Technical Reference Manual CANEO series4x

Firmware V5.x

Revision: B
Date: 2022-06-23

Contents

IO-Link-Interface

IO-Link Specification: V1.1.2 (July 2013)

Vendor ID	1239			
Device Family	Capacitive Sensors			
Device Name	CANEO series40 CANEO series41 CANEO series43 CANEO series46	CANEO series40 Display CANEO series41 Display CANEO series43 Display	CANEO series44 Glass Display	CANEO series44 Glass
Device ID	1024	1280	1792	2048
IODD	IODDfinder.io-link.com	IODDfinder.io-link.com	IODDfinder.io-link.com	IODDfinder.io-link.com

Device Variants

With Display

Product ID	Name	Description
CD40K-MSBN	CANEO series40 Puck Display M12 connector	SENSORswitch incl. 7-Segment display and M12 connector
CD41A-APBK	CANEO series41 Solid Display red M12 connector	SENSORswitch incl. 7-Segment display with mounting support aluminum, red cover ring (RAL 3020), and M12 connector
CD41A-AQBK	CANEO series41 Solid Display gray M12 connector	SENSORswitch incl. 7-Segment display with mounting support aluminum, gray cover ring (RAL 7042), and M12 connector

CD41A-ARBK	CANEO series41 Solid Display black M12 connector	SENSORswitch incl. 7-Segment display with mounting support aluminum, black cover ring (RAL 9017), and M12 connector
CD41A-ASBK	CANEO series41 Solid Display yellow M12 connector	SENSORswitch incl. 7-Segment display with mounting support aluminum, yellow cover ring (RAL 1023), and M12 connector
CD41A-ATBK	CANEO series41 Solid Display green M12 connector	SENSORswitch incl. 7-Segment display with mounting support aluminum, green cover ring (RAL 6024), and M12 connector
CD41A-AUBK	CANEO series41 Solid Display blue M12 connector	SENSORswitch incl. 7-Segment display with mounting support aluminum, blue cover ring (RAL 5015), and M12 connector
CD41A-AVBK	CANEO series41 Solid Display orange M12 connector	SENSORswitch incl. 7-Segment display with mounting support aluminum, orange cover ring (RAL 2009), and M12 connector
CD41A-AWBK	CANEO series41 Solid Display white M12 connector	SENSORswitch incl. 7-Segment display with mounting support aluminum, white cover ring (RAL 9016), and M12 connector
CD41A-AZBK	CANEO series41 Solid Display gray B M12 connector	SENSORswitch incl. 7-Segment display with mounting support aluminum, gray cover ring (RAL 7043), and M12 connector
CD41K-CRBK	CANEO series41 Standard Display black M12 connector	SENSORswitch incl. 7-Segment display with black cover ring (RAL 9017) and M12 connector
CD41K-DCBL	CANEO series41 Standard Display yellow M12 connector	SENSORswitch incl. 7-Segment display with yellow cover ring (RAL 1023) and M12 connector
CD41K-DEBL	CANEO series41 Standard Display orange M12 connector	SENSORswitch incl. 7-Segment display with orange cover ring (RAL 2009) and M12 connector
CD41K-DFBL	CANEO series41 Standard Display red M12 connector	SENSORswitch incl. 7-Segment display with red cover ring (RAL 3020) and M12 connector
CD41K-DGBL	CANEO series41 Standard Display white M12 connector	SENSORswitch incl. 7-Segment display with white cover ring (RAL 9016) and M12 connector

CD41K-DHBL	CANEO series41 Standard Display gray B M12 connector	SENSORswitch incl. 7-Segment display with gray cover ring (RAL 7043) and M12 connector
CD41K-DJBL	CANEO series41 Standard Display gray M12 connector	SENSORswitch incl. 7-Segment display with gray cover ring (RAL 7042) and M12 connector
CD41K-DKBL	CANEO series41 Standard Display green M12 connector	SENSORswitch incl. 7-Segment display with green cover ring (RAL 6024) and M12 connector
CD41K-DLBL	CANEO series41 Standard Display blue M12 connector	SENSORswitch incl. 7-Segment display with blue cover ring (RAL 5015) and M12 connector
CD41K-DMBL	CANEO series41 Standard Display black M12 connector	SENSORswitch incl. 7-Segment display with black cover ring (RAL 9017) and M12 connector
CD41K-DNBQ	CANEO series41 Standard Display black strands	SENSORswitch incl. 7-segment display with black cover ring (RAL 9017) and strands
CD41K-DPBQ	CANEO series41 Standard Display red strands	SENSORswitch incl. 7-segment display with red cover ring (RAL 3020) and strands
CD41K-DQBQ	CANEO series41 Standard Display yellow strands	SENSORswitch incl. 7-segment display with yellow cover ring (RAL 1023) and strands
CD41K-DRBQ	CANEO series41 Standard Display orange strands	SENSORswitch incl. 7-segment display with orange cover ring (RAL 2009) and strands
CD41K-DSBQ	CANEO series41 Standard Display white strands	SENSORswitch incl. 7-segment display with white cover ring (RAL 9016) and strands
CD41K-DTBQ	CANEO series41 Standard Display gray B strands	SENSORswitch incl. 7-segment display with gray cover ring (RAL 7043) and strands
CD41K-DUBQ	CANEO series41 Standard Display gray A strands	SENSORswitch incl. 7-segment display with gray cover ring (RAL 7042) and strands

CD41K-DVBQ	CANEO series41 Standard Display green strands	SENSORswitch incl. 7-segment display with green cover ring (RAL 6024) and strands
CD41K-DWBQ	CANEO series41 Standard Display blue strands	SENSORswitch incl. 7-segment display with blue cover ring (RAL 5015) and strands
CD43G-JSBL	CANEO series43 Hygienic Display M12 connector	SENSORswitch incl. 7-Segment display, hygiene compliant, with M12 connector
CD43G-JTBQ	CANEO series43 Hygienic Display strands	SENSORswitch incl. 7-segment display, hygiene compliant, with strands
CD44F-EDBL	CANEO series44 Glass Display M12 connector	SENSORswitch incl. 7-Segment display for mounting behind Glass with M12 connector
CD44F-EEBQ	CANEO series44 Glass Display strands	SENSORswitch incl. 7-segment display for mounting behind Glass with strands

