMB_s_Mn_Mn_Mn	Current measuring range of all channels is responded
_AEMB_Km	_AKON_s_Mn	Current measuring range of channel m is responded

2.1.3 AMBE: Measuring range limit

Command	Response	Description
_AMBE_Km	_AMBE_s_M1_w.w _M2_x.x _M3_y.y _M4_z.z	All existing measuring range limits of channel m are responded
_AMBE_Km_Mn	_AMBE_s_Mn_z.z	Range limit of Range Mn of channel m is responded

2.1.4 AKAK: Calibration gas concentrations

Command	Response	Description
_AKAK_Km	_AKAK_s_M1_w.w _M2_x.x _M3_y.y _M4_z.z	All existing calibration gas values are responded for selected channel m
_AKAK_Km_Mn	_AKAK_s_Mn_z.z	For selected channel m calibration gas value of Range Mn is responded

2.1.5 AMBU: Upper and lower range switchover values for auto range

Command	Response	Description
_AMBU_Km	_AMBU_s_M1_w.w_W.W _M2_x.x_X.X _M3_y.y_Y.Y _M4_z.z_Z.Z	Lower and upper range switchover value of auto range are responded for channel m
_AMBU_Km_Mn	_AMBU_s_Mn_w.w_W.W	Lower and upper range switchover value of auto range are responded for channel m range n

2.1.6 ASTZ: Normal device status

Command	Response	Description
_ASTZ_K0	_ASTZ_s_K1_State1_State2_State3 _K2_State1_State2_State3 _K3_State1_State2_State3	Respond device status for all channels
_ASTZ_Km	_ASTZ_s_State1_State2_State3	Respond device status only for channel m

Possible states:

State1	**State2**		**State3**
SREM: remote	STBY:	standby	SARE: auto range on
SMAN: manual	SPAU:	pause	SARA: auto range off
	SMGA:	measuring gas	
	SNGA:	zero gas	
	SEGA:	end gas	
	SATK SNGA:	zero gas during auto cal	
	SATK SEGA:	end gas during auto cal	

2.1.7 ASTF: Error status

Command	Response	Description
_ASTF_K0	_ASTF_s_f1_f2_f3_…_f10	Current error numbers of all are responded

Errors:

1	Channel 1 Flow Failure
2	Channel 2 Flow Failure
3	Channel 3 Flow Failure
4	External Analog 1 Failure
5	External Analog 2 Failure
6	Pressure Failure
7	Temperature Failure
8	Channel 1 not calibrated
9	Channel 2 not calibrated
10	Channel 3 not calibrated
11…13	Ch1…3: Low concentration warning
14…16	Ch1…3: High concentration warning
17…19	Ch1…3: Temperature failure
20…22	Ch1…3: EPC Voltage failure

2.1.8 AKEN: Device identification and information

Command	Response	Description
_AKEN_K0	_AKEN_s_devicename	Device identification is responded
_AKEN_K1	_AKEN_s_model	Device model
_AKEN_K2	_AKEN_s_serialno	Device serial number
_AKEN_K3	_AKEN_s_samplepressure	Suggested input sample pressure

2.1.9 ARMU: Raw value

Command	Response	Description
_ARMU_K0	_ARMU_s_z.z_y.y_x.x_t	Raw value before linearization and offset-span-correction is responded for all channels t = Timestamp (1/10 sec)
_ARMU_Km	_ARMU_s_z.z_t	Raw value before linearization and offset-span-correction is responded for channel m t = Timestamp (1/10 sec)

2.1.10 ATEM: Temperature

Command	Response	Description
_ATEM_K0	_ATEM_s_z.z_y.y_x.x_w.w	z.z: Device temperature y.y: Detector 1 Temperature x.x: Detector 2 Temperature w.w: Detector 3 Temperature All Temperatures in degrees Celsius
_ATEM_Km	_ATEM_s_z.z	Detector temperature of channel m is returned in z.z

2.1.11 ADRU: Pressure / Valve voltage

Command	Response	Description
_ADRU_K0	_ADRU_s_z.z_y.y_x.x_w.w	z.z: Environment-Pressure y.y: Sample Pressure 1 x.x: Sample Pressure 2 w.w: Sample Pressure 3
_ADRU_Km	_ADRU_s_z.z	EPC voltage of channel m is returned in z.z

