Preliminary Datasheet

35AH-4Exx Series Battery-less Encoder

Absolute Encoder with Energy Harvesting Multi-Turn Counter

Description

The Broadcom® 35AH-4Exx Series is an optical absolute house encoder, which offers up to 25-bit single-turn (ST) position information and 24-bit multi-turn (MT) counts, hence a combined 49 bits high resolution output. The ST block of the encoder consists of a patterned disk, a light source and photosensitive elements to translate the mechanical motion into electrical signal. It is designed with a selection of serial communication protocols, with dedicated electronic circuit designed for a robust signal communication.

These encoders offer many intelligent features such as a built-in temperature sensor, options of output resolution, zero reset, system alarm, and more. They come with a recommended high-temperature range of –20°C to 105°C. One of the key advantages is the multi-turn tracking that employs a proprietary energy harvesting (EH) technology by harvesting the magnetic energy as the patterned disk with magnet rotates. The counter ASIC harvests the energy generated by EH sensor for processing rotational count and generating counting logics to the non-volatile memory, which updates and stores the counting.

The entire operation of energy generation, counting and storage processing is completed within a limited energy and short duration; hence, the encoder is suited for both low and high-speed measurement.

Features & Benefits

- Default 16-bit energy harvesting multi-turn with 23 or 25-bit optical single-turn
- Position accuracy of +/-50 arcseconds
- Encoder Fault and Status bits with CRC
- Integrated differential transceiver for RS485 communication protocol
- Overall encoder outer diameter Ø37 mm and maximum height of 34 mm
- 8K bits of user accessible memory in EEPROM
- Immediate position detection on power up; no battery or capacitor required for position detection during power failure
- RoHS Compliant

Applications

- AC/DC Servo Motor Feedback
- Medical & laboratory equipment
- Robotics
- Factory automation

CAUTION

This Broadcom Wuxi product is not specifically designed nor manufactured for use in any specific devices. Customers are solely responsible for determining the suitability of the product for its intended application and solely liable for all loss, damage, expense, or liability in connection with such use. Please contact factory for further enquiry.

Product Specifications

Product Specifications

Table 1 Absolute Maximum Ratings (1)

Parameters	Symbol	Min	Max	Units	Notes
Storage Temperature	T_S	-40	125	°C	
Operating Temperature	T_a	-20	105	°C	
Supply Voltage	V_{dd}	-0.3	6.5	V	
Permissible Speed (2)		–	8,000	RPM	
Relative Humidity	RH	–	90	%	T=60°C (non-condensing)
Transmission Length (3)		–	30	meter	Differential line

NOTE

1. Encoder works reliably up until this permissible speed.
2. Twisted pair and shielded cable is recommended for robustness against environmental noise. Frame Ground (FG) termination near the motor frame is recommended.
3. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Stress greater than the absolute maximum rating may cause permanent damage to the device.

Table 2 Electrical Characteristics

DC Characteristics over recommended operating V_{DD} 4.5 to 5.5V, Ta = -20 to 105°C

Parameters	Symbol	Min.	Typical	Max.	Unit	Remark
Supply Voltage	V_{DD}	4.5	5.0	5.5	V	
Supply Current	I_{DD}		71		mA	
Power on Standby		–	–	500	ms	
Single-Turn Resolution		17	–	25	Bit	23 or 25 bits default
Multi-Turn Resolution		0	–	16	Bit	16 bits default
Protocol IO drive strength	I_{DIO}	–	20	–	mA	Differential line driver
Differential Transceiver						
Hysteresis	V_{hys}	–	100	–	mV	220Ω termination
Opening	V_{open}	200	–	–	mV	
Peak-Peak Voltage	V_{PP}	–	2	–	V	

Table 3 Power Supply Considerations

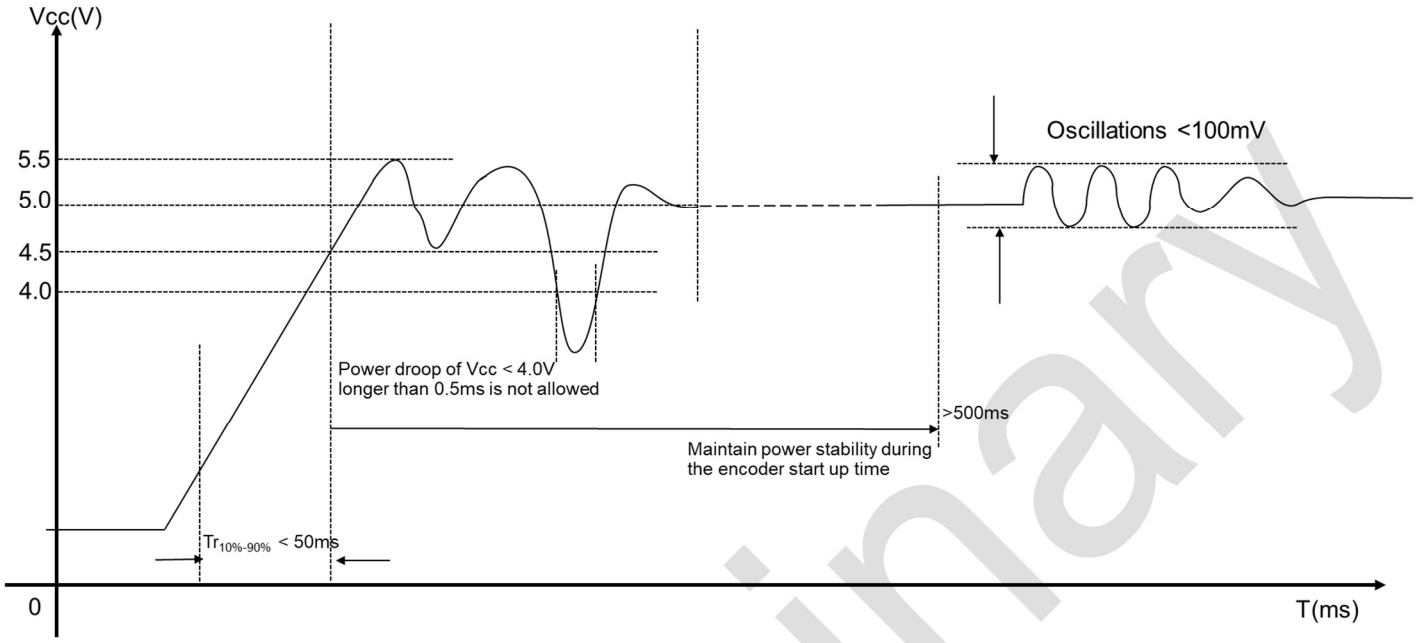


Figure 1 Encoder power up considerations

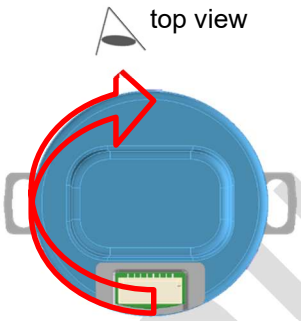
NOTE

1. Power droop during the initial power up should be avoided.
2. Power up rise time of <50ms is recommended.
3. Encoder communication ready after 500ms.

Table 5 General encoder specifications

Parameter	Remarks
Counting Direction	Increase with clockwise (CW) codewheel rotation, view from encoder top (Figure 2)
User accessible Memory size	8K bits
Initialization Time	500ms