Without Display

Product ID	Name	Description
CS40K-MSBN	CANEO series40 Puck M12 connector	SENSORswitch with M12 connector
CS41A-APBK	CANEO series41 Solid red M12 connector	SENSORswitch with mounting support aluminum, red cover ring (RAL 3020), and M12 connector
CS41A-AQBK	CANEO series41 Solid gray M12 connector	SENSORswitch with mounting support aluminum, gray cover ring (RAL 7042), and M12 connector
CS41A-ARBK	CANEO series41 Solid black M12 connector	SENSORswitch with mounting support aluminum, black cover ring (RAL 9017), and M12 connector

CS41A-ASBK	CANEO series41 Solid yellow M12 connector	SENSORswitch with mounting support aluminum, yellow cover ring (RAL 1023), and M12 connector
CS41A-ATBK	CANEO series41 Solid green M12 connector	SENSORswitch with mounting support aluminum, green cover ring (RAL 6024), and M12 connector
CS41A-AUBK	CANEO series41 Solid blue M12 connector	SENSORswitch with mounting support aluminum, blue cover ring (RAL 5015), and M12 connector
CS41A-AVBK	CANEO series41 Solid orange M12 connector	SENSORswitch with mounting support aluminum, orange cover ring (RAL 2009), and M12 connector
CS41A-AWBK	CANEO series41 Solid white M12 connector	SENSORswitch with mounting support aluminum, white cover ring (RAL 9016), and M12 connector
CS41A-AZBK	CANEO series41 Solid gray B M12 connector	SENSORswitch with mounting support aluminum, gray cover ring (RAL 7043), and M12 connector
CS41K-CRBK	CANEO series41 Standard black M12 connector	SENSORswitch with black cover ring (RAL 9017) and M12 connector
CS41K-DCBL	CANEO series41 Standard yellow M12 connector	SENSORswitch with yellow cover ring (RAL 1023) and M12 connector
CS41K-DEBL	CANEO series41 Standard orange M12 connector	SENSORswitch with orange cover ring (RAL 2009) and M12 connector
CS41K-DFBL	CANEO series41 Standard red M12 connector	SENSORswitch with red cover ring (RAL 3020) and M12 connector
CS41K-DGBL	CANEO series41 Standard white M12 connector	SENSORswitch with white cover ring (RAL 9016) and M12 connector
CS41K-DHBL	CANEO series41 Standard gray B M12 connector	SENSORswitch with gray cover ring (RAL 7043) and M12 connector

CS41K-DJBL	CANEO series41 Standard gray M12 connector	SENSORswitch with gray cover ring (RAL 7042) and M12 connector
CS41K-DKBL	CANEO series41 Standard green M12 connector	SENSORswitch with green cover ring (RAL 6024) and M12 connector
CS41K-DLBL	CANEO series41 Standard blue M12 connector	SENSORswitch with blue cover ring (RAL 5015) and M12 connector
CS41K-DMBL	CANEO series41 Standard black M12 connector	SENSORswitch with black cover ring (RAL 9017) and M12 connector
CS41K-DNBQ	CANEO series41 Standard strands	SENSORswitch with black cover ring (RAL 9017) and strands
CS41K-DPBQ	CANEO series41 Standard red strands	SENSORswitch with red cover ring (RAL 3020) and strands
CS41K-DQBQ	CANEO series41 Standard yellow strands	SENSORswitch with yellow cover ring (RAL 1023) and strands
CS41K-DRBQ	CANEO series41 Standard orange strands	SENSORswitch with orange cover ring (RAL 2009) and strands
CS41K-DSBQ	CANEO series41 Standard white strands	SENSORswitch with white cover ring (RAL 9016) and strands
CS41K-DTBQ	CANEO series41 Standard gray B strands	SENSORswitch with gray cover ring (RAL 7043) and strands
CS41K-DUBQ	CANEO series41 Standard gray A strands	SENSORswitch with gray cover ring (RAL 7042) and strands
CS41K-DVBQ	CANEO series41 Standard green strands	SENSORswitch with green cover ring (RAL 6024) and strands

CS41K-DWBQ	CANEO series41 Standard blue strands	SENSORswitch with blue cover ring (RAL 5015) and strands
CS43G-JSBL	CANEO series43 Hygienic M12 connector	SENSORswitch, hygiene compliant, with M12 connector
CS43G-JTBQ	CANEO series43 Hygienic strands	SENSORswitch, hygiene compliant, with strands
CS44F-EDBL	CANEO series44 Glass M12 connector	SENSORswitch for mounting behind Glass with M12 connector
CS44F-EEBQ	CANEO series44 Glass strands	SENSORswitch for mounting behind Glass with strands
CS46A-GABM	CANEO series46 Solid red M12 connector	SENSORswitch with mounting support aluminum, red cover ring (RAL 3020) and M12 connector
CS46A-GBBM	CANEO series46 Solid yellow M12 connector	SENSORswitch with mounting support aluminum, yellow cover ring (RAL 1023) and M12 connector
CS46A-GCBM	CANEO series46 Solid orange M12 connector	SENSORswitch with mounting support aluminum, orange cover ring (RAL 2009) and M12 connector
CS46A-GDBM	CANEO series46 Solid white M12 connector	SENSORswitch with mounting support aluminum, white cover ring (RAL 9016) and M12 connector
CS46A-GEBM	CANEO series46 Solid gray B M12 connector	SENSORswitch with mounting support aluminum, gray cover ring (RAL 7043) and M12 connector
CS46A-GFBM	CANEO series46 Solid gray M12 connector	SENSORswitch with mounting support aluminum, gray cover ring (RAL 7042) and M12 connector
CS46A-GGBM	CANEO series46 Solid green M12 connector	SENSORswitch with mounting support aluminum, green cover ring (RAL 6024) and M12 connector