2.1.12 ADUF: Flows

Command	Response	Description
_ADUF_K0	_ADUF_s_z.z_y.y_x.x	Sample gas flow of all channels is responded
_ADUF_Km	_ADUF_s_z.z	Sample gas flow of channel m is

		responded

2.1.13 AGRD: Polynomial coefficients

Command	Response	Description
_AGRD_Km_Mn	_AGRD_s_Mn_a0_a1_a2_a3_a4	Polynomial coefficients of channel m range Mn are responded

2.1.14 AFGR: Factory set polynomial coefficients (calibration defaults) NOT FOR CUTOMERS!

Command	Response	Description
_AFGR_Km_Mn	_AFGR_s_Mn_a0_a1_a2_a3_a4	Factory default polynomial coefficients of channel m range n are responded

2.1.15 AANG: Deviation from zero point after auto calibration

Command	Response	Description
_AANG_Km	_AANG_s_M1_z.z_da_dr _M2_z.z_da_dr _M3_z.z_da_dr _M4_z.z_da_dr	Verifying deviations from zero point after auto calibration. Values: measured value (z.z), absolute dev (da), relative dev (dr)

2.1.16 AAEG: Deviation from end point after auto calibration

Command	Response	Description
_AAEG_Km	_AANG_s_M1_z.z_da_dr _M2_z.z_da_dr _M3_z.z_da_dr _M4_z.z_da_dr	Verifying deviation from end point after auto calibration Values: measured value (z.z), absolute dev (da), relative dev (dr)

2.1.17 AFDA: Purge and auto calibration times

Command	Response	Description
_AFDA_Km_SATK	_AFDA_s_z_y_x_w	Auto calibration times of channel m: z: Purge time y: Calibration time x: Total calibration time w: Verify time (z, y, x, w in seconds)
_AFDA_K0_SSPL	_AFDA_s_z	Purge time will be responded

2.1.18 APAR: Request auto calibration tolerance values

Command	Response	Description
_APAR_Km_SATK	_APAR_s_z.z_y.y_x.x_w.w	Auto calibration Tolerance value [%]: z.z: Range 1

	y.y: Range 2 x.x: Range 3 w.w: Range 4

2.1.19 AKAL: Deviation from end point after auto calibration

Command	Response	Description
_AKAL_Km	_AKAL_s_M1_z.z_y.y_x.x_w.w _M2_z.z_y.y_x.x_w.w _M3_z.z_y.y_x.x_w.w _M4_z.z_y.y_x.x_w.w	Deviation: z.z: Zero gas relative last calib. y.y: Zero gas factory calib. x.x: Span gas relative last calib. w.w: Span gas factory calib.

2.1.20 ASYZ: System time

Command	Response	Description
_ASYZ_K0	_ASYZ_s_yymmdd_hhmmss	System time: yymmdd: year, month, day (each 2 characters wide, no spaces) hhmmss: hour, minute, second (each 2 characters wide, no spaces)

2.1.21 AT90: Low pass Filter time

Command	Response	Description
_AT90_K0	_AT90_s_t	Respond low pass filter time. t: filer time constant in seconds

2.1.22 ADAL: Diagnostic alarm limits

Command	Response	Description
_ADAL_K0	_ADAL_s_a1.min_a1.max_... _a16.min_a16.max	All alarm limits are responded
_ADAL_K0_x	_ADAL_s_x.min_x.max	Alarm limits of x

Alarm Limits:

1	Sample gas flow channel 1
2	Sample gas flow channel 2
3	Sample gas flow channel 3
4	External input 1
5	External input 2
6	Baro-Pressure
7	Temperature
8	Sample concentration channel 1
9	Sample concentration channel 2
10	Sample concentration channel 3
11…13	Temperature channel 1…3
14…16	EPC voltage channel 1…3

