Briterencoder Absolute Rotary Encoder

Analog 0~5V/10V Voltage Output User Manual

1. Product Model Description

BRT=BriterEncoder:
BRT25=OD.25mm,4mm shaft
BRT27=27*27mm,6mm shaft
BRT38=OD.39mm, 6mm shaft
BRT38B=OD.39mm, 8mm hoop blind hole
BRT38M=OD.39mm,8mm blind hole
BRT42=OD.42mm, 6mm shaft
BRT50=OD.50mm, 8mm shaft
BRT58=OD.58mm, 10mm shaft

Resolution:
1024=10bit
4096=12bit
16384=14bit
32768=15bit
16bit =65536
17bit =131072
.....
21bit=2097152

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

IP54:Normal
IP65:Waterproof
IP68:Waterproof and dustproof
(Usable 1m underwater)
EX:Explosion-proof

BRT38 — R0M — 1024 — D24 — RT1 — IP68 — X3

Communication Protocal:

R0M=RS485 (Modbus RTU)	A0M=4~20mA
R2M=RS232(Modbus RTU)	V5M=0~5V
R4M=RS422(Modbus RTU)	V10M=0~10V
T0M=TTL(Modbus RTU)	R0&A0M=RS485&4~20mA
C0M=CANbus	R0&V5M=RS48580~5V
C2M=CANopen	R0&V10M=RS485&0~10V
S0M=SPI	
S1M=SSI	
S2M=BISS-C	

Turns:
1, 16, 24, 32, 50, 64, 99, 100, 200, 400, 600, 800, 1800, 5400, 10800, 21600, 34891, 69782 turns (Customizable)
D1 = Single turn
D16 = 16 turns

Internal Identification Code

Note 1: For photoelectric types, add P before the communication interface, e.g., photoelectric RS485 = PROM.

Note 2: For high-speed RS485 communication interfaces compatible with Tamagawa models, add HS before the communication interface, e.g., high-speed RS485 = HSR0M.

Note 3: For analog speed models, note the maximum speed RPM after the model, e.g., BRT38 - A0M1024 - RT1 - IP68(1000RPM).

Model Description:
1.Model:e.g., BRT25 indicates an outer diameter of 25mm and an output shaft of 4mm.
2.Communication interface: e.g., R0M means the electrical interface is RS485 and the communication protocol is Modbus RTU.
3.Resolution: It refers to the single - turn resolution, which has nothing to do with the subsequent number of turns. e.g., with a 10 - bit resolution, 2 to the power of 10 equals 1024. That is, the 360° full circle is divided into 1024 parts, and the minimum angular resolution is 360°/1024 = 0.38°.
4.Turns:It represents the power-off memory range, rather than the mechanical rotation turns of the encoder. The power-off memory of a single-turn encoder is limited to one turn, while a multi-turn encoder can record and restore multi-turn position information. Both types of encoders can perform infinite mechanical rotations.
5.Blind holes are mainly used to provide space for fixed threaded connections, while hoop blind hole are mainly used to fix and connect components. In practical applications, it is more recommended to use hoop blind hole for encoders.
6.Inventory: Some randomly combined models may be out of stock. Please consult in advance to ensure that the selected model is available.

2. Wiring Definition and connection

Output 0-5V

Grey wire (optional)	0-5 negative	1.In a three-wire system, since the signal negative and the power negative are directly connected, this line is left unconnected. 2.In a four-wire system, this line must be connected to the negative of the 0-5V voltage loop (i.e., the signal negative).
Brown wire	0-5V positive	-
Black wire	0V (GND)	-
Red wire	Power Supply	DC 12-24V
Orange wire	Function line	SETH/ Direction
Yellow wire	Function line	SETL/ Reset

Output 0-10V

Grey wire (optional)	0-10V negative	1.In a three-wire system, since the signal negative and the power negative are directly connected, this line is left unconnected. 2.In a four-wire system, this line must be connected to the negative of the 0-10V voltage loop (i.e., the signal negative).
Brown wire	0-10V positive	-
Black wire	0V (GND)	-
Red wire	Power Supply	DC 12-24V
Orange wire	Function line	SETH/ Direction
Yellow wire	Function line	SETL/ Reset