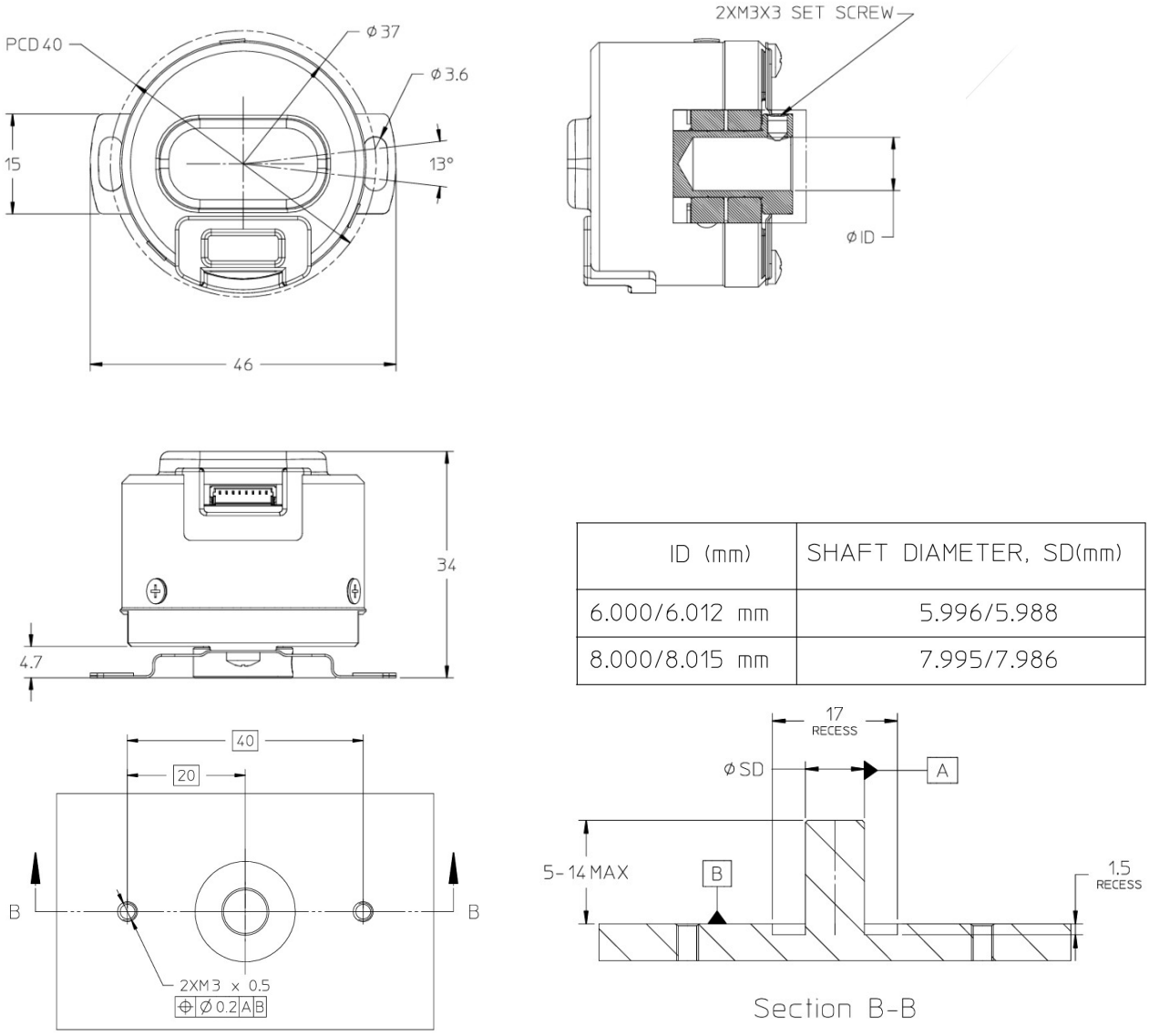
Figure 2 Counting 'Up' direction from top view



Mechanical and Environmental Specifications

Mechanical Specifications

Figure 3 Encoder Package Dimensions and Recommended Mounting Requirements for the PCD40 Coupling Plate

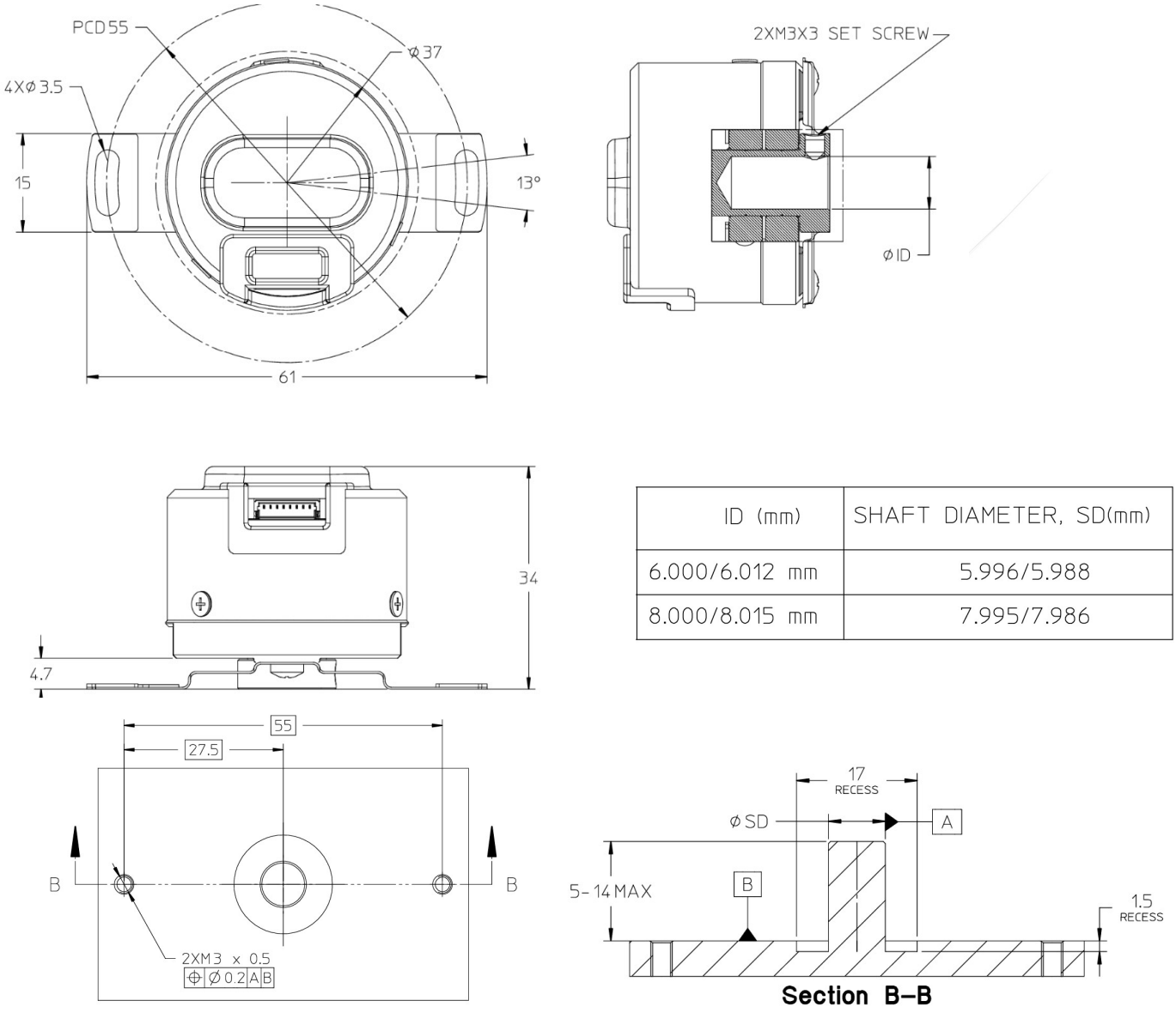


ID (mm)	SHAFT DIAMETER, SD(mm)
6.000/6.012 mm	5.996/5.988
8.000/8.015 mm	7.995/7.986

NOTE

1. Dimensions are in millimeters.
2. 3rd angle projection.
3. Unless otherwise specified, all tolerances are within ±0.5 mm.
4. It is recommended to have a recess on the motor mounting surface to prevent interference between the encoder shaft and the motor base.

Figure 4 Encoder Package Dimensions and Recommended Mounting Requirements for the PCD55 with M3 Coupling Plate