2.1.23 ATCP: Query TCP/IP settings

Command	Response	Description
_ATCP_K0	_ADAL_s_zzz.zzz.zzz.zzz _yyy.yyy.yyy.yyy _xxxx	zzz: TCP/IP address yyy: TCP/IP subnet mask xxxx: TCP/IP port

2.1.24 AVER: Query software version

Command	Response	Description
_AVER_K0	_AVER_s_3MAIN_z_3USER_y_OSMSR_x	z: Main version x.xxx.b_dd.mm.yyyy y: User version x.xxx.b_dd.mm.yyyy x: OSMSR version x.xxx_dd.mm.yyyy

2.1.25 AH2O: Query H_2O correction parameter

Command	Response	Description
_AH2O_Km	_AH2O_s_Ext2_z.z_y.y_x.x	Ext2: Voltage at External 2 analog input z.z: Dry – voltage of Ain with no water present y.y: 1st order coefficient x.x.: 2nd order coefficient

2.1.26 ACO2: Query CO_2 correction parameter

Command	Response	Description
_ACO2_Km	_ACO2_s_Ext1_z.z_y.y_x.x_w.w	Ext1: Voltage at External 1 analog input z.z: Offset – voltage of Ain with no CO_2 present y.y: Min Ain – if Ain is below this value no CO_2 correction will be done. x.x: 1st order coefficient w.w.: 2nd order coefficient

2.1.27 AUDP: Query UDP data streaming parameter

Command	Response	Description
_AUDP_K0	_AUDP_s_<UDPPort>_<DataFrequeny>_[<Mode>]_[<UDP_IP>]_[Data]_[On/Off]	Port: port for open the UDP connection DataFrequency: Frequency for transmit the data in Hz Mode: A: ASCII Mode UDP_IP: Alternative IP address for open the UDP connection when it should not use the IP of connected TCP/IP client. Data: AK commands that will be streamed over UDP On/Off: 0 – UDP streaming is off 1 – UDP streaming is on

2.1.28 ARAW: Raw detector volts

Command	Response	Description
_ARAW_K0	_ARAW_s_z.z_y.y_x.x_t	z.z: Raw detector volts – channel 1 y.y: Raw detector volts – channel 2 x.x: Raw detector volts – channel 3 t: Timestamp
_ARAW_Km	_ARAW_s_z.z_t	z.z: Raw detector volts – channel m t: Timestamp

2.1.29 AGRW: Request maximum allowed absolute/relative deviations

Command	Response	Description
_AGRW_Km_Mn	_AGRW_s_z.z_y.y	Allowed deviations of range n [%]: z.z : absolute y.y : relative Channel m

2.2 Control commands

2.2.1 SRES: Reset

Command	Response	Description
_SRES_K0	_SRES_s	Reset

2.2.2 SPAU: Pause

Command	Response	Description
_SPAU_K0	_SPAU_s	Pause mode

2.2.3 STBY: Standby

Command	Response	Description
_STBY_K0	_STBY_s	Standby mode for all channels
_STBY_Km	_STBY_s	Standby mode for channel m

2.2.4 SNGA: Open valve for zero gas calibration

Command	Response	Description
_SNGA_K0	_SNGA_s	Open all three zero gas valves
_SNGA_Km	_SNGA_s	Open valve for zero gas calibration of actual measuring range
_SNGA_Km_Mn	_SNGA_s	Open valve for zero gas calibration of range Mn

2.2.5 SEGA: Open valve for end gas calibration

Command	Response	Description
_SEGA_K0	_SEGA_s	Open all three end gas valves
_SEGA_Km	_SEGA_s	Open valve for end gas calibration of actual measuring range
_SEGA_Km_Mn	_SEGA_s	Open valve for end gas calibration of range Mn

2.2.6 SSPL: Purge Analyzer with zero gas

Command	Response	Description
_SSPL_K0	_SSPL_s	Open zero gas valve and purge all channels

2.2.7 SATK: Start automatic calibration

Command	Response	Description
_SATK_Km	_SATK_s	Start automatic calibration with selected range of channel m
_SATK_Km_Mn	_SATK_s	Start automatic calibration for channel m, Range n

2.2.8 SEMB: Set measuring range

Command	Response	Description
_SEMB_Km_Mn	_SEMB_s	Set measuring range Auto range will be disabled