3. Product Parameters

Multi-turns	Singleturn、16、25、32、50、64、100、400、1800、5400、10800、21600turns(Customizable)		
Resolution	10bit、12bit、13bit、14bit、15bit、16bit		
Supply Voltage	12~24V	Linearity	0.1%
Kernel Refresh Period	50uS	Electrical lifespan	> 100000 h
WorkingCurrent	100mA	Protection Level	IP54、IP68、EX
Shell/ Flange Material	Galvanized steel / Aluminum alloy IP68/EX Stainless Steel	Maximum mechanical speed	Singleturn 8000RPM Multi-turn 6000PRM
Shaft Material	Stainless Steel(Customizable)	Starting Torque	0.006Nm
Bearing material	Bearing Steel	Weight	86~200 g ((Includes 1.2m shielded wire, Customizable)
Maximum load on the shaft	Axial 20 N, Radial 80 N	Humidity	98 % (No condensation)
Working temperature	-40 ~ + 85 ℃	Storage temperature	-40 ~ +85°C

How to calculate the encoder rotation angle through sensor feedback analog signal?

Determine the number of turns and signal output type of the sensor you purchased.

Output 0-5V encoder:

The angle=number of turns * 360 * voltage/5 (unit: °)
E.g. If a single turn 0-5V encoder is used and the voltage is 2.5V, then the angle=1 * 360 * 2.5/5=180 °

Output 0-10V encoder:

The angle=number of turns * 360 * voltage/10 (unit: °)
E.g. If a single turn 0-10V encoder is used and the voltage is 2.5V, then the angle=1 * 360 * 2.5/10=90 °

4. Function Line Setting Method

Set the minimum value:

When power on, use the yellow wire to touch the black wire (0V) for a short time (more than100ms) to set the current position to the minimum analog value;

Set the maximum value:

When power on, use the orange wire to touch the black wire (0V) for a short time (more than100ms) to set the current position to the maximum analog value;

Set the midpoint value:

When power on, use the yellow wire and the orange wire for to touch the black wire (0V) a short time (more than100ms) to set the current position to the midpoint analog value;

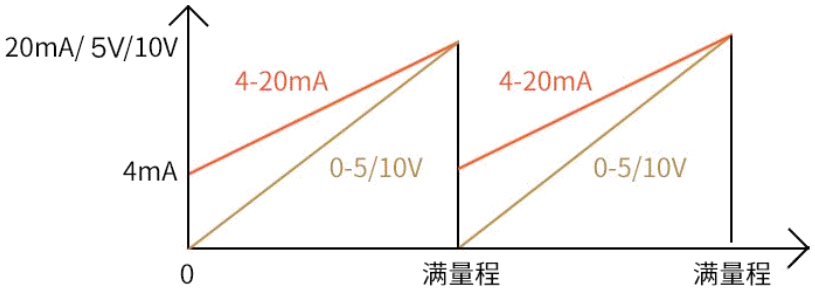
Restore the encoder to factory settings:

When the encoder is in power-off state, connect the yellow wire to the black wire (0V). Then power on and keep it on for 2 minutes (110~130 seconds) to reset the encoder.

Set the encoder's value direction

When the encoder is in a powered-off state, the orange wire contacts the black wire (0V). Then power on and keep it on for 2 minutes (110~130 seconds), the encoder can switch its direction of value.

5. Schematic diagram of output signal



6. Precautions and warranty

● Encoders belong to precision instruments. Please handle them with care and use them with care, especially do not knock, hit, or forcefully pull the encoder shaft.
● The encoder and mechanical connection should use flexible connectors or elastic brackets to avoid hard damage caused by non concentric rigid connections.
● Although the encoder itself does not lose the number of turns in interference environments, it can cause interference to the data during transmission. Therefore, when there is a motor or strong electromagnetic interference environment in the system, an isolated power supply should be used to power the encoder. And when there's external extended communication lines, it is best to use double shielded cables.
● The encoder casing and shielding wire should be well grounded to prevent damage to the encoder circuit caused by lightning strikes or high-voltage static electricity

● 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. Encoder Indicator Lights Description

1. The status light displays are as follows:
1) Default indication status: "Blue -> Blue -> Blue -> Cyan -> Blue" 1s slow flash, indicating normal power supply to the encoder;

2) Other work status indications:
a. Setting minimum value status: Orange light flashes quickly at 0.5s intervals;
b. Setting maximum value status: Purple light flashes quickly at 0.5s intervals;
c. Setting midpoint value status: Orange light flashes quickly at 0.5s intervals;
d. Power-on reset status: Orange light flashes quickly at 0.5s intervals;
e. Setting direction status: Purple light flashes quickly at 0.5s intervals;

3) Red light indicates encoder failure.

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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