BOURNS®

Features

- Hybrid technology
- Highly resistant to vibration/shock
- Highly resistant to fluid/dust ingress
- Robust design for industrial applications
- Highly repeatable
- RoHS compliant*

HES38U-RS485 Hybrid Position Sensor

Electrical Characteristics (@ 25 °C)

VDD Supply Voltage .... 10 to 30 V DC
Supply Current .... 44 mA max.
Output Signal (Single) RS-485
Independent Linearity .... ±0.1 % max.
Hysteresis .... 0.3 % VDD max.
Effective Electrical Angle .... 3600 ° ± 10 °
Output Resolution 163,840
Baud Rate 19,200

Environmental Characteristics

Storage Temperature .... -40 °C to +125 °C
Operating Temperature .... -40 °C to +85 °C
Moisture Resistance
.... MIL-STD-202, Method 106
Insulation Resistance @ 500 V AC
.... 500 MW min.
Vibration .... 15 G
Shock .... 50 G
IP Rating .... IP 65
ESD Rating .... 2 kV max.

Mechanical Characteristics

Mechanical Angle .... 3600 ° ± 10 °
Shaft/RPM .... 200 RPM max.
Torque
   Starting & Running
   .... 2.12 N-cm (3.0 oz-in.)max.
   Mounting
   .... 2.12 N-cm (3.0 oz-in.)max.
Shaft Material .... Stainless steel
Bearing .... 2 ball bearings
Rotational Life (Shaft Revolutions) ..... 5 million

BOURNS®

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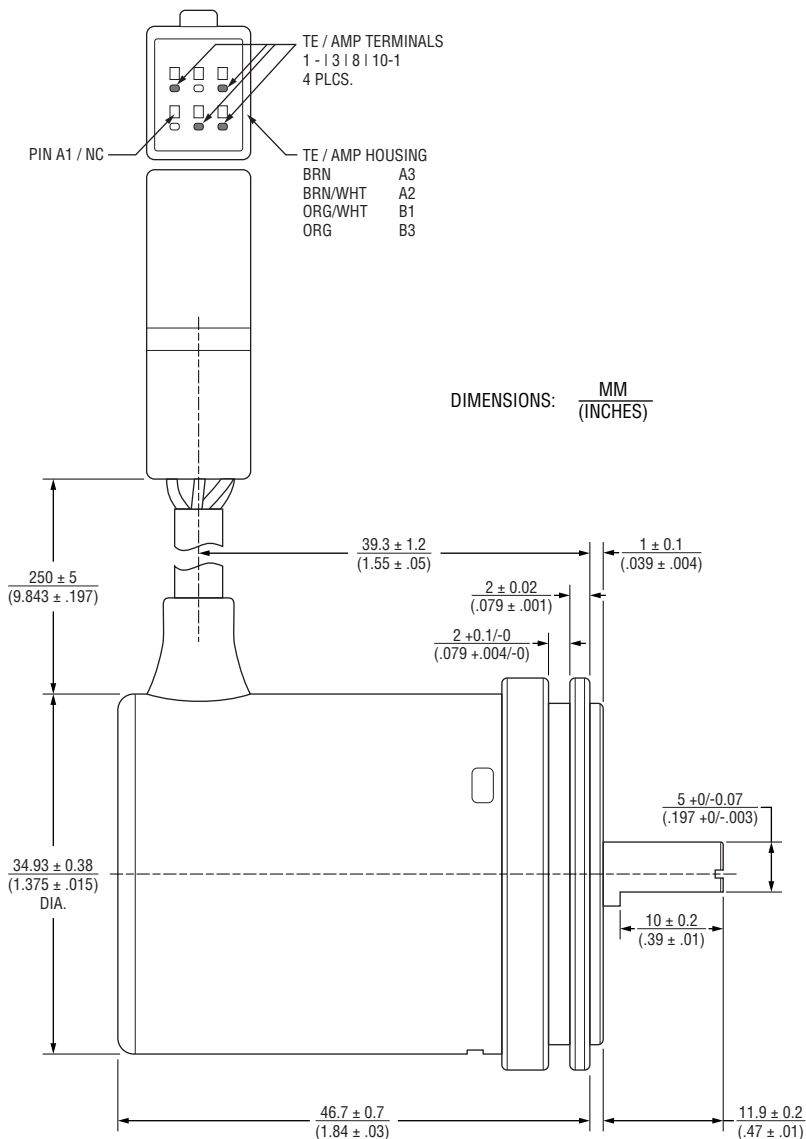Tel: +1-951 781-5500
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Additional Information

Click these links for more information:

PRODUCT   TECHNICAL   INVENTORY   SAMPLES   CONTACT
                LIBRARY

Product Dimensions

TE / AMP TERMINALS
1 - | 3 | 8 | 10-1
4 PLCS.

