Knick

Common Interface Specification

Protos II 4400

Unical
Device Description
Time Sync

[CIS]
Version 1.0

www.knick-international.com

Contents

1 Introduction

Through its digital communication modules, Protos provides access to various device functions. Interfaces that are the same across all communication modules are available for many of these functions. This document describes these interfaces.

1.1 Addressing the Interface Parameters

This general document does not list any specific PROFIBUS, PROFINET, or HART addresses for the individual parameters. They are available under the name of the parameter in the descriptions of the relevant Protos II 4400 communication module.

1.2 Bit Fields and Bit Definitions

Bit positions inside values are written as hexadecimal values (e.g., 0x02). This means the bit or bits that indicate a 1 in the binary representation of this number (e.g., 0x02 = b00000010).

The following applies to all the bit fields listed in the coding sections of the parameter tables: Bits that are not explicitly listed are reserved. They must be ignored for read access and set to zero for write access.

Values in decimal notation represent a numerical value and do not symbolize a bit position in bit fields.

1.3 Parameter Names

The names of parameters are written in capital letters and begin with the code of the function group (e.g., DSC_AVAILABLE).

If a parameter contains subparameters (Elements), they are written in CamelCase notation (e.g., FirmwareVersion). If a parameter does not contain subparameters, the name of the parameter is repeated as the element.

If symbolic names for values or bit definitions are used, they are written in capital letters but do not begin with a characteristic code.

2 Unical

An interface consisting of four 16-bit parameters is available for controlling and monitoring Unical.

Controlling:

UNICAL_CONTROL	Control the position of the retractable fitting and start Unical programs

Monitoring:

UNICAL_STATUS	Position of the retractable fitting, alarm, program currently being executed
UNICAL_MESSAGES	Collective messages about alarms or maintenance states
UNICAL_STEP	Current step of a running Unical program

2.1 Note

The “Wait Position” program step in a Unical program is skipped if the program was started using a fieldbus interface.

2.2 Parameter Definition

Access	Parameter Description		
r	**UNICAL_STATUS** Current state of the Unical system		2 bytes
	Element		*Type*
	UNICAL_STATUS		UInt16
	Bit field with various Unical state messages *Coding*		
	0x0001	Probe in PROCESS	The retractable fitting is in the PROCESS position.
	0x0002	Probe in SERVICE	The retractable fitting is in the SERVICE position.
	0x0004	Service Switch	The service switch was actuated.
	0x0008	Alarm	An alarm related to Unical is active.
	0x0010	Program Active	One of the Unical programs is currently being executed.
	0x00E0	Active Program	This program is currently being executed: 000: No program active 001: Program P1 010: Program P2 011: Program P3 100: Program P4 101: Program P5 110: Program P6 111: Service program P7

r	**UNICAL_MESSAGES**	2 bytes
	Active messages of the Unical system	
	Element	*Type*
	UNICAL_MESSAGES	UInt16

Bit field in which each bit stands for a group of messages. Any combination of bits can be set together.

Coding		Possible Trigger
0x0001	Probe Maint. Request	U231 Probe PROCESS Travel Time U234 Probe SERVICE Travel Time
0x0002	Media Adapter Maint. Request	U190 Container I Almost Empty U191 Container II Almost Empty U192 Container III Almost Empty
0x0004	Unical Basic Unit Maint. Request	U229 Sensor Removal Safeguard Defective U233 Water Pressure Sensor U235 Safety Valve Defective U248 Water Valve Defective
0x0008	Medium Maint. Request	U241 Rinsing Medium Monitoring U242 Medium I Monitoring U243 Medium II Monitoring U244 Medium III Monitoring U245 Aux 1 Monitoring U246 Aux 2 Monitoring
0x0010	Probe Failure	U227 Probe SERVICE Limit Position U230 Probe PROCESS Limit Position
0x0020	Media Adapter Failure	U194 Container I Empty U195 Container II Empty U196 Container III Empty
0x0040	Unical Basic Unit Failure	U217 Immersion Lock: Sensor Not Connected U218 Immersion Lock: Sensocheck Glass U220 Compressed Air Sensor
0x0080	Calibration Error	U251 Calibration Error pH U255 Calibration Error ORP
0x0100	Sensor Monitoring	Messages that were activated in the Sensor Monitoring menu for the sensor channels assigned to Unical

