

R1-EC-8124

User Guide

操作手冊

User Information

Be sure to store this guide at a safe place.

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7.1 SDO Error Message Abort Codes 7-1

Chapter 1 Preface

1.1 Inspection

Please inspect the following items carefully.

1. Package: Check if the package is complete.
2. Bubble wrap: It can protect the product. Please make sure the sticker is firmly stuck on it.
3. R1-EC8124: Please make sure no damage is shown on its appearance and the accessories are all attached.
4. Installation Guide: Check if there is an installation guide

1.2 Model Explanation

R 1 - EC 8 1 2 4
(1) (2) (3) (4) (5) (6) (7)

(1) Product Type	R: Remote
(2) Product Category	1: Type 1 - Slim
(3) Product Name	ESC: EtherCAT Slave Component
(4) Module Type	8: Gateway ADC Module
(5) Module Resolution	1: 16-Bit Single End
(6) Module Sampling Rate	2: ≤ 10 KHz
(7) Channels	4: 4 Channels

1.3 Using R1-EC8124

This product has to be used with R1-EC5500 of Delta Electronics.

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Chapter 2 Specifications

2.1 Product Figure



Figure 2.1 Front View

2.2 Specifications and Dimensions of R1-EC8124

2.2.1 Electrical Specifications of R1-EC8124

Item	R1-EC8124
Number of Inputs	4 (Single-Ended)
Power Supply	via E-Bus
Signal Voltage	$\pm 10\text{ V} / \pm 5\text{ V}$
Internal Resistance	$> 1\text{ M}\Omega$
Input Filter Limit Frequency	1 KHz ~ 10 KHz
Resolution	16-bit
Over Sampling Rate	0 ~ 64
Conversion Time	2 us ~ 3315 us (Based on Over Sampling Rate)
Measurement Error	$< \pm 0.2\%$ (Full-Scale)
Electrical Isolation	1000 V rms (E-Bus / Signal Voltage)
E-Bus Current Loss	300 mA
Bit Width in the Process Image	Input: 4 x 16 Byte Data, 4 x 16 Byte Control/ Status
Vibration / Shock Resistance	Conforms to EN 60068-2-6 / EN 60068-2-27/29
Noise Immunity	ESD (IEC 61131-2, IEC 61000-4-2): 8 KV Air Discharge EFT (IEC 61131-2, IEC 61000-4-4): Power Line: 2 KV, Communication I/O: 1 KV RS (IEC 61131-2, IEC 61000-4-3): 8 MHz ~ 1GHz, 10 V/m
Operating / Storage Temperature	Operating: $0^{\circ}\text{C} \sim 50^{\circ}\text{C}$; Storage: $-20^{\circ}\text{C} \sim 70^{\circ}\text{C}$

