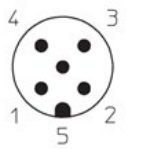


THX5 IO-LINK OPERATING INSTRUCTIONS – FIRMWARE V1.2



ELECTRICAL INSTALLATION

BF : Connector M12 5 pins (Device class B)

Pin number	Description	Illustration
1	L+ : power supply V+	
2	N.C.	
3	L- : power supply gnd	
4	IO-Link	
5	N.C.	



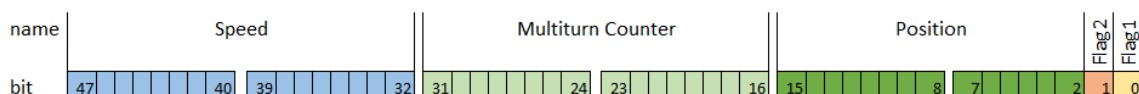
IO-LINK SPECIFICATION INFORMATION

Device specification

Specification	IO-Link description	Value
Transfer rate	COM3	230.4 kBaud
Minimum cycle time of device	Minimum cycle time	0x0A (1ms)
Frame specification Amount of preoperate data required Amount of operate data required Enhanced parameters	M-Sequence Capability: M-Sequence Type Preoperate M-Sequence Type Operate ISDU supported	TYPE_1_2 TYPE_2_V Supported
IO-Link protocol version	Revision ID	0x11 (Version 1.1)
Amount of process data from the device to the master to the device	ProcessDataIn	0x85 (6 bytes)
Amount of process data from the master	ProcessDataOut	0x00 (0 byte)
Manufacturer ID	Vendor ID	0x0468 (1128)
Device identification	Device ID	0x0006

Process data

Name	Description	Datatype	Bitoffset	Bitlength	Value Range	Unit
Speed	Rotating speed	IntegerT	32	16	-12000 to 12000	rpm
Multiturn	Multiturn counter	UIntegerT	16	16	0 to 65535	turns
Position	Absolute position counter	UIntegerT	2	14	0 to 16383	
Flag2	Absolute position error True: The multiturn counter cannot be trusted Cleared after set Zero, Apply Preset or Restore Factory Settings command	BooleanT	1		true false	
Flag1	Magnetic field issue Problem with the sensor	BooleanT	0		true false	



When the absolute position resolution is configured to a value smaller than 14 bits, the data is aligned to the right on the bit 2.

For example, if the absolute position resolution (index 90) is configured to 12 bits, the bits 2 to 13 will contain the data. Bits 14 and 15 will then be unused and set to zero.

Standard Identification data

Index (hex)	Sub index	Name	Data type	Access	Contents
16 (0x10)	0	Vendor Name	StringT	RO	BEI Sensors
17 (0x11)	0	Vendor Text	StringT	RO	Sensata Technologies Inc.
18 (0x12)	0	Product Name	StringT	RO	THx5-ZIO
19 (0x13)	0	Product ID	StringT	RO	Detailed reference
20 (0x14)	0	Product Text	StringT	RO	Absolute multiturn encoder
21 (0x15)	0	Serial Number	StringT	RO	Unique number
22 (0x16)	0	Hardware Version	StringT	RO	284v3
23 (0x17)	0	Firmware Version	StringT	RO	V1.2
24 (0x18)	0	Application Specific Tag	StringT	RW	***

System command

Index (hex)	Subindex	Name	Data type	Access	Value range
2 (0x02)	0	System-Command	UIntegerT 8	WO	130 (0x82) : Restore factory settings
					131 (0x83) : Back-to-Box command

Observation parameters

Index (hex)	Subindex	Name	Data type	Access	Value range	Comment
40 (0x28)	0	Process Data Input	Record	RO		
	1	Speed	IntegerT16	NA	-10000 to 10000	Speed value.
	2	Multiturn counter	UIntegerT16	NA	0 to 65535	Number of complete turns
	3	Position	UIntegerT14	NA	0 to 16383	Single-turn position
	4	Absolute position error	BooleanT	NA	0 or 1	Multi turn position status
	5	Magnetic field issue	BooleanT	NA	0 or 1	Magnetic field status

Diagnosis, Observer and Maintenance access

Index (hex)	Subindex	Name	Data type	Access	Value range	Comment
36 (0x24)	0	Device Status	UIntegerT 8	RO	0 to 4	Device status : Device is OK [0] Maintenance required [1] Out of specification [2] Functional check [3] Failure [4]
110 (0x6E)	0	Operating hours	UIntegerT 32	RO	0 to 4294967295	Number of hours with device on

Sensata specific parameters, Observer and Maintenance access

Index	Subindex	Name	Data type	Access	Value range	Comment
64 (0x40)	0	Set Zero Point	Button	WO	-	Set zero as current position
65 (0x41)	0	Apply Preset	Button	WO	-	Apply preset values as the current position
67 (0x43)	0	Preset singleturn	UIntegerT14	RW	0 to 16383	Preset value for position inside the turn
68 (0x44)	0	Preset multiturn	UIntegerT16	RW	0 to 65535	Preset value for the number of turns
72 (0x48)	0	Rotation direction	BooleanT	RW	0 : CW 1 : CCW	Set the rotation direction
80 (0x50)	0	Speed calculation window	UIntegerT8	RW	0 : 20 ms 1 : 200 ms 2 : 600 ms	Time between each speed data update
90 (0x5A)	0	Singleturn Resolution	UIntegerT8	RW	1 to 14 bits	Power of 2, number of bits
91 (0x5B)	0	Multiturn Resolution	UIntegerT8	RW	1 to 16 bits	Power of 2, number of bits

Sensata specific parameters, Specialist access

Index	Subindex	Name	Data format	Access	Value range	Comment
252 (0xFC)	0	Test parameter 252	UIntegerT 8	RW	0 : A appears 1 : A disappears 2 : B appears 3 : B disappears	Do not use For IO-link test purpose.

Factory settings parameters

Name	Index	Factory Setting	Comment
Application Specific Tag	24	***	Customer text tag (string 32 characters)
Rotation direction	72	0 : CW	Set the rotation direction
Singleturn Resolution	90	12 bits	Resolution of the single-turn counter (in bits)
Multiturn Resolution	91	16 bits	Resolution of the multi-turn counter (in bits)
Speed calculation window	80	1 : 200ms	Time between each speed data update
Preset singleturn	67	0	Preset value for position inside the turn
Preset multiturn	68	0	Preset value for the number of turns
Operating-hours	110	0	Number of hours with device on

Events

Code	Name	Type	Comment
16912 (0x4210)	Temperature issue	Warning	event appears when temperature exceeds specifications.
6145 (0x1801)	Off-power multi-turn counter desynchronized with running multi-turn counter	Warning	Device off-power MT counter is desynchronized with running MT. Set Zero or set Preset needs to be done
16912 (0x5012)	Battery low	Warning	Device needs to be replaced, the multi-turn position will be lost when power is off
35888 (0x8C30)	Test Event A	Error	Event appears by setting index 252 to value 1, Event disappears by setting index 252 to value 2
36351 (0x8DFF)	Test Event B	Error	Event appears by setting index 252 to value 3, Event disappears by setting index 252 to value 4

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