KENDRION

EtherCAT®

CANopen®

Kuhnke FIO I/O System

Product Manual: Special Function Modules

12/03/2024

PRECISION. SAFETY. MOTION.

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1 Preface

1.1 Legal Notice

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Document History

Modification History	
Date	Comments / Modifications
12.03.2024	New document structure created according to module groups

1.2 About this Manual

This technical information is primarily directed to system designers, project engineers and device developers. It does not contain any availability information. We reserve the rights for errors, omissions and modifications. Pictures are similar.

This product manual extends the system, installation and safe handling information provided by the Kuhnke FIO System Manual. This product manual only applies in conjunction with the system manual.

2 Special Function Modules

2.1 Generalities

The special function module is comprised of a group of Kuhnke FIO modules featuring a particular combination of inputs, outputs or inputs and outputs.

2.1.1 Numeric Values

As a general rule, numeric values are shown as decimals.

If a hexadecimal notation is preferred instead, "0x" is prefixed to the numeric value.

Objects from the object dictionary generally show as hexadecimal values.

2.1.2 CoE – CANopen over EtherCAT

Communication protocol CANopen is based on CAN and designed to interconnect automation devices. Communication profiles for various device classes harmonise device operations and simplify their handling.

EtherCAT features the same communication mechanisms as CANopen, i.e. an object dictionary, process data objects (PDOs), service data objects (SDOs), and a similar network management methodology.

The object dictionary describes the object available to the EtherCAT slave. It distinguishes between objects with read access (read), write access (write) and read/write access (read/write). The dictionary also classifies these objects as (mappable) process data objects, if so.

A cyclic process exchanges the process data objects (PDOs) and the input and output data they normally carry. Depending on your EtherCAT slave, you may be able to add (map) further object dictionary variables.

Service data objects (SDOs) provide options like setting the parameters of EtherCAT slaves and adding them to the startup parameters. They will then be automatically transferred to the EtherCAT slave as the EtherCAT bus starts up. Setting up the parameters is as easy as that. And if you have to replace your EtherCAT slave, you can simply use another EtherCAT slave of the same type.

2.2 FIO Mix04 (CoE)

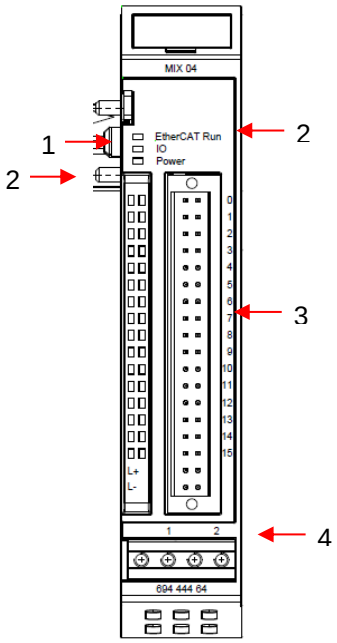
2.2.1 Function

Kuhnke FIO MIX 04 has 4 analogue inputs for capturing current or voltage values as well as 4 analogue outputs that analogue current or voltage values are output to.

Kuhnke FIO Mix 04 also has 2 counter/encoder interfaces for connecting incremental or absolute position encoders equipped with an SSI or EnDat interface. Using the event counter configuration option provides you with 6 independent event counters.

All channels configure almost independently, giving the module a maximum of flexibility.

2.2.2 Front View



Key

1. Status LEDs
2. E-Bus / module lock
3. 36-pin system connector
4. Earth/shield connector for M3x5 bolts

2.2.3 Connectors

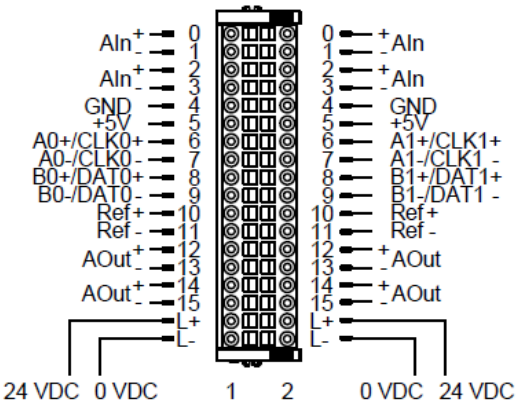
I/O Power Supply (Load)

System connector pin 16:	L+	24 VDC
System connector pin 17:	L-	0 V

Analogue Inputs and Outputs

Left row of system connector pins, pins 0…3, 12…15

Right row of system connector pins, pins 0…3, 12…15



Counter/Encoder Inputs

Left row of system connector pins, pins 4… 11 (Enc 1)

Right row of system connector pins, pins 4… 11 (Enc 2)

EtherCAT

E-Bus IN	female 10-pole connector
E-Bus Out	10-pole multi-pin connector

2.2.4 Status LEDs

LED "EtherCAT Run":

State	LED Flash Code	Explanation
Init	Off	Initialising, no data exchange
Pre-Op	Off/green, 1:1	Pre-operational, no data exchange
Safe-Op	Off/green, 5:1	Safe operation, inputs readable
Op	Green, on	Operational, unrestricted data exchange
Bootstrap	Flickering	Optional if the bootstrap mode is supported.

LED "IO"

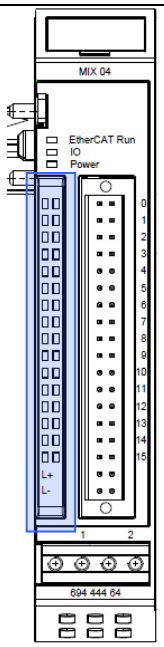
State	LED Flash Code	Explanation
Ok	Green	No error
Error	Off	LED "EtherCAT Run" off: n/a LED "EtherCAT Run" green: Module defective
	Red, 2x	Low voltage
	Red, 3x	Internal watchdog
	Red, 4x	Bus error
	Red, 6x	Module-specific error, see Predefined Error Field 0x1003:01 … 08 for details
	Red, 7x	Configuration error
	Red, on	Module defective

LED "Power"

State	LED	Explanation
On	Green	24 VDC supply to I/Os (load) ok
Off	Off	24 VDC supply not ok

LED "Channel"

Channel			Channel	Description
AI0+	■	■	AI2+	2-col. LED: analogue input enabled, error
AI0-			AI2-	
AI1+	■	■	AI3+	2-col. LED: analogue input enabled, error
AI1-			AI3-	
GND			GND	GND connection for supply to encoder
5 V			5 V	5V connection for supply to encoder
A+/CLK+			A+/CLK+	Incremental encoder: The LEDs indicate the signal state of the incremental encoder track Endat / SSI: The LEDs light up along with the Clock or Data signal Event counter: The LEDs indicate the signal state of the event counter input
A-/CLK-			A-/CLK-	
B+/DAT+			B+/DAT+	
B-/DAT-			B-/DAT-	
Z+			Z+	
Z-			Z-	
AO0+			AO2+	analogue output enabled, no error
AO0-			AO2-	
AO1+			AO3+	analogue output enabled, no error
AO1-			AO3-	



2.2.5 Process Data Objects

	Information
	EtherCAT Modular Device Profile: Availability of process data objects depends on which modules are installed below the EtherCAT slave.

General Process Data

Variable	Data type	Explanation
AI/AO Device Control	UINT	Analogue channel control register
AI/AO Error Register	USINT	Analogue channel error register

Module-dependent Process Data Objects (Encoder)

Variable	Data type	Explanation
Enc <n> Digital Interface Control	UINT	Encoder interface control register
Enc <n> Position Value	UDINT	Actual position
Enc <n> High Resoloution Speed Value	DINT	Actual speed
Enc <n> Error Register	USINT	Error register

Module-dependent Process Data Objects (Event Counter)

Variable	Data type	Explanation
Enc 1 digital interface control	UINT	Encoder interface control register
Event Counter Channel 1	UDINT	Actual counter reading of that channel
Event Counter Channel 2	UDINT	
Event Counter Channel 3	UDINT	
Event Counter Channel 4	UDINT	
Event Counter Channel 5	UDINT	
Event Counter Channel 6	UDINT	
Enc 1 Error Register	USINT	Error register

Module-dependent Process Data Objects (Analogue Inputs)

Variable	Data type	Explanation
AI<n> Input FV	REAL	Analogue input value in V or mA

Module-dependent Process Data Objects (Analogue Outputs)

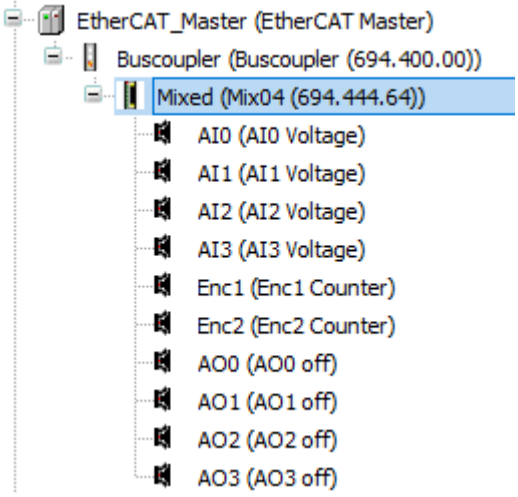
Variable	Data type	Explanation
AO Output FV <n>	REAL	Analogue output value in V or mA

2.2.6 Module Configuration

The analogue inputs/outputs and the counter/encoder interfaces are configured by plugging modules into the appropriate slots. A slot stands for an analogue channel or an encoder/counter interface. A slot will accept the correct types of modules only. The procedure is based on the EtherCAT Modular Device Profile.

	Information
	Check that there is a module in every slot.

