



# IO-Link Parameter Datasheet

## Encoder

Absolute rotary encoder

ENA36HT-S\*9-15\* series

### General Information

Device Identification	
Vendor ID	1 (0x0001)
Device ID	500901 (0x5245185)

Features	
Data storage	Yes
Block parameterization	Yes

Communication Characteristics	
IO-Link revision	V1.1 (specification V1.1.2)
IO-Link backward compatibility	n/a
Data transmission rate	COM3 (230.4 kbit/s)
Min. cycle time	1.5 ms
Process data input	12 byte
Process data output	n/a
SIO mode support	no
Compatible master port type	Class A, Class B (see NOTE)

Device Profile	
Identification & Diagnosis – I&D	16384 (0x4000)

NOTE: For use at IO-Link master port Class B, use 3-pole adapter or 3-wire cable.

### Supported Product Variants

Product ID	Product Name	Description	Connector
70119037-100508	ENA36HT-S10SA9-1516-IO-ABD01	Absolute rotary heavy duty encoder, housing size 36, solid diameter 10 mm, flange servo, IP69, multi-turn resolution 15 bit, single-turn resolution 16 bit, axial connection, M12 5-pole	Plug, M12, 5-pole
70119037-100509	ENA36HT-S10SA9-1516-IO-RBD01	Absolute rotary heavy duty encoder, housing size 36, solid diameter 10 mm, flange servo, IP69, multi-turn resolution 15 bit, single-turn resolution 16 bit, radial connection, M12 5-pole	Plug, M12, 5-pole

### Connection

Connection Diagram	Description
	<p><b>Plug, M12, 5-pole</b></p> <p>1: Brown - +24V 2: White - reserved, do not connect 3: Blue - 0V 4: Black - C/Q 5: Grey - n.c.</p>

## Process Data

### Process Data Input

Sub	Name	Data type	Length	Bitoffs.	Value	Unit	Description
.1	SSC1 - Switching Signal	String	1 bit	0	0 1		Indicates the current status of the switching signal 1. <i>Low</i> <i>High</i>
.2	SSC2 - Switching Signal	Bool	1 bit	1	0 1		Indicates the current status of the switching signal 2. <i>Low</i> <i>High</i>
.3	Status - Count Direction	Bool	1 bit	2	0 1		Indicates the current status of the direction of position count. <i>Increase</i> <i>Decrease</i>
.5	Status - Auxiliary Measurement MDC2	UInteger	4 bit	4	0 1		Indicates the currently selected source for the auxiliary measurement channel MDC2. <i>Deactivated</i> <i>Temperature</i>
.9	DSC1.1 - Temperature Warning	Bool	1 bit	8	0 1		Indicates that the configured temperature threshold has been exceeded. <i>Low</i> <i>High</i>
.10	DSC1.2 - Temperature Warning	Bool	1 bit	9	0 1		Indicates that the configured temperature threshold has been undershot. <i>Low</i> <i>High</i>
.17	MDC1 - Resolution (STR)	UInteger	16 bit	16	STR value		Indicates the current resolution of the position value.
.18	MDC1 - Position	Integer	32 bit	32	POS value		Indicates the current position value.
.19	MDC2 - Auxiliary Measurement	Integer	32 bit	64	AUX value		Indicates the measurement value of the selected auxiliary measurement channel MDC2.

NOTE: The process data input content can be accessed in addition over parameter 'Process Data Input' at index 40 (0x28)