PIN A1 / NC

TE / AMP HOUSING
BRN   A3
BRN/WHT   A2
ORG/WHT   B1
ORG   B3

DIMENSIONS: $\dfrac{MM}{(INCHES)}$

39.3 ± 1.2
(1.55 ± .05)

1 ± 0.1
(.039 ± .004)

2 ± 0.02
(.079 ± .001)

2 +0.1/-0
(.079 +.004/-0)

250 ± 5
(9.843 ± .197)

5 +0/-0.07
(.197 +0/-.003)

34.93 ± 0.38
(1.375 ± .015)
DIA.

10 ± 0.2
(.39 ± .01)

46.7 ± 0.7
(1.84 ± .03)

11.9 ± 0.2
(.47 ± .01)

Applications

- Patient platform positioning feedback
- 3D imaging position feedback
- Pneumatic control valve position feedback
- Draw wire position sensors
- Actuator motor position feedback

- Automated manufacturing robotics
- Electric linear actuator position sensors

HES38U-RS485 Hybrid Position Sensor

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How To Order

HE S 38 U - RS485 - S C 2F

Model
HE = Hybrid Encoder

Configuration
S = Serial

Body Size
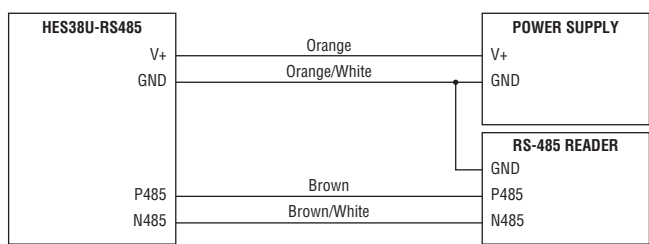38 = 38 mm Servo

Shaft
U = 6 mm diameter slotted shaft / 12 mm length

Output Type
RS485 = Non-Synchronous Serial Protocol,
Differential, 163,840 Bit Output Resolution

Shaft Style
S = Slotted

Configuration
C = RJ-45 Connector

Cable Length
2F = 2 Feet

Connection Diagram

HES38U-RS485

HES38U-RS485		POWER SUPPLY
V+	Orange	V+
GND	Orange/White	GND

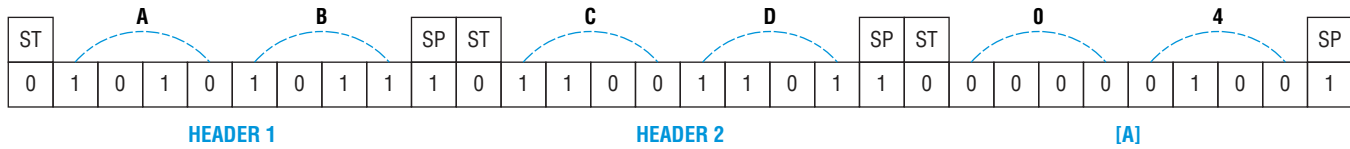|		RS-485 READER
		GND
P485	Brown	P485
N485	Brown/White	N485

Connect the GND of the power supply with the GND of the RS-485 reader.
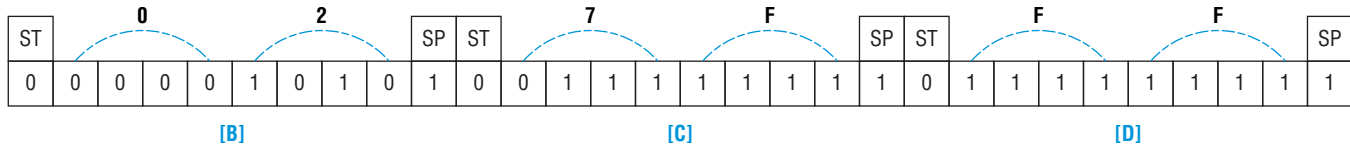
Serial Protocol