CODESYS devices explorer configuration example



Configuration – Overview of Matching Modules

Slot	Slot Name	Function	Module Code	Module Function
1	AI0	Analogue input AI0	192361001	AI0 voltage
			192361002	AI0 current 0..20mA
			192361003	AI0 current 4..20mA
2	AI1	Analogue input AI1	192361004	AI1 voltage
			192361005	AI1 current 0..20mA
			192361006	AI1 current 4..20mA
3	AI2	Analogue input AI2	192361007	AI2 voltage
			192361008	AI2 current 0..20mA
			192361009	AI2 current 4..20mA
4	AI3	Analogue input AI3	192361010	AI3 voltage
			192361011	AI3 current 0..20mA
			192361012	AI3 current 4..20mA
5	Enc1	Encoder 1	192361013	Enc1 counter
			192361041	Enc1 SixStep
			192361014	Enc1 SSI
			192361015	Enc1 Endat
			192361016	Enc event counter
6	Enc2	Encoder 2	192361017	Enc2 counter
			192361042	Enc2 SixStep
			192361018	Enc2 SSI
			192361019	Enc2 Endat
			192361020	Enc event counter
7	AO0	Analogue output AO0	192361021	AO0 0..10V
			192361022	AO0 -10..10V
			192361023	AO0 0..20mA
			192361024	AO0 4..20mA
			192361025	AO0 off
8	AO1	Analogue output AO1	192361026	AO1 0..10V
			192361027	AO1 -10..10V
			192361028	AO1 0..20mA
			192361029	AO1 4..20mA
			192361030	AO1 off
9	AO2	Analogue output AO2	192361031	AO2 0..10V
			192361032	AO2 -10..10V
			192361033	AO2 0..20mA
			192361034	AO2 4..20mA
			192361035	AO2 off
10	AO3	Analogue output AO3	192361036	AO3 0..10V
			192361037	AO3 -10..10V
			192361038	AO3 0..20mA
			192361039	AO3 4..20mA
			192361040	AO3 off

Encoder Interface

The general-purpose encoder interface provides you with many options of capturing angles, positions and counting pulses.

The system accepts the following encoders:

- Incremental encoder with RS422 interface (RS422)
- Incremental encoder with 5V single-ended interface (TTL)
- Incremental encoder with 24V single-ended interface (HTL)
- SixStep encoder with 5V single-ended interface (TTL)
- SixStep encoder with 24V single-ended interface (HTL)
- SSI encoder
- Endat 2.1 single-turn encoder
- Endat 2.1 multi-turn encoder

You can arrange them any way you like. The module also supplies max. 150 mA power to every 5V encoder. A power monitor outputs and error if this power rating is exceeded.

Another option is to use the encoder interface as an event counter for capturing 6 fast signals. If you do use this option, you cannot attach an encoder.

The sections below break down your configuration options and list the associated objects, which are linked to the object dictionary.

Encoder Interface Configuration – Incremental Encoder

Available objects

<table>
<tr><th>Slot</th><th>Object</th><th>Description</th></tr>
<tr><td>Enc1</td><td>0x2100 Enc1 Digital Interface Type</td><td rowspan="2">64 Encoder (automatically assigned by the module)</td></tr>
<tr><td>Enc2</td><td>0x2900 Enc2 Digital Interface Type</td></tr>
<tr><td>Enc1</td><td>0x2103 Enc1 Digital Interface Config</td><td rowspan="2">Sub 01 (level): 0=HTL, 1=TTL or 2=RS422
Sub 02 (mode): 0=multi-turn or 1=single-turn
Sub 03 (index level):
0=reference on rising edge
1=reference on falling edge
Sub 04 (SSI):
0=straight binary
1=Gray coded binary
Sub 05 (event counter):
0=count rising edges
1=count falling edges
3=count both edges</td></tr>
<tr><td>Enc2</td><td>0x2903 Enc2 Digital Interface Config</td></tr>
<tr><td>Enc1</td><td>0x2110 Enc1 Digital Interface Bit Size</td><td rowspan="2">Encoder resolution as per data sheet</td></tr>
<tr><td>Enc2</td><td>0x2910 Enc2 Digital Interface Bit Size</td></tr>
<tr><td>Enc1</td><td>0x2111 Enc1 Digital Interface Baud Rate</td><td rowspan="2">Clock frequency as per data sheet [kHz]</td></tr>
<tr><td>Enc2</td><td>0x2911 Enc2 Digital Interface Baud Rate</td></tr>
<tr><td>Enc1</td><td>0x6002 Enc1 Total Measuring Range</td><td rowspan="2">Relevant for overflow in single-turn mode</td></tr>
<tr><td>Enc2</td><td>0x6802 Enc2 Total Measuring Range</td></tr>
</table>

Encoder Interface Configuration – SixStep Encoder

Available objects

Slot	Object	Description
Enc1	0x2100 Enc1 Digital Interface Type	64 Encoder (automatically assigned by the module)
Enc2	0x2900 Enc2 Digital Interface Type	
Enc1	0x2103 Enc1 Digital Interface Config	Sub 01 (level): 0=HTL, 1=TTL or 2=RS422 Sub 02 (mode): 0=multi-turn or 1=single-turn Sub 03 (index level): 0=reference on rising edge 1=reference on falling edge Sub 04 (SSI): 0=straight binary 1=Gray coded binary Sub 05 (event counter): 0=count rising edges 1=count falling edges 3=count both edges
Enc2	0x2903 Enc2 Digital Interface Config	
Enc1	0x2110 Enc1 Digital Interface Bit Size	Encoder resolution as per data sheet
Enc2	0x2910 Enc2 Digital Interface Bit Size	
Enc1	0x2111 Enc1 Digital Interface Baud Rate	Clock frequency as per data sheet [kHz]
Enc2	0x2911 Enc2 Digital Interface Baud Rate	
Enc1	0x6002 Enc1 Total Measuring Range	Relevant for overflow in single-turn mode
Enc2	0x6802 Enc2 Total Measuring Range	

Encoder Interface Configuration – SSI Encoder

Available objects

Slot	Object	Description
Enc1	0x2100 Enc1 Digital Interface Type	65 SSI (automatically assigned by the module)
Enc2	0x2900 Enc2 Digital Interface Type	
Enc1	0x2103 Enc1 Digital Interface Config	Sub 01 (level): 0=HTL, 1=TTL or 2=RS422 Sub 02 (mode): 0=multi-turn or 1=single-turn Sub 03 (index level): 0=reference on rising edge 1=reference on falling edge Sub 04 (SSI): 0=straight binary 1=Gray coded binary Sub 05 (event counter): 0=count rising edges 1=count falling edges 3=count both edges
Enc2	0x2903 Enc2 Digital Interface Config	
Enc1	0x2110 Enc1 Digital Interface Bit Size	Encoder resolution as per data sheet
Enc2	0x2910 Enc2 Digital Interface Bit Size	
Enc1	0x2111 Enc1 Digital Interface Baud Rate	Clock frequency as per data sheet [kHz]
Enc2	0x2911 Enc2 Digital Interface Baud Rate	
Enc1	0x6002 Enc1 Total Measuring Range	Relevant for overflow in single-turn mode
Enc2	0x6802 Enc2 Total Measuring Range	

Encoder Interface Configuration – ENDAT Encoder

Available objects

Slot	Object	Description
Enc1	0x2100 Enc1 Digital Interface Type	69 Endat (automatically assigned by the module)
Enc2	0x2900 Enc2 Digital Interface Type	
Enc1	0x2103 Enc1 Digital Interface Config	Sub 01 (level): 0=HTL, 1=TTL or 2=RS422 Sub 02 (mode): 0=multi-turn or 1=single-turn Sub 03 (index level): 0=reference on rising edge 1=reference on falling edge Sub 04 (SSI): 0=straight binary 1=Gray coded binary Sub 05 (event counter): 0=count rising edges 1=count falling edges
Enc2	0x2903 Enc2 Digital Interface Config	
Enc1	0x2110 Enc1 Digital Interface Bit Size	Encoder resolution as per data sheet
Enc2	0x2910 Enc2 Digital Interface Bit Size	
Enc1	0x2111 Enc1 Digital Interface Baud Rate	Clock frequency as per data sheet [kHz]
Enc2	0x2911 Enc2 Digital Interface Baud Rate	
Enc1	0x6002 Enc1 Total Measuring Range	Relevant for overflow in single-turn mode
Enc2	0x6802 Enc2 Total Measuring Range	

Encoder Interface Configuration – Event Counter

Available objects

Slot	Object	Description
Enc1	0x2100 Enc1 Digital Interface Type	80 Event Counter (automatically assigned by the module)
Enc2	0x2900 Enc2 Digital Interface Type	Enc event counter dummy module
Enc1	0x2103 Enc1 Digital Interface Config	Sub 01 (level): 0=HTL, 1=TTL or 2=RS422 Sub 02 (mode): 0=multi-turn or 1=single-turn Sub 03 (index level): 0=reference on rising edge 1=reference on falling edge Sub 04 (SSI): 0=straight binary 1=Gray coded binary Sub 05 (event counter): 0=count rising edges 1=count falling edges 3=count both edges
Enc2	0x2903 Enc2 Digital Interface Config	
Enc1	0x2110 Enc1 Digital Interface Bit Size	Encoder resolution as per data sheet
Enc2	0x2910 Enc2 Digital Interface Bit Size	
Enc1	0x2111 Enc1 Digital Interface Baud Rate	Clock frequency as per data sheet [kHz]
Enc2	0x2911 Enc2 Digital Interface Baud Rate	
Enc1	0x6002 Enc1 Total Measuring Range	Relevant for overflow in single-turn mode
Enc2	0x6802 Enc2 Total Measuring Range	

	Information
	The event counter inputs cannot be used for mechanical switches because they are neither debounced nor filtered.

	Information
	The max. counting frequency of event counter channels 0 & 3 is 400 kHz. *The max. counting frequency of event counter channels 1, 2, 4 & 5 is 5 kHz.*

	Information
	Only the event counter dummy module may be in slot 2 if you wish to use the module as an event counter. Also operating an encoder is currently not supported.

Encoder Interface Configuration – User-defined Units

Apart from position values in increments, the module can also output the position value in user-defined units (in REAL format). This option applies to incremental, SSI and ENDAT encoders.

The following objects are available for outputting the position value in user-defined units:

- 0x2014 Enc1 Linear Position Value
- 0x2814 Enc2 Linear Position Value

Add these objects to the PDO mapping as needed.