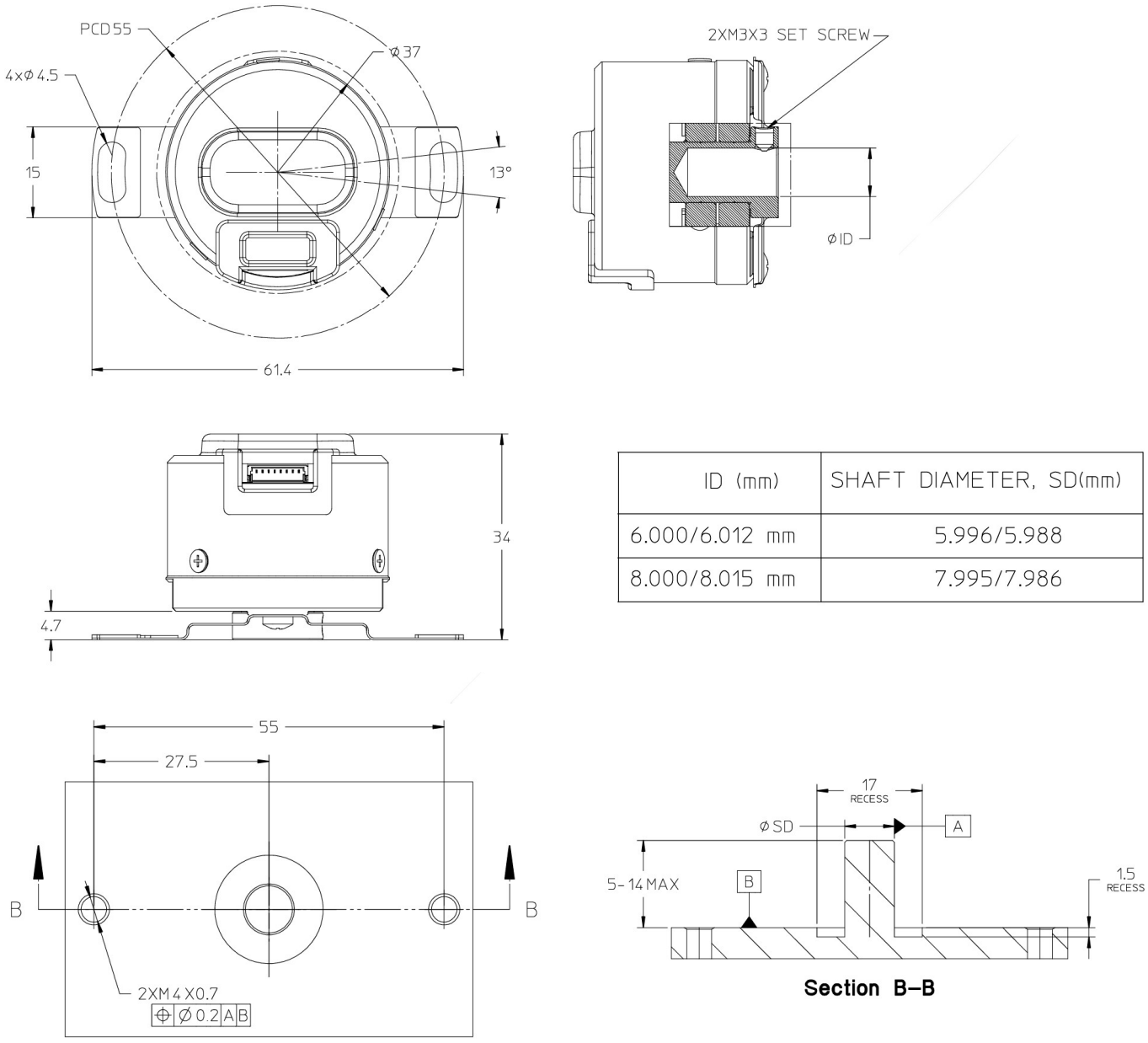


ID (mm)	SHAFT DIAMETER, SD(mm)
6.000/6.012 mm	5.996/5.988
8.000/8.015 mm	7.995/7.986

NOTE

1. Dimensions are in millimeters.
2. 3rd angle projection.
3. Unless otherwise specified, all tolerances are within ±0.5 mm.
4. It is recommended to have a recess on the motor mounting surface to prevent interference between the encoder shaft and the motor base.

Figure 5 Encoder Package Dimensions and Recommended Mounting Requirements for the PCD55 with M4 Coupling Plate

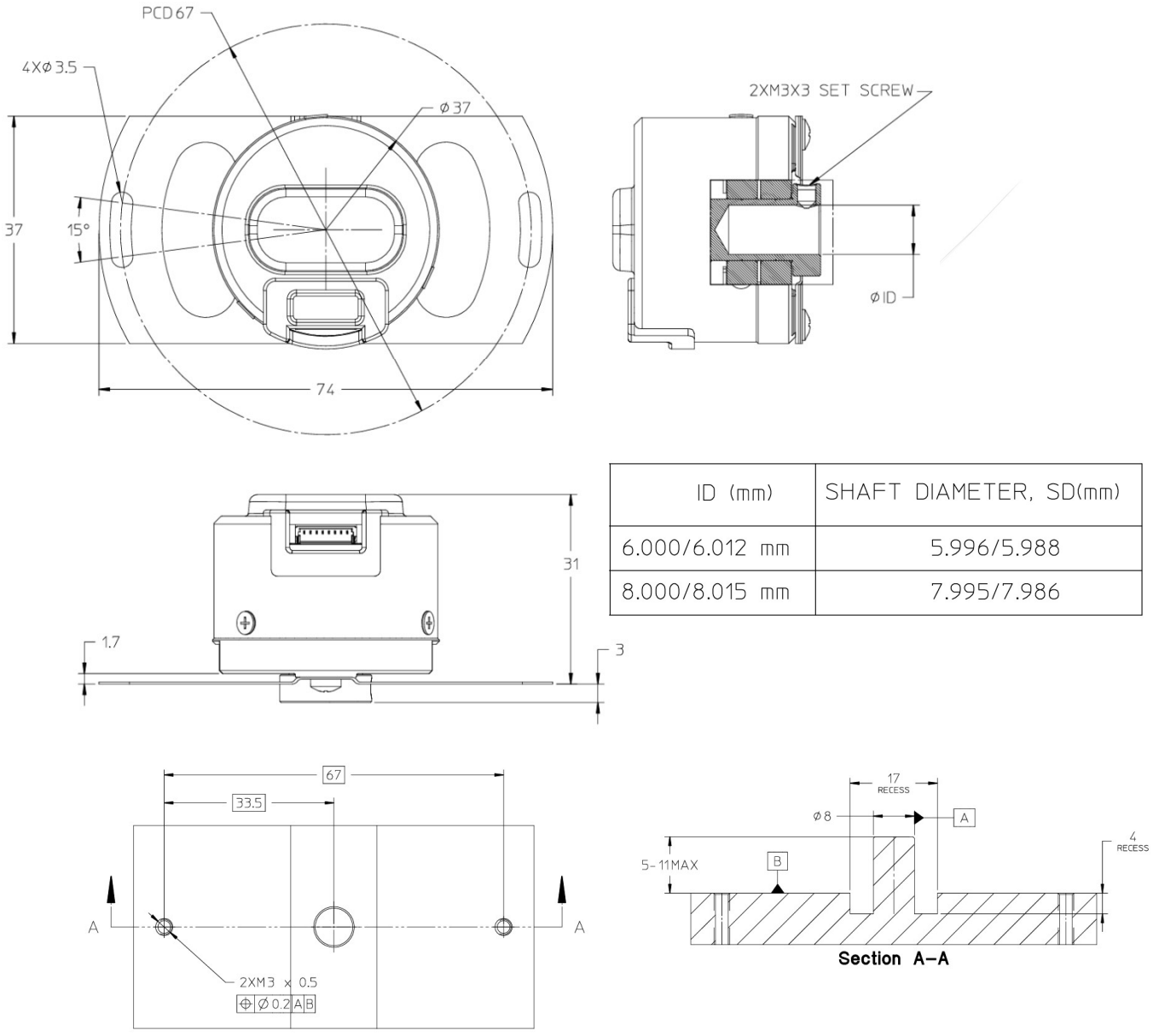


ID (mm)	SHAFT DIAMETER, SD(mm)
6.000/6.012 mm	5.996/5.988
8.000/8.015 mm	7.995/7.986

NOTE

1. Dimensions are in millimeters.
2. 3rd angle projection.
3. Unless otherwise specified, all tolerances are within ±0.5 mm.
4. It is recommended to have a recess on the motor mounting surface to prevent interference between the encoder shaft and the motor base.

Figure 6 Encoder Package Dimensions and Recommended Mounting Requirements for the PCD67 with M3 Coupling Plate

