Parameters of the encoder manufacturer

The meaning of the information contained in the parameters of the encoder manufacturer depends on the encoder.

HEIDENHAIN encoders can be divided into six groups. They are differentiated by the type of encoder (word 14 of the EnDat 2.1 parameters).

Encoder types:

L Linear encoder
ST Singleturn rotary encoder or angle encoder
MT Multiturn encoder
iL Incremental linear encoder with external (EIB) or integral conversion of 1 V_{PP} to purely serial EnDat 2.2
iR Incremental rotational encoder with external (EIB) or integral conversion of 1 V_{PP} to purely serial EnDat 2.2
T Touch probe

The meanings of parameters are divided into evaluation categories. On the basis of these categories, the user can make clear decisions on the use of parameters and their integration in the application software.

Evaluation categories:

- **Required:**
  It is essential for operation of the encoder that these parameters be considered.
- **Depending on application:**
  Whether these parameters are to be considered depends on the customer's application. If, for example, no OEM range is used, then the parameter regarding memory allocation for parameters of the OEM need not be considered.
- **Informative:**
  These parameters are not required for encoder operation, but they give the user additional information such as the model number.
- **Irrelevant:**
  If no encoder types were assigned to any of the three other evaluation categories, then the parameter is not required for encoder operation and can be ignored.

The additional data for EnDat 2.2 contained in the parameters of the encoder manufacturer depends in part on the respective encoder.

The additional data, additional functions, diagnostic values, and specifications that the respective encoder supports are saved in the assigned status words of these memory areas. Before interrogation of the additional data, HEIDENHAIN recommends reading out the supported information and functions (typically for every initialization of encoders). They are also shown in the encoders' specifications.

Parameters of the encoder manufacturer for EnDat 2.1

Word	Contents	Unit for		Required	Depends on application	Only for information purposes	Remark
		Linear encoder	Rotary/Angle encoder				
4	Mask 0	–	–	–	–	–	–
5	Mask 1	–	–	–	–	–	–
6	Mask 2	–	–	–	–	–	–
7	Mask 3	–	–	–	–	–	–
8	Version of the EnDat interface	–	–	–	–	All	"2" saved with EnDat 2.1 or 2.2
9 10	Memory allocation for parameters of the OEM	–	–	All	–	–	Depends on encoder; flexibly programmable. Memory pointer to first free address
11 12	Memory allocation for compensation values	–	–	–	–	–	Reserved for encoder manufacturer
13	Number of clock pulses for transfer of the position value (transmission format)	–	–	All	–	–	Setting the correct clock number for position transmission
14	Encoder type	–	–	All	–	–	Defines the units of the parameters
15 16	Signal period(s) per revolution for incremental output signals	nm	–	All[1)]	–	–	**iL, iR:** For calculating the smallest display step (LSB) or the correct display value for negative traverse direction **All:** For EnDat-compliant datum shift
17	Distinguishable revolutions (only for multiturn rotary encoders)	–	–	MT	–	–	Required for correct calculation of the position
18	(Nominal) increment of reference marks	mm	Signal periods	–	–	iL iR	–
19	Position of the first reference mark	mm	–	–	–	iL	–

[1)] Except touch probe

Parameters of the encoder manufacturer for EnDat 2.1 (continued)

Word	Contents	Unit for		Required	Depends on application	Only for information purposes	Remark
		Linear encoder	Rotary/Angle encoder				
20 21	Measuring step or measuring steps/rev for serial data transmission	nm	Measuring steps per revolution	All[1)]	–	–	–
22 23	Datum shift of the encoder manufacturer	Signal periods	Signal periods	All	–	–	To be considered by the user during datum shift
24 25 26	ID number	–	–	–	–	All	Safety technology
27 28 29	Serial number	–	–	–	All	–	Encoder exchange can be detected (may affect application—safety related)
30	Direction of rotation or traverse	–	–	All[1)]	–	–	–
31	Status of commissioning diagnostics	–	–	–	–	–	No longer supported since 1999
32	Maximum mechanically permissible linear velocity or shaft speed	m/min	min^{-1}	–	All[1)]	–	Required for cross checking of absolute position ⇔ incremental position
33	Accuracy depending on linear velocity or shaft speed, area I	LSB [2)]	LSB [2)]	–	ST MT L	–	Comparison of absolute and incremental position not possible with **iL iR** because these encoders have only incremental information
34	Accuracy depending on linear velocity or shaft speed, area II	LSB [2)]	LSB [2)]	–	ST MT L	–	
35	Support of error messages 1	–	–	All	–	–	For definition of an “error mask” (safety related)
36	Support of warnings	–	–	–	–	All	For preventive maintenance
37	EnDat Command Set	–	–	All	–	–	Information on whether EnDat 2.2 mode commands are supported
38	Reserved for measuring length[3)]	–	–	–	–	L iL	–
39	Maximum processing time	–	–	All	–	–	For monitoring (time out)
40	EnDat ordering designation	–	–	–	All	–	Distinguishes between with/without incremental signals
41 42 43 44 45 46	HEIDENHAIN specifications	–	–	–	–	–	–
47	CHECKSUM	–	–	–	–	–	–

[1)] Except touch probe

[2)] The higher-valued byte contains the division factor relative to the maximum permissible linear velocity or shaft speed up to which this accuracy is valid.