To calculate the position value:

$$Linear\ Position\ Value = High\ Resolution\ Raw\ Value * \frac{Encoder\ Increments}{Motor\ Revolutions} * \frac{Motor\ Shaft\ Revolutions}{Driving\ Shaft\ Revolutions} * \frac{Feed}{Shaft\ Revolutions}$$

Available objects

Slot	Object	Description
Enc1	0x208f Enc1 Position Encoder Resolution	$\frac{Encoder\ Increments}{Motor\ Revolutions}$
Enc2	0x288f Enc2 Position Encoder Resolution	
Enc1	0x2091 Enc1 Gear Ratio	$\frac{Motor\ Shaft\ Revolutions}{Driving\ Shaft\ Revolutions}$
Enc2	0x2891 Enc2 Gear Ratio	
Enc1	0x2092 Enc1 Feed Constant	$\frac{Feed}{Shaft\ Revolutions}$
Enc2	0x2892 Enc2 Feed Constant	

Configuration of Analogue Inputs

Available objects

Slot	Object	Subindex	Description
AI0	0x7110 AISensorType	01	Automatically assigned by the module
AI1		02	
AI2		03	
AI3		04	
AI0	0x7120 AIInputScaling1FV 0x7122 AIInputScaling2FV 0x7121 AIInputScaling1PV 0x7123 AIInputScaling2PV	01	Scales the analogue input values by setting control points. The scaled values are output to object 0x7130 AIInputPV added to the mapping.
AI1		02	
AI2		03	
AI3		04	
AI0	0x7126 AIScalingFactor 0x7127 AIScalingOffset	01	Scales the analogue input values by setting a scaling factor and an offset. The scaled values are output to object 0x7130 AIInputPV added to the mapping.
AI1		02	
AI2		03	
AI3		04	
AI0	0x7130 AIInputPV	01	Object for outputting the scaled analogue values to
AI1		02	
AI2		03	
AI3		04	
AI0	0x71a0 AIFilterType	01, 05	Object for filtering the analogue input values Subindex 01…04 low-pass filter Subindex 05…08 notch filter
AI1		02, 06	
AI2		03, 07	
AI3		04, 08	
AI0	0x71a1 AIFilterConstant	01	Object for setting the PT1 filter time in [ms]
AI1		02	
AI2		03	
AI3		04	

Configuration of Analogue outputs

Available objects

Slot	Object	Subindex	Description
AO0	0x7300 AOOutputPV	01	Object for outputting the scaled analogue values as REAL values.
AO1		02	
AO2		03	
AO3		04	
AO0	0x7310 AOOutputType	01	Automatically assigned by the module in the slot
AO1		02	
AO2		03	
AO3		04	
AO0	0x7312 AOOperatingMode	01	Automatically assigned by the modules in the slots. Remember to adjust the automatic slot configuration if you are using scaled output values.
AO1		02	
AO2		03	
AO3		04	
AO0	0x7320 AOOutputScaling1FV	01	Scales the analogue output values by setting control points. The scaled values are output to object 0x7300 AOOutputPV added to the mapping.
AO1	0x7321 AOOutputScaling1PV	02	
AO2	0x7322 AOOutputScaling2FV	03	
AO3	0x7323 AOOutputScaling2PV	04	
AO0	0x7330 AOOutputFV_Dec	01	Object for outputting the analogue output values as REAL values einer in V or in mA, depending on which module is in the slot
AO1		02	
AO2		03	
AO3		04	
AO0	0x8331 AOOutputFV_Inc	01	Object for outputting the analogue output values as (raw) Integer values
AO1		02	
AO2		03	
AO3		04	

2.2.7 EtherCAT Configuration

The module supports two op modes

Mode: Synchronous Syncmanager

The cycling EtherCAT frame triggers data exchange with the bus.

Mode: Distributed Clocks

All EtherCAT network stations should use synchronised clocks, if they are to capture and output data at the same point in time. This is achieved by a local clock in every EtherCAT slave controller that the EtherCAT master automatically synchronises with the EtherCAT network's master clock.

The EtherCAT slave controllers residing in the EtherCAT network generate synchronous interrupts which simultaneously capture input data and/or process output data.

2.2.8 Object Dictionary

Generalities

Kuhnke FIO MIX 04 breaks down into 3 virtual devices. The objects are arranged as follows:

0x1000 … 0x1FFF	Device-specific
0x2000 … 0x23FF	Manufacturer-specific: counter/encoder 1
0x2800 … 0x2FFF	Manufacturer-specific: counter/encoder 2
0x3000 … 0x37FF	Manufacturer-specific: analogue input/output
0x6000 … 0x67FF	virtual device: counter/encoder 1
0x6800 … 0x6FFF	virtual device: counter/encoder 2
0x7000 … 0x7FFF	virtual device: analogue input/output

0x1000 Device Type

Object Code	Variable

Sub	0x00
Name	Device type
Data type	UNSIGNED32
Access	R/O
Default value	5001 (0x1389)
PDO mapping	No

5001 = Modular Device Profile

0x1001 Error Register

Object Code	Variable

Sub	0x00
Name	Error register
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	No

In case of an error, the associated error bit is set. The bit is cleared automatically when the cause of the error has been removed.

This object OR-links the following objects:

0x2001 Enc1 Error Register

0x2801 Enc2 Error Register

0x3001 AI/AO Error Register

7	6	5	4	3	2	1	0
MAN	RES	PROF	COM	TEMP	VOL	CUR	GEN

GEN: general error

CUR: current

VOL: voltage

TEMP: temperature

COM: communication

PROF: device profile

RES: not used, always "0"

MAN: manufacturer-specific

0x1003 Pre-defined Error Field

Object Code	Array

Sub	0x00
Name	Highest subindex supported
Data type	UNSIGNED8
Access	R/W
Default value	8
Low limit	0
High limit	0
PDO mapping	No

Sub	0x01
Name	Standard error field 1
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	No
Access name	Pre-definederrorfield[0]

Sub	0x02
Name	Standard error field 2
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	No
Access name	Pre-definederrorfield[1]

Sub	0x03
Name	Standard error field 3
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	No
Access name	Pre-definederrorfield[2]

Sub	0x04
Name	Standard error field 4
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	No
Access name	Pre-definederrorfield[3]

Sub	0x05

Name	Standard error field 5
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	No
Access name	Pre-definederrorfield[4]

Sub	0x06
Name	Standard error field 6
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	No
Access name	Pre-definederrorfield[5]

Sub	0x07
Name	Standard error field 7
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	No
Access name	Pre-definederrorfield[6]

Sub	0x08
Name	Standard error field 8
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	No
Access name	Pre-definederrorfield[7]

A new error occurring is entered in subindex 1. Previous entries in subindices 1 to 7 are moved one place back. The error in subindex 7 is removed.

Check the object with subindex 0 to find the number of previous errors. Setting this object to "0" starts a new count.

Bit															
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Error Register								Error Origin				Sub-Number			
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Error Code															

Error Register [31 … 24]
Copy of object 0x1001 after causing an error
Error Origin [23 … 20]
Source of error inside the device
0xF across module / logical device
0x1 encoder 1
0x2 encoder 2
0x3 AI/AO
Sub-Number [19 … 16]
See Error Code table
Error Code [15 … 0]

Error Code	Sub	Device	Channel	Reaction	Explanation
0x2110	0x0	Enc1/Enc2		None	Encoder supply overload
0x2320	0x0	AI/AO	AO0	Output resets to zero	Output driver overheated
0x2320	0x1	AI/AO	AO1	Output resets to zero	Output driver overheated
0x2320	0x2	AI/AO	AO2	Output resets to zero	Output driver overheated
0x2320	0x3	AI/AO	AO3	Output resets to zero	Output driver overheated
0x2330	0x0	AI/AO	AO0	Output resets to zero	Open circuit / overvoltage
0x2330	0x1	AI/AO	AO1	Output resets to zero	Open circuit / overvoltage
0x2330	0x2	AI/AO	AO2	Output resets to zero	Open circuit / overvoltage
0x2330	0x3	AI/AO	AO3	Output resets to zero	Open circuit / overvoltage
0x3100	0x0	Module		None	Low module voltage
0x3110	0x1	Enc1/Enc2		None	Signal integrity error
0x5030	0x0	AI/AO	AI0	None	Current below 4 mA
0x5030	0xA	AI/AO	AI0	None	Input out of set limits
0x5030	0x1	AI/AO	AI1	None	Current below 4 mA
0x5030	0xB	AI/AO	AI1	None	Input out of set limits
0x5030	0x2	AI/AO	AI2	None	Current below 4 mA
0x5030	0xC	AI/AO	AI2	None	Input out of set limits
0x5030	0x3	AI/AO	AI3	None	Current below 4 mA
0x5030	0xD	AI/AO	AI3	None	Input out of set limits
0x6100	0x0	Module		Device no longer operational	Watchdog
0x7000	0x0	Enc1/Enc2		None	Endat CRC error
0x7000	0x1	Enc1/Enc2		None	Endat encoder error
0x7000	0x2	Enc1/Enc2		None	Endat timeout/answer format
0x8100	0x0	Module		Device no longer operational	Communication error

0x1008 Manufacturer Device Name

Object Code	Variable

Sub	0x00
Name	Manufacturer device name
Data type	VISIBLE_STRING
Access	R/O
Default value	Mix04 (694.444.64)
PDO mapping	No

0x1009 Manufacturer Hardware Version

Object Code	Variable

Sub	0x00
Name	Manufacturer hardware version
Data type	VISIBLE_STRING
Access	R/O
Default value	1.00
PDO mapping	No

0x100a Manufacturer Software Version

Object Code	Variable

Sub	0x00
Name	Manufacturer software version
Data type	VISIBLE_STRING
Access	R/O
Default value	C017
PDO mapping	No

0x1018 Identity Object

Object Code	RECORD

Sub	0x00
Name	Highest sub-index supported
Data type	UNSIGNED8
Access	R/O
Default value	0x04
PDO mapping	No

Sub	0x01
Name	Vendor ID
Data type	UNSIGNED32
Access	R/O
Default value	0x48554B
PDO mapping	No

Sub	0x02
Name	Product code
Data type	UNSIGNED32
Access	R/O
Default value	0x2F144
PDO mapping	No

Sub	0x03
Name	Revision Number
Data type	UNSIGNED32
Access	R/O
Default value	0x00000001
PDO mapping	No

Sub	0x04
Name	Serial Number
Data type	UNSIGNED32
Access	R/O
Default value	0x00000000
PDO mapping	No

0x10f1 Error Settings

Object Code	RECORD

Sub	0x00
Name	Highest sub-index supported
Data type	UNSIGNED8
Access	R/O
Default value	2
PDO mapping	No

Sub	0x01
Name	Local error reaction
Data type	UNSIGNED32
Access	R/W
Default value	1
PDO mapping	No