CS46A-GHBM	CANEO series46 Solid blue M12 connector	SENSORswitch with mounting support aluminum, blue cover ring (RAL 5015) and M12 connector
CS46A-GIBM	CANEO series46 Solid black M12 connector	SENSORswitch with mounting support aluminum, black cover ring (RAL 9017) and M12 connector
CS46K-FABM	CANEO series46 Standard red M12 connector	SENSORswitch with red cover ring (RAL 3020) and M12 connector
CS46K-FBBM	CANEO series46 Standard yellow M12 connector	SENSORswitch with yellow cover ring (RAL 1023) and M12 connector
CS46K-FCBM	CANEO series46 Standard orange M12 connector	SENSORswitch with orange cover ring (RAL 2009) and M12 connector
CS46K-FDBM	CANEO series46 Standard white M12 connector	SENSORswitch with white cover ring (RAL 9016) and M12 connector
CS46K-FEBM	CANEO series46 Standard gray M12 connector	SENSORswitch with gray cover ring (RAL 7043) and M12 connector
CS46K-FFBM	CANEO series46 Standard gray M12 connector	SENSORswitch with gray cover ring (RAL 7042) and M12 connector
CS46K-FGBM	CANEO series46 Standard green M12 connector	SENSORswitch with green cover ring (RAL 6024) and M12 connector
CS46K-FHBM	CANEO series46 Standard blue M12 connector	SENSORswitch with blue cover ring (RAL 5015) and M12 connector
CS46K-FIBM	CANEO series46 Standard black M12 connector	SENSORswitch with black cover ring (RAL 9017) and M12 connector

Communication Interface

IO-Link Version	V1.1
Bitrate	COM2
Minimum Cycle Time	14800µs
Process Data Input Bits	80
Process Data Output Bits	112
SIO Supported	Yes
ISDU Supported	Yes
Data Storage	Yes
Block Parameter	No

Process Data

Process Data Input

Bit Length: 80

Bit Offset	Name	Datatype	Values	Info
0	Pin 2	8-bit UIntegerT	4 - Input - OFF 5 - Input - ON 8 - Pin unused	E1 input pin state 4 - Input - OFF: No Input signal (voltage level according to "E1/E2 Mode") on pin 5 - Input - ON: Input signal (voltage level according to "E1/E2 Mode") on pin 8 - Pin unused: Pin not used (cf. parameter "Active Inputs")
8	Pin 4	8-bit UIntegerT	0 - Output - OFF 1 - Output - ON	OUT pin state 0 - Output - OFF: SENSORswitch output not switched 1 - Output - ON: SENSORswitch output switched on
16	Pin 5	8-bit UIntegerT	4 - Input - OFF 5 - Input - ON 8 - Pin unused	E2 input pin state 4 - Input - OFF: No Input signal (voltage level according to "E1/E2 Mode") on pin 5 - Input - ON: Input signal (voltage level according to "E1/E2 Mode") on pin 8 - Pin unused: Pin not used (cf. parameter "Active Inputs")
24	Actuation Flag	8-bit UIntegerT	0 - Idle 1 - Actuated	0 - Idle: Sensor is not actuated 1 - Actuated: Sensor is actuated

32	Actuation Count	16-bit UIntegerT	0 ... 65535	Number of actuation cycles since sensor has been turned on. Counter resets when sensor restarts and after count of 65535 has been reached.
48	Actuation Strength	8-bit UIntegerT	0...100 [%]	Damping of sensor in percent.
56	Surrounding Brightness	8-bit UIntegerT	0...100 [%]	Ambient brightness in percent.
64	unused	16-bit UIntegerT	0 ... 65535	

Process Data Output

Bit Length: 112

Condition "LED Control Mode = 0"

unused

Condition "LED Control Mode = 1"

Bit Offset	Name	Datatype	Values	Info
0	LED Scene	8-bit UIntegerT	0...7 255 - Automatic	Switch between LED scenes “0” to “7”. For control by activation and input pins set value to “255”.
The following data applies only for Display variants				
8	Display Mode	8-bit UIntegerT	0 - Use text from Scene	0 - Use text from Scene: Displays the text predefined in scene. 1 - Number given: Displays the number set in Process Data Output

			1 - Number given 2 - Digits given	“Displayed Number” 2 - Digits given: Displays the digits set in Process Data Output “Display Digit 1” to “Display Digit 4”
16	Displayed Number	16-bit UIntegerT	0...9999	Number between "0" and "9999".
32	Display Digit 1	8-bit UIntegerT	0 ... 255	Set digits as ASCII-code. See section “Display Content” below
40	Display Digit 2	8-bit UIntegerT	0 ... 255	Set digits as ASCII-code. See section “Display Content” below
48	Display Digit 3	8-bit UIntegerT	0 ... 255	Set digits as ASCII-code. See section “Display Content” below
56	Display Digit 4	8-bit UIntegerT	0 ... 255	Set digits as ASCII-code. See section “Display Content” below

Condition "LED Control Mode = 2"

Bit Offset	Name	Datatype	Values	Info
0	Active LEDs	16-bit UIntegerT	0 ... 65535	Bitmask, defining which LEDs are active
16	LED Brightness	8-bit UIntegerT	0...100 255 - Automatic Control [%]	Brightness of LED ring in percent. Value of 255 means automatic brightness control by sensor.
24	LED Color R	8-bit UIntegerT	0 ... 255	Red component of LED color

32	LED Color G	8-bit UIntegerT	0 ... 255	Green component of LED color
40	LED Color B	8-bit UIntegerT	0 ... 255	Blue component of LED color
48	LED Effect	8-bit UIntegerT	0 - Static Ring 1 - Flash Ring 2 - Pulse Ring 3 - Throbber Clockwise 22 - Throbber Counter Clockwise 4 - Solid Arrow Up 5 - Solid Arrow Down 6 - Solid Arrow Left 7 - Solid Arrow Right 8 - Flash Arrow Up 9 - Flash Arrow Down 10 - Flash Arrow Left 11 - Flash Arrow Right 12 - Animated Arrow Up 13 - Animated Arrow Down 14 - Animated Arrow Left 15 - Animated Arrow Right 16 - Circle Point Clockwise 17 - Circle Point Counter Clockwise 18 - Circle Fill Clockwise	