2.2.9 SARE: Auto range on

Command	Response	Description
_SARE_K0	_SARE_s	Set auto range on for all channels
_SARE_Km	_SARE_s	Set auto range on for channel m

2.2.10 SARA: Auto range off

Command	Response	Description
_SARA_K0	_SARA_s	Set auto range off for all channels
_SARA_Km	_SARA_s	Set auto range off

2.2.11 SREM: Remote mode for AK-commands

Command	Response	Description
_SREM_K0	_SREM_s	Set device in remote mode

2.2.12 SMAN: Manual control to control device manually

Command	Response	Description
_SMAN_K0	_SMAN_s	Set device in manual mode

2.2.13 SMGA: Start measuring

Command	Response	Description
_SMGA_K0	_SMGA_s	Start measuring Open all sample valves
_SMGA_Km	_SMGA_s	Open sample valve of channel m

2.2.14 SNKA: Saves measured value as new offset.

Command	Response	Description
_SNKA_K0	_SNKA_s	Saves measured value of actual range for each channel as new offset if zero valve is opened
_SNKA_Km	_SNKA_s	Saves measured value of actual range as new offset if zero valve is opened

2.2.15 SEKA: Saves measured value as new span value

Command	Response	Description
_SEKA_K0	_SEKA_s	Saves new span values for each channel if span valve is opened
_SEKA_Km	_SEKA_s	Saves measured value of actual range as new span value if span valve is opened

2.2.16 SUDP: Start / Stop UDP data streaming

Command	Response	Description
_SUDP_K0_ON	_SUDP_s	Start Data streaming via the UDP channel. You need to configure the channel before with EUDP command
_SUDP_K0_OFF	_SUDP_s	Stop streaming via the UDP channel

2.2.17 SFGR: Reset calibration settings to factory default

Command	Response	Description
_SFGR_Km	_SFGR_s	Reset calibration settings of channel m to their factory default settings.

2.3 Settings

2.3.1 EKAK: The four span gas concentration values are set

Command	Response	Description
_EKAK_Km_M1_w.w_M2_x.x_M3_y.y_M4_z.z	_EKAK_s	Set end gas values for channel m

2.3.2 EMBE: The four measuring range end values are set

Command	Response	Description
_EMBE_Km_M1_w.w_M2_x.x_M3_y.y_M4_z.z	_EMBE_s	Set range limits

2.3.3 EMBU: The upper and lower range switchover for auto range are set

Command	Response	Description
_EMBU_Km_M1_w.w_W.W_M2_x.x_X.X_M3_y.y_Y.Y_M4_z.z_Z.Z	_EMBU_s	Set lower and upper range switchover limits

2.3.4 EKEN: Set device identification and information

Command	Response	Description
_EKEN_K0_new device-name	_EKEN_s	Set new device identification Maximum length of device name are 40 characters

To change device identification, you must first rename the device to “RESET”.
Now a name up to 40 letters can be given.
Note: The device name must not have any blanks between, e.g. “CAI CLD” is not allowed. You can use underscore instead, e.g. “CAI_CLD”.

2.3.5 EGRD: Set polynomial coefficients

Command	Response	Description
_EGRD_Km_Mn_a0_a1_a2_a3_a4	_EGRD_s	Set polynomial coefficients of range Mn on channel m

2.3.6 EFGR: Set factory polynomial coefficients (calibration defaults) NOT FOR CUSTOMERS!

Command	Response	Description
_EFGR_Km_Mn_a0_a1_a2_a3_a4	_EFGR_s	Set FACTORY polynomial coefficients of range n on channel m

2.3.7 EFDA: Set auto calibration and purge time

Command	Response	Description
_EFDA_Km_SATK_z_y_x_w	_EFDA_s	Set auto cal. times for channel m: z: Purge time y: Calibration time x: Total calibration time w: Verify time (z, y, x, w in seconds)
_EFDA_K0_SSPL_z	_EFDA_s	Set analyzer purge time to z sec.

2.3.8 EPAR: Set auto calibration tolerance values

Command	Response	Description
_EPAR_Km_SATK_z.z_y.y_x.x_w.w	_EPAR_s	Autocalibration tolerance value [%]: z.z:Range 1 y.y:Range 2 x.x:Range 3 w.w:Range 4

2.3.9 ESYZ: Set system time

Command	Response	Description
_ESYZ_K0_yymmdd_hhmmss	_ESYZ_s	Set system time: yymmdd: year, month, day (each 2 characters wide, no spaces) hhmmss: hour, minutes, seconds (each 2 characters, no spaces)

2.3.10 ET90: Set low pass filter time

Command	Response	Description
_ET90_K0_t	_ET90_s	Set low pass filter time: t: filter time constant in seconds

2.3.11 EDAL: Set diagnostic alarm limits

Command	Response	Description
_EDAL_K0_x_x.min_x.max	_EDAL_s	Set alarm limits of x

Alarm Limits:

1	Flow of channel 1
2	Flow of channel 2
3	Flow of channel 3
4	External analog in 1
5	External analog in 2
6	Pressure
7	Temperature
8	Sample concentration channel 1
9	Sample concentration channel 2
10	Sample concentration channel 3
11…13	Temperature alarm limits (channel 1…3)
14…16	EPC voltage alarm limits (channel 1…3)

2.3.12 ETCP: Set TCP/IP parameters

Command	Response	Description
_ETCP_K0_zzz.zzz.zzz.zzz _yyy.yyy.yyy.yyy _xxxx	_EDAL_s	zzz: TCP/IP address yyy: TCP/IP subnet mask xxxx: TCP/IP port All changes take effect after next power on cycle

2.3.13 EH2O: Set H2O correction parameters

Command	Response	Description
_EH2O_Km_z.z_y.y_x.x	_EH2O_s	z.z: dry y.y: 1st order coefficient x.x: 2nd order coefficient

2.3.14 ECO2: Set CO2 correction parameters

Command	Response	Description
_ECO2_Km_z.z_y.y_x.x_w.w	_ECO2_s	z.z: Offset y.y: MinAin x.x: 1st order coefficient w.w: 2nd order coefficient

2.3.15 EUDP: Set UDP Data streaming parameters

Command	Response	Description
_EUDP_K0_<UDPPort>_<DataFrequeny>_[<Mode>]_[<UDP_IP>]_[DATA]	_EUDP_s	Configure an UDP channel for data streaming of the measuring values via Ethernet UDP. Port: port for open the UDP connection DataFrequency: Frequency for transmit the data in Hz Mode: A: ASCII Mode (optional) UDP_IP: Alternative IP address for open the UDP connection when it should not use the IP of connected TCP/IP client (optional). DATA: See description below (optional)

DATA format:

DATA is any number of AK commands delimited by a semicolon (;). Replace spaces in the AK command with a underscore (_).
If data is given UDP_IP has to be set to a legal IP address or a hyphen (-) if default address should be used.
If DATA is omitted, “AKON K0” is used as default streaming data.

Format of the streaming Data via UDP:

ASCII Mode:
The measuring values will be sent with ASCII signs. The format is:
<Sequence number> <data>

The sequence number will be incremented with every data packet, which is sent.
<data> is the AK four character code followed by the answer. See corresponding AK command description.

Example:

Sending “EUDP K0 7001 2 A – AKON_K0;ADUF_K0” will give following streaming result:
“123 AKON 4.07 901.33 22.50 3481639460 ADUF 4.30 4.59 4.45”, where 123 is the sequence number.

2.3.16 EGRW: Set maximum allowed absolute/relative deviations

Command	Response	Description
_EGRW_Km_Mn_z.z_y.y	_EGRW_s	Allowed deviations for range n [%]: z.z : absoulte y.y : relative Channel m

2.4 Abbreviations

Km	: 'K' + channel number (→K1 .. K3)
Mn	: Measuring range number
M1 .. M4	: Measuring Range 1 .. 4
w.w .. z.z.	: Numerical value
W.W .. Z.Z.	: Numerical value
T	: Numeric integer value
x	: Number
a0 .. a4	: Polynomial coefficients
s	: Status