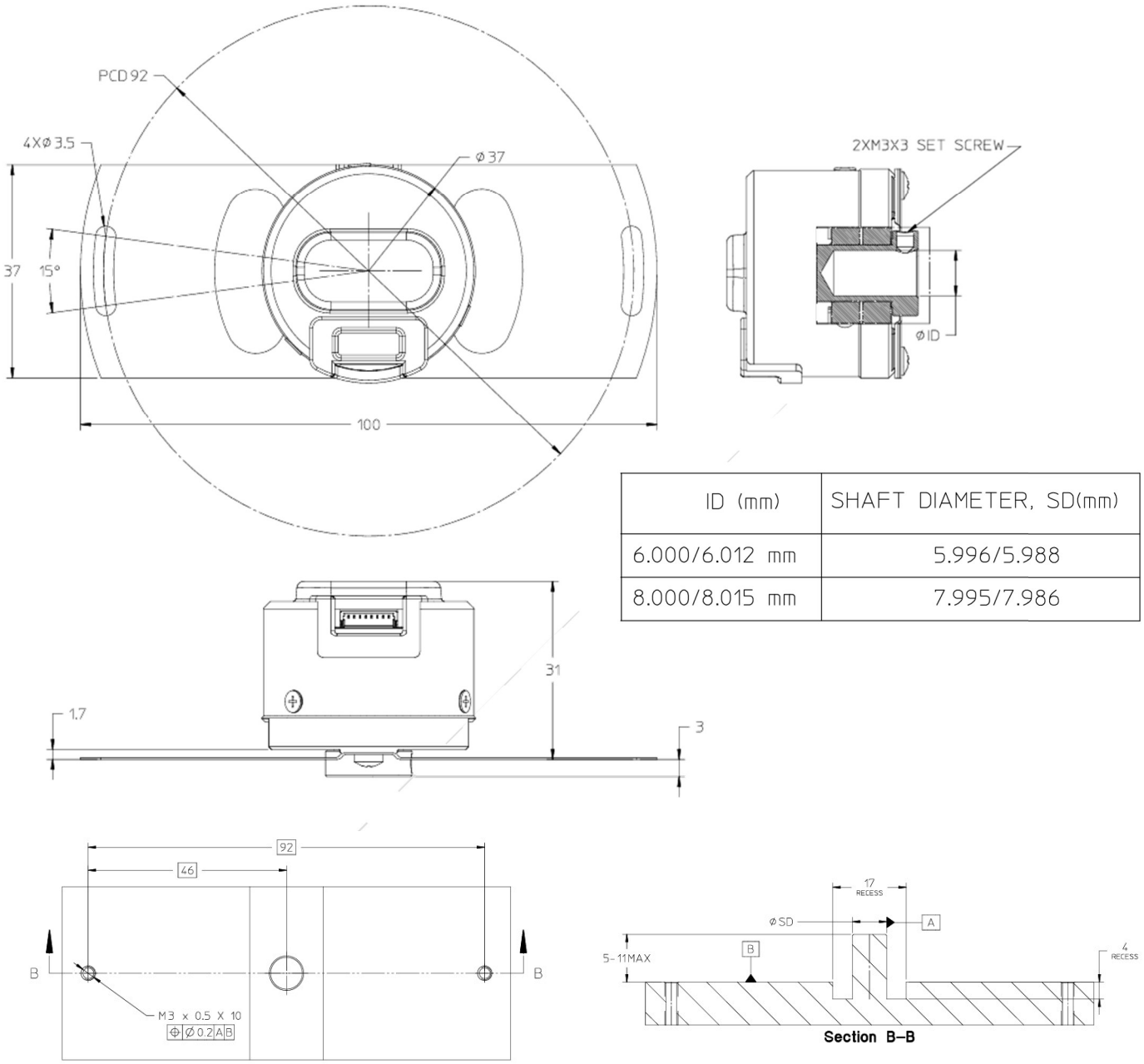


ID (mm)	SHAFT DIAMETER, SD(mm)
6.000/6.012 mm	5.996/5.988
8.000/8.015 mm	7.995/7.986

NOTE

1. Dimensions are in millimeters.
2. 3rd angle projection.
3. Unless otherwise specified, all tolerances are within ±0.5 mm.
4. It is recommended to have a recess on the motor mounting surface to prevent interference between the encoder shaft and the motor base.

Figure 7 Encoder Package Dimensions and Recommended Mounting Requirements for the PCD92 with M3 Coupling Plate



ID (mm)	SHAFT DIAMETER, SD(mm)
6.000/6.012 mm	5.996/5.988
8.000/8.015 mm	7.995/7.986

NOTE

1. Dimensions are in millimeters.
2. 3rd angle projection.
3. Unless otherwise specified, all tolerances are within ±0.5 mm.
4. It is recommended to have a recess on the motor mounting surface to prevent interference between the encoder shaft and the motor base.

Table 3 Mechanical characteristics
Mechanical characteristics over recommended operating conditions of VDD 4.5 to 5.5V, Ta = -20 to 105°C

Parameters	Conditions	Typ.	Units
System Accuracy	T_a = 25˚C	±50	Arc-sec
Mechanical Permissible Speed		8,000	min^{-1}
Shaft Radial Play		+/-0.1	mm
Shaft Axial Play		+/- 0.2	mm
Starting torque	T_a = 25˚C	$9.8x10^{-3}$	N.m

Environmental Specifications

Table 4 Environmental characteristics

Parameters	Conditions	Min	Typ.	Max	Units
Storage Temperature		-40	-	125	°C
Operating Temperature		-20	-	105	°C
Relative Air Humidity (Non-Condensing)	T_a = 40˚C, Per IEC 61800-2	90			RH%
Ingress Protection	After assembly to customer motor	IP40			
Vibration	Per IEC 60068-2-6	10G; 10~2000Hz			
Shock	Per IEC 60068-2-27	6ms; Half Sine; 200G			
Discharge of Static Electricity (ESD)	Per IEC 61000-4-2	± 8kV contact discharge, ± 12kV air discharge			-
Electrical Fast Transient / Burst Immunity	Per IEC 61000-4-4, Capacitive Coupling	± 2 kV / 5 kHz / 15ms			-
Dielectric Resistance	AC 500V, 1Min	Leakage <0.3			mA
Insulation Resistance	DC 500V	50			MΩ

CAUTION Refrain from exposing the encoder assembly to a strong magnetic field, e.g. placing a strong magnet near the encoder assembly (maximum magnetic field for storage and operating condition must be <20mT).

35AH-4Exx with RS485 Half-Duplex Protocol

A one-to-one half-duplex serial communication is established between the client encoder and the host (for example, a servo driver). The communication is in a differential transmission format. The encoder will carry out specific operations based on the command requests made by the host. An acknowledgment of the command request received by the encoder is necessary before the encoder executes the requested operation. The acknowledgment is conditional on the valid verification of the start bit, information data field, and stop bit. Failing this checking, the encoder will not acknowledge and execute the received command request.

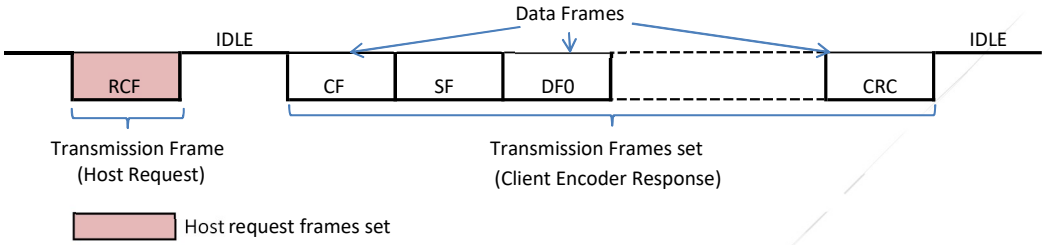


Figure 8 General transmission frames format on half-duplex line

NOTE

Start of transmission frames set: Upon detecting of the first logic of low state 0 on the transmission line after an idling state, and if the following 3 bits conform to the encoder address sync code, the encoder will acknowledge it as a valid request control field (RCF) and indicates the start of a transmission frame set. Otherwise, the encoder will continue to search for the next available logic of Low State 0.

End of transmission frames set: After the command frame is detected, if there is no start bit after the end bit of the last frame read, and no subsequent frame is detected, then the end of the transmission frame set is concluded.

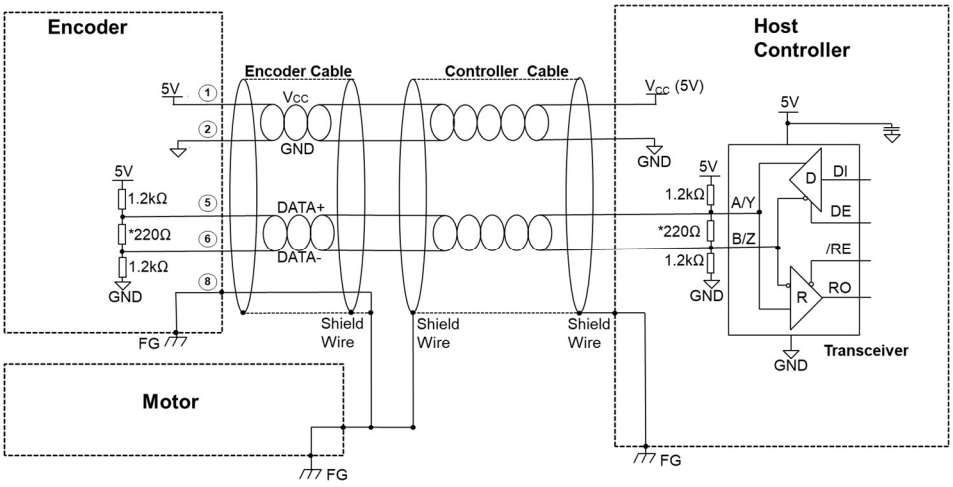
Idle state: The Idle state indicates there is a space between each transmission frames set and subsequent transmission frames. At idling state, the logic of output in transmission line is kept to high state 1.