			19 - Circle Fill Counter Clockwise 20 - Static Ring Even 21 - Static Ring Odd	
56	Effect Frequency	8-bit UIntegerT	1...60 0 - Default Frequency [0.1 Hz]	Frequency of LED effect in 1/10 Hz, range: 0.1 ... 6 Hz.
The following data applies only for Display variants				
64	Display Digit 1	8-bit UIntegerT	0 ... 255	Set digits as ASCII-code. See section “Display Content” below
72	Display Digit 2	8-bit UIntegerT	0 ... 255	Set digits as ASCII-code. See section “Display Content” below
80	Display Digit 3	8-bit UIntegerT	0 ... 255	Set digits as ASCII-code. See section “Display Content” below
88	Display Digit 4	8-bit UIntegerT	0 ... 255	Set digits as ASCII-code. See section “Display Content” below
96	Display Brightness	8-bit UIntegerT	0...100 255 - Automatic Control [%]	Brightness of 7 segment display in percent. Value of 255 means automatic brightness control by sensor.

Events

EventCodes	Definition and recommended maintenance action	Type
6144	Output Overload - Output current too high - max. 200 mA	Error
16912	Device temperature over-run - Clear source of heat	Warning
16928	Device temperature under-run - Insulate device	Warning
20496	Component malfunction - Repair or exchange	Error
20752	Primary supply voltage over-run - Check tolerance	Warning
20753	Primary supply voltage under-run - Check tolerance	Warning

Commands

ISDU Index 2 - System Command

Value	Name	Description
128	Device Reset	Reset the device
130	Restore Factory Settings	Restore Factory Settings
160	Trigger Self-Test	Self-Test will activate the switch; in Toggle mode the switch will remain activated

ISDU Indices

Access Rights: ro - Read Only, rw - Read/Write, wo - Write Only

Name	Index (- Subindex)	Access	Values	Description
System Command	2	wo	see above	
Identification				
Vendor Name	16	ro	CAPTRON Electronic GmbH	
Product Name	18	ro	CANEO series44 Glass Display	
Product ID	19	ro	CD44F-EDBL	

Product Text	20	ro		
Symbol	276	ro		
Hardware Identification Key	17342	ro		
Serial Number	21	ro		
Firmware Version	23	ro		
Parameter				
Activation				
Sensor Mode	261	rw	3 - Static 2 - Dynamic 1 - Toggle	3 - Static: The user touches the sensor and the output is switched on until the user is no longer touching the sensor (but is at least on for the “Output Minimum Impulse Time”). 2 - Dynamic: The user touches the sensor and the output switches on momentarily. The output is on as long as “Output Minimum Impulse Time” is set; even though the user continues touching, the output will switch off. 1 - Toggle: The user touches the sensor to switch the output on and touches the sensor once more to switch the output off. Can only be set back after “Output Minimum Impulse Time” is over.
Touch Sensitivity	260	rw	0 - High 1 - Middle 2 - Low	0 - High: required Actuation Strength > 4%. 1 - Middle: required Actuation Strength > 14%. 2 - Low: required Actuation Strength > 24%.
Glass Thickness	292	rw	1 - glass below 4mm / plexiglass below 2mm 2 - glass 4mm to 7mm / plexiglass 2mm to	*series44 Glass Devices, only*

			3mm 3 - glass 8mm to 10 mm / plexiglass 4mm to 5mm	
Minimum Actuation Time	263	rw	0 ... 65535 [ms]	Time the sensor has to be activated before Output on Pin 4 switches, “Actuation Flag” is set to “Actuated” and “Actuation Count” goes up.
Minimum Actuation Time (Toggle OFF)	283	rw	0 ... 65535 [ms]	Time the sensor has to be touched in “Toggle” mode to before Output on Pin 4 turns OFF and “Actuation Flag” is set to “Idle”.
Output Activation Delay	324	rw	0 ... 65535 [ms]	Time the switching of the output is delayed when the sensor has been actuated
I/O				
Active Inputs	271	rw	3 - None (3 pin mode) 4 - Pin 2 (E1) (4 pin mode) 5 - Pin 2 (E1) and Pin 5 (E2) (5 pin mode)	3 - None (3 pin mode): Pin 2 and Pin 5 are not used, input signals are not monitored. 4 - Pin 2 (E1) (4 pin mode): Pin 2 is monitored, Pin 5 is not used and not monitored. 5 - Pin 2 (E1) and Pin 5 (E2) (5 pin mode): Pin 2 and Pin 5 are monitored.
E1/E2 Mode	272	rw	0 - Active Low 1 - Active High	0 - Active Low: Accepts a low signal as input to turn on 1 - Active High: Accepts a high signal as input to turn on
Output Locking	337	rw	0 - No locking 1 - Release by E1 2 - Release by E2 3 - Release by E1 and E2	0 - No locking: The output signal on “Pin4” will be ON when sensor is touched 1 - Release by E1: The output signal on “Pin4” will be ON when sensor is touched and gets an Input signal on E1. 2 - Release by E2: The output signal on “Pin4” will be ON when sensor is touched and gets an Input signal on E2.

