Briterencoder Linear Wire Displacement Sensor

BRT38X Series CANopen Interface User Manual V202407

1. Product Model Description

Communication Protocal:

R0M=RS485 (Modbus RTU)
R2M=RS232(Modbus RTU)
R4M=RS422(Modbus RTU)
T0M=TTL(Modbus RTU)
C0M=CANbus
C2M=CANopen

S1M=SSI
S2M=BISS-C
A0M=4~20mA
V5M=0~5V
V10M=0~10V
K5M=0~5K

K10M=0~10K
R0&A0M=RS485&4~20mA
R0&V5M=RS485&0~5V
R0&V10M=RS485&0~10V

Resolution:
1024、4096

RT1=Side Outlet
AT1=Tail Outlet
(Default Cable Length 1~1.2M)

BRT38X	1M	ROM	1024	RT1	IP68

BRT=BriterEncoder
BRT38= OD.39mm
BRT50= OD50mm
BRT27=27*27mm
BRT38X=X series

Measuring range:0.3M、0.5M、1M、2M、3M、4M、5M、6M、7M、8M、9M、10M、11M、12M、13M、14M、15M、(Customizable)

IP54:Normal
IP68:Waterproof
(Usable 1m underwater)
EX:Explosion-proof

Model description:

1.Structural form of the encoder: e.g., BRT38 indicates an outer diameter of 38mm.
2.Measuring range: e.g., 1M indicates a measuring stroke range of 0 - 1000mm.
3.Communication interface: e.g., R0M indicates an electrical interface of RS485 and the communication protocol is Modbus RTU.
4.Resolution: e.g., 1024 means that the internal encoder and the winding wheel feed back 1024 data when rotating one circle. For a 1 - meter stroke, referring to the corresponding table parameters, if the diameter of the internal winding wheel is 100mm, it means that the encoder feeds back 1024 data when moving 100mm. The minimum displacement resolution: 100mm / 1024 = 0.098mm. That is, the displacement resolution of 1024 is 0.098mm.
5.Inventory: Some randomly combined models may be out of stock. Please consult in advance to ensure that the selected model is available.

www.briterencoder.com Email: brt@briterencoder.com Phone: +86 176 6528 0977

2. Wiring Definition and connection

Red wire	Power Supply	DC 5V~24V
Black wire	0V (GND)	-
Green wire	CANH	-
White wire	CANL	-
Yellow wire	Function line	1. It serves for encoder zero position setting and factory settings restoration. 2. During normal encoder operation, keep the yellow wire suspended and disconnected.

Three simple ways to set absolute encoder to zero position?

- Method 1. Connect yellow wire to ground (black wire) more than 100mS. After set zero, please separate the yellow and black wire.
- Method 2. After right connected the wires according to the wiring definition. send set zero position command according to the user manual.
- Method 3. Use the upper computer provided by our company (BriterEncoder).

How to restore the absolute encoder to factory settings?

- Step 1, After power off, connect the yellow wire to the black wire.
- Step 2, power on, and hold for two minutes.
- Step 3, power off, then separate the yellow wire from the black wire. now the rotary encoder had been restored to factory settings.

3. Product Parameters

Measuring Range	Interface	Linear accuracy	Resolution 1024PPR	Resolution 4096PPR	Winding wheel diameter(mm)
500mm	CANOPEN	±0.1%	0.126mm	0.031mm	130
1000mm		±0.1%	0.126mm	0.031mm	130
2000mm		±0.1%	0.175mm	0.043mm.	180
3000mm		±0.1%	0.224mm	0.056mm	230
4000mm		±0.1%	0.292mm	0.073mm	300
5000mm		±0.1%	0.375mm	0.093mm	385
Service times	>5million times		Working temp.	-40~+85°C	
Pull Tension	2~3N		Working current	100mA	
Max. Working Speed	1m/s		Pull rope material	Stranded steel wire	
Protection Grade	IP54, IP68 Waterproof, Explosion proof		Drawstring Diameter	0.6mm	
Cable Length	1-1.2meters(Customizable)		Working voltage	5~24V	
Body material	Aluminum alloy (anti-static), stainless steel head; IP68/ex-proof encoder in stainless steel.				