[3)] Not supported by all linear encoder models; preset with default value 0

Parameters of the encoder manufacturer for EnDat 2.2

Word	Contents	Unit for		Required	Depends on application	Only for information purposes	Comment
		Linear encoder	Rotary/ Angle encoder				
0	Status of additional datum 1	–	–	–	All	–	Can be safety related. Cross checking of "what is required" and "what does the encoder support"
1	Status of additional datum 2	–	–	–	All	–	
2	Status of additional functions	–	–	–	All	–	
3	Acceleration	m/s^2	$1/s^2$	–	All[1)]	–	Consider the scaling factor
4	Temperature	K	K	–	All	–	Consider the scaling factor
5	Diagnostic status	–	–	–	–	All	–
6	Support of error message 2	–	–	All[1)]	–	–	For definition of an "error mask": (safety related)
7	Dynamization status	–	–	–	All[1)]	–	Safety technology
8							
9	Measuring step or measuring steps per revolution for position value 2	nm	–	–	All[1)]	–	Safety technology
10							
11	Accuracy of position value 2 depending on linear velocity or shaft speed, area I	LSB[2)]	LSB[2)]	–	All[1)]	–	Safety technology
12		LSB[2)]	LSB[2)]	–	All[1)]	–	Safety technology
13	Accuracy of position value 2 depending on linear velocity or shaft speed, area II	LSB[2)]	LSB[2)]	–	All[1)]	–	Safety technology
14		LSB[2)]	LSB[2)]	–	All[1)]	–	Safety technology
15	Distinguishable revolutions for position value 2 (only for multiturn encoders)	–	–	MT	–	–	Required for correct calculation of the position
16	Direction of rotation of position value 2	–	–	All[1)]	–	–	iL, iR safety technology
17-20	Encoder designation	–	–	–	–	All	–
21	Support of instructions	–	–	–	–	–	Not yet supported Not for safety technology
22	Max. permissible encoder temperature at measuring point	K	K	–	All[1)]	–	–
23	Max. permissible acceleration	m/s^2	$1/s^2$	–	All[1)]	–	–
24	Number of blocks for memory area section 2	–	–	All	–	–	Depends on encoder; program flexibly.
25	Maximum clock frequency	kHz	kHz	All	–	–	Depends on connector, cable and cable lengths
26	Number of bits for position comparison	–	–	–	All[1)]	–	Safety technology
27	Scaling factor for resolution	–	–	All[1)]	–	–	For calculation of the smallest display step (LSB)
28	Measuring step, or measuring steps per revolution or subdivision values of a grating period	–	–	All[1)]	–	–	
29							
30	Max. velocity or rotational shaft speed for constant code value	m/min	min^{-1}	–	All[1)]	–	Specific to application. Applies for encoders that permit higher mechanical than electrical speed. (Not supported by the EIB.)
31-33	Offset between position value and position value 2	–	–	–	All[1)]	–	Safety technology
34	"Number of distinguishable revolutions" with scaling factor	–	–	MT	–	–	Required for correct calculation of the position
35	Support of operating status error sources	–	–	–	All	–	Expanded EnDat error message, particularly for battery-buffered encoders
36-38	Safety-relevant measuring steps	–	–	–	All[1)]	–	Safety technology
39-40	Non-safety-relevant subdivision of the relative position	–	–	–	All[1)]	–	Safety technology
41-42	Non-safety-relevant subdivision of the absolute position	–	–	–	All[1)]	–	Safety technology
43	Generation of a warning message through limit position signals	–	–	–	L iL	–	Presently available only with certain incremental exposed linear encoders
44	Support for touch probes	–	–	T	–	–	Supported features
45	Timestamp for unit of measure	–	–	T	–	–	–
46	Referencing of incremental encoders	–	–	–	iL, Ir	–	Is re-referencing supported?
47	Support of I/O's	–	–	–	All[1)]	–	Are I/O supported and which?
48 49	–	–	–	–	–	–	Reserved
50	Support of temperature sensor types	–	–	All[1)]	ST MT L	–	For what temperature sensor type is an evaluation in the encoder implemented?

[1)] Except touch probe
[2)] The higher-valued byte contains the division factor relative to the maximum permissible linear velocity or shaft speed up to which this accuracy is valid