				3 - Release by E1 and E2: The output signal on “Pin4” will be ON when sensor is touched and gets an Input signal on E1 and E2.
Output Mode	273	rw	0 - NPN 1 - PNP 2 - PushPull	0 - NPN: Output signal is pulled down to 0V when output is on. 1 - PNP: Output signal is pushed up to +VDC when output is on 2 - PushPull: Output signal is pushed up to +VDC when output is on, and is pulled down to 0V when it is off.
Output NO/NC	274	rw	0 - NO (Normally Open) 1 - NC (Normally Closed)	
Output Minimum Impulse Time	275	rw	10...86400000 [ms]	The minimal time (ms) of the output signal when the sensor is activated. The output signal cannot be interrupted. In toggle mode the sensor can only be deactivated after the minimal output signal length is over.
LEDs				
LED Control Mode	293	rw	0 - Automatic Scene selection 1 - Scene controlled by IO-Link Process Data 2 - Advanced control by IO-Link Process Data	0 - Automatic Scene selection: Operation of sensor using “Led Scenes” depending on “Actuation Flag” Status and E1, E2 input. Use for operation without IO-Link. 1 - Scene controlled by IO-Link Process Data: Operation of sensor using “Led Scenes” controlled via IO-Link “Process Data Output” – “LED Scene”. For use of preconfigured Scenes via IO-Link. 2 - Advanced control by IO-Link Process Data: LED display completely controlled via “Process Data Output” – Process Data, no usage of “LED Scenes”.

Adaptive LED Brightness	270	rw	0 - Off 1 - On	If turned “On” the sensor automatically adjusts the LED Brightness depending on the “Surrounding Brightness”.
Manual LED Brightness	305	rw	0...100 [%]	Brightness of LED Ring and 7-Segment Display. Sets minimal Brightness if “Adaptive LED Brightness” is turned “On”.
Rotate Button	304	rw	0 - 0° 1 - 180°	Rotate LED Display – use if Button is mounted upside down.
Boot Sequence	314	rw	0 - Off 1 - Classic 2 - CANEO	0 - Off: Immediately available. 1 - Classic: Countdown sequence. 2 - CANEO: CANEO sequence.
Custom Color 1				
R	306 - 1	rw	0 ... 255	Red component of color
G	306 - 2	rw	0 ... 255	Green component of color
B	306 - 3	rw	0 ... 255	Blue component of color
Custom Color 2				
R	307 - 1	rw	0 ... 255	Red component of color
G	307 - 2	rw	0 ... 255	Green component of color
B	307 - 3	rw	0 ... 255	Blue component of color
Timer				
Timer Function	322 - 1	rw	0 - disabled 1 - count down	0 - disabled: No timer active Scene settings apply 1 - count down: Timer is active and counts down a predefined Time, when sensor enters a certain scene

			2 - count up 3 - count up infinitely	2 - count up: Timer is active and counts up for a predefined Time, when sensor enters a certain scene 3 - count up infinitely: Timer is active and counts up infinitely, when sensor enters a certain scene
Trigger timer	322 - 2	rw	0 - when entering Scene 0 1 - when entering Scene 1 2 - when entering Scene 2 3 - when entering Scene 3 4 - when entering Scene 4 5 - when entering Scene 5 6 - when entering Scene 6 7 - when entering Scene 7	Trigger to start timer. The timer starts when sensor enters/falls back into a certain scene. - See example cases below in the section Timer.
Timer timeout	322 - 3	rw	0...9999 [s]	Time after which the timer stops.
LED Color	323 - 1	rw	0 - CANEO 1 - Red 2 - Green 3 - Blue 4 - Yellow 5 - Magenta 6 - Cyan 10 - Orange 11 - Violet	LED Color of the scene

			13 - Off 14 - Clean Blue 128 - Custom Color 1 129 - Custom Color 2	
Timer LED effect	323 - 2	rw	0 - Static Ring 1 - Flash Ring 2 - Pulse Ring 3 - Throbber Clockwise 22 - Throbber Counter Clockwise 4 - Solid Arrow Up 5 - Solid Arrow Down 6 - Solid Arrow Left 7 - Solid Arrow Right 8 - Flash Arrow Up 9 - Flash Arrow Down 10 - Flash Arrow Left 11 - Flash Arrow Right 12 - Animated Arrow Up 13 - Animated Arrow Down 14 - Animated Arrow Left 15 - Animated Arrow Right 16 - Circle Point Clockwise 17 - Circle Point Counter Clockwise 18 - Circle Fill	The following effects are synchronized with the Timer: 24 - Timer Circle Clearing Clockwise, 25 - Timer Circle Clearing Counter-Clockwise, 26 - Timer Circle Filling Clockwise, 27 - Timer Circle Filling Counter-Clockwise

			Clockwise 19 - Circle Fill Counter Clockwise 20 - Static Ring Even 21 - Static Ring Odd 24 - Timer Circle Clearing Clockwise 25 - Timer Circle Clearing Counter-Clockwise 26 - Timer Circle Filling Clockwise 27 - Timer Circle Filling Counter-Clockwise	
Effect Frequency	323 - 3	rw	1...60 0 - Default Frequency [0.1 Hz]	Frequency of LED effect in 1/10 Hz, range: 0.1 ... 6 Hz - Applies only for animated effects.
LED Scenes				
LED Scene 0 (no Touch, E1 off, E2 off)				
LED Color	295 - 1	rw	0 - CANEO 1 - Red 2 - Green 3 - Blue 4 - Yellow 5 - Magenta 6 - Cyan 10 - Orange 11 - Violet 13 - Off	LED Color of the scene

			14 - Clean Blue 128 - Custom Color 1 129 - Custom Color 2	
LED Effect	295 - 2	rw	0 - Static Ring 1 - Flash Ring 2 - Pulse Ring 3 - Throbber Clockwise 22 - Throbber Counter Clockwise 4 - Solid Arrow Up 5 - Solid Arrow Down 6 - Solid Arrow Left 7 - Solid Arrow Right 8 - Flash Arrow Up 9 - Flash Arrow Down 10 - Flash Arrow Left 11 - Flash Arrow Right 12 - Animated Arrow Up 13 - Animated Arrow Down 14 - Animated Arrow Left 15 - Animated Arrow Right 16 - Circle Point Clockwise 17 - Circle Point Counter Clockwise 18 - Circle Fill Clockwise	LED Behavior of the scene