2.2.2 Dimensions of R1-EC8124

Dimensions of R1-EC8124: 100 mm x 73.2 mm x 17.5 mm

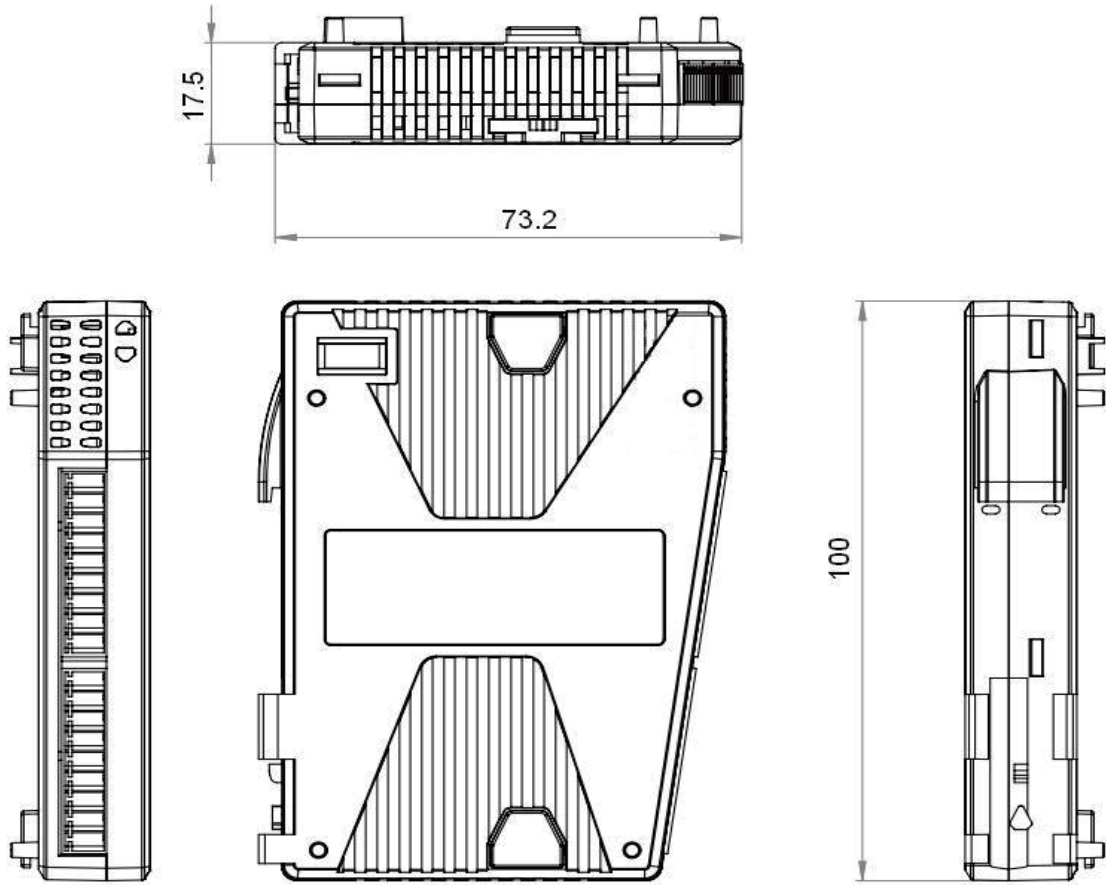


Figure 2.2 Module Dimensions

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Chapter 3 Product Description

3.1 Description of Each Part

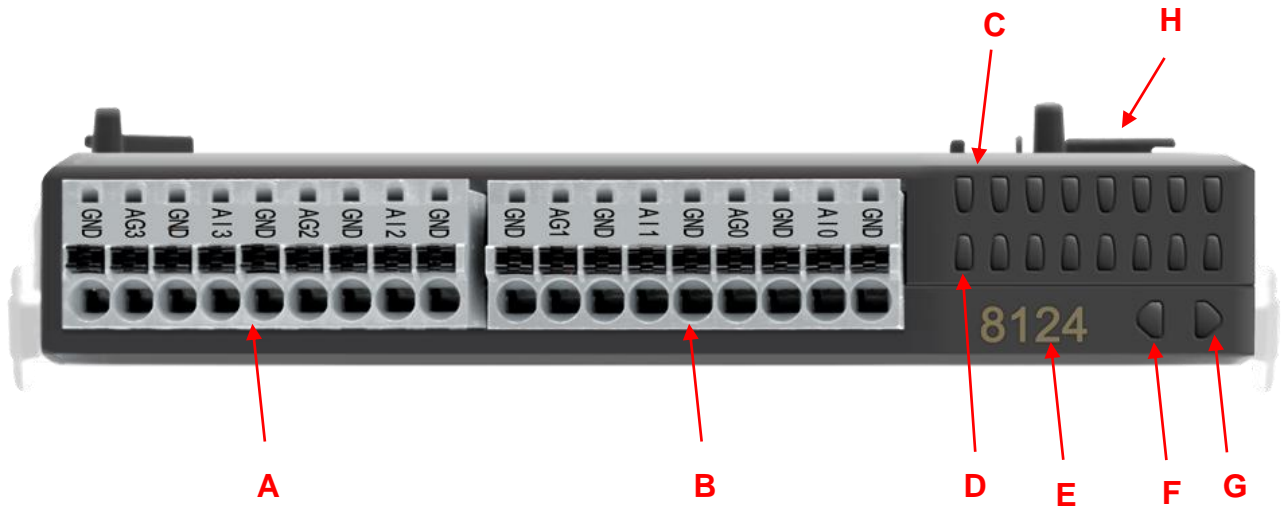


Figure 3.1 Identification of Each Part

No.	Description
A	Ch.2 / Ch.3 Signal Port
B	Ch.0 / Ch.1 Signal Port
C	(Part B) Ch.0 / Ch.1 Signal Indicator
D	(Part A) Ch.2 / Ch.3 Signal Indicator
E	Product ID Number
F	Status Indicator
G	Power Indicator
H	E-BUS Input Port