Table 5 RS485 Protocol Specifications

Over the recommended operating conditions, Vdd 4.5 to 5.5V, Ta = -20 to 115°C

Parameters	Conditions	Min.	Typ.	Max.	Unit	Remarks
Communication Baud Rate	–	–	2.5	10	Mbps	2.5, 5, 10 Mbps
Frame Length	–	–	10	–	Bit/Frame	–
Cycle Time Between Frames Sets Request	Command ID3	62.5	–	–	µs	2.5 Mbps
		35	–	–	µs	5 Mbps
		20	–	–	µs	10 Mbps
Jitter	Every Frame	-100	–	+100	ns	2.5 Mbps
		-50	–	50	ns	5 Mbps
		-25	–	25	ns	10 Mbps

RS485 Differential Connection



Connection with a recommended cable (shield wire is not connected at encoder end)

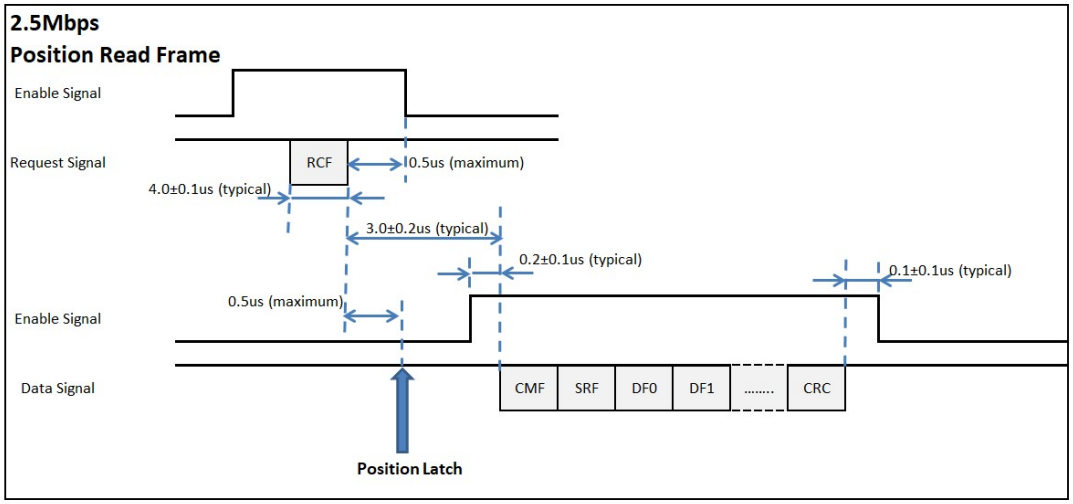
Figure 9 Typical RS485 connection

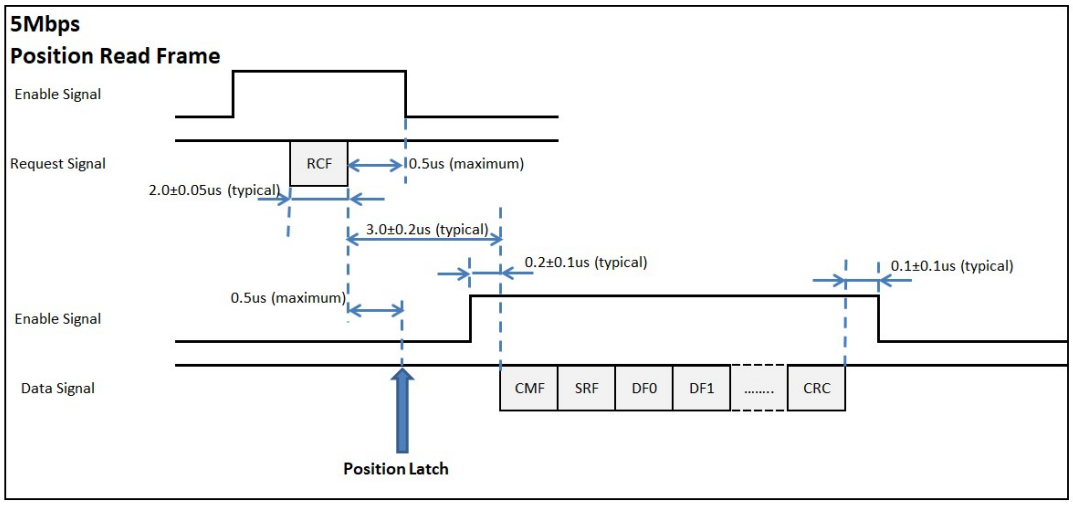
NOTE

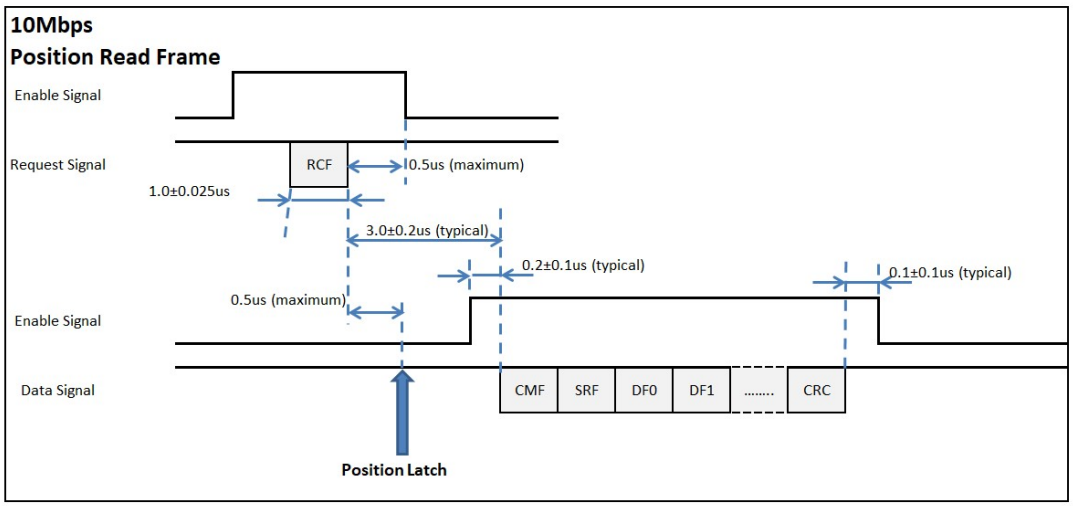
- It is strongly recommended to provide encoder power supply, Vcc within 4.5V ~ 5.5V. Typical value is 5V.
- For best noise immunity, it is recommended to use twisted-pairs shielded cable for connection to controller (servo driver), up to 30m in length.
- It is recommended to connect the encoder chassis and cable shield to the frame ground (FG) in application for enhanced noise immunity in harsh operating condition.
- Recommended differential transceiver P/N: ISL8485E or equivalent.
- To prevent undesirable signal reflections, the termination resistor is needed. The termination resistor, *220ohm 1/4W is recommended but may depend on the characteristic impedance of the cable used.

Encoder Data Read Out Frames Set

Figure 10 Encoder Data Read Out Frames Set







Upon the Host issuing a CMF request, after 3.0 µs (typical), the encoder shall respond with Encoder Data Frames set with the following contents:

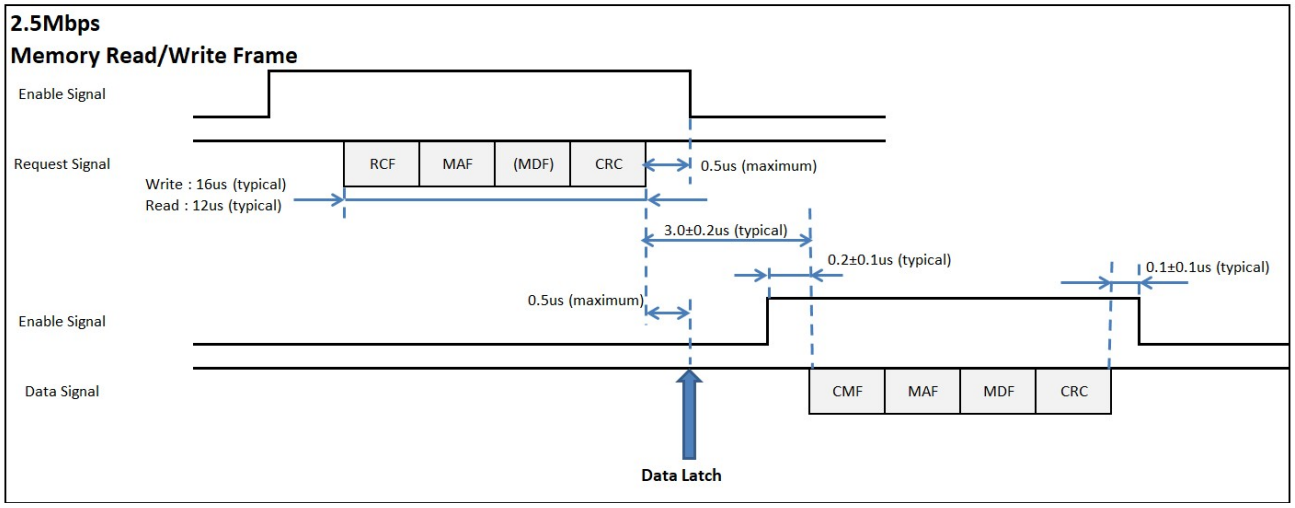
- CMF: corresponds to the Command Frame issued by the Host
- SRF: Status Response Frame
- DF^0~DF^7: Encoder Data Frames
- CRC: Cyclic Redundancy Check (CRC) frame