4. How to calculate the displacement length

Firstly, it is necessary to determine the inner wheel perimeter and resolution of the sensor you purchased; When using, the position values feedback by the sensor before and after pull the rope are X2 and X1.

Method 1: For the rope sensor you purchased with a range of Part No. BRT38-0.5M with 500mm and a resolution of 4096ppr, referring to the corresponding wheel diameter of 100mm in the table, the displacement calculation formula is: Length = (X2 - X1) * 100 / 4096 mm.

Part No.	Measuring Range	Interface	Linear accuracy	Resolution 1024PPR	Resolution 4096PPR	Winding wheel diameter(mm)
BRT38-0.5M	500mm	RS485	±0.1%	0.098mm	0.0244mm	100

Method 2: For the rope sensor you purchased with a range of Part No. BRT38-0.5M with 500mm and a resolution of 4096ppr, according to the table, the actual resolution is 0.0244mm, so the displacement calculation formula is: Length = (X2 - X1) * 0.0244 mm.

Note: When X1 displays a large value, it is caused by the principle of multi-turn absolute encoder used in the draw-wire displacement sensor. Therefore, moving backward from the zero position results in a large numerical value.
To address this situation, simply preset the initial value of X1 to 1000 (this can be modified via the PC software or by sending a command), which can effectively solve the problem.

5. CANOPEN interface communication protocol

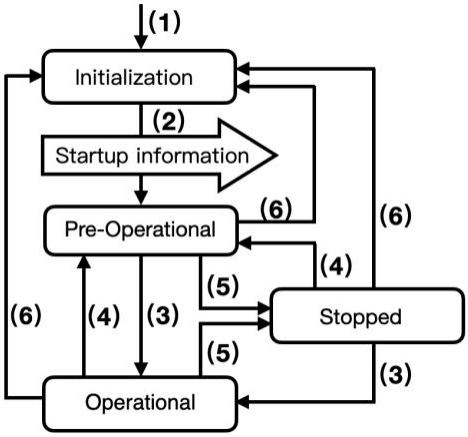
This encoder follows the "Encoder Equipment Code Class2" and is generally used as a slave device.

1) EDS file

Please send email to hello@briterencoder.com or visit the official website: www.briterencoder.com to get EDS file, Please install the EDS file on the CANopen main controller before using.

2) State device

The CANopen device can be in different working states, and can switch between different working states by sending specific NMT messages to it. The state diagram is as follows:
Power on-->Initialize completed, automatically send startup information-->NMT message "start remote node"-->NMT message "pre-operational"-->NMT message "shut down remote node"-->NMT message "reset node" or "reset communication"



Initialization

This is the first time that the CANopen device has entered the state after power-up or hardware reset. After reading the parameter information stored in EPROM and completing the basic device initialization, the CANopen device (Encoder) automatically sends startup information to the main Master to enter the "Pre-Operational" state.

Pre-operational

In this state, communication can be carried out through SDO. Because PDO does not yet exist, communication cannot be conducted through PDO. The configuration program can be used to complete the configuration and parameter configuration of PDO. By sending 'Start Remote Node', the encoder can be directly put into operation.

Operational

In this state, all communication objects are available. The slave device can send Process data through PDO according to the parameter settings in the object dictionary. The main Master can access the object dictionary through PDO.
The main Master enters the "Pre-Operational" state by sending a "Pre-Operational" message.

Stopped

In this state, the slave device is forced to stop all communication (except for the monitoring node). It is also not possible to communicate through PDO and SDO. The main master can directly enter the pre operation or running state from the encoder by sending specific NMT messages.

3) Communication Object

There are four communication data:

-Network Management NMT: The NMT-master controls the NMT status of the NMT slave device.

-Process Data Object PDO: used for transmitting real-time data

-Service Data Object SDO: Object Dictionary for Direct Access to CANopen Devices.