Sub	0x02
Name	Sync error counter limit
Data type	UNSIGNED16
Access	R/W
Default value	4
PDO mapping	No

0x10f8 Timestamp Object

Object Code	Variable

Sub	0x00
Name	Timestamp object
Data type	UNSIGNED64
Access	R/W
Default value	
PDO mapping	Optional, TPDO only

0x1600 Analogue Interface Control

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x32010010
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1601 Digital Interface Control Encoder 1

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x21010010
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1602 Digital Interface Control Encoder 2

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x29010010
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1603 AO0 Output Value

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x73300108
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1604 AO1 Output Value

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x73300208
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1605 AO2 Output Value

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x73300308
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1606 AO3 Output Value

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x73300408
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1a00 Analog Interface Status

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x30010008
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1a01 AI0 Input Value

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x71000108
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1a02 AI1 Input Value

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x71000208
PDO mapping	No

0x1a03 AI2 Input Value

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x71000308
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1a04 AI3 Input Value

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x71000408
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1a05 Rotary Encoder SD Encoder 1

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	3
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x60040020
PDO mapping	No

Sub	0x02
Name	Mapping entry 2
Data type	UNSIGNED32
Access	R/O
Default value	0x20300020
PDO mapping	No

Sub	0x03
Name	Mapping entry 3
Data type	UNSIGNED32
Access	R/O
Default value	0x20010008
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1a06 Event Counter

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	7
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x24080120
PDO mapping	No

Sub	0x02
Name	Mapping entry 2
Data type	UNSIGNED32
Access	R/O
Default value	0x24080220
PDO mapping	No

Sub	0x03
Name	Mapping entry 3
Data type	UNSIGNED32
Access	R/O
Default value	0x24080320
PDO mapping	No

Sub	0x04
Name	Mapping entry 4
Data type	UNSIGNED32
Access	R/O
Default value	0x24080420
PDO mapping	No

Sub	0x05
Name	Mapping entry 5
Data type	UNSIGNED32
Access	R/O
Default value	0x24080520

PDO mapping	No

Sub	0x06
Name	Mapping entry 6
Data type	UNSIGNED32
Access	R/O
Default value	0x24080620
PDO mapping	No

Sub	0x07
Name	Mapping entry 7
Data type	UNSIGNED32
Access	R/O
Default value	0x20010008
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1a07 Rotary Encoder SD Encoder 2

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	3
Low limit	0
High limit	64
PDO mapping	No

Sub	0x01
Name	Mapping entry 1
Data type	UNSIGNED32
Access	R/O
Default value	0x68040020
PDO mapping	No

Sub	0x02
Name	Mapping entry 2
Data type	UNSIGNED32
Access	R/O
Default value	0x28300020
PDO mapping	No

Sub	0x03
Name	Mapping entry 3
Data type	UNSIGNED32
Access	R/O
Default value	0x28010008
PDO mapping	No

Every subindex (1-8) describes a mapped object each. A mapping entry contains four bytes which are made up as follows:

Index[16]	bits 31..16	index of object to be mapped
SubIndex[8]	bits 15..8	subindex of object to be mapped
Length[8]	bits 7..0	length of object to be mapped

0x1c00 Sync Manager Communication Type

Object Code	Array

Sub	0x00
Name	Highest subindex supported
Data type	UNSIGNED8
Access	R/O
Default value	4
Low limit	0
High limit	8
PDO mapping	No

Sub	0x01
Name	SubIndex 1
Data type	UNSIGNED8
Access	R/O
Default value	1
PDO mapping	No

Sub	0x02
Name	SubIndex 2
Data type	UNSIGNED8
Access	R/O
Default value	2
PDO mapping	No

Sub	0x03
Name	SubIndex 3
Data type	UNSIGNED8
Access	R/O
Default value	3
PDO mapping	No

Sub	0x04
Name	SubIndex 4
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

0x1c12 Sync Manager 2 PDO Assignment

Object Code	Array

Sub	0x00
Name	Highest subindex supported
Data type	UNSIGNED8
Access	R/O
Default value	2
Low limit	0
High limit	2
PDO mapping	No

Sub	0x01
Name	Subindex
Data type	UNSIGNED16
Access	R/W
Default value	0x1600
PDO mapping	No

Sub	0x02
Name	SubIndex 2
Data type	UNSIGNED16
Access	R/W
Default value	0x1601
PDO mapping	No

0x1c13 Sync Manager 3 PDO Assignment

Object Code	Array

Sub	0x00
Name	Highest subindex supported
Data type	UNSIGNED8
Access	R/O
Default value	2
Low limit	0
High limit	4
PDO mapping	No

Sub	0x01
Name	Subindex
Data type	UNSIGNED16
Access	R/W
Default value	0x1a00
PDO mapping	No

Sub	0x02
Name	SubIndex 2
Data type	UNSIGNED16
Access	R/W
Default value	0x1a05
PDO mapping	No

0x1c32 Sync Manager 2 Synchronization

Object Code	RECORD

Sub	0x00
Name	Highest subindex supported
Data type	UNSIGNED8
Access	R/O
Default value	32
Low limit	0
High limit	8
PDO mapping	No

Sub	0x01
Name	Synchronization type
Data type	UNSIGNED16
Access	R/O
Default value	0x10
PDO mapping	No

Sub	0x02
Name	Cycle time
Data type	UNSIGNED32
Access	R/O
Default value	0x20
PDO mapping	No

Sub	0x04
Name	Synchronization types supported
Data type	UNSIGNED16
Access	R/O
Default value	0x10
PDO mapping	No

Sub	0x05
Name	Cycle time
Data type	UNSIGNED32
Access	R/O
Default value	0x20
PDO mapping	No

Sub	0x06
Name	Calc and copy time
Data type	UNSIGNED32
Access	R/O
Default value	0x20

PDO mapping	No

Sub	0x08
Name	Cycle time
Data type	UNSIGNED16
Access	R/W
Default value	0x10
PDO mapping	No

Sub	0x09
Name	Delay time
Data type	UNSIGNED32
Access	R/O
Default value	0x20
PDO mapping	No

Sub	0x0a
Name	Sync0 cycle time
Data type	UNSIGNED32
Access	R/W
Default value	0x20
PDO mapping	No

Sub	0x0b
Name	SM event missed
Data type	UNSIGNED16
Access	R/O
Default value	0x10
PDO mapping	No

Sub	0x0c
Name	Cycle time too small
Data type	UNSIGNED16
Access	R/O
Default value	0x10
PDO mapping	No

Sub	0x20
Name	Sync error
Data type	BOOLEAN
Access	R/O
Default value	0x01
PDO mapping	No

0x1c33 Sync Manager 3 Synchronization

Object Code	RECORD

Sub	0x00
Name	Highest subindex supported
Data type	UNSIGNED8
Access	R/O
Default value	32
Low limit	0
High limit	8
PDO mapping	No

Sub	0x01
Name	Synchronization type
Data type	UNSIGNED16
Access	R/O
Default value	0x10
PDO mapping	No

Sub	0x02
Name	Cycle time
Data type	UNSIGNED32
Access	R/O
Default value	0x20
PDO mapping	No

Sub	0x04
Name	Synchronization types supported
Data type	UNSIGNED16
Access	R/O
Default value	0x10
PDO mapping	No

Sub	0x05
Name	Cycle time
Data type	UNSIGNED32
Access	R/O
Default value	0x20
PDO mapping	No

Sub	0x06
Name	Calc and copy time
Data type	UNSIGNED32
Access	R/O
Default value	0x20

PDO mapping	No

Sub	0x08
Name	Cycle time
Data type	UNSIGNED16
Access	R/W
Default value	0x20
PDO mapping	No

Sub	0x09
Name	Delay time
Data type	UNSIGNED32
Access	R/O
Default value	0x10
PDO mapping	No

Sub	0x0a
Name	Sync0 cycle time
Data type	UNSIGNED32
Access	R/W
Default value	0x20
PDO mapping	No

Sub	0x0b
Name	SM event missed
Data type	UNSIGNED16
Access	R/O
Default value	0x20
PDO mapping	No

Sub	0x0c
Name	Cycle time too small
Data type	UNSIGNED16
Access	R/O
Default value	0x10
PDO mapping	No

Sub	0x20
Name	Sync error
Data type	BOOLEAN
Access	R/O
Default value	0x01
PDO mapping	No

0x2001 Enc1 Error Register

Object Code	Variable

Sub	0x00
Name	Enc1 error register
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc1ErrorRegister

0x2003 Enc1 Preset Value Signed

Object Code	Variable

Sub	0x00
Name	Enc1 preset value signed
Data type	INTEGER32
Access	R/W
Default value	
PDO mapping	No
Access name	Enc1PresetValueSigned

Offset value

0x2004 Enc1 Position Value Signed

Object Code	Variable

Sub	0x00
Name	Enc1 position value signed
Data type	INTEGER32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc1PositionValueSigned

0x2008 Enc1 High Resolution Position Value Signed

Object Code	Variable

Sub	0x00
Name	Enc1 high resolution position value signed
Data type	INTEGER64
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc1HighResolutionPositionValueSigned

0x2009 Enc1 High Resolution Preset Value Signed

Object Code	Variable

Sub	0x00
Name	Enc1 high resolution preset value signed
Data type	INTEGER64
Access	R/W
Default value	
PDO mapping	No
Access name	Enc1HighResolutionPresetValueSigned

High resolution offset value

0x2014 Enc1 Linear Position Value

Object Code	Variable

Sub	0x00
Name	Enc1 linear position value
Data type	REAL32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc1LinearPositionValue

Position value in user-defined units

0x2015 Enc1 Linear Position Preset Value

Object Code	Variable

Sub	0x00
Name	Enc1 linear position preset value
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	Enc1LinearPositionPresetValue

Position offset in user-defined units

0x2030 Enc1 High Resolution Speed Value

Object Code	Variable

Sub	0x00
Name	Enc1 high resolution speed value
Data type	INTEGER32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc1HighResolutionSpeedValue

Speed value

0x2031 Enc1 Linear Speed Value

Object Code	Variable

Sub	0x00
Name	Enc1 linear speed value
Data type	REAL32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc1LinearSpeedValue