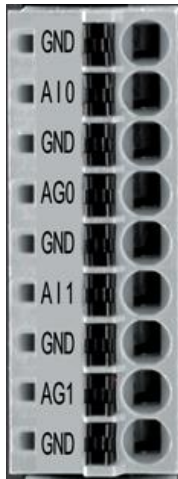


Figure 3.2 Pin Definition of Part B

Label	Description
GND	Analog Ground
AI0	Ch.0 Voltage/Current Input
GND	Analog Ground
AG0	Ch.0 Current COM
GND	Analog Ground
AI1	Ch.1 Voltage/Current Input
GND	Analog Ground
AG1	Ch.1 Current COM
GND	Analog Ground

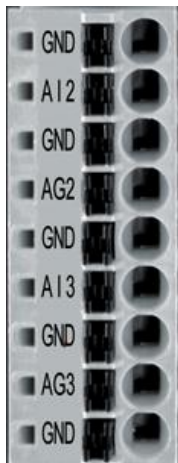


Figure 3.3 Pin Definition of Part A

Label	Description
GND	Analog Ground
AI0	Ch.0 Voltage/Current Input
GND	Analog Ground
AG0	Ch.0 Current COM
GND	Analog Ground
AI1	Ch.1 Voltage/Current Input
GND	Analog Ground
AG1	Ch.1 Current COM
GND	Analog Ground



Figure 3.4 Indicator Definition

No.	Description	No.	Description
1	Ch.0 Enable	9	Ch.2 Enable
2	Ch.0 Input Range ± 5 V	10	Ch.2 Input Range ± 5 V
3	Ch.0 Input Range ± 10 V	11	Ch.2 Input Range ± 10 V
4	Ch.0 OS Conversion Frequency 0	12	Ch.2 OS Conversion Frequency 0
5	Ch.1 Enable	13	Ch.3 Enable
6	Ch.1 Input Range ± 5 V	14	Ch.3 Input Range ± 5 V
7	Ch.1 Input Range ± 10 V	15	Ch.3 Input Range ± 10 V
8	Ch.1 OS Conversion Frequency 0	16	Ch.3 OS Conversion Frequency 0