Model HES38 RS-485 Protocol

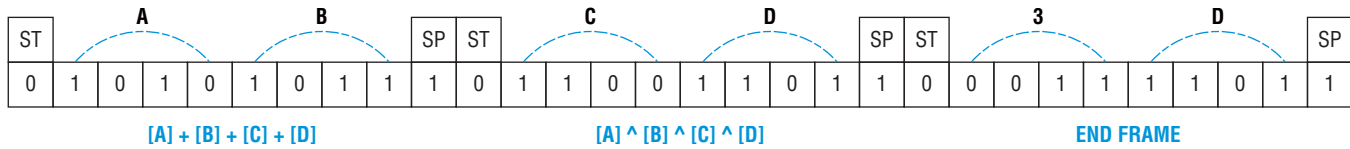Maximum resolution for the Model HES38U is 163,840 bits = 027FFF HEX Baud Rate 19,200 BPS

Start frame and data length

ST	A	B	SP	ST	C	D	SP	ST	0	4	SP
0	1 0 1 0 1 0 1	1 1 0 1 1 0 0 1	1	0	1 1 0 1	1 0	0 0 0 0 0 1 0 0	1

HEADER 1   HEADER 2   [A]

Encoder position data

ST	0	2	SP	ST	7	F	SP	ST	F	F	SP
0	0 0 0 0 1 0 1 0	1 0 0 1 1 1 1 1	1	0	1 1 1 1 1 1 1 1	1

[B]   [C]   [D]

Parity and end frame

ST	A	B	SP	ST	C	D	SP	ST	3	D	SP
0	1 0 1 0 1 0 1 1	1 0 1 1 0 0 1 1 0 1	1	0	0 0 1 1 1 1 0 1	1

[A] + [B] + [C] + [D]   [A] ^ [B] ^ [C] ^ [D]   END FRAME

Serial Protocol (Continued)

Start Frame		Data Frame				Accumulate Data Sum		End of Frame
Header		Data Length	High Byte	Mid Byte	Low Byte	AND	OR	
Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	Byte8
Header 1	Header 2	[A]	[B]	[C]	[D]	[A]+[B]+[C]+[D]	[A]^[B]^[C]^[D]	END
0XAB	0XCD	0X04	0X00 to 0X02	0X00 to 0X7F	0X00 to 0XFF	AND DATA	OR DATA	0X3D

The position data is contained within bytes B, C, and D. Together, this data makes up a 24-bit packet referred to as DATA24 which could be a valid angle or an error condition. The meaning is distinguished by the MSB. DATA24: Position data P [17.0], Error data E[15:0].

DATA24 Position Data Structure

Most Significant Byte								Middle Byte								Least SIgnificant Byte							
MSB							LSB	MSB							LSB	MSB							LSB
0	0	0	0	0	0	P17	P16	P15	P14	P13	P12	P11	P10	P9	P8	P7	P6	P5	P4	P3	P2	P1	P0

DATA24 Error Data Structure

Most Significant Byte								Middle Byte								Least SIgnificant Byte							
MSB							LSB	MSB							LSB	MSB							LSB
1	0	0	0	0	0	0	0	E15	E14	E13	E12	E11	E10	E9	E8	E7	E6	E5	E4	E3	E2	E1	E0

DATA24 Error Structure

Bit	Name	Description	Bit	Name	Description
E0	F_ERROR	Sensor error occurred	E12	F_ADCGND	Potentiometer ADC GND disconnected
E1	F_INTSPIREAD	Internal SPI read failure	E13	F_ADCCON	Potentiometer ADC connection disconnected
E2	F_ADCMONITOR	ADC failure	E14	F_DACMONITOR	Never occurring in serial protocol
E3	F_ADCSATURA	ADC saturation (electrical failure or field too strong	E15	F_INTCHKSUM	Internal checksum failure
E4	F_RGTOOLOW	Analog gain below trimmed threshold (likely reason: field too strong)	E16	—	
E5	F_MAGTOOLOW	Magnetic field too weak	E17	—	
E6	F_MAGTOOHIGH	Magnetic field too strong	E18	—	
E7	F_RGTOOHIGH	Analog gain above trimmed threshold (likely reason: field too strong)	E19	—	
E8	F_FGCLAMP	Never occurring in serial protocol	E20	—	
E9	F_ROCLAMP	Analog chain rough offset compensation: clipping	E21	—	
E10	F_MT7V	Device supply Vdd greater than 7V	E22	—	
E11	F_ADCVDD	Potentiometer ADC VDD disconnected	E23	F_SYSERROR	Internal system error flag

02/21

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