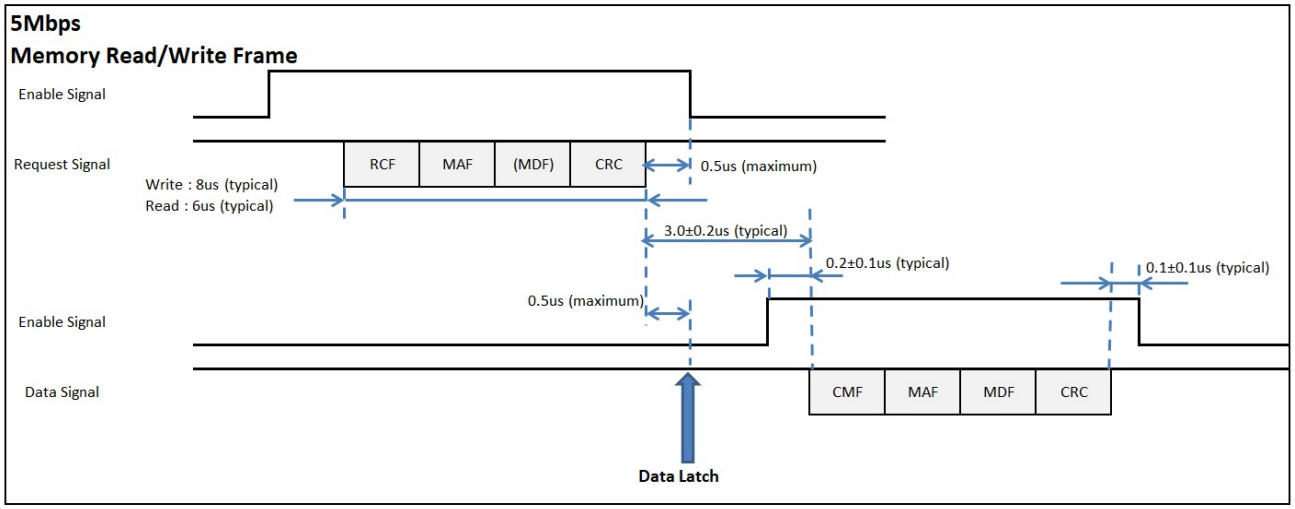
Encoder position calculation will be completed 3.5µs (typical) after the end bit of Host request CMF frame.

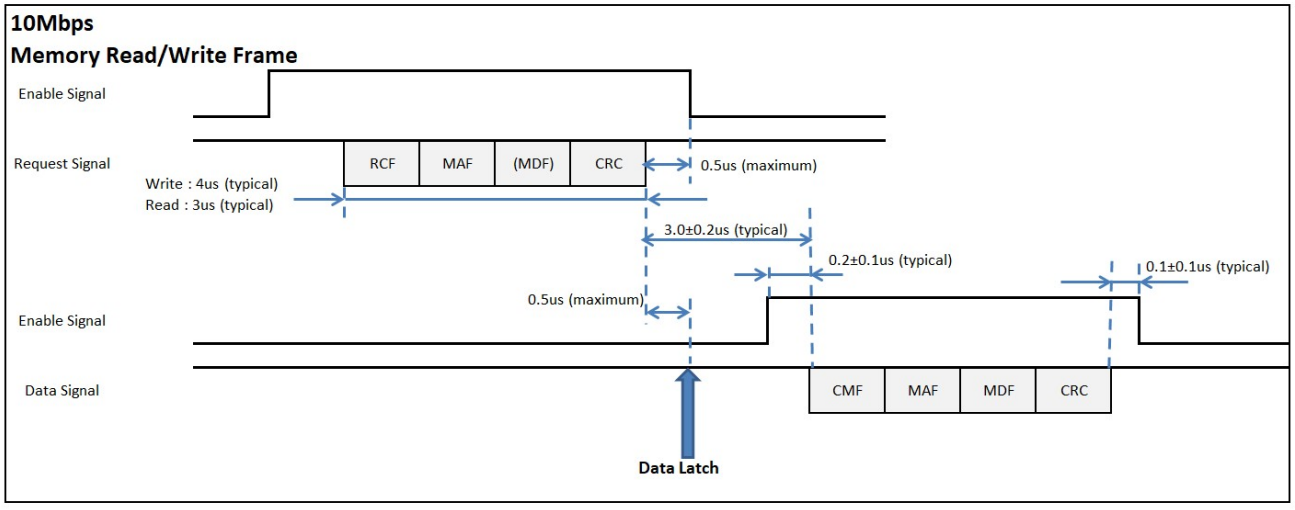
The encoder responded data frames set format are dependent on the requested operation by the Host, refer to Table 7.

EEPROM Data Read Out Frames Set

Figure 11 Encoder Memory Data Read and Write Frames Set







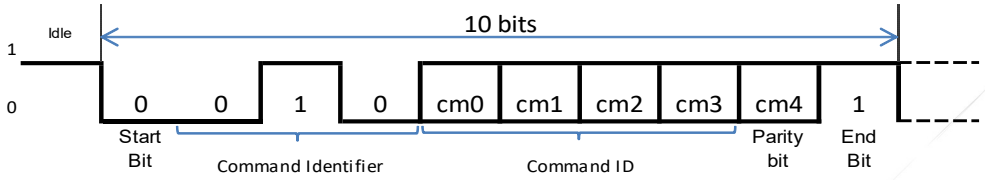
Upon the Host issuing a CMF request, after 3.0 µs (typical), the Client Encoder shall respond with Encoder Memory Data Frames set with the following contents:

- CMF: Command Frame (Same for both Host Command and Encoder Response)
- MAF: Memory Address Frame indicates the EEPROM memory location to Read/Write.
- CRC: Cyclic Redundancy Check (CRC) checking
- MDF: Memory Data Frame contains the data read from EEPROM.

Details Description of Data Frames

Command Frame (CMF)

Figure 12 Command Frame Format



Content of CMF frame:-

- Start Bit: Indicating the start of Frame, always “0”
- Command Identifier: Indicate a valid command frame has been issued, defined as “010”.
- Command ID: Combination of bits defining command instructions, refer to Table 6 and Table 7
- Parity Bit: Parity check bit for Command ID, refer to Table 6.
- End Bit: Indicating end of Frame, always “1”

Command ID and Encoder Operation Definition (ST 17/23/24 Bits Options)

Table 6 Definition of Encoder Operation Command Codes and Parity Bit (ST 17/23/24 bits options)

Encoder Operation	Command ID	Command ID Bits				Parity	ID
		cm0	cm1	cm2	cm3	cm4	Hex
Encoder Information Read Out	0	0	0	0	0	0	02
	1	1	0	0	0	1	8A
	2	0	1	0	0	1	92
	3	1	1	0	0	0	1A
EEPROM Write	6	0	1	1	0	0	32
EEPROM Read	D	1	0	1	1	1	EA
Clear All Errors	7	1	1	1	0	1	BA
Single-Turn Counter Reset	8	0	0	0	1	1	C2
Multi-Turn Counter Reset & Clear All Errors	C	0	0	1	1	0	62

Table 7 Description of Encoder Operation (ST 17/23 bits options)

Operation	Command ID	Description of Operation
Encoder Information Read Out	0, 1, 2, 3	Transmit Command ID code (Table 6) according to the List of Data Field to Encoder.
Single-Turn Counter Reset	8	Transmit request minimum 10 times consecutively at an interval of 40µs or more to the Encoder, where the motor shaft is in a stationary condition.
		Single turn Zero position can be reset to any desired position.
		Upon successful completion of Zero Reset, the Zero position will be retained regardless of the presence of Vcc or battery backup supply.
Multi-Turn Counter Reset & All Error Clear	C	Transmit request minimum 10 times consecutively at an interval of 40µs or more to the Encoder, where the motor shaft is in a stationary condition.
		Only Multi-turn counter will be reset (Single turn counter is not reset).
		All latched errors as described in Table 7 are reset at the same time.
Clear All Error	7	Transmit request minimum 10 times consecutively at interval of 40µs or more to the Encoder, where the motor shaft is in a stationary condition.
		All latched errors as described in Table 7 are reset at the same time.
EEPROM Read	D	8 bits of data to be read from designated EEPROM address of User accessible memory area.
EEPROM Write	6	8 bits of data to be written into designated EEPROM address of User accessible area.