Chapter 4 Wiring

4.1 Wiring of R1-EC8124 Input Point

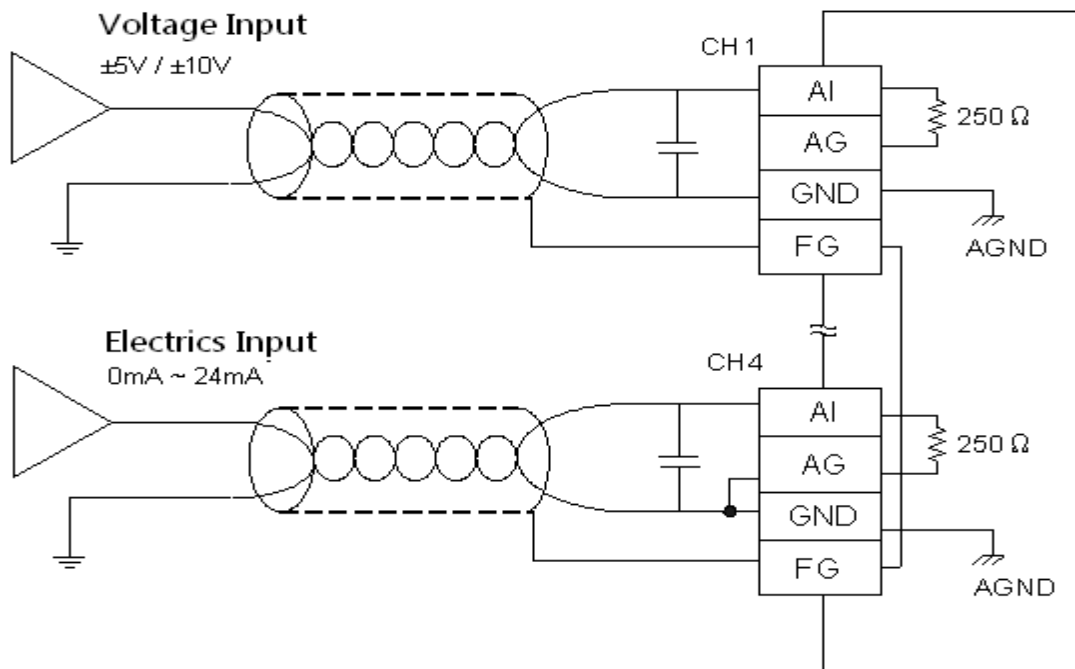


Figure 4.1 Wiring Example of Input Point

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Chapter 5 CiA401 Device Profile

5.1 Analogue Input Module

Users may use objects such as Average selection, Range mode selection, and Over-sampling rate selection to acquire voltage data in Read analogue input (6401h).

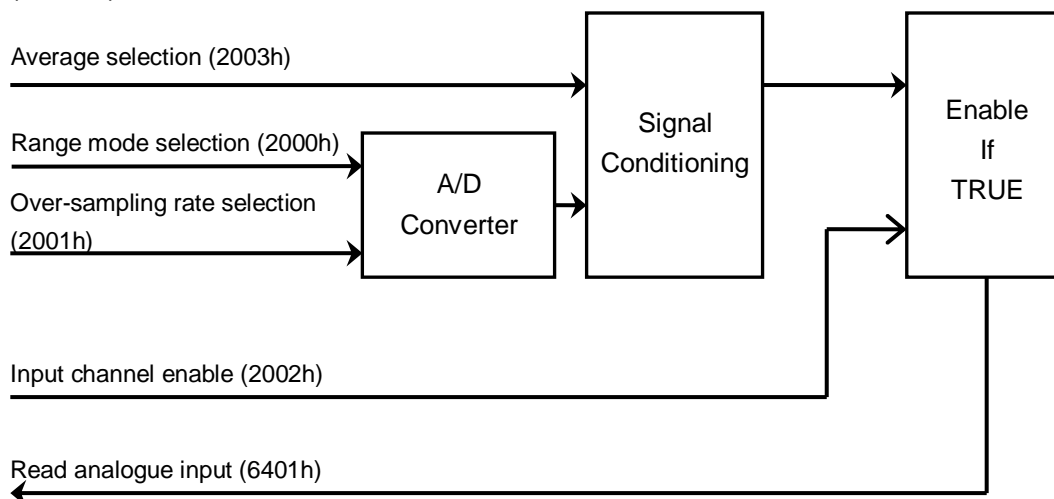


Figure 5.1 Object Block Diagram

Related Object

Index	Sub Index	Name	Data Type	Access	PDO Mapping	EEPROM
2000h	-	Range mode selection	UINT	RW	NO	NO
2001h	-	Over-sampling rate selection	UINT	RW	NO	NO
2002h	-	Input channel enable	-	-	-	-
	1	Ch.0 input enable	UINT	RW	NO	NO
	2	Ch.1 input enable	UINT	RW	NO	NO
	3	Ch.2 input enable	UINT	RW	NO	NO
	4	Ch.3 input enable	UINT	RW	NO	NO
2003h	-	Average selection	UDINT	RW	NO	NO
6401h	-	Read analogue input	-	-	-	-
	1	Analog input ch.0	UINT	RO	YES	NO
	2	Analog input ch.1	UINT	RO	YES	NO
	3	Analog input ch.2	UINT	RO	YES	NO
	4	Analog input ch.3	UINT	RO	YES	NO

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Chapter 6 Object Dictionary

6.1 Command List

Object Dictionaries	
Manufacturer Specific Objects	Range mode selection (2000h)
	Over-sampling rate selection (2001h)
	Input channel enable (2002h)
	Average selection (2003h)
Device Control	Read analogue input (6401h)

6.2 General Objects

6.2.1 Device Type (1000h)

This object describes the type of device and its functionality.