Speed value in user-defined units

0x2032 Enc1 Speed Value Filter Select

Object Code	Variable

Sub	0x00
Name	Enc1 speed value filter select
Data type	UNSIGNED8
Access	R/O
Default value	11
PDO mapping	No
Access name	Enc1SpeedValueFilterSelect

Configuration object for calculating the speed
0 no filter
10 PT1 filter
11 integration (default)

0x208f Enc1 Position Encoder Resolution

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	2
PDO mapping	No

Sub	0x01
Name	Encoder increments
Data type	UNSIGNED32
Access	R/W
Default value	0x000003E8
PDO mapping	No
Access name	Enc1PositionEncoderResolution.EncoderIncrements

Sub	0x02
Name	Motor revolutions
Data type	UNSIGNED32
Access	R/W
Default value	0x00000001
PDO mapping	No
Access name	Enc1PositionEncoderResolution.MotorRevolutions

To convert the units:

$$\frac{Encoder\ Increments\ 208f:01}{Motor\ Revolution\ 208f:02}$$

0x2091 Enc1 Gear Ratio

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	2
PDO mapping	No

Sub	0x01
Name	Motor shaft revolutions
Data type	UNSIGNED32
Access	R/W
Default value	0x00000001
PDO mapping	No
Access name	Enc1GearRatio.MotorShaftRevolutions

Sub	0x02
Name	Driving shaft revolutions
Data type	UNSIGNED32
Access	R/W
Default value	0x00000001
PDO mapping	No
Access name	Enc1GearRatio.DrivingShaftRevolutions

To convert the units:

$$\frac{Motor\ Shaft\ Revolutions\ 2091{:}01}{Driving\ Shaft\ Revolutions\ 2091{:}02}$$

0x2092 Enc1 Feed Constant

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	2
PDO mapping	No

Sub	0x01
Name	Feed
Data type	UNSIGNED32
Access	R/W
Default value	0x00000064
PDO mapping	No
Access name	Enc1FeedConstant.Feed

Sub	0x02
Name	Shaft revolutions
Data type	UNSIGNED32
Access	R/W
Default value	0x00000001
PDO mapping	No
Access name	Enc1FeedConstant.ShaftRevolutions

To convert the units:

$$\frac{Feed\ 2092{:}01}{Shaft\ Revolutions\ 2092{:}02}$$

0x2100 Enc1 Digital Interface Type

Object Code	Variable

Sub	0x00
Name	Enc1 digital interface type
Data type	UNSIGNED8
Access	R/W
Default value	64
PDO mapping	No
Access name	Enc1DigitalInterfaceType

To set up the encoder connected:
64 Encoder (default)
65 SSI
66 SixStep
69 Endat
80 EventCounter

0x2101 Enc1 Digital Interface Control

Object Code	Variable

Sub	0x00
Name	Enc1 digital interface control
Data type	UNSIGNED16
Access	R/W
Default value	0
PDO mapping	Optional, RPDO only
Access name	Enc1DigitalInterfaceControl

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RC6	RC5	RC4	RC3	RC2	RC1						RES CNT			REF CNT	RES Err

RES Err

0 = do nothing

1 = reset device

REF CNT

A/B/Ref counter: Rising edge starts referencing the A/B/Ref counter's Ref track

RES CNT:

A/B/Ref counter: A rising edge resets the current counter reading

RC1…6 (Reset Event Counter 1...6)

A rising edge resets the associated event counter

0x2102 Enc1 Digital Interface Status

Object Code	Variable

Sub	0x00
Name	Enc1 digital interface status
Data type	UNSIGNED16
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc1DigitalInterfaceStatus

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
													DIR	Ref	

Ref:

0 = encoder not referenced

1 = encoder referenced

DIR

0 = clockwise (CW)

1 = counterclockwise (CCW)

0x2103 Enc1 Digital Interface Config

Object Code	RECORD

Sub	0x00
Name	Highest sub-index supported
Data type	UNSIGNED8
Access	R/O
Default value	5
PDO mapping	No

Sub	0x01
Name	Enc1 encoder: Level
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	Enc1DigitalInterfaceConfig.Enc1Encoder:Level

Sub	0x02
Name	Enc1 encoder: mode
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	Enc1DigitalInterfaceConfig.Enc1Encoder:Mode

Sub	0x03
Name	Enc1 encoder: index level
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	Enc1DigitalInterfaceConfig.Enc1Encoder:Indexlevel

Sub	0x04
Name	Enc1 SSI: use Gray code
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	Enc1DigitalInterfaceConfig.Enc1SSI:Usegreycode

Sub	0x05
Name	Enc1 event counter: sensitivity
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	Enc1DigitalInterfaceConfig.Enc1EventCounter:Sensitivity

Object for configuring the counter/encoder interface
Subindex 01 (Encoder: level)
0 HTL (default)
1 TTL
2 RS422
Subindex 02 (Encoder: mode)
0 multi-turn encoder, no index (default)
1 single-turn encoder
Subindex 03 (Encoder: index level)
0 reference on rising edge (default)
1 reference on falling edge
3 reference on both edges
Subindex 04 (SSI: Use Gray Code)
0 straight binary (default)
1 Gray coded binary
Subindex 05 (Event Counter: Sensitivity)
0 count rising edges (default)
1 count falling edges
3 count both edges

0x2110 Enc1 Digital Interface Bit Size

Object Code	Variable

Sub	0x00
Name	Enc1 digital interface bit size
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	No
Access name	Enc1DigitalInterfaceBitSize

SSI / ENDAT: Encoder resolution as per the data sheet

0x2111 Enc1 Digital Interface Baud Rate

Object Code	Variable

Sub	0x00
Name	Enc1 digital interface baud rate
Data type	UNSIGNED16
Access	R/W
Default value	1000 (0x03E8)
PDO mapping	No
Access name	Enc1DigitalInterfaceBaudRate

SSI / ENDAT: Clock frequency, in kHz, as per encoder data sheet

0x2120 Enc1 Index Capture Value

Object Code	Variable

Sub	0x00
Name	Enc1 index capture value
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc1IndexCaptureValue

0x2122 Enc1 Encoder Track ABRef

Object Code	Variable

Sub	0x00
Name	Enc1 encoder track ABRef
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc1EncoderTrackABRef

7	6	5	4	3	2	1	0
					Ref	B	A

Level of encoder track signal

0x213f Enc1 ErrorCode

Object Code	Variable

Sub	0x00
Name	Enc1 ErrorCode
Data type	UNSIGNED16
Access	R/O
Default value	
PDO mapping	No
Access name	Enc1ErrorCode

See object table 0x1003 Pre-defined Error Field

0x2408 Event Counter Count

Object Code	RECORD

Sub	0x00
Name	Highest sub-index supported
Data type	UNSIGNED8
Access	R/O
Default value	6
PDO mapping	No

Sub	0x01
Name	Event counter channel 1
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	EventCounterCount.EventCounterChannel1

Sub	0x02
Name	Event counter channel 2
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	EventCounterCount.EventCounterChannel2

Sub	0x03
Name	Event counter channel 3
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	EventCounterCount.EventCounterChannel3

Sub	0x04
Name	Event counter channel 4
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	EventCounterCount.EventCounterChannel4

Sub	0x05
Name	Event counter channel 5
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	EventCounterCount.EventCounterChannel5

Sub	0x06
Name	Event counter channel 6
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	EventCounterCount.EventCounterChannel6

0x2801 Enc2 Error Register

Object Code	Variable

Sub	0x00
Name	Enc2 error register
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc2ErrorRegister

0x2803 Enc2 Preset Value Signed

Object Code	Variable

Sub	0x00
Name	Enc2 preset value signed
Data type	INTEGER32
Access	R/W
Default value	
PDO mapping	No
Access name	Enc2PresetValueSigned

0x2804 Enc2 Position Value Signed

Object Code	Variable

Sub	0x00
Name	Enc2 position value signed
Data type	INTEGER32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc2PositionValueSigned

0x2808 Enc2 High Resolution Position Value Signed

Object Code	Variable

Sub	0x00
Name	Enc2 high resolution position value signed
Data type	INTEGER64
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc2HighResolutionPositionValueSigned

0x2809 Enc2 High Resolution Preset Value Signed

Object Code	Variable

Sub	0x00
Name	Enc2 high resolution preset value signed
Data type	INTEGER64
Access	R/W
Default value	
PDO mapping	No
Access name	Enc2HighResolutionPresetValueSigned

0x2814 Enc2 Linear Position Value

Object Code	Variable

Sub	0x00
Name	Enc2 linear position value
Data type	REAL32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc2LinearPositionValue

Position value in user-defined units

0x2815 Enc2 Linear Position Preset Value

Object Code	Variable

Sub	0x00
Name	Enc2 linear position preset value
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	Enc2LinearPositionPresetValue

Position offset in user-defined units

0x2830 Enc2 High Resolution Speed Value

Object Code	Variable

Sub	0x00
Name	Enc2 linear position preset value
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	Enc2LinearPositionPresetValue

Speed value

0x2831 Enc2 Linear Speed Value

Object Code	Variable

Sub	0x00
Name	Enc2 linear speed value
Data type	REAL32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc2LinearSpeedValue

Speed value in user-defined units

0x2832 Enc2 Speed Value Filter Select

Object Code	Variable

Sub	0x00
Name	Enc2 speed value filter select
Data type	UNSIGNED8
Access	R/O
Default value	11
PDO mapping	No
Access name	Enc2SpeedValueFilterSelect

0x288f Enc2 Position Encoder Resolution

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	2
PDO mapping	No

Sub	0x01
Name	Encoder increments
Data type	UNSIGNED32
Access	R/W
Default value	0x000003E8
PDO mapping	No
Access name	Enc2PositionEncoderResolution.EncoderIncrements

Sub	0x02
Name	Motor revolutions
Data type	UNSIGNED32
Access	R/W
Default value	0x00000001
PDO mapping	No
Access name	Enc2PositionEncoderResolution.MotorRevolutions

To convert the units:

$$\frac{Encoder\ Increments\ 288f:01}{Motor\ Revolution\ 288f:02}$$

0x2891 Enc2 Gear Ratio

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	2
PDO mapping	No

Sub	0x01
Name	Motor shaft revolutions
Data type	UNSIGNED32
Access	R/W
Default value	0x00000001
PDO mapping	No
Access name	Enc2GearRatio.MotorShaftRevolutions