Command ID and Encoder Operation Definition (ST 25 Bits Option)

Table 1 Definition of Encoder Operation Command Codes and Parity Bit (ST 25 Bits Option)

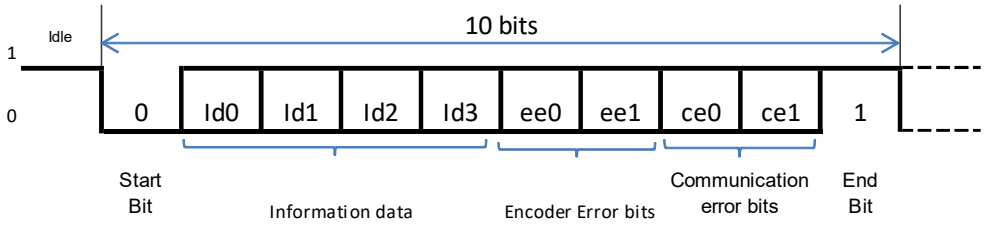
Encoder Operation	Command ID	Encoder Sync Code			Data ID Bits				Parity	ID
		BIT 0	BIT 1	BIT 2	CM0	CM1	CM2	CM3	CM4	HEX
Position Information	2	0	1	0	0	1	0	0	1	92
	3	0	1	0	1	1	0	0	0	1A
	4	0	1	0	0	0	1	0	1	A2
	5	0	1	0	1	0	1	0	0	2A
Memory Write	6	0	1	0	0	1	1	0	0	32
Memory Read	D	0	1	0	1	0	1	1	1	EA
Alarm Clear	7	0	1	0	1	1	1	0	1	BA
Single-Turn Position Zero Reset	8	0	1	0	0	0	0	1	1	C2
Multi-turn Counter Reset & Alarm Clear	C	0	1	0	0	0	1	1	0	62

Table 2 Description of Encoder Operation (ST 25 Bits Option)

Operation	Command ID	Description of Operation
Encoder Information Read Out	2, 3, 4, 5	Transmit Command ID code (Table 1) according to the List of Data Field to the Encoder.
Single-Turn Counter Reset	8	Transmit request minimum 10 times consecutively at an interval of 40µs or more to the Encoder, where the motor shaft is in a stationary condition.
		Single turn Zero position can be reset to any desired position.
		Upon successful completion of Zero Reset, the Zero position will be retained regardless of the presence of Vcc or battery backup supply.
Multi-Turn Counter Reset & All Error Clear	C	Transmit request minimum 10 times consecutively at an interval of 40µs or more to the Encoder, where the motor shaft is in a stationary condition. Note).
		Only Multi-turn counter will be reset (Single turn counter is not reset).
		All latched errors as described in **Table 7** are reset at the same time.
Clear All Error	7	Transmit request minimum 10 times consecutively at interval of 40µs or more to the Encoder, where the motor shaft is in a stationary condition.
		All latched errors as described in Table 7 are reset at the same time.
EEPROM Read	D	8 bits of data to be read from designated EEPROM address of User accessible memory area. Refer to Appendix A for recommended EERPOM read out process flow.
EEPROM Write	6	8 bits of data to be written into designated EEPROM address of User accessible area. Refer to Appendix B for recommended EERPOM writing process flow and Data content confirmation.

Status Response Frame (SRF)

Figure 13 SRF frame format



Content of SRF frame:

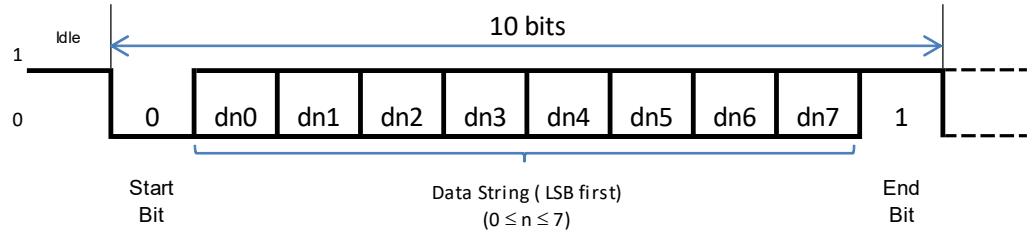
- Start Bit: Indicating the start of Frame, always “0”
- Information Data: Defined as “0000”
- Encoder Error Bits: Return with state “1” if encoder error is detected, referring to Table 3
- Communication Error Bits: Return with state “1” if communication error detected, referring to Table 3.
- End bit: Indicating the end of Frame, always “1”

Table 3 Encoder Error and Communication Error Descriptions

Logic When Error Detected	Error Flag	Error Description
Encoder Error Bits "1"	ee0	Encoder ST Counting Error
	ee1	Multi-turn Count Error OR Battery Supply Error OR Battery Supply Alarm detected
Communication Error Bits "1"	ce0	Parity Error detected in Host Request Frames set
	ce1	End Bit Error detected in Host Request Frames set.

Encoder Data Frame (DF_n)

Figure 14 DF_n frame format



Content of DF_n frame:

- Start Bit: Indicating the start of Frame, always “0”
- dn^0~dn^7: 8 bits data set with LSB first in sequence.
- End Bit: Indicating end of Frame, always “1”

Description of Data Frames with Respective Command ID

Table 4 Data Frames Content With Respective Command ID (17/23 Bits Single-turn Options)

Command ID	DF0	DF1	DF2	DF3	DF4	DF5	DF6	DF7
0	STC0	STC1	STC2					
1	MTC0	MTC1	MTC2					
2	ENID							
3	STC0	STC1	STC2	ENID	MTC0	MTC1	MTC2	ERRF
7	STC0	STC1	STC2					
8	STC0	STC1	STC2					
C	STC0	STC1	STC2					

STCn: Single Turn counts, LSB of the Single Turn counts is located in STC0 and MSB of the counts data is located in STC2. Combining STC0~STC2 will provide a total to 24 bits of Single Turn data.
For Single Turn 23 bits encoder option, the MSB of STC2 is fixed to “0”, hence giving a total of 23 bits Single Turn data.
For Single Turn 17 bits encoder option, the higher 7 bits of STC2 is fixed to “0”, hence giving a total of 17 bits Single Turn data.

MTCn: Multi Turn counts, LSB of the multi-turn counts is located in MTC0 and MSB of the counts data is located in MTC2. Combining MTC0~MTC2 will provide a total to 24 bits of multi-turn data. For 16 bits multi-turn counting, MTC2 are fixed to “00”, hence giving a total of 16 bits multi-turn data.

ENID: Encoder Single Turn bits identification
For Single Turn 23 bits encoder option, ENID is fixed as “17h”
For Single Turn 17 bits encoder option, ENID is fixed as “11h”
ERRF: Encoder Error Flags. Refer to Table 7.

Table 5 lient Responded Data Frames Content With Respective Command ID (25 Bits Single-turn Option)

ID	CMF	SRF/ MAF	DF0/ MDF	DF1	DF2	DF3	DF4	DF5	DF6	DF7	CRC	Frame Size
2	CMF	SRF	ENID								Include CRC	4
3	CMF	SRF	STC0	STC1	STC2	ENID	STC3	MTC0	MTC1	ERRF		11
4	CMF	SRF	STC0	STC1	STC2	STC3						7
5	CMF	SRF	STC0	STC1	STC2	STC3	MTC0	MTC1				9
6	CMF	MAF	MDF									4
7	CMF	SRF	STC0	STC1	STC2							6
8	CMF	SRF	STC0	STC1	STC2							6
C	CMF	SRF	STC0	STC1	STC2							6
D	CMF	MAF	MDF									4

NOTE

STCn: Single-turn counts, LSB of the single-turn counts is in STC0 and MSB of the counts data is in STC3. 7 bits LSB of STC0 are fixed to "0". Combining STC0~STC3 will provide a maximum total of 25 bits single-turn data.

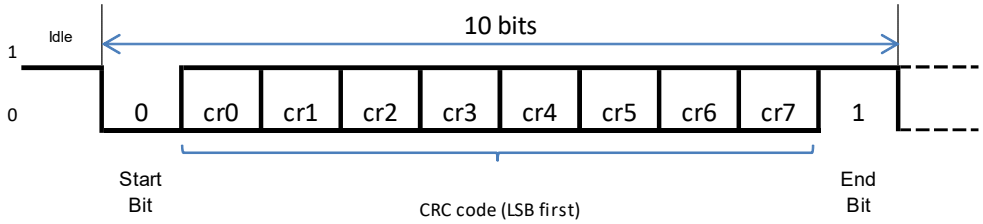
MTCn: Multi-turn counts, LSB of the multi-turn counts is in MTC0 and MSB of the counts data is in MTC1. Combining MTC0~MTC1 will provide a maximum total of 16 bits multi-turn data.

ENID: Encoder Single-turn bits identification in 8-bit format. For Single-turn 25-bit output is set to “19h”.

ERRF: Encoder Error Flags in 8-bit format. Refer to Table 7.