Index	Sub Index	Name	Data Type	Access	PDO Mapping	Value	EEPROM
1000h	0	Device type	UDINT	RO	No	0x00040191	NO

Additional information (bit 16 ~ 31): 0004 (Analog Input)

General information (bit 0 ~ 15): 0191 (DS401)

6.2.2 Error Register (1001h)

This object is an error register for the device. The value of this object is stored in the Emergency message.

Index	Sub Index	Name	Data Type	Access	PDO Mapping	Value	EEPROM
1001h	0	Error register	USINT	RO	No	0x00	NO

6.2.3 Manufacturer Device Name (1008h)

This object shall acquire the device name of R1-EC8124.

Index	Sub Index	Name	Data Type	Access	PDO Mapping	Value	EEPROM
1008h	0	Device name	STRING	RO	No	R1-EC8124	NO

6.2.4 Manufacturer Software Version (100Ah)

This object shall acquire information about the software version of R1-EC8124.

Index	Sub Index	Name	Data Type	Access	PDO Mapping	Value	EEPROM
100Ah	0	Software version	STRING	RO	No	1.10	NO

6.2.5 Identity Object (1018h)

This object shall acquire basic information about the device.

Index	Sub Index	Name	Data Type	Access	PDO Mapping	Value	EEPROM
1018h	0	Number of entries	USINT	RO	No	4	NO
	1	Vendor ID	UDINT	RO	No	0x00001A05	NO
	2	Product code	UDINT	RO	No	0x00008124	NO
	3	Revision	UDINT	RO	No	0x00100000	NO
	4	Serial number	UDINT	RO	No	0x00000000	NO

6.3 PDO Mapping Objects

EtherCAT in CANopen protocol allows users to map objects to process data objects (PDO) and use these PDO to conduct data transmission.

6.3.1 TxPDO-Map Outputs (1A00h)

Index	Sub Index	Name	Data Type	Access	PDO Mapping	Value	EEPROM
1A00h	0	Number of objects in this PDO	USINT	RW	No	4	YES
	1	Mapping entry 1	UDINT	RW	No	0x64010110	YES
	2	Mapping entry 2	UDINT	RW	No	0x64010210	YES
	3	Mapping entry 3	UDINT	RW	No	0x64010310	YES
	4	Mapping entry 4	UDINT	RW	No	0x64010410	YES

6.4 Sync Manager Communication Objects

6.4.1 Sync Manager Communication Type (1C00h)

Index	Sub Index	Name	Data Type	Access	PDO Mapping	Value	EEP-ROM
1C00h	0	Number of used Sync Manager channels	USINT	RO	No	4	No
	2	Communication type sync manager 0	USINT	RO	No	1: mailbox receive (Master to slave)	No
	2	Communication type sync manager 1	USINT	RO	No	2: mailbox send (Slave to master)	No
	3	Communication type sync manager 2	USINT	RO	No	3: process data output (Master to slave)	No
	4	Communication type sync manager 3	USINT	RO	No	4: process data input (Slave to master)	No

6.4.2 Sync Manager PDO Assignment (1C12h, 1C13h)

Index	Sub Index	Name	Data Type	Access	PDO Mapping	Value	EEPROM
1C12h	0	Number of assigned PDOs	USINT	RO	No	1	YES
	1	PDO Mapping object index of assigned RxPDO 1	UINT	RO	No	1601h	YES
1C13h	0	Number of assigned PDOs	USINT	RO	No	1	YES
	1	PDO Mapping object index of assigned TxPDO 1	UINT	RO	No	1A00h	YES

6.5 Manufacturer Specific Objects

6.5.1 Range Mode Selection (2000h)

This object shall select the voltage range of AD input.

Index	Sub Index	Name	Data Type	Access	PDO Mapping	Value	EEPROM
2000h	0	Rang mode selection	UINT	RW	NO	0: -5 V ~ 5 V 1: -10 V ~ 10 V	NO

6.5.2 Over-Sampling Rate Selection (2001h)

This object shall select the AD conversion frequency.