-Special function objects:

Synchronous transfer (Sync): provides a basic network synchronization mechanism. Using this service, the master Master can send real-time data.
Emergency: this object is used whenever an error event occurs.
Node guard: used to view the Operational status of slave devices. The relationship between device status and communication objects.

	Initialization	Pre-Operational	Operational	Stopped
NMT		×	×	×
PDO			×	
SDO		×	×	
Sync			×	
Emerg	×	×	×	
Boot-up				
Nodeg		×	×	×

Predefined connection instructions

Master→Encoder（Broadcast）		
Communication object COB type	Functional codes (Binary system)	COB-ID (hexadecimal)
NMT	0000	000
SYNC	0001	080
Master→Encoder(Point to point)		
Emergency	0001	081-0FF
PD01(tx)	0011	181-1FF
PD02(tx)	0101	281-2FF
PD03(tx)	0111	381-3FF
SDO(tx)	1011	581-5FF

SDO(rx)	1100	601-67F
Node guard	1110	701-77F

The "communication object type" (send / receive) is from the point of view of the device (Encoder). The boot-up message uses the Nodeguard object COB-ID.

4) NMT Object

NMT Structure

COB-ID(11 bits)		2 Byte CAN data	
Function code	Node ID	Command	Encoder ID
0000	0	NMT command	Encoder ID

If the Encoder ID is 00h，the NMT message is sent to all nodes accessing the network.

NMT Function

Command（hexadecimal）	NMT function	Node Status
01	Start remote node	Operational
02	Stop remote node	Stopped
80	Entering pre-operational	Pre-operational
81	Reset node	Pre-operational
82	Reset communication	Pre-operational

5) （Boot-up）Object

Boot-up message structure：

COB-ID (hexadecimal)	1 Byte CAN data
700+Node ID	00

6) PDO Object

The PDO message consists of four CAN data Byte, which is used to transmit the position value of the Encoder.

PDO Structure

Identity		4 Byte CAN data			
COD-ID (hexadecimal)		Byte 0	Byte 1	Byte 2	Byte 3
Functional code	Node ID	27-20	215-28	223-216	231-224
		L Byte	...	...	H Byte

The definitions of the three types of PDO are as follows：

PDO loop mode: asynchronous transfer. The absolute rotary encoder automatically circulates the current process data without being queried by the host. Cycle time can be set programmatically, with values between 1 to 65536. unit: ms (refer to "cycle time: 6200h object"). Loop mode can be used (or disabled) by setting the highest position of the COB-ID used by PD01 (object 1800h, sub-title 1) to "0" ("1").

PD0 synchronous mode: synchronous transmission. Synchronization refers to sending PDO after synchronization by the main controller. The synchronization message is the high priority COB sent by the master controller to all slave devices. After receiving the synchronization message, the encoder sends the process data back. Each slave device transmits data according to its own node ID.

Note: multiple transmission modes can coexist.

7) SDO Object:

SDO messages are used to query or change encoder parameters, which are included in the object dictionary. The maximum CAN data is 4 bytes, and the other 4 bytes are used for fields such as command, index, and sub-index. When the controller sends a SDO message to the encoder, the encoder sends a response message to the main controller (alarm message in case of error).
The Structure of an SDO message is:

Identity		4 Byte CAN data				1 to 4 Byte CAN Data			
ID (hexadecimal)		0	1	2	3	4	5	6	7
Functional codes	Node ID	Command	Index		sub-Index	Process data			
		1 Byte	L Byte	H Byte	1 Byte	L Byte	...	...	H Byte

6.7.1 Command
The content of Command Byte is written by CAN network.
There are three kinds of command definitions.

-Write command: Parameter to encoder;

-Response: Parameter to SDO master;

-Warning: Encoder sends error messaged to Master (e.g. index does not exist, invalid parameters, etc.).