r	**UNICAL_STEP**	2 bytes
	Current step of the running Unical program	
	Element	*Type*
	UNICAL_STEP	UInt16
	Bit field in which the program step currently being executed is displayed Each step of a Unical program has a program step number. This number can be seen when configuring the programs. The function code indicates the type of program step involved. *Coding*	
	0x003E Program Step	Number of the current program step 0: No program active 1…32: Number of the program step that is currently being executed
	0xFF00 Function Code	Function of the current program step 0: Program End 1: Probe in SERVICE 2: Probe in PROCESS 3: Water On 4: Water Off 7: Measuring Time 8: Waiting Time 9: Wait Position (Service) 10: Goto Line 32: Wait Position 63: Space 142: Pump 1 143: Pump 2 144: Pump 3 151: Cal Point 1 152: Cal Point 2 159: ORP Check 217: Aux 1 On 218: Aux 1 Off 219: Aux 2 On 220: Aux 2 Off

rw	**UNICAL_CONTROL**	2 bytes
	Activates the service state and starts Unical programs	
	Element	*Type*
	UNICAL_CONTROL	UInt16

Coding

0x0002	Service State	This bit puts Unical in the service state and holds the retractable fitting in the SERVICE position. 0: Do not request the service state 1: Request the service state However, Unical only cancels the service state and returns the retractable fitting to its normal operating position (Continuous mode: PROCESS, Short-Time Measurement mode: SERVICE) if no other system component, such as the service switch, requests the service state. When the service mode is activated or deactivated, the appropriate part of the service program is executed to move the retractable fitting to the desired position. The service program is not executed if the retractable fitting is already in the desired position. If the service state is requested when a program is running, the program is canceled.
0x0004	Time Control	This bit controls whether time-controlled program starts configured on Protos are executed or deactivated. 0: Time control deactivated 1: Time control active
0x00E0	Program Start	This control starts a Unical program. The bit combination transmitted in these three bits determines which program is started. 000: No program 001: Program P1 010: Program P2 011: Program P3 100: Program P4 101: Program P5 110: Program P6 Programs that have already been started are not interrupted when the bit is reset to 000 or another program is set. Programs can be started and executed while the retractable fitting is held in the SERVICE position with the service state bit (0x0002).

3 Device Description

The Device Description function offers the option to automate the complete identification of all components that belong to a Protos measuring point.

To do this, the following information is provided for all components, i.e., Protos FRONT, BASE, all plugged-in modules, all connected sensors, and Unical:

Identifier	Example
Order code	SE555
Serial number	1234567
Hardware version	1.0.0
Firmware version	1.0.3

3.1 Parameter Definition

Access	Parameter Description	
r	**DSC_AVAILABLE**	4 bytes
	Bit field that shows which components are active at this Protos measuring point. The associated DSC_* parameters are only filled for these components.	
	Element	*Type*
	DSC_AVAILABLE	UInt32
	Bit field in which the bit set to 1 indicates the presence of the assigned component	
	Coding	
	0x00000002	FRONT
	0x00000004	BASE
	0x00000008	Module at slot 1
	0x00000010	Module at slot 1 – Component on channel A
	0x00000020	Module at slot 1 – Component on channel B
	0x00000040	Module at slot 1 – Component on channel C
	0x00000080	Module at slot 2
	0x00000100	Module at slot 2 – Component on channel A
	0x00000200	Module at slot 2 – Component on channel B
	0x00000400	Module at slot 2 – Component on channel C
	0x00000800	Module at slot 3
	0x00001000	Module at slot 3 – Component on channel A
	0x00002000	Module at slot 3 – Component on channel B
	0x00004000	Module at slot 3 – Component on channel C