			19 - Circle Fill Counter Clockwise 20 - Static Ring Even 21 - Static Ring Odd	
Effect Frequency	295 - 3	rw	1...60 0 - Default Frequency [0.1 Hz]	Frequency of LED effect in 1/10 Hz, range: 0.1 ... 6 Hz - Applies only for animated effects.
Displayed Text	295 - 4	rw		*For Display variants, only* See section “Display Content” below.
LED Scene 1 (Touch, E1 off, E2 off)				
LED Color	296 - 1	rw	0 - CANEO 1 - Red 2 - Green 3 - Blue 4 - Yellow 5 - Magenta 6 - Cyan 10 - Orange 11 - Violet 13 - Off 14 - Clean Blue 128 - Custom Color 1 129 - Custom Color 2	LED Color of the scene
LED Effect	296 - 2	rw	0 - Static Ring 1 - Flash Ring 2 - Pulse Ring 3 - Throbber Clockwise	LED Behavior of the scene

			22 - Throbber Counter Clockwise 4 - Solid Arrow Up 5 - Solid Arrow Down 6 - Solid Arrow Left 7 - Solid Arrow Right 8 - Flash Arrow Up 9 - Flash Arrow Down 10 - Flash Arrow Left 11 - Flash Arrow Right 12 - Animated Arrow Up 13 - Animated Arrow Down 14 - Animated Arrow Left 15 - Animated Arrow Right 16 - Circle Point Clockwise 17 - Circle Point Counter Clockwise 18 - Circle Fill Clockwise 19 - Circle Fill Counter Clockwise 20 - Static Ring Even 21 - Static Ring Odd	
Effect Frequency	296 - 3	rw	1...60 0 - Default Frequency [0.1 Hz]	Frequency of LED effect in 1/10 Hz, range: 0.1 ... 6 Hz - Applies only for animated effects.

Displayed Text	296 - 4	rw		*For Display variants, only* See section “Display Content” below.
LED Scene 2 (no Touch, E1 on, E2 off)				
LED Color	297 - 1	rw	0 - CANEO 1 - Red 2 - Green 3 - Blue 4 - Yellow 5 - Magenta 6 - Cyan 10 - Orange 11 - Violet 13 - Off 14 - Clean Blue 128 - Custom Color 1 129 - Custom Color 2	LED Color of the scene
LED Effect	297 - 2	rw	0 - Static Ring 1 - Flash Ring 2 - Pulse Ring 3 - Throbber Clockwise 22 - Throbber Counter Clockwise 4 - Solid Arrow Up 5 - Solid Arrow Down 6 - Solid Arrow Left 7 - Solid Arrow Right 8 - Flash Arrow Up 9 - Flash Arrow Down	LED Behavior of the scene

			10 - Flash Arrow Left 11 - Flash Arrow Right 12 - Animated Arrow Up 13 - Animated Arrow Down 14 - Animated Arrow Left 15 - Animated Arrow Right 16 - Circle Point Clockwise 17 - Circle Point Counter Clockwise 18 - Circle Fill Clockwise 19 - Circle Fill Counter Clockwise 20 - Static Ring Even 21 - Static Ring Odd	
Effect Frequency	297 - 3	rw	1...60 0 - Default Frequency [0.1 Hz]	Frequency of LED effect in 1/10 Hz, range: 0.1 ... 6 Hz - Applies only for animated effects.
Displayed Text	297 - 4	rw		*For Display variants, only* See section “Display Content” below.
LED Scene 3 (Touch, E1 on, E2 off)				
LED Color	298 - 1	rw	0 - CANEO 1 - Red 2 - Green	LED Color of the scene

			3 - Blue 4 - Yellow 5 - Magenta 6 - Cyan 10 - Orange 11 - Violet 13 - Off 14 - Clean Blue 128 - Custom Color 1 129 - Custom Color 2	
LED Effect	298 - 2	rw	0 - Static Ring 1 - Flash Ring 2 - Pulse Ring 3 - Throbber Clockwise 22 - Throbber Counter Clockwise 4 - Solid Arrow Up 5 - Solid Arrow Down 6 - Solid Arrow Left 7 - Solid Arrow Right 8 - Flash Arrow Up 9 - Flash Arrow Down 10 - Flash Arrow Left 11 - Flash Arrow Right 12 - Animated Arrow Up 13 - Animated Arrow Down 14 - Animated Arrow Left 15 - Animated Arrow	LED Behavior of the scene

			Right 16 - Circle Point Clockwise 17 - Circle Point Counter Clockwise 18 - Circle Fill Clockwise 19 - Circle Fill Counter Clockwise 20 - Static Ring Even 21 - Static Ring Odd	
Effect Frequency	298 - 3	rw	1...60 0 - Default Frequency [0.1 Hz]	Frequency of LED effect in 1/10 Hz, range: 0.1 ... 6 Hz - Applies only for animated effects.
Displayed Text	298 - 4	rw		*For Display variants, only* See section “Display Content” below.
LED Scene 4 (no Touch, E1 off, E2 on)				
LED Color	299 - 1	rw	0 - CANEO 1 - Red 2 - Green 3 - Blue 4 - Yellow 5 - Magenta 6 - Cyan 10 - Orange 11 - Violet 13 - Off 14 - Clean Blue	LED Color of the scene

			128 - Custom Color 1 129 - Custom Color 2	
LED Effect	299 - 2	rw	0 - Static Ring 1 - Flash Ring 2 - Pulse Ring 3 - Throbber Clockwise 22 - Throbber Counter Clockwise 4 - Solid Arrow Up 5 - Solid Arrow Down 6 - Solid Arrow Left 7 - Solid Arrow Right 8 - Flash Arrow Up 9 - Flash Arrow Down 10 - Flash Arrow Left 11 - Flash Arrow Right 12 - Animated Arrow Up 13 - Animated Arrow Down 14 - Animated Arrow Left 15 - Animated Arrow Right 16 - Circle Point Clockwise 17 - Circle Point Counter Clockwise 18 - Circle Fill Clockwise 19 - Circle Fill Counter	LED Behavior of the scene