Sub	0x02
Name	Driving shaft revolutions
Data type	UNSIGNED32
Access	R/W
Default value	0x00000001
PDO mapping	No
Access name	Enc2GearRatio.DrivingShaftRevolutions

To convert the units:

$$\frac{Motor\ Shaft\ Revolutions\ 2891{:}01}{Driving\ Shaft\ Revolutions\ 2891{:}02}$$

0x2892 Enc2 Feed Constant

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	2
PDO mapping	No

Sub	0x01
Name	Feed
Data type	UNSIGNED32
Access	R/W
Default value	0x00000001
PDO mapping	No
Access name	Enc2FeedConstant.Feed

Sub	0x02
Name	Shaft revolutions
Data type	UNSIGNED32
Access	R/W
Default value	0x00000064
PDO mapping	No
Access name	Enc2FeedConstant.ShaftRevolutions

To convert the units:

$$\frac{Feed\ 2892{:}01}{Shaft\ Revolutions\ 2892{:}02}$$

0x2900 Enc2 Digital Interface Type

Object Code	Variable

Sub	0x00
Name	Enc2 digital interface type
Data type	UNSIGNED8
Access	R/W
Default value	64
PDO mapping	No
Access name	Enc2DigitalInterfaceType

To set up the encoder connected:
64 Encoder
65 SSI
66 SixStep
69 Endat
80 EventCounter

0x2901 Enc2 Digital Interface Control

Object Code	Variable

Sub	0x00
Name	Enc1 digital interface control
Data type	UNSIGNED16
Access	R/W
Default value	0
PDO mapping	Optional, RPDO only
Access name	Enc1DigitalInterfaceControl

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
RC6	RC5	RC4	RC3	RC2	RC1						RES CNT			REF CNT	RES Err

RES Err

0 = do nothing

1 = reset device

REF CNT
A/B/Ref counter: Rising edge starts referencing the A/B/Ref counter's Ref track

RES CNT: (software release 1.10 or higher)

A/B/Ref counter: A rising edge resets the current counter reading

RC1…6 (Reset Event Counter 1...6)

A rising edge resets the associated event counter

0x2902 Enc2 Digital Interface Status

Object Code	Variable

Sub	0x00
Name	Enc2 digital interface status
Data type	UNSIGNED16
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc2DigitalInterfaceStatus

0x2903 Enc2 Digital Interface Config

Object Code	RECORD

Sub	0x00
Name	Highest sub-index supported
Data type	UNSIGNED8
Access	R/O
Default value	5
PDO mapping	No

Sub	0x01
Name	Enc2 encoder: level
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	Enc2DigitalInterfaceConfig.Enc2Encoder:Level

Sub	0x02
Name	Enc2 encoder: mode
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	Enc2DigitalInterfaceConfig.Enc2Encoder:Mode

Sub	0x03
Name	Enc2 encoder: index level
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	Enc2DigitalInterfaceConfig.Enc2Encoder:Indexlevel

Sub	0x04
Name	Enc2 SSI: use Gray code
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	Enc2DigitalInterfaceConfig.Enc2SSI:Usegreycode

Sub	0x05
Name	Enc2 event counter: sensitivity
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	Enc2DigitalInterfaceConfig.Enc2EventCounter:Sensitivity

Object for configuring the counter/encoder interface
Subindex 01 (encoder: level)
0 HTL (default)
1 TTL
2 RS422
Subindex 02 (encoder: mode)
0 multi-turn encoder, no index (default)
1 single-turn encoder
Subindex 03 (encoder: index level)
0 reference on rising edge (default)
1 reference on falling edge
3 reference on both edges
Subindex 04 (SSI: Use Gray Code)
0 straight binary (default)
1 Gray coded binary
Subindex 05 (event counter: sensitivity)
0 count rising edges (default)
1 count falling edges
3 count both edges

0x2910 Enc2 Digital Interface Bit Size

Object Code	Variable

Sub	0x00
Name	Enc1 digital interface bit size
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	No
Access name	Enc2DigitalInterfaceBitSize

0x2911 Enc2 Digital Interface Baud Rate

Object Code	Variable

Sub	0x00
Name	Enc2 digital interface baud rate
Data type	UNSIGNED16
Access	R/W
Default value	0x03E8
PDO mapping	No
Access name	Enc2DigitalInterfaceBaudRate

0x2920 Enc2 Index Capture Value

Object Code	Variable

Sub	0x00
Name	Enc2 index capture value
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc2IndexCaptureValue

0x2921 Enc2 Capture Input Value

Object Code	Variable

Sub	0x00
Name	Enc2 capture input value
Data type	INTEGER64
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc2CaptureInputValue

0x2922 Enc2 Encoder Track ABRef

Object Code	Variable

Sub	0x00
Name	Enc2 encoder track ABRef
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc2EncoderTrackABRef

7	6	5	4	3	2	1	0
					Ref	B	A

Level of encoder track signal

0x293f Enc2 ErrorCode

Object Code	Variable

Sub	0x00
Name	Enc2 ErrorCode
Data type	UNSIGNED16
Access	R/O
Default value	
PDO mapping	No
Access name	Enc2ErrorCode

See object table 0x1003 Pre-defined Error Field

0x3001 AI/AO Error Register

Object Code	Variable

Sub	0x00
Name	AI/AO error register
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AI/AOErrorRegister

See 0x1001

0x3011 AIChannelControl

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	Channel control AI0
Data type	UNSIGNED8
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AIChannelControl.ChannelControlAI0

Sub	0x02
Name	Channel control AI1
Data type	UNSIGNED8
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AIChannelControl.ChannelControlAI1

Sub	0x03
Name	Channel control AI2
Data type	UNSIGNED8
Access	R/W
Default value	
PDO mapping	Optional, RPDO only

Access name	AIChannelControl.ChannelControlAI2

Sub	0x04
Name	Channel control AI3
Data type	UNSIGNED8
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AIChannelControl.ChannelControlAI3

7	6	5	4	3	2	1	0
					COMP	SCAL	ACT

ACT:

0 = input inactive

1 = input active

SCAL:

0 = scale input values by factor and offset

1 = scale input values by control points

COMP:

0 = comparator inactive

1 = comparator active

0x3012 AIChannelStatus

Object Code	Array

Sub	0x00
Name	Highest sub-index supported
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	Channel status AI0
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIChannelStatus[0]

Sub	0x02
Name	Channel status AI1
Data type	UNSIGNED8
Access	R/O
Default value	

PDO mapping	Optional, TPDO only
Access name	AIChannelStatus[1]

Sub	0x03
Name	Channel status AI2
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIChannelStatus[2]

Sub	0x04
Name	Channel status AI3
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIChannelStatus[3]

7	6	5	4	3	2	1	0
						UpLim	LoLim

LoLim (lower limit) or UpLim (upper limit)

0 = limit not exceeded

1 = limit exceeded

0x3100 AI/AO SampleCount

Object Code	Variable

Sub	0x00
Name	AI/AO SampleCount
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AI/AOSampleCount

Number of samples since last reset / restart

0x3125 AIInputCalibrationGain

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AI input calibration gain 0
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AIInputCalibrationGain.AIInputcalibrationgain0

Sub	0x02
Name	AI input calibration gain 1
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AIInputCalibrationGain.AIInputcalibrationgain1

Sub	0x03
Name	AI input calibration gain 2
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AIInputCalibrationGain.AIInputcalibrationgain2

Sub	0x04
Name	AI input calibration gain 3
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AIInputCalibrationGain.AIInputcalibrationgain3

0x313f AI/AO Error Code

Object Code	Variable

Sub	0x00
Name	AI/AO error code
Data type	UNSIGNED16
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AI/AOErrorCode

See object table 0x1003 Pre-defined Error Field

0x3201 AI/AO DeviceControl

Object Code	Variable

Sub	0x00
Name	AI/AO DeviceControl
Data type	UNSIGNED16
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AI/AODeviceControl

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
															RES

RES

0 = do nothing

1 = reset device

0x3202 AI/AO DeviceState

Object Code	Variable

Sub	0x00
Name	AI/AO DeviceState
Data type	UNSIGNED16
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AI/AODeviceState

Not used

0x6000 Enc1 Operating Parameters

Object Code	Variable

Sub	0x00
Name	Enc1 operating parameters
Data type	UNSIGNED16
Access	R/W
Default value	
PDO mapping	No
Access name	Enc1OperatingParameters

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
												DIR			

Bit 3 DIR

0 = clockwise

1 = counterclockwise

0x6002 Enc1 Total Measuring Range

Object Code	Variable

Sub	0x00
Name	Enc1 total measuring range
Data type	UNSIGNED32
Access	R/W
Default value	4000
PDO mapping	No
Access name	Enc1TotalMeasuringRange

Encoder resolution. Relevant for overflow in single-turn mode

0x6003 Enc1 Preset Value

Object Code	Variable

Sub	0x00
Name	Enc1 preset value
Data type	UNSIGNED32
Access	R/W
Default value	
PDO mapping	No
Access name	Enc1PresetValue

Offset value

0x6004 Enc1 Position Value

Object Code	Variable

Sub	0x00
Name	Enc1 position value
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc1PositionValue

0x6008 Enc1 High Resolution Position Value

Object Code	Variable

Sub	0x00
Name	Enc1 high resolution position value
Data type	UNSIGNED64
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc1HighResolutionPositionValue

0x6009 Enc1 High Resolution Preset Value

Object Code	Variable

Sub	0x00
Name	Enc1 high resolution preset value
Data type	UNSIGNED64
Access	R/W
Default value	

PDO mapping	No
Access name	Enc1HighResolutionPresetValue

0x600b Enc1 High Resolution Raw Value

Object Code	Variable

Sub	0x00
Name	Enc1 high resolution raw value
Data type	UNSIGNED64
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc1HighResolutionRawValue

64-bit raw encoder value without any offsets, homing and index

0x600c Enc1 Position Raw Value

Object Code	Variable

Sub	0x00
Name	Enc1 position raw value
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc1PositionRawValue

32-bit raw encoder value without any offsets, homing and index

0x6030 Enc1 Speed Value

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
PDO mapping	No

Sub	0x01
Name	Enc1 speed value channel 1
Data type	INTEGER16
Access	R/O
Default value	

PDO mapping	Optional, TPDO only
Access name	Enc1SpeedValue.Enc1SpeedValueChannel1