Command	COB	COB type	Data length
23h	Write command	M→S Parameter to encoder	4 Byte
2Bh	Write command	M→S Parameter to encoder	2 Byte
2Fh	Write command	M→S Parameter to encoder	1 Byte
60h	Write command	S→M Parameter received	
40h	response	M→S Parameter from Encoder	0 Byte
43h	response	S→M Parameter to SDO master	4 Byte
4Bh	response	S→M Parameter to SDO master	2 Byte
4Fh	response	S→M Parameter to SDO master	1 Byte
41h	response	S→M segmented transfer started (see CiA 301)	
80h	Warning	S→M Failure / Failure code	4 Byte

8) Object dictionary

Each object is represented in the following form:
Index-sub-Index Object Name [Data Type, Attribute]
-Index and sub-Index are identified in hexadecimal.
-Attribute: ro=read only, rw=read and write

-Unsigned16 Data Type:

Process data Byte	
Byte 4	Byte 5
L Byte	H Byte

-Unsigned32 Data Type:

Process data Byte

Byte 4	Byte 5	Byte 6	Byte 7
L Byte	...	...	H Byte

Communication Objects（DS 301)

Object No.-Sub-Index	Function	[Data Type，ro/rw]
1000-00	Device type Default Value: 0001 0196h=Single turn，DS 406 0002 0196h=Multi-turns，DS 406	[Unsigned32，ro]
1001-00	Error register [Unsigned8，ro] If a bit of the register is set to "1", its corresponding error has already occurred. Default value：00h	
1003	Pre-defined Error Field This object saves errors that have been generated by the device.	
-00	stores occurring errors Writing 00H clears the error history	[Unsigned8，rw]
-01	The last error that occurred	[Unsigned32，ro]
-02 . . .		
-08	An error that occurred earlier	[Unsigned32，ro]
1004	Numbe of PDOs Supported	
-00	Number of Entries [Unsigned32，ro]	
-01	Number of SyncPDOs [Unsigned32，ro]	
-02	Number of AsyncPDOs [Unsigned32，ro]	
1005-00	COB-ID SYNC Message Default Value：0000 0080h	[Unsigned32，rw]
1008-00	Manufacturer Default Value：“BRT”	[String，ro]
1009-00	Manufacturer Hardware version	[String，ro]

<table>
<tr><td>100A-00</td><td>Manufacturer software version [String，ro]</td></tr>
<tr><td>1010-01</td><td>Store Parameters [Unsigned32，rw]
This object stores all parameters to non-volatile memory. The written signal is "save".
Master→Encoder(write)
<table>
<tr><td>COB-ID</td><td>Command</td><td colspan="2">Index</td><td>sub-Index</td><td colspan="4">Data Byte</td></tr>
<tr><td>600+ID</td><td>23</td><td>10</td><td>10</td><td>01</td><td>73</td><td>61</td><td>76</td><td>65</td></tr>
</table>
Encoder→Master(response)
<table>
<tr><td>COB-ID</td><td>Command</td><td colspan="2">Index</td><td>sub-Index</td><td colspan="4">Data Byte</td></tr>
<tr><td>580+ID</td><td>60</td><td>10</td><td>10</td><td>01</td><td>00</td><td>00</td><td>00</td><td>00</td></tr>
</table></td></tr>
<tr><td>1011-01</td><td>Restores default Parameters [Unsigned32，rw]
This object is used to restore the default values of all parameters. When the written signal is "load", the default value of the restore takes effect after the setting is reset.
Master→Encoder(write)
<table>
<tr><td>COB-ID</td><td>Command</td><td colspan="2">Index</td><td>sub-Index</td><td colspan="4">Byte</td></tr>
<tr><td>600+ID</td><td>23</td><td>11</td><td>10</td><td>01</td><td>6C</td><td>6F</td><td>61</td><td>64</td></tr>
</table>
Encoder→Master(response)
<table>
<tr><td>COB-ID</td><td>Command</td><td colspan="2">Index</td><td>sub-Index</td><td colspan="4">Byte</td></tr>
<tr><td>580+ID</td><td>60</td><td>11</td><td>10</td><td>01</td><td>00</td><td>00</td><td>00</td><td>00</td></tr>
</table></td></tr>
<tr><td>1014-00</td><td>COB-ID Emergency object [Unsigned32，rw]
Default Value 80h+node ID
Defines the COB-ID of the emergency object (EMCY).</td></tr>
<tr><td>1017-00</td><td>Producer Heartbeat Time [Unsigned16，rw]</td></tr>
<tr><td>1018
-01
-02
-03
-04</td><td>Identity object
Vendor-ID [Unsigned32，ro]
Product Code [Unsigned32，ro]
Revision Number [Unsigned32，ro]
Serial Number [Unsigned32，ro]</td></tr>
</table>