## Parameter Data

### Identification

Index	Parameter	Access	Data type	Length	Default	Description	DS	R
16 (0x10)	Vendor Name	ro	String	13 byte	Pepperl+Fuchs	The vendor name that is assigned to a Vendor ID.		
17 (0x11)	Vendor Text	ro	String	29 byte	www.pepperl-fuchs.com/io-link	Additional information about the vendor.		
18 (0x12)	Product Name	ro	String	max. 30 byte	ENA36HT-S*9-15* <i>See table</i> <i>Supported Product Variants</i>	Complete product name.		
19 (0x13)	Product ID	ro	String	13 byte	70119037-* <i>See table</i> <i>Supported Product Variants</i>	Vendor-specific product or type identification (e.g., item number or model number).		
20 (0x14)	Product Text	ro	String	max. 30 byte	Absolute rotary encoder	Additional product information for the device.		
21 (0x15)	Serial Number	ro	String	14 byte		Unique, vendor-specific identifier of the individual device.		
22 (0x16)	Hardware Revision	ro	String	7 byte	HW**.*	Unique, vendor-specific identifier of the hardware revision of the individual device.		
23 (0x17)	Firmware Revision	ro	String	7 byte	FW**.*	Unique, vendor-specific identifier of the firmware revision of the individual device.		
24 (0x18)	Application Specific Tag	rw	String	max. 32 byte	Your automation, our passion.	Possibility to mark a device with user- or application-specific information.	Y	F
25 (0x19)	Function Tag	rw	String	max. 32 byte	***	Possibility to mark a device with function-specific information.	Y	F
26 (0x1A)	Location Tag	rw	String	max. 32 byte	***	Possibility to mark a device with location-specific information.	Y	F

Diagnosis											
Index .sub	Parameter	Access	Data type	Length	Bitoffs.	Default	Value	Unit	Description	DS	R
36 (0x24)	Device Status	ro	UInteger	8 bit		0	0 1 2 3 4		Indicator for the current device condition and diagnosis state. <i>Device is OK</i> <i>Maintenance required</i> <i>Out of Specification</i> <i>Functional check</i> <i>Failure</i>		FA
37 (0x25)	Detailed Device Status	ro	Array <sup>S0</sup>	12 byte					List of all currently pending events in the device.		FA
	.1 Element 1		Octetstr	3 byte	36	0					
	.2 Element 2		Octetstr	3 byte	24	0					
	.3 Element 3		Octetstr	3 byte	12	0					
	.4 Element 4		Octetstr	3 byte	0	0					
127 (0x7F)	Indication Control	rw	Record <sup>S0</sup>	8 bit					Provides control functions for diagnosis purposes for indicators or display.		FA
	.1 Locator Indication	rw	Boolean	1 bit	0	0	0 1		Enables a defined flashing pattern of the indicator LEDs for better spotting of a device in field applications. <i>Disabled</i> <i>Enabled</i>		FA
224 (0xE0)	Operating Hours	ro	UInteger	32 bit			0 .. 2 <sup>32</sup> -1		Shows the overall hours of operation since initial commissioning.		
225 (0xE1)	Temperature Indicator	ro	UInteger	8 bit			0 1 2 3 4		Indicates the operation at critical ambient temperatures or excess of specification limits. <i>Operating condition OK</i> <i>Close to upper limit</i> <i>Upper limit exceeded</i> <i>Close to lower limit</i> <i>Lower limit exceeded</i>		
232 (0xE8)	Device Characteristic	ro	Record <sup>S0</sup>	6 byte					Shows relevant key characteristics of the device for use in applications.		
	.1 ST Resolution (bit)	ro	UInteger	16 bit	32				Shows the maximum configurable resolution for a single turn in counts: 2 <sup>STR</sup> -1.		
	.2 MT Resolution (bit)	ro	UInteger	16 bit	16				Shows the maximum number of detectable revolutions: 2 <sup>MTR</sup> -1.		
	.3 Supply Current Requirement	ro	UInteger	16 bit	0			mA	Shows the maximum specified supply current excluding load.		