			Clockwise 20 - Static Ring Even 21 - Static Ring Odd	
Effect Frequency	299 - 3	rw	1...60 0 - Default Frequency [0.1 Hz]	Frequency of LED effect in 1/10 Hz, range: 0.1 ... 6 Hz - Applies only for animated effects.
Displayed Text	299 - 4	rw		*For Display variants, only* See section “Display Content” below.
LED Scene 5 (Touch, E1 off, E2 on)				
LED Color	300 - 1	rw	0 - CANEO 1 - Red 2 - Green 3 - Blue 4 - Yellow 5 - Magenta 6 - Cyan 10 - Orange 11 - Violet 13 - Off 14 - Clean Blue 128 - Custom Color 1 129 - Custom Color 2	LED Color of the scene
LED Effect	300 - 2	rw	0 - Static Ring 1 - Flash Ring 2 - Pulse Ring 3 - Throbber Clockwise 22 - Throbber Counter	LED Behavior of the scene

			Clockwise 4 - Solid Arrow Up 5 - Solid Arrow Down 6 - Solid Arrow Left 7 - Solid Arrow Right 8 - Flash Arrow Up 9 - Flash Arrow Down 10 - Flash Arrow Left 11 - Flash Arrow Right 12 - Animated Arrow Up 13 - Animated Arrow Down 14 - Animated Arrow Left 15 - Animated Arrow Right 16 - Circle Point Clockwise 17 - Circle Point Counter Clockwise 18 - Circle Fill Clockwise 19 - Circle Fill Counter Clockwise 20 - Static Ring Even 21 - Static Ring Odd	
Effect Frequency	300 - 3	rw	1...60 0 - Default Frequency [0.1 Hz]	Frequency of LED effect in 1/10 Hz, range: 0.1 ... 6 Hz - Applies only for animated effects.

Displayed Text	300 - 4	rw		*For Display variants, only* See section “Display Content” below.
LED Scene 6 (no Touch, E1 on, E2 on)				
LED Color	301 - 1	rw	0 - CANEO 1 - Red 2 - Green 3 - Blue 4 - Yellow 5 - Magenta 6 - Cyan 10 - Orange 11 - Violet 13 - Off 14 - Clean Blue 128 - Custom Color 1 129 - Custom Color 2	LED Color of the scene
LED Effect	301 - 2	rw	0 - Static Ring 1 - Flash Ring 2 - Pulse Ring 3 - Throbber Clockwise 22 - Throbber Counter Clockwise 4 - Solid Arrow Up 5 - Solid Arrow Down 6 - Solid Arrow Left 7 - Solid Arrow Right 8 - Flash Arrow Up 9 - Flash Arrow Down	LED Behavior of the scene

			10 - Flash Arrow Left 11 - Flash Arrow Right 12 - Animated Arrow Up 13 - Animated Arrow Down 14 - Animated Arrow Left 15 - Animated Arrow Right 16 - Circle Point Clockwise 17 - Circle Point Counter Clockwise 18 - Circle Fill Clockwise 19 - Circle Fill Counter Clockwise 20 - Static Ring Even 21 - Static Ring Odd	
Effect Frequency	301 - 3	rw	1...60 0 - Default Frequency [0.1 Hz]	Frequency of LED effect in 1/10 Hz, range: 0.1 ... 6 Hz - Applies only for animated effects.
Displayed Text	301 - 4	rw		*For Display variants, only* See section “Display Content” below.
LED Scene 7 (Touch, E1 on, E2 on)				
LED Color	302 - 1	rw	0 - CANEO 1 - Red 2 - Green	LED Color of the scene

			3 - Blue 4 - Yellow 5 - Magenta 6 - Cyan 10 - Orange 11 - Violet 13 - Off 14 - Clean Blue 128 - Custom Color 1 129 - Custom Color 2	
LED Effect	302 - 2	rw	0 - Static Ring 1 - Flash Ring 2 - Pulse Ring 3 - Throbber Clockwise 22 - Throbber Counter Clockwise 4 - Solid Arrow Up 5 - Solid Arrow Down 6 - Solid Arrow Left 7 - Solid Arrow Right 8 - Flash Arrow Up 9 - Flash Arrow Down 10 - Flash Arrow Left 11 - Flash Arrow Right 12 - Animated Arrow Up 13 - Animated Arrow Down 14 - Animated Arrow Left 15 - Animated Arrow	LED Behavior of the scene

			Right 16 - Circle Point Clockwise 17 - Circle Point Counter Clockwise 18 - Circle Fill Clockwise 19 - Circle Fill Counter Clockwise 20 - Static Ring Even 21 - Static Ring Odd	
Effect Frequency	302 - 3	rw	1...60 0 - Default Frequency [0.1 Hz]	Frequency of LED effect in 1/10 Hz, range: 0.1 ... 6 Hz - Applies only for animated effects.
Displayed Text	302 - 4	rw		*For Display variants, only* See section “Display Content” below.
Observation				
LED Control Mode	293	rw	0 - Automatic Scene selection 1 - Scene controlled by IO-Link Process Data 2 - Advanced control by IO-Link Process Data	0 - Automatic Scene selection: Operation of sensor using “Led Scenes” depending on “Actuation Flag” Status and E1, E2 input. Use for operation without IO-Link. 1 - Scene controlled by IO-Link Process Data: Operation of sensor using “Led Scenes” controlled via IO-Link “Process Data Output” – “LED Scene”. For use of preconfigured Scenes via IO-Link. 2 - Advanced control by IO-Link Process Data: LED display completely controlled via “Process Data Output” – Process Data, no usage of “LED Scenes”.

Sensor Temperature	257	ro	-32768 ... 32767 [0.1 °C]	
Supply Voltage	256	ro	0 ... 65535 [0.001 V]	
Diagnosis				
Sensor Temperature	257	ro	-32768 ... 32767 [0.1 °C]	
Supply Voltage	256	ro	0 ... 65535 [0.001 V]	
Input E1 voltage	277	ro	0 ... 65535 [0.001 V]	
Input E2 voltage	278	ro	0 ... 65535 [0.001 V]	
MCU Voltage	279	ro	0 ... 65535 [0.001 V]	
Charge Code	280	ro	0 ... 4294967295	
Error Code	282	ro	0 ... 65535	
Flash Erase Count	259	ro	0 ... 65535	
Device Access Locks	12	rw		

LED (and Display) Control

series4x (Display) supports three modes for controlling its LEDs (and Display).