1800		Transmit PDO1 communication parameters Defines the communication parameters of the 1st TPDO [Unsigned8，ro]
	-00	Default Value：5H
	-01	COB-ID for PD01 [Unsigned32，rw] 0180h+Node- ID
	-02	Transmission type [Unsigned8，rw]
	-03	Default Value：FEH InhibitTime (unit：0.1ms) [Unsigned16，rw]
	-05	Event-Timer (unit：ms) [Unsigned16，rw]
1801		Transmit PDO2 communication parameters
	-00	Defines the communication parameters of the 2nd TPDO [Unsigned8，ro] Default value：5H
	-01	COB-ID for PD02 [Unsigned32，rw] 0280h+Node- ID
	-02	Transmission type [Unsigned8，rw] Default value：01H For the n value that requires n synchronization signals, it can be set in sub-index 2 of the object 1801h.
	-03	InhibitTime (unit: 0.1ms) [Unsigned16，rw]
	-05	Event-Timer (unit: ms) [Unsigned16，rw]
1A00		
	-00	Number of entrances [Unsigned8，rw] Default value：1
	-01	PD01 mapping parameter [Unsigned32，rw] Default value：60040020h This object complies with the device line rule DS406 and contains the location value of the encoder.
1A01	-00	Number of entrances [Unsigned8，rw] Default value：1
	-01	PD02 mapping parameter [Unsigned32，rw] Default value：60040020h

Objects related to manufacturers

<table>
<tr><th>Object No.-Sub-Index</th><th>Function [Data type，ro/rw]</th></tr>
<tr><td>3000-00</td><td>
Baud rate [Unsigned8，rw]
Baud rate-Coding
<table>
<tr><th>Data</th><th>Baud rate</th></tr>
<tr><td>00h</td><td>10Kbit/s</td></tr>
<tr><td>01h</td><td>20Kbit/s</td></tr>
<tr><td>02h</td><td>50Kbit/s</td></tr>
<tr><td>03h</td><td>100Kbit/s</td></tr>
<tr><td>04h</td><td>125Kbit/s</td></tr>
<tr><td>05h</td><td>250Kbit/s</td></tr>
<tr><td>06h</td><td>500Kbit/s(default value)</td></tr>
<tr><td>07h</td><td>800Kbit/s</td></tr>
<tr><td>08h</td><td>1000Kbit/s</td></tr>
</table>
Change Baud rate：Setting Object 3000h，Save data，Write Command“Reset Node”（or “Reset communication”）。

Master→Encoder
<table>
<tr><th>COB-ID</th><th>Command</th><th colspan="2">Index</th><th>Sub-index</th><th>data</th></tr>
<tr><td>600+ID</td><td>2F</td><td>00</td><td>30</td><td>00</td><td>04 00 00 00</td></tr>
</table>
Encoder→Master（Confirm）
<table>
<tr><td>COB-ID</td><td>Command</td><td colspan="2">Index</td><td>Sub-index</td><td>data</td></tr>
<tr><td>580+ID</td><td>60</td><td>00</td><td>30</td><td>00</td><td>00 00 00 00</td></tr>
</table>
Store parameters (refer to object 1010h). If it cannot be stored, the original baud rate will be used after power-on again.
</td></tr>
</table>