0x6031 Enc1 Speed Parameters

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	Enc1 speed source selector
Data type	UNSIGNED16
Access	R/W
Default value	4
PDO mapping	No
Access name	Enc1SpeedParameters.Enc1SpeedSourceSelector

Sub	0x02
Name	Enc1 speed integration time
Data type	UNSIGNED16
Access	R/O
Default value	100
PDO mapping	No
Access name	Enc1SpeedParameters.Enc1SpeedIntegrationTime

Sub	0x03
Name	Enc1 multiplier value
Data type	UNSIGNED16
Access	R/O
Default value	1
Low limit	1
High limit	65535
PDO mapping	No
Access name	Enc1SpeedParameters.Enc1Multipliervalue

Sub	0x04
Name	Enc1 divider value
Data type	UNSIGNED16
Access	R/W
Default value	1
Low limit	1

High limit	65535
PDO mapping	No
Access name	Enc1SpeedParameters.Enc1Dividervalue

Sub 01:

4= use object 0x600B

Sub 02:

Integration time in [ms]

Sub 03:

Conversion factor for calculating the speed; result output to 0x6030

Sub 04:

Conversion divider for calculating the speed; result output to 0x6030

0x6500 Enc1 Operating Status

Object Code	Variable

Sub	0x00
Name	Enc1 operating status
Data type	UNSIGNED16
Access	R/O
Default value	
PDO mapping	No
Access name	Enc1OperatingStatus

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
												DIR			

Bit 3 DIR

0 = clockwise

1 = counterclockwise

0x6800 Enc2 Operating Parameters

Object Code	Variable

Sub	0x00
Name	Enc2 operating parameters
Data type	UNSIGNED16
Access	R/W
Default value	
PDO mapping	No
Access name	Enc2OperatingParameters

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
												DIR			

Bit 3 DIR

0 = clockwise

1 = counterclockwise

0x6802 Enc2 Total Measuring Range

Object Code	Variable

Sub	0x00
Name	Enc2 total measuring range
Data type	UNSIGNED32
Access	R/W
Default value	4000
PDO mapping	No
Access name	Enc2TotalMeasuringRange

Encoder resolution. Relevant for overflow in single-turn mode

0x6803 Enc2 Preset Value

Object Code	Variable

Sub	0x00
Name	Enc2 preset value
Data type	UNSIGNED32
Access	R/W
Default value	
PDO mapping	No
Access name	Enc2PresetValue

0x6804 Enc2 Position Value

Object Code	Variable

Sub	0x00
Name	Enc2 position value
Data type	UNSIGNED32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc2PositionValue

0x6808 Enc2 High Resolution Position Value

Object Code	Variable

Sub	0x00
Name	Enc2 high resolution position value
Data type	UNSIGNED64
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc2HighResolutionPositionValue

0x6809 Enc2 High Resolution Preset Value

Object Code	Variable

Sub	0x00
Name	Enc2 high resolution preset value
Data type	UNSIGNED64
Access	R/W
Default value	
PDO mapping	No
Access name	Enc2HighResolutionPresetValue

0x680b Enc2 High Resolution Raw Value

Object Code	Variable

Sub	0x00
Name	Enc2 high resolution raw value
Data type	UNSIGNED64
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc2HighResolutionRawValue

64-bit raw encoder value without any offsets, homing and index

0x680c Enc2 Position Raw Value

Object Code	Variable

Sub	0x00
Name	Enc2 position raw value
Data type	UNSIGNED32
Access	R/O
Default value	

PDO mapping	Optional, TPDO only
Access name	Enc2PositionRawValue

32-bit raw encoder value without any offsets, homing and index

0x6830 Enc2 Speed Value

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	1
PDO mapping	No

Sub	0x01
Name	Enc2 speed value channel 1
Data type	INTEGER16
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	Enc2SpeedValue.Enc2SpeedValueChannel1

0x6831 Enc2 Speed Parameters

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	Enc2 speed source selector
Data type	UNSIGNED16
Access	R/W
Default value	4
PDO mapping	No
Access name	Enc2SpeedParameters.Enc2SpeedSourceSelector

Sub	0x02

Name	Enc2 speed integration time
Data type	UNSIGNED16
Access	R/O
Default value	100
PDO mapping	No
Access name	Enc2SpeedParameters.Enc2SpeedIntegrationTime

Sub	0x03
Name	Enc2 multiplier value
Data type	UNSIGNED16
Access	R/O
Default value	1
Low limit	1
High limit	65535
PDO mapping	No
Access name	Enc2SpeedParameters.Enc2MultiplierValue

Sub	0x04
Name	Enc2 divider value
Data type	UNSIGNED16
Access	R/O
Default value	1
Low limit	1
High limit	65535
PDO mapping	No
Access name	Enc2SpeedParameters.Enc2Dividervalue

Sub 01:

4= use object 0x680B

Sub 02:

Integration time in [ms]

Sub 03:

Conversion factor for calculating the speed; result output to 0x6830

Sub 04:

Conversion divider for calculating the speed; result output to 0x6830

0x6d00 Enc2 Operating Status

Object Code	Variable

Sub	0x00
Name	Enc2 operating status
Data type	UNSIGNED16
Access	R/O
Default value	
PDO mapping	No
Access name	Enc2OperatingStatus

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
												DIR			

Bit 3 DIR

0 = clockwise

1 = counterclockwise

x7100 AIInputFV_Real

Object Code	Array

Sub	0x00
Name	Unnamed subindex
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AI input FV 0
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIInputFV_Real[0]

Sub	0x02
Name	AI input FV 1
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIInputFV_Real[1]

Sub	0x03

Name	AI input FV 2
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIInputFV_Real[2]

Sub	0x04
Name	AI input FV 3
Data type	UNSIGNED8
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIInputFV_Real[3]

Analogue input values as measured Real variable or, if oversampling is active, average of sampled input values.

0x7110 AISensorType

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AI sensor type 0
Data type	UNSIGNED16
Access	R/O
Default value	42
PDO mapping	No
Access name	AISensorType.AIsensortype0

Sub	0x02
Name	AI sensor type 1
Data type	UNSIGNED16
Access	R/O
Default value	42
PDO mapping	No
Access name	AISensorType.AIsensortype1

Sub	0x03
Name	AI sensor type 2

Data type	UNSIGNED16
Access	R/O
Default value	42
PDO mapping	No
Access name	AISensorType.AIsensortype2

Sub	0x04
Name	AI sensor type 3
Data type	UNSIGNED16
Access	R/O
Default value	42
PDO mapping	No
Access name	AISensorType.AIsensortype3

Channel-specific setting of the attached sensor:
42 = 0…10 V (default), 52 = 0…20 mA, 51 = 4…20 mA

0x7120 AIInputScaling1FV

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AI input scaling 1 FV 0
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputScaling1FV.AIInputscaling1FV0

Sub	0x02
Name	AI input scaling 1 FV 1
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputScaling1FV.AIInputscaling1FV1

Sub	0x03
Name	AI input scaling 1 FV 2
Data type	REAL32

Access	R/O
Default value	
PDO mapping	No
Access name	AIInputScaling1FV.AIInputscaling1FV2

Sub	0x04
Name	AI input scaling 1 FV 3
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputScaling1FV.AIInputscaling1FV3

0x7121 AIInputScaling1PV

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AI input scaling 1 PV 0
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputScaling1PV.AIInputscaling1PV0

Sub	0x02
Name	AI input scaling 1 PV 1
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputScaling1PV.AIInputscaling1PV1

Sub	0x03
Name	AI input scaling 1 PV 2
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No

Access name	AIInputScaling1PV.AIInputscaling1PV2

Sub	0x04
Name	AI input scaling 1 PV 3
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputScaling1PV.AIInputscaling1PV3

0x7122 AIInputScaling2FV

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AI input scaling 2 FV 0
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputScaling2FV.AIInputscaling2FV0

Sub	0x02
Name	AI input scaling 2 FV 1
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputScaling2FV.AIInputscaling2FV1

Sub	0x03
Name	AI input scaling 2 FV 2
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputScaling2FV.AIInputscaling2FV2

Sub	0x04

Name	AI input scaling 2 FV 3
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AIInputScaling2FV.AIInputscaling2FV3

0x7123 AIInputScaling2PV

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AI input scaling 2 PV 0
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputScaling2PV.AIInputscaling2PV0

Sub	0x02
Name	AI input scaling 2 PV 1
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputScaling2PV.AIInputscaling2PV1

Sub	0x03
Name	AI input scaling 2 PV 2
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputScaling2PV.AIInputscaling2PV2

Sub	0x04
Name	AI input scaling 2 PV 3
Data type	REAL32
Access	R/O

Default value	
PDO mapping	No
Access name	AIInputScaling2PV.AIInputscaling2PV3

0x7124 AIInputOffset

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AI input offset 0
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputOffset.AIInputoffset0

Sub	0x02
Name	AI input offset 1
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputOffset.AIInputoffset1

Sub	0x03
Name	AI input offset 2
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputOffset.AIInputoffset2

Sub	0x04
Name	AI input offset 3
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIInputOffset.AIInputoffset3

Channel-specific offset, in [V] or [mA]

0x7126 AIScalingFactor

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AI scaling factor 0
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIScalingFactor.AIscalingfactor0

Sub	0x02
Name	AI scaling factor 1
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIScalingFactor.AIscalingfactor1

Sub	0x03
Name	AI scaling factor 2
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIScalingFactor.AIscalingfactor2

Sub	0x04
Name	AI scaling factor 3
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIScalingFactor.AIscalingfactor3

Scaling factor [process value / field value]

0x7127 AIScalingOffset

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AI scaling offset 0
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIScalingOffset.AIscalingoffset0

Sub	0x02
Name	AI scaling offset 1
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIScalingOffset.AIscalingoffset1

Sub	0x03
Name	AI scaling offset 2
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIScalingOffset.AIscalingoffset2

Sub	0x04
Name	AI scaling offset 3
Data type	REAL32
Access	R/O
Default value	
PDO mapping	No
Access name	AIScalingOffset.AIscalingoffset3

Scaling offset [process value]

0x7130 AIInputPV

Object Code	Array

Sub	0x00
Name	Highest sub-index supported
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AI input PV 0
Data type	REAL32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIInputPV[0]

Sub	0x02
Name	AI input PV 1
Data type	REAL32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIInputPV[1]

Sub	0x03
Name	AI input PV 2
Data type	REAL32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIInputPV[2]

Sub	0x04
Name	AI input PV 3
Data type	REAL32
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIInputPV[3]

Analogue process input values as measured Real quantities, depending on the scaling values.
Average of sampled process input values if oversampling is active.