r	**DSC_FRONT** Identifiers of the FRONT component	86 bytes
	Element	*Type*
	OrderID	ASCII[32]
	Order code *Coding* Unused positions are filled with trailing blank spaces (0x20).	
	Serial	ASCII[16]
	Serial number *Coding* Unused positions are filled with trailing blank spaces (0x20).	
	Hardware Version	ASCII[8]
	Coding [xx.xx.xx] e.g., “01.00.00”	
	Firmware Version	ASCII[30]
	Coding [xx.xx.xx] e.g., “01.00.02” If a component contains multiple firmwares, their versions are listed using “/”, e.g., “01.00.02 / 01.02.00“ Unused positions are filled with trailing blank spaces (0x20).	
r	**DSC_BASE** Identifiers of the BASE component For the elements, see DSC_FRONT	86 bytes
r	**DSC_MOD1** Identifiers of the module component at slot 1 For the elements, see DSC_FRONT	86 bytes
r	**DSC_MOD1_CHANNEL_A** Identifiers of the component at module 1, channel A For the elements, see DSC_FRONT	86 bytes
r	**DSC_MOD1_CHANNEL_B** Identifiers of the component at module 1, channel B For the elements, see DSC_FRONT	86 bytes
r	**DSC_MOD1_CHANNEL_C** Identifiers of the component at module 1, channel C For the elements, see DSC_FRONT	86 bytes
r	**DSC_MOD2** Identifiers of the module component at slot 2 For the elements, see DSC_FRONT	86 bytes
r	**DSC_MOD2_CHANNEL_A** Identifiers of the component at module 2, channel A For the elements, see DSC_FRONT	86 bytes
r	**DSC_MOD2_CHANNEL_B** Identifiers of the component at module 2, channel B For the elements, see DSC_FRONT	86 bytes

r	**DSC_MOD2_CHANNEL_C** Identifiers of the component at module 2, channel C For the elements, see DSC_FRONT	86 bytes
r	**DSC_MOD3** Identifiers of the module component at slot 3 For the elements, see DSC_FRONT	86 bytes
r	**DSC_MOD3_CHANNEL_A** Identifiers of the component at module 3, channel A For the elements, see DSC_FRONT	86 bytes
r	**DSC_MOD3_CHANNEL_B** Identifiers of the component at module 3, channel B For the elements, see DSC_FRONT	86 bytes
r	**DSC_MOD3_CHANNEL_C** Identifiers of the component at module 3, channel C For the elements, see DSC_FRONT	86 bytes

4 Time Synchronization (Time Sync)

This function can be used to set the clock of Protos so that it synchronizes with the higher-level time base of a production plant.

To do this, the current time of the production plant is transmitted to Protos in the LDT (Long Date and Time) format. This time format, which is well known in information and automation technology, is based on the number of nanoseconds since January 1, 1970, and therefore contains both the date and the time. In the Siemens TIA Portal, for example, this time type is known as DATE_AND_LTIME.

4.1 Parameter Definition

<table>
<tr><th>Access</th><th>Parameter Description</th></tr>
<tr><td>r/w</td><td>
TS_TIME_SYNC 8 bytes
Enables the internal Protos time to be synchronized with an externally provided time reference.
<table>
<tr><td>Element</td><td>Type</td></tr>
<tr><td>TS_TIME_SYNC</td><td>UInt64</td></tr>
<tr><td colspan="2">The time to be set in the Protos in the LDT format. This format maps the number of nanoseconds since 1970 in a 64-bit counter.
Example:
<table>
<tr><th>Time</th><th>LDT (decimal)</th><th>LDT (hexadecimal)</th></tr>
<tr><td>January 27, 2026 08:31:39</td><td>1769502699000000000</td><td>0x188E89545AFD6E00</td></tr>
</table>
</td></tr>
</table>
</td></tr>
</table>

Knick
Elektronische Messgeräte
GmbH & Co. KG

Beuckestraße 22
14163 Berlin
Germany
Phone: +49 30 80191-0
Fax: +49 30 80191-200
info@knick.de
www.knick-international.com

TE-300.214-KNEN01

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