<table>
<tr><td>3001-00</td><td>
Node ID [Unsigned8，rw]
This object defines the node identifier of the device.
Default value：01h
The steps to change the address of the node are as follows: set the object 3001h, send a command to store the parameters, and finally "reset the node".
Master→Encoder（write）
<table>
<tr><th>COB-ID</th><th>Command</th><th colspan="2">Index</th><th>sub-Index</th><th>data</th></tr>
<tr><td>600+ID</td><td>2F</td><td>01</td><td>30</td><td>00</td><td>01 00 00 00</td></tr>
</table>
Encoder→Master（response）
<table>
<tr><th>COB-ID</th><th>Command</th><th colspan="2">Index</th><th>sub-Index</th><th>data</th></tr>
<tr><td>580+ID</td><td>60</td><td>01</td><td>30</td><td>00</td><td>00 00 00 00</td></tr>
</table>
Store parameters (refer to object 1010h). If it cannot be stored, the original Node ID will be used after power-on again.
</td></tr>
</table>

Device-Specific Objects（DS 406)

<table>
<tr><th>Index-sub-Index</th><th>Function [Data Type，ro/rw]</th></tr>
<tr><td>6000-00</td><td>
Operating parameters
<table>
<tr><th>Bit</th><th>function</th><th>Bit=0</th><th>Bit=1</th></tr>
<tr><td>0</td><td>Encoder counting direction</td><td>CW</td><td>CCW</td></tr>
<tr><td>1</td><td>Hardware self-test</td><td>Off</td><td>On</td></tr>
<tr><td>2</td><td>ZOOM</td><td>Off</td><td>On</td></tr>
</table>
Default value：0000h
--The encoder counting direction defines whether the count value increases or decreases when the rotation axis rotates CW or CCW from the encoder axis.
-- Zoom function: if this feature is disabled, the physical resolution is used (refer to objects 6501h and 6502h).
</td></tr>
<tr><td>6001-00</td><td>
Measuring units per resolution [Unsigned32，rw]
Default value：2000H。
If the 6000 parameter bit2=1, can be used to change the single-turn resolution, it should not be greater than the 6501 parameter.
</td></tr>
<tr><td>6002-00</td><td>
Total measuring range [Unsigned32，rw]
Default value：20000000H。
If the 6000 parameter bit2=1, can be used to change the total resolution of multi-turns, it should not be greater than the 6502 parameter.
</td></tr>
<tr><td>6003-00</td><td>
Preset value
The preset value is the set position value, which must not exceed the "total hardware resolution" in order to prevent running errors.。
</td></tr>
<tr><td>6004-00</td><td>Current position value [Unsigned32, ro]</td></tr>
</table>

6200-00	Cyclic-Timer [Unsigned16, rw] Default value：0064h（100ms）。 Loop timer is used in asynchronous communication to adjust the cycle interval when PD01 (object 1800-05h) is transmitted.
6500-00	Operation-status [Unsigned16, ro]
6501-00	Measuring units per revolution [Unsigned32, ro] Indication of the single-turn resolution. To use other values, refer to object 6001h.
6502-00	Number of distinguishable revolutions [Unsigned32, ro] Indication of the multi-turn resolution. To use other values, refer to 6001h and 6002h。
6503-00	Alarms [Unsigned16, ro]
6504-00	Supported alarms,Default value：1H [Unsigned16, ro]
6505-00	Warnings [Unsigned16, ro]
6506-00	Supported warnings, Default value：4H [Unsigned16, ro]
6507-00	Profile and software version. Default value：01000100H [Unsigned32, ro]
6508-00	Operation time, default value=FFFF FFFFh（not supported）unit: 0.1 h [Unsigned32, ro]
6509-00	Offset value [Integer32, ro]
	Offset value, calculated from the preset value
650B-00	Serial number [Unsigned32, ro] Default value=FFFF FFFFh（not supported） 650B-00

Note：In order for the modified parameters to take effect, it is necessary to perform the "Save Parameters" operation (refer to object 1010h). If the "Save Parameters" operation is not executed, the parameters will be lost when the "Reset Node" command, "Reset Communication" command, or when the power is turned off.

9) General Settings

Here are some examples of data exchange between the main controller and the encoder when parameters are set. "ID" is used to indicate the address of the encoder. The values are recorded in hexadecimal.

·Setting Operational、Pre-operational status.

