Dynamic Motor Motion
Technology Corporation

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ABS-16-MB1 MULTI-TURN ABSOLUTE ENCODER

Features

- Non-Contact Shaft-Sensor Coupling - Magnetic Sensor
- 16-bits Single-Turn, 16-bits Multi-Turn Resolution
- Internal Supply Voltage Filter
- Active Sensor Optimization - Ultra High Reliability
- 4-Wire RS485 Interface (6-wire with Battery)
- 32-Byte EEPROM memory
- With Battery or Battery-Less Multi-Turn option

Main Application

- Servo Motor Control
- Robotics
- Machine Tool
- AGV
- Simulator
- Medical / Healthcare

ABS-16-MB1C5-00

Model Number

ABS - 16 - ST1 C5 - 00

DMM Absolute Magnetic Encoder

Single-Turn Resolution	
16	16-bit Absolute

Type	
ST1	Single-Turn
MB1	Multi-Turn with Battery
ML1	Multi-Turn Battery-Less

Size and Mounting	
00	50mm Diameter - Standard Mounting
01	33mