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Reference manual

KERN Communications Protocol (KCP)

KERN KCP

Version 1.1

02/2017

GB



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1 Brief outline

The KERN Communications Protocol (KCP) is a standardized interface command set for KERN balances and other instruments, which allows retrieving and controlling all relevant functions and functions of the device. KERN instruments featuring KCP are thus easily integrated with computers, industrial controllers and other digital systems.

This section gives an overview over the general command and response structure and lists the few basic commands required to handle the vast majority of applications.

1.1 Default interface communication parameters

By default, each KCP device comes preset to the following communication parameters. The applicable parameters depend on the type of communication interface:

Interfaces	Parameters			
RS-232 / RS-485 / Bluetooth SPP	Baud rate:	9600 baud/s	Data bits:	8 bits
	Parity:	none	Stop bits:	1 bit

1.2 Basic command and response format

KCP is based on simple ASCII-encoded text commands and responses. Every interaction consists of a command, possibly with arguments separated by spaces (symbol `␣`) and terminated by Windows-style newline characters (`<CR><LF>`):

Command		Arguments					Terminator	
<code><cmd></code>	<code>␣</code>	<code><arg1></code>	<code>␣</code>	<code><arg2></code>	<code>␣</code>	<code><arg3></code>	<code>...</code>	<code><CR></code> <code><LF></code>

Correctly formatted commands are answered with a response containing the requested data including or following a confirmation of the following form:

Response		Status		Data	Terminator	
<code><cmd></code>	<code>␣</code>	A = accepted / acknowledge L = logical error / invalid parameter I = internal / technical error	<code>␣</code>	<i>command specific</i>	<code><CR></code>	<code><LF></code>
ES		<i>Erroneous syntax or unknown command</i>			<code><CR></code>	<code><LF></code>

Example: Command “Set indication unit to grams (g)” with response “accepted”

Command:	U	␣	g	<CR>	<LF>	→	Response:	U	␣	A	<CR>	<LF>
dec:	85	32	103	13	10		dec:	85	32	65	13	10
hex:	55	20	67	0D	0A		hex:	55	20	41	0D	0A

Example: Command “Set indication unit to invalid unit” with response “logical error”

Command:	U	␣	X	<CR>	<LF>	→	Response:	U	␣	L	<CR>	<LF>
dec:	85	32	88	13	10		dec:	85	32	76	13	10
hex:	55	20	58	0D	0A		hex:	55	20	4C	0D	0A

Example: Invalid command

Command:	U	␣	g	<CR>	<LF>	→	Response:	ES	<CR>	<LF>
dec:	85	32	103	13	10		dec:	69 83	13	10
hex:	55	20	67	0D	0A		hex:	45 53	0D	0A

1.3 Language conventions

Throughout this manual, the following conventions are used for command and response syntax:

<code>␣</code>	Space symbol (dec 32, hex 20)
↓	Commands sent to the balance / measurement device.
↑	Responses of the balance / measurement device

1.4 Overview of basic commands

	Request stable indication (weighing or measured value) in the host unit (by default the current indication unit). Waits until indication fulfills the “stable” condition or until configured timeout is reached.	
↓	S	
↑	S_S_____100.00_g S_S_____ -100.00_g S_S_____1152.05_kg S_I S_+ or S_-	Indication value is right aligned, 10 characters. Decimal sign is a point. The minus sign immediately precedes the numerical value – without leading zero. On multi-range devices, hidden trailing decimals are shown as spaces. Status “S” = current indication is stable Status “D” = current indication is unstable / dynamic In menu, currently executing another command or timeout reached. Overload or underload

	Request immediate indication in the host unit (by default the current indication unit) Immediately sends the current indication without waiting for stable conditions.	
↓	SI	
↑	SI_S_____100.00_g SI_D_____99.98_g SI_I SI_+ or S_-	<i>see description of command “S”</i> In menu, currently executing another command or timeout reached. Overload or underload

	Zero indication	Tare indication	
↓	Z	T	
↑	Z_A Z_I Z_+ or Z_-	T_A T_I T_+ or T_-	Zeroing/taring successful. In menu, currently executing another command or timeout reached. Overload or underload; or zero range exceeded

	Query or set display and host unit		
↓	U	Query current display unit	
↑	U_A<unit>	Current display unit is <unit>	
↓	U_<unit>	Set current display and host unit.	Units: g,kg,mg, lb,pcs,%, N,kN,TF,KLBF,...
↑	U_A U_I	Unit successfully set Invalid unit.	

	Set mode of indication (Peak or track mode)	
↓	SIM	Query current mode of indication
↑	SIM_A<mode>	Current mode of indication is <mode>
↓	SIM_<mode>	Set current mode of indication and reset the current peak value. <mode> is one of the following: • T = Track mode (indicate the current measurand) • P = Peak mode (only indicate the largest value +/-) • P+ = Peak positive mode (only indicate the largest pos. value) • P- = Peak negative mode (only indicate the largest neg. value)
↑	SIM_A SIM_I	Mode successfully set, current peak value is zero. Invalid <mode>

	Read measurement memory / reports Sends all available recorded data in a unspecified tabular form (separated by spaces)	
↓	SMEM	
↑	SMEM_A_START	Command understood, next lines will be the data in tabular form
	<header line>	Number Date Time Mode Indication
	<data line 1>	1 2016-01-13 12:34:56 T 12.3456 N
	<data line 2>	2 2016-02-22 12:37:15 P+ 12.3456 kN
	<data line 3>	3 2016-03-31 12:39:41 P- -1234.56 N
	SMEM_A_END	End of data