Master→Encoder

NMT message
Operational
Pre-Operational

COB-ID	Command	Node
000	01	ID
000	80	ID

·Set single-turn solution (2^{12}=0000 1000h)

Master→Encoder（write）

COB-ID	Command	Index		sub-Index	Process data			
600+ID	23	01	60	00	00	10	00	00

Encoder→Master（response）

COB-ID	Command	Index		sub-Index	Process data			
580+ID	60	01	60	00	00	00	00	00

·Set total resolution（2^{24}=0100 0000h）

Master→Encoder（write）

COB-ID	Command	Index		sub-Index	Process data			
600+ID	23	02	60	00	00	00	00	01

Encoder→Master（response）

COB-ID	Command	Index		sub-Index	Process data			
580+ID	60	02	60	00	00	00	00	00

·Set Operational parameters
(counting direction: clockwise, zoom function: use, hardware self-test: disabled)

Master→Encoder（write）

COB-ID	Command	Index		sub-Index	Process data			
600+ID	2B	00	60	00	04	00	00	00

Encoder→Master（Response）

COB-ID	Command	Index		sub-Index	Process data			
580+ID	60	00	60	00	00	00	00	00

Set preset value（set preset value is 1000=03E8h）

Master→Encoder（write）

COB-ID	Command	Index		sub-Index	Process data			
600+ID	23	03	60	00	E8	03	00	00

Encoder→Master（Response）

COB-ID	Command	Index		sub-Index	Process data			
580+ID	60	03	60	00	00	00	00	00

Set synchronization counter（n=5=05h）

Master→Encoder（write）

COB-ID	Command	Index	sub-Index	Process data

600+ID	2F	01	18	02	05	00	00	00

Encoder→Master（Response）

COB-ID	Command	Index		sub-Index	Process data			
580+ID	60	01	18	02	00	00	00	00

Cycle time mode : Cycle time setting（100ms=64h）

Master→Encoder（write）

COB-ID	Command	Index		sub-Index	Process data			
600+ID	2B	00	62	00	64	00	00	00

Encoder→Master（Response）

COB-ID	Command	Index		sub-Index	Process data			
580+ID	60	00	62	00	00	00	00	00

In order for the modified parameters to take effect, it is necessary to perform the "Save Parameters" operation (refer to object 1010h). If the operation of "saving parameters" is not executed, the parameters will be lost when the command of "reviving nodes", "resetting communication", or turning off the power.

Warnings

To understand the meaning of the warning message, please refer to the "SD0 exception interrupt Code" section of "CIA draft Standard 301" on www.can-cia.org.

6.9.2 Emergency Message (EMCY)
An emergency is sent when a failure occurs either on the bus or within the device.
General structure of an emergency message:

Identity	CAN data			
COB-ID(hex)	0	1	2	3…7
Refer to 1014h	Error code		Error Register	Info.
	L	H	1001	00…00

Emergency Error Code List: 1000h=NodeGuard error
5530h=Registor error

6. Precautions and warranty

● The displacement sensor of the pull rope is installed in a fixed position, and when the pull head is pulled out, it is strictly prohibited to let go and allow the pull rope to retract instantly.
● Movement needs to be kept unobstructed, and the cable should be pulled out vertically during installation.
● Non technical personnel are strictly prohibited from disassembling. If necessary, please disassemble and reassemble under the guidance of technical personnel;
● When installing the stainless steel ropes, attention should be paid to angle control. If necessary, pulleys can be added appropriately to change direction to ensure measurement accuracy and the service life of the steel rope, and to avoid friction between the wire and the outlet.
● Please confirm the power is turned off when wiring, and be aware that incorrect wiring may cause the encoder main board to burn out.
● The product is guaranteed for one year free of charge when used correctly.
● When exceed the warranty period, or the product is damaged due to improper use, the product can be sent back to the original factory for repair (only raw material cost is required when repair).

7. Indicator Lights Description

1. Default Indicator Status: “Green” flashes quickly for 0.5s, indicating normal communication of the encoder.

8. Contact us and technology support

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Technical documentation

- Detailed version of the instruction manual;
- PC software;
- 2D drawings and 3D model files;
- Additional Video Tutorials;

For more details, please visit our website:
www.briterencoder.com.

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