Cyclic Redundancy Check Frame (CRC)

Figure 15 CRC frame format



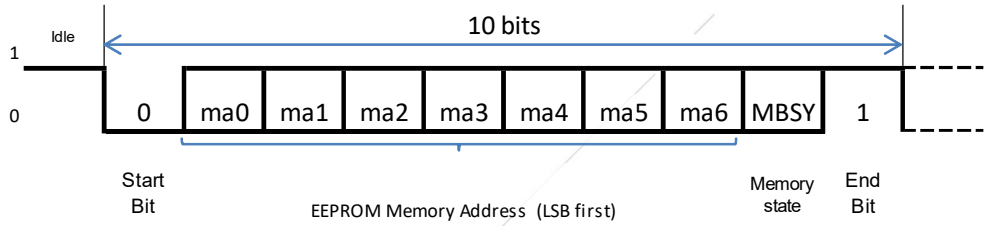
Content of CRC frame:

- Start Bit: Indicating the start of frame, always “0”
- cr^0~^{cr7}: 8 bits of CRC data set with LSB first in the sequence.
- End Bit: Indicating the end of frame, always “1”

NOTE The CRC code is generated per the equation of $G(X) = X^8 + 1$ (X = cr0 ~cr7)

Memory Address Frame (MAF)

Figure 16 MAF frame format

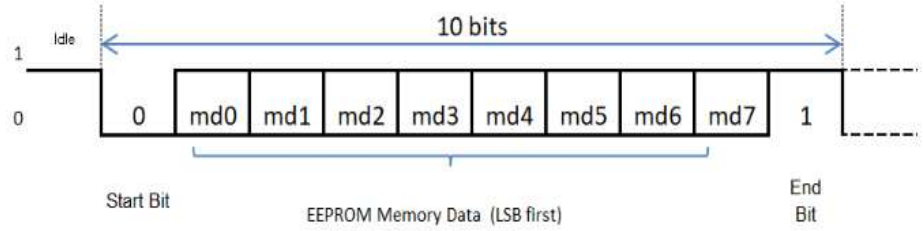


Content of MAF frame:

- Start Bit: Indicating the start of frame, always “0”
- ma^0~ma^6: 7 bits Memory Address data set with LSB first in the sequence.
- MBSY: Memory Access busy status Flag, refer to Table 6.
- End Bit: Indicating the end of frame, always “1”

Memory Data Frame (MDF)

Figure 17 MDF frame format



Content of MDF frame:

- Start Bit: Indicating the start of frame, always “0”
- md^0~md^7: 8 bits EEPROM Memory data set with LSB first in the sequence.
- End Bit: Indicating the end of frame, always “1”

Table 6 MBSY Status Definition

EEPROM Access Operation	Host Command	Encoder Response			Remarks
	MBUSY Value in MAF	MBUSY Value in MAF	Content of MAF	Content of MDF	
EEPROM Read	0	0	EEPROM Address to read	Correct Data read from EEPROM	EEPROM read completed
		1	EEPROM Address to read	"00"	EEPROM busy, accessing in progress, subsequent request will not be accepted
EEPROM Write	0	0	EEPROM Address to write	Data to write in to EEPROM	EEPROM not busy, Write request accepted.
		1	EEPROM Address to write	"00"	EEPROM is busy, accessing in progress, subsequent request will not be accepted

Alarm Description

Table 7 Error Flag Bits Definition

Bit Value	ERRF Bits							
	DF7-0	DF7-1	DF7-2	DF7-3	DF7-4	DF7-5	DF7-6	DF7-7
0	No Error	N/A	No Error	N/A	No Error	No Error	No Error	No Error
1	Memory Err		ST Error		LED Error | Incremental Error	MT Error	MT Sync Error	MT Counter Error
Encoder Error Status	N/A		EA0		N/A	EA1	EA1	EA1

Table 8 Error Flag Descriptions

Error Flags	Description
Single-turn Counting Error	To check integrity of single-turn position data calculation. 1: Error detected in single-turn position counting. 0: No Error detected.
MT Error	MT Error for RS485 Protocols To detect error on reading MT Hardware counter value or there is a communication error.
MT Counter Error	MT Counter Error To detect Error bit received from the EHMT Counter Error register 1 : Any of the EHMT Counter Err[9:1] bit triggers 0 : No EHMT Counter Error

EEPROM User Accessible Memory Area

Table 9 User Accessible Memory Area

Page	Address (Hexadecimal)	Remarks
0 to 4	0x00~0x7E	User Area (Nonvolatile Memory)
Page Selection	0x7F	
5 to 10	0x00~0x7E	System Area
Page Selection	0x7F	
11 to 13	0x00~0x7E	User Area (Nonvolatile Memory)
Page Selection	0x7F	

NOTE

1. A total of 8 pages with 127 addresses each are allocated for User access, as highlighted in green.
2. All User accessible addresses are pre-programed to “00” prior to shipment.
3. The active page number is specified in address 0x7F, page change is done by writing to address 0x7F.
4. Once the page value is changed, allow a time delay of 18 ms.
5. Typical EEPROM Read time is 200μs minimum.
6. Typical EEPROM Write time is 6ms minimum.
7. Permissible EEPROM writing cycle is 1,000,000 times.
8. Page 9 and 10 are volatile memory addresses reserved for encoder system use.

Connector Information

Figure 18 Horizontal and Vertical Connector Information

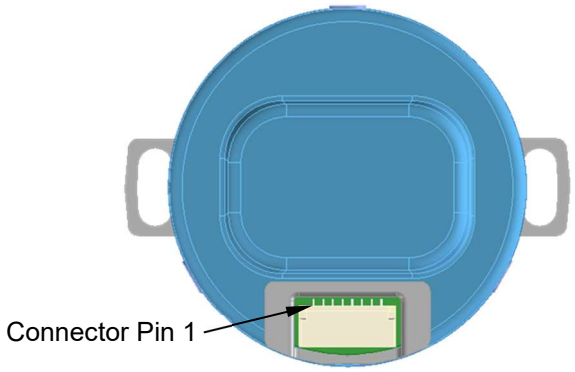


Table 10 Recommended Connector Information

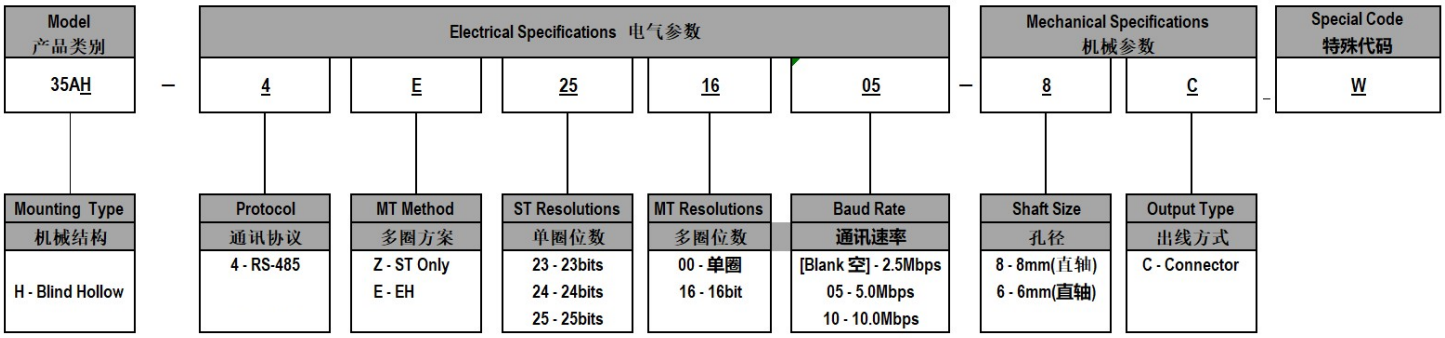
Part	Location	Manufacturer	Part Number	Description
Header	On PCB	JST	SM08B-SRSS-TB	Horizontal/Radial connector
Wire Plug	Mating plug for wires	JST	SHR-08V-S	
Crimp Pins	Crimp pins for wires	JST	SSH-003T-P0.2-H	Terminal Pin for Wire 32~28AWG

Table 11 Electrical Pinout Connection

Pin Number (Encoder End)	Wire Color (Cable Assembly)	Description
1	Red	VCC, Encoder Supply
2	Black	GND, Ground
3	NC	No connection
4	NC	No connection
5	Brown	Data +
6	Brown/Black	Data -
7	NC	No connection
8	Gray	Encoder Chassis, Connect to Motor Chassis
-	Cable Shield Strand	Cable Shield, Connect to Motor Chassis

Encoder Ordering Information

Table 12 Encoder Ordering Information



型号示例：35AH-4E2316-8C-W

注意：

1. 韦根多圈方案配备“H”盲孔直轴, 标准孔径为8mm。

2. 本编码器产品配送安装板弹簧，有 PCD40, PCD55（M3 或 M4）, PCD67 以及 PCD72 五种规格可选，请一并确认板弹簧规格。