- Automatic Scene Selection
- Scene controlled by IO-Link-Process Data
- Advanced Control by IO-Link Process Data

The control mode can be selected via IO-Link parameter LED Control Mode.

Control Modes

Automatic Scene Selection (LED Control Mode = 0)

The LEDs (and Display) behave like the selected Scene. Scene *n* is selected by the state of Touch (Sensor actuation) and the state of the input pins E1 and E2:

LED Scene n	**Actuation Flag**	**E1**	**E2**	**Active Inputs**		
				None	Pin2 (E1)	Pin2 (E1) and Pin5 (E2)
0	0	0	0			
1	1	0	0			
2	0	1	0			
3	1	1	0			
4	0	0	1			

5	1	0	1			
6	0	1	1			
7	1	1	1			

The number of applicable scenes depends on parameter "*Active Inputs*":

Active Inputs	Applicable Scenes
None (3 pin mode)	0, 1
Pin2 (E1) (4 pin mode)	0 ... 3
Pin2 (E1) and Pin5 (E2) (5 pin mode)	0 ... 7

Scene controlled by IO-Link Process Data (LED Control Mode = 1)

The active Scene is set to the value written to "LED Scene". For "LED Scene" = 255, the active Scene is selected by inputs like "Automatic Scene Selection" (LED Control Mode = 0). LEDs always act like the active Scene. The Display behavior depends on "Display Mode", for more Information see part "Process Data OUT (PDout)".

Advanced Control by IO-Link Process Data (LED Control Mode = 2)

The LED color, brightness, effect and effect frequency is controlled by IO-Link process data. For more Information see part "Process Data OUT (PDout)".

Timer

The timer functionality is designed for applications without IO-Link only. This means the “LED Control Mode” needs to be set to “Automatic scene Selection” so the timer can be started by activation of the switch or the inputs E1 / E2 - see Control Modes.

Activating a scene via IO Link when “LED Control Mode” is set to “Scene controlled by IO-Link Process Data” will not activate the Timer. If you want to control a Timer via IO-Link please use the “LED Control Mode” “Advanced Control by IO-Link Process Data” and run the timer on the PLC and display the time.

Note: Timer overwrites LED effect of the scene; Led effects with prefix timer are synchronized with the timer.

Use Case 1: The output signal shall come in the beginning, before the timer runs down/up.

1. Set “Sensor Mode” to “Static” or “Dynamic”
2. Set “Timer Function” to “1 - count down” / “2 – count up”
3. Set “Trigger Timer” to “0 - when entering Scene 0”
4. Set “Timer timeout” to i.e. “10” s
5. Set “Output Minimum Impulse Time”
6. Set “LED Effect” for Timer

Note: “Sensor Mode” needs to be “Static” or “Dynamic”. If the sensor is in “Toggle” mode the timer will start when the sensor is touched for a second time since it will be in “Scene 1” after the first touch and goes back to “Scene 0” after the second.

Use Case 2: The output signal shall come at the end

1. Set “Sensor Mode” to “Static” or “Dynamic”
2. Set “Timer Function” to “1 - count down” / “2 – count up”
3. Set “Trigger Timer” to “1 - when entering Scene 1”
4. Set “Timer timeout” to i.e. “10”s
5. Set “Output Minimum Impulse Time” i.e. “300” ms
6. Set “Output Activation Delay” to i.e. “9700” ms.
7. Set “LED Effect” for Timer

Note: “Sensor Mode” needs to be “Static” or “Dynamic”.

Note: “Output Activation Delay” = “Timer timeout” - “Output Minimum Impulse Time”.

Use Case 3: The timer shall count infinitely (display up to 9999 s)

1. Set “Sensor Mode” to “Toggle” (you will have an output signal as long as the timer counts)
2. Set “Timer Function” to “Count Up Infinite”
3. Set “Trigger Timer” to “1 - when entering Scene 1”
4. Set “Output Minimum Impulse Time” i.e. “300” ms
5. Set “Output Activation Delay” to 0 ms
6. Set “LED Effect” for timer

Note: “Sensor Mode” needs to be “toggle” to get a continuous output signal as long as the counter is active.

Note: “Output Activation Delay” = “Count down/up time” - “Output Minimum Impulse Time”.

Note: The timer display / LED-ring stops counting up at 9999 s, the output signal stays until the switch is touched again.

Note: The timer can be ended if “Output Locking” is active and you put an input signal on one of the inputs.

Output Locking

The “Output Locking“ was designed for applications without IO-Link only, the sensor needs to be set to “LED Control Mode” “Automatic Scene selection”, it locks the “Pin 4” output signal but has no Impact on the “Actuation Flag”. The “Output Locking” has no influence on the scene or scene change. This means touching / inputs on E1 / E2 will change the scene accordingly – see LED Control.

For locking the inputs need to be active according to “Active inputs”.

Output locking can be used to interrupt an infinite timer / terminate an output signal.

Display Content

applies to series4x Display variants, only

Displayable Characters

Table shows all displayable characters (marked green)

ASCII Code	_0	_1	_2	_3	_4	_5	_6	_7	_8	_9	_A	_B	_C	_D	_E	_F
3_	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4_	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5_	P	Q	R	S	T	U	V	W	X	Y	Z	[	\\	]	^	_
6_	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7_	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	DEL
8_	Bit 0 to 6 of ASCII code controls segment a to g															

To do custom display pattern use 80h + (Bit 0 to 7). Bit 0 to 7 refers to segments *a* to *g* (see Segment Coding).

Example: Symbol **|-** = 80h + 0111 0000b = F0h

Segment Coding

Display Segment LEDs refer to segment *a* to *g*.

	a	
f		**b**
	g	
e		**c**
	d	

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