0x71a0 AIFilterType

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	8
PDO mapping	No

Sub	0x01
Name	AI0 low pass filter type
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	AIFilterType.AI0lowpassfiltertype

Sub	0x02
Name	AI1 low pass filter type
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	AIFilterType.AI1lowpassfiltertype

Sub	0x03
Name	AI2 low pass filter type
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	AIFilterType.AI2lowpassfiltertype

Sub	0x04
Name	AI3 low pass filter type
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	AIFilterType.AI3lowpassfiltertype

Sub	0x05
Name	AI0 notch filter type
Data type	UNSIGNED8

Access	R/O
Default value	0
PDO mapping	No
Access name	AIFilterType.AI0notchfiltertype

Sub	0x06
Name	AI1 notch filter type
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	AIFilterType.AI1notchfiltertype

Sub	0x07
Name	AI2 notch filter type
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	AIFilterType.AI2notchfiltertype

Sub	0x08
Name	AI3 notch filter type
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	AIFilterType.AI3notchfiltertype

Object for activating the input filter.
Subindex 01…04
0 = no filter active
1 = filter PT1

Subindex 05…08
0 = no Filter active
101 = 50 Hz notch filter
102 = 60 Hz notch filter

0x71a1 AIFilterConstant

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AI filter constant 0
Data type	UNSIGNED16
Access	R/W
Default value	
PDO mapping	No
Access name	AIFilterConstant.AIfilterconstant0

Sub	0x02
Name	AI filter constant 1
Data type	UNSIGNED16
Access	R/W
Default value	
PDO mapping	No
Access name	AIFilterConstant.AIfilterconstant1

Sub	0x03
Name	AI filter constant 2
Data type	UNSIGNED16
Access	R/W
Default value	
PDO mapping	No
Access name	AIFilterConstant.AIfilterconstant2

Sub	0x04
Name	AI filter constant 3
Data type	UNSIGNED16
Access	R/W
Default value	
PDO mapping	No
Access name	AIFilterConstant.AIfilterconstant3

PT1 filter time, in [ms]

0x7300 AOOutputPV

Object Code	Array

Sub	0x00
Name	Highest sub-index supported
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AO output PV 0
Data type	REAL32
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AOOutputPV[0]

Sub	0x02
Name	AO output PV 1
Data type	REAL32
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AOOutputPV[1]

Sub	0x03
Name	AO output PV 2
Data type	REAL32
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AOOutputPV[2]

Sub	0x04
Name	AO output PV 3
Data type	REAL32
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AOOutputPV[3]

0x7310 AOOutputType

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AO output type 0
Data type	UNSIGNED8
Access	R/O
Default value	10
PDO mapping	No
Access name	AOOutputType.AOoutputtype0

Sub	0x02
Name	AO output type 1
Data type	UNSIGNED8
Access	R/O
Default value	10
PDO mapping	No
Access name	AOOutputType.AOoutputtype1

Sub	0x03
Name	AO output type 2
Data type	UNSIGNED8
Access	R/O
Default value	10
PDO mapping	No
Access name	AOOutputType.AOoutputtype2

Sub	0x04
Name	AO output type 3
Data type	UNSIGNED8
Access	R/O
Default value	10
PDO mapping	No
Access name	AOOutputType.AOoutputtype3

Channel-specific setting of the attached sensor:
10 = 0…10 V (default), 11 = -10…10 V, 20 = 0…20 mA, 21 = 4…20 mA

0x7312 AOOperatingMode

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AO operating mode 0
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	AOOperatingMode.AOoperatingmode0

Sub	0x02
Name	AO operating mode 1
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	AOOperatingMode.AOoperatingmode1

Sub	0x03
Name	AO operating mode 2
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	AOOperatingMode.AOoperatingmode2

Sub	0x04
Name	AO operating mode 3
Data type	UNSIGNED8
Access	R/O
Default value	0
PDO mapping	No
Access name	AOOperatingMode.AOoperatingmode3

Choose output source

0 = Output not active, 1 = Output process value,

10 = Output field value decimal, 11 = Output field value increments

0x7320 AOOutputScaling1FV

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AO output scaling 1 FV 0
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling1FV.AOoutputscaling1FV0

Sub	0x02
Name	AO output scaling 1 FV 1
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling1FV.AOoutputscaling1FV1

Sub	0x03
Name	AO output scaling 1 FV 2
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling1FV.AOoutputscaling1FV2

Sub	0x04
Name	AO output scaling 1 FV 3
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling1FV.AOoutputscaling1FV3

0x7321 AOOutputScaling1PV

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AO output scaling 1 PV 0
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling1PV.AOoutputscaling1PV0

Sub	0x02
Name	AO output scaling 1 PV 1
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling1PV.AOoutputscaling1PV1

Sub	0x03
Name	AO output scaling 1 PV 2
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling1PV.AOoutputscaling1PV2

Sub	0x04
Name	AO output scaling 1 PV 3
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling1PV.AOoutputscaling1PV3

0x7322 AOOutputScaling2FV

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AO output scaling 2 FV 0
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling2FV.AOoutputscaling2FV0

Sub	0x02
Name	AO output scaling 2 FV 1
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling2FV.AOoutputscaling2FV1

Sub	0x03
Name	AO output scaling 2 FV 2
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling2FV.AOoutputscaling2FV2

Sub	0x04
Name	AO output scaling 2 FV 3
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling2FV.AOoutputscaling2FV3

0x7323 AOOutputScaling2PV

Object Code	RECORD

Sub	0x00
Name	SubIndex 000
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AO output scaling 2 PV 0
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling2PV.AOoutputscaling2PV0

Sub	0x02
Name	AO output scaling 2 PV 1
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling2PV.AOoutputscaling2PV1

Sub	0x03
Name	AO output scaling 2 PV 2
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling2PV.AOoutputscaling2PV2

Sub	0x04
Name	AO output scaling 2 PV 3
Data type	REAL32
Access	R/W
Default value	
PDO mapping	No
Access name	AOOutputScaling2PV.AOoutputscaling2PV3

0x7330 AOOutputFV_Dec

Object Code	Array

Sub	0x00
Name	Unnamed subindex
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AO output FV 0
Data type	UNSIGNED8
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AOOutputFV_Dec[0]

Sub	0x02
Name	AO output FV 1
Data type	UNSIGNED8
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AOOutputFV_Dec[1]

Sub	0x03
Name	AO output FV 2
Data type	UNSIGNED8
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AOOutputFV_Dec[2]

Sub	0x04
Name	AO output FV 3
Data type	UNSIGNED8
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AOOutputFV_Dec[3]

0x8100 AIInputFV_Int

Object Code	Array

Sub	0x00
Name	Highest sub-index supported
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AI input FV 0
Data type	INTEGER16
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIInputFV_Int[0]

Sub	0x02
Name	AI input FV 1
Data type	INTEGER16
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIInputFV_Int[1]

Sub	0x03
Name	AI input FV 2
Data type	INTEGER16
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIInputFV_Int[2]

Sub	0x04
Name	AI input FV 3
Data type	INTEGER16
Access	R/O
Default value	
PDO mapping	Optional, TPDO only
Access name	AIInputFV_Int[3]

Analogue input values as measured Integer variable or, if oversampling is active, average of sampled input values.

0x8331 AOOutputFV_Inc

Object Code	Array

Sub	0x00
Name	Highest sub-index supported
Data type	UNSIGNED8
Access	R/O
Default value	4
PDO mapping	No

Sub	0x01
Name	AO output FV 0
Data type	INTEGER16
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AOOutputFV_Inc[0]

Sub	0x02
Name	AO output FV 1
Data type	INTEGER16
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AOOutputFV_Inc[1]

Sub	0x03
Name	AO output FV 2
Data type	INTEGER16
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AOOutputFV_Inc[2]

Sub	0x04
Name	AO output FV 3
Data type	INTEGER16
Access	R/W
Default value	
PDO mapping	Optional, RPDO only
Access name	AOOutputFV_Inc[3]

Analogue output values as Integer values

2.2.9 Technical Data

General

Channels	2 (counters/encoders) or 6 (event counters) 4 Analogue inputs 4 Analogue outputs
EtherCAT slave controller	ASIC ET1200
E-bus connector	10-pole system plug in side wall
E-bus load	150 mA
I/O / power connection	36-pin male
Power supply	24 VDC (-15% ... +20%)
Electrical insulation	500V E-Bus / power supply and I/Os
Part no.	694.444.64

Analogue inputs

Quantity	4
Type	0 … 10 V, 0(4) … 20 mA
Internal resistance (voltage)	>200 kΩ
Internal resistance (current)	120 Ω
Resolution	12 bit
Sample rate	<62.5 µs

Analogue outputs

Quantity	4
Type	0 … 10 V, -10 … +10 V, 0(4) … 20 mA
Load (voltage)	>1000 Ω (short-circuit-proof)
Load (current)	<500 Ω (short-circuit-proof)
Resolution	16 bit
Update rate	<=250 µs

Counter/encoder

RS422	32-bit, 5 MHz
5/24V single-ended	32Bit, 1.6 MHz
SSI	18-32 bit, 80-1000 Kbit/s
EnDAT 2.1	100 kHz – 2 MHz
Event counter (CNT0-5)	6 x HTL/TTL 32bit, 1 kHz

Encoder supply:	5V/150 mA / encoder

Line length	<30 m, shielded cable

3 Appendix

3.1 Order data

3.1.1 Modules

Kuhnke FIO Mix04 (CoE) ..... 694.444.64 / 192358

3.1.2 Accessories

Kuhnke FIO Shield Terminal 2x8mm .....694 412 03 / 196445
Kuhnke FIO Shield Terminal 1x14mm .....694 412 04 / 196446
Kuhnke FIO Shield Terminal 4x8mm .....694 412 05 / 196448
Kuhnke FIO Shield Terminal 2x14mm .....694 412 06 / 197524

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PRECISION. SAFETY. MOTION.

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