Index	Sub Index	Name	Data Type	Access	PDO Mapping	Value	EEPROM																
2001h	0	Over-sampling rate selection	UINT	RW	NO	<table border="1"> <thead> <tr> <th>Value</th> <th>Conversion Frequency (kHz)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>200</td> </tr> <tr> <td>1</td> <td>100</td> </tr> <tr> <td>2</td> <td>50</td> </tr> <tr> <td>3</td> <td>25</td> </tr> <tr> <td>4</td> <td>12.5</td> </tr> <tr> <td>5</td> <td>6.25</td> </tr> <tr> <td>6</td> <td>3.125</td> </tr> </tbody> </table>	Value	Conversion Frequency (kHz)	0	200	1	100	2	50	3	25	4	12.5	5	6.25	6	3.125	NO
						Value	Conversion Frequency (kHz)																
						0	200																
						1	100																
						2	50																
						3	25																
						4	12.5																
						5	6.25																
6	3.125																						

6.5.3 Input Channel Enable (2002h)

This object shall enable or disable the input channels.

Index	Sub Index	Name	Data Type	Access	PDO Mapping	Value	EEPROM						
2002h	0	Number of Channels	USINT	RO	NO	4	NO						
	1	Ch.0 input enable	UINT	RW	NO	<table border="1"> <thead> <tr> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Disable</td> </tr> <tr> <td>1</td> <td>Enable</td> </tr> </tbody> </table>	Value	Description	0	Disable	1	Enable	NO
	Value	Description											
	0	Disable											
	1	Enable											
2	Ch.1 input enable	UINT	RW	NO	NO								
3	Ch.2 input enable	UINT	RW	NO	NO								
4	Ch.3 input enable	UINT	RW	NO	NO								

6.5.4 Average Selection (2003h)

This object shall allow the received data to be calculated in the software based on the selected number of times; after figuring out the average, this value will be output. The calculation method is to collect the average number of times and then figure out the average value to be output. The next average data will discard the data saved in the very beginning, adding the latest one. Then, the average value will be figured out and be output.

Index	Sub Index	Name	Data Type	Access	PDO Mapping	Value	EEP-ROM
2003h	0	Average selection	UDINT	RW	NO	1 to 64	NO

6.6 Analogue Input

6.6.1 Read Analogue Input (6401h)

This object shall read the value of 4 input channels. The total voltage /current value is 16-bit wide.

Index	Sub Index	Name	Data Type	Access	PDO Mapping	Value	EEPROM
6401h	0	Number of channel input	USINT	RO	NO	4	NO
	1	Analog input ch.0	UINT	RO	YES	0 to 65535	NO
	2	Analog input ch.1	UINT	RO	YES		NO
	3	Analog input ch.2	UINT	RO	YES		NO
	4	Analog input ch.3	UINT	RO	YES		NO

Chapter 7 SDO Error Message Abort Codes

7.1 SDO Error Message Abort Codes

The following table lists the SDO error message abort codes.

Abort Code	Description
0x05 03 00 00	Toggle bit not alternated.
0x05 04 00 00	SDO protocol timeout.
0x05 04 00 01	Client/server command specifier not valid or unknown.
0x05 04 00 05	Out of memory.
0x06 01 00 05	Unsupported access to an object.
0x06 01 00 00	Attempt to read an object.
0x06 03 00 02	Attempt to write a read-only object.
0x06 02 00 00	Object does not exist in the object dictionary.
0x06 04 00 41	Object cannot be mapped to the PDO.
0x06 04 00 42	The number and length of the objects to be mapped would exceed PDO length.
0x06 04 00 43	General parameter incompatibility.
0x06 04 00 47	General internal error in device.
0x06 06 00 00	Access failed due to a hardware error.
0x06 07 00 10	Data type does not match; length of service parameter does not match.
0x06 07 00 12	Data type does not match; length of service parameter too high.
0x06 07 00 13	Data type does not match; length of service parameter too low.
0x06 09 00 11	Sub-index does not exist.
0x06 09 00 30	Value range of parameter exceeded (only for write access).
0x06 09 00 31	Value of parameter written too high.
0x06 09 00 32	Value of parameter written too low.
0x06 09 00 36	Maximum value is less than minimum value.
0x08 00 00 00	General error.
0x08 00 00 20	Data cannot be transferred or stored in the application.
0x08 00 00 21	Data cannot be transferred or stored in the application because of local control.
0x08 00 00 22	Data cannot be transferred or stored in the application because of present device state.
0x08 00 00 23	Object dictionary dynamic generation fails or no object dictionary is present.

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