Parameterization & Configuration											
Index .sub	Parameter	Access	Data type	Length	Bitoffs.	Default	Value	Unit	Description	DS	R
64 (0x40)	SSC1.1 Param - Position	rw	Record	8 byte					Defines the setpoint values for switching signal channel 1.1.	Y	FA
	.1 SP1	rw	Integer	32 bit	32	0	0 .. 2 <sup>31</sup> -1		Defines the setpoint 1 value for the switching signal channel.	Y	FA
	.2 SP2	rw	Integer	32 bit	0	0	0 .. 2 <sup>31</sup> -1		Defines the setpoint 2 value for the switching signal channel.	Y	FA
65 (0x41)	SSC1.1 Config - Position	rw	Record	4 byte					Defines the configuration parameter for switching signal channel 1.1.	Y	FA
	.1 Logic	rw	UInteger	8 bit	24	0	0 1		Defines the logical behavior of the switching signal. <i>High active</i> <i>Low active</i>	Y	FA
	.2 Mode	rw	UInteger	8 bit	16	0	0 1 2 3		Defines the evaluation mode for the switching signal. <i>Deactivated</i> <i>Single point</i> <i>Window</i> <i>Two point</i>	Y	FA
	.3 Hyst	rw	Integer	16 bit	0	0	0 .. 2 <sup>15</sup> -1		Defines the hysteresis at the switchpoint. A higher hysteresis may help to improve the stability in critical applications.	Y	FA
66 (0x42)	SSC1.2 Param - Position	rw	Record	8 byte					Defines the setpoint values for switching signal channel 1.2.	Y	FA
	.1 SP1	rw	Integer	32 bit	32	0	0 .. 2 <sup>31</sup> -1		Defines the setpoint 1 value for the switching signal channel.	Y	FA
	.2 SP2	rw	Integer	32 bit	0	0	0 .. 2 <sup>31</sup> -1		Defines the setpoint 2 value for the switching signal channel.	Y	FA
67 (0x43)	SSC1.2 Config - Position	rw	Record	4 byte					Defines the configuration parameter for switching signal channel 1.2.	Y	FA
	.1 Logic	rw	UInteger	8 bit	24	0	0 1		Defines the logical behavior of the switching signal. <i>High active</i> <i>Low active</i>	Y	FA
	.2 Mode	rw	UInteger	8 bit	16	0	0 1 2 3		Defines the evaluation mode for the switching signal. <i>Deactivated</i> <i>Single point</i> <i>Window</i> <i>Two point</i>	Y	FA
	.3 Hyst	rw	Integer	16 bit	0	0	0 .. 2 <sup>15</sup> -1		Defines the hysteresis at the switchpoint. A higher hysteresis may help to improve the stability in critical applications.	Y	FA
80 (0x50)	DSC1 Param - Temperature	rw	Record	4 byte					Defines the thresholds for temperature warnings in the diagnosis signal channel DSC1.	Y	FA
	.1 High Limit	rw	Integer	16 bit	16	70	-45 .. 90	°C	Defines the upper temperature threshold. At ambient temperatures above this limit, the diagnosis flag 'DSC1.1 - Temperature Warning' in the process data is activate. An event is triggered, if enabled.	Y	FA
	.2 Low Limit	rw	Integer	16 bit	0	-30	-45 .. 90	°C	Defines the lower temperature threshold. At ambient temperatures below this limit, the diagnosis flag 'DSC1.2 - Temperature Warning' in the process data is activate. An event is triggered, if enabled.	Y	FA

Parameterization & Configuration											
Index .sub	Parameter	Access	Data type	Length	Bitoffs.	Default	Value	Unit	Description	DS	R
81 (0x51)	DSC1 Config - Temperature	rw	Record	4 byte					Defines the configuration parameter for diagnosis signal channel DSC1.	Y	FA
.1	Logic	rw	UInteger	8 bit	24	0	0 1		Defines the logical behavior of the switching signal.  <i>High active</i> <i>Low active</i>	Y	FA
.2	Mode	rw	UInteger	8 bit	16	0	0 1 2		Defines the evaluation behavior of the diagnosis signal channel 1.  <i>Deactivated</i> <i>High limit active</i> <i>High and low limit active</i>	Y	FA
.3	Hyst	rw	Integer	16 bit	0	0	0 .. 20	°C	Defines the hysteresis at the temperature thresholds.	Y	FA
96 (0x60)	Config - Resolution	rw	UInteger	16 bit		$2^{16}-1$	0 .. $2^{16}-1$		Defines the single-turn resolution in counts per revolution.	Y	FA
97 (0x61)	Config - Rotation Direction	rw	UInteger	8 bit		0	0 1		Defines the counting direction for the position - clockwise: position increases on clockwise rotation / counter clockwise: position decreases on clockwise rotation.  <i>Clockwise</i> <i>Counter clockwise</i>	Y	FA
99 (0x63)	Config - Position Preset	rw	Integer	32 bit		0	0 .. $2^{31}-1$		Defines the preset value, which is set for the current position on trigger of the command 'Position Preset'. Resolution is in counts.	Y	FA
100 (0x64)	Config - Position Overflow	rw	Integer	32 bit		0	0 .. $2^{31}-1$		Defines the position where an overflow will occur. The maximum range for position values in the process data is from 0 to Position Overflow-1.	Y	FA
101 (0x65)	Config - Auxiliary Measurement	rw	UInteger	8 bit		0	0 1		Defines the source for the auxiliary measurement channel MDC2.  <i>Deactivated</i> <i>Temperature</i>	Y	FA
120 (0x78)	Event Config	rw	Record <sup>50</sup>	2 byte					Defines which event sources can trigger events.	Y	FA
.1	Position Channel 1 Diagnosis	rw	Boolean	1 bit	24	0	0 1		Enabled: an event is generated, if the position value is outside the configured application specific position limits for channel 1.  <i>Disabled</i> <i>Enabled</i>	Y	FA
.2	Position Channel 2 Diagnosis	rw	Boolean	1 bit	16	0	0 1		Enabled: an event is generated, if the position value is outside the configured application specific position limits for channel 2.  <i>Disabled</i> <i>Enabled</i>	Y	FA
.3	Temperature Diagnosis	rw	Boolean	1 bit	0	0	0 1		Enabled: an event is generated, if the detected temperature is outside the configured application specific temperature limits.  <i>Disabled</i> <i>Enabled</i>	Y	FA

Observation											
Index .sub	Parameter	Access	Data type	Length	Bitoffs.	Default	Value	Unit	Description	DS	R
36 (0x24)	Device Status	ro	UInteger	8 bit		0	0 1 2 3 4		Indicator for the current device condition and diagnosis state. <i>Device is OK</i> <i>Maintenance required</i> <i>Out of Specification</i> <i>Functional check</i> <i>Failure</i>		FA
236 (0xEC)	Measurement Data	ro	Record <sup>S0</sup>						Shows a collection of relevant measurement and process data.		
	.1 MDC1 - Position	ro	Integer	32 bit	136	0	POS value		Indicates the current position value.		
	.2 MDC1 - ST Resolution	ro	Integer	16 bit	120	0	STR value		Indicates the current resolution of the position value.		
	.3 MDC2 - Temperature	ro	Integer	32 bit	88	0	TEMP value	°C	Indicates the current approximated ambient temperature value.		
	.8 DSC1.2 – Temperature Warning	ro	UInteger	8 bit	32	0	0 1		Indicates that the configured temperature threshold has been undershot. <i>Low</i> <i>High</i>		
	.7 DSC1.1 – Temperature Warning	ro	UInteger	8 bit	24	0	0 1		Indicates that the configured temperature threshold has been exceeded. <i>Low</i> <i>High</i>		
	.6 Status – Count Direction	ro	UInteger	8 bit	16	0	0 1		Indicates the current status of the direction of position count. <i>Increase</i> <i>Decrease</i>		
	.5 SSC2 – Switching Signal	ro	UInteger	8 bit	8	0	0 1		Indicates the current status of the switching signal 2. <i>Low</i> <i>High</i>		
.4 SSC1 – Switching Signal	ro	UInteger	8 bit	0	0	0 1		Indicates the current status of the switching signal 1. <i>Low</i> <i>High</i>			

NOTE 1: The parameter data provide the attributes DS (Data Storage) and R (Reset behavior). The following rules apply:

DS: Parameter marked with 'Y' (yes) are exchanged with the master via the data storage mechanism.

R: Parameter marked with 'F' are reset to the default value upon reception of the command 'Restore Factory Settings'.

R: Parameter marked with 'A' are reset to the default value upon reception of the command 'Application Reset'.

NOTE 2: Parameter with datatype Record or Array, which are marked with 'S0' can only be accessed over subindex 0 (whole parameter object). Subindex access to single items is not possible.

## Command Interface

Index/.sub	Parameter	Access	Data type	Length	Value	Description
2 (0x02)	System Command	wo	UInteger	8 bit	See command value	Command interface for applications. A positive acknowledge indicates the complete and correct finalization of the requested function.

Command Value	Command	Description
129 (0x81)	Application Reset	The parameter of the technology-specific application are set to default values. Identification parameter remain unchanged. An upload to the data storage of the master will be executed, if activated in the port configuration of the master.
130 (0x82)	Restore Factory Settings	The parameter of the device are reset to factory settings. Note: A download of the data storage may be executed on the next power cycle and overwrite the factory default settings!
170 (0xA0)	Position Preset	The position value at the current position is set to the position preset value.

## Error Codes

<b>Code</b>	<b>Additional code</b>	<b>Name</b>	<b>Description</b>
128 (0x80)	17 (0x11)	Index not available	Read or write access attempt to a non-existing index.
128 (0x80)	18 (0x12)	Subindex not available	Read or write access attempt to a non-existing subindex of an existing index.
128 (0x80)	32 (0x20)	Service temporarily not available	Parameter not accessible due to the current state of the technology-specific application.
128 (0x80)	33 (0x21)	Service temporarily not available - local control	Parameter not accessible. The device is currently in an ongoing, locally controlled operation.
128 (0x80)	34 (0x22)	Service temporarily not available - device control	Parameter not accessible. The technology-specific application is currently in a remotely triggered operation.
128 (0x80)	35 (0x23)	Access denied	Write access to a read-only parameter or read access to write-only parameter.
128 (0x80)	48 (0x30)	Parameter value out of range	Written parameter value is outside of the permitted value range.
128 (0x80)	49 (0x31)	Parameter value above limit	Written parameter value is above its specified value range.
128 (0x80)	50 (0x32)	Parameter value below limit	Written parameter value is below its specified value range.
128 (0x80)	51 (0x33)	Parameter length overrun	Written parameter is longer than specified.
128 (0x80)	52 (0x34)	Parameter length underrun	Written parameter is shorter than specified.
128 (0x80)	53 (0x35)	Function not available	Written command is not supported by the technology-specific application.
128 (0x80)	54 (0x36)	Function temporarily unavailable	Written command is unavailable due to the current state of the technology-specific application.
128 (0x80)	64 (0x40)	Invalid parameter set	Written single parameter value collides with other existing parameter settings.
128 (0x80)	65 (0x41)	Inconsistent parameter set	Parameter set inconsistencies at the end of block parameter transfer. Device plausibility check failed.
129 (0x81)	129 (0x81)	Invalid value Position Preset	Interfering parameter values: Position Preset value is greater or equal to the value of Position Overflow.
129 (0x81)	130 (0x82)	Invalid value Position Overflow	Interfering parameter values: Position Overflow value is less than the value of ST Resolution.

## Event Codes

<b>Code</b>	<b>Type</b>	<b>Name</b>	<b>Description</b>
36163 (0x8d43)	Warning	Ambient temperature outside specified temperature range	Check device environment.
36176 (0x8d50)	Warning	Position channel 1 diagnosis	Position value outside configured application specific position limits for channel 1. Check adjustment or application.
36177 (0x8d51)	Warning	Position channel 2 diagnosis	Position value outside configured application specific position limits for channel 2. Check adjustment or application.
36178 (0x8d52)	Warning	Temperature diagnosis	Temperature exceeds configured application specific temperature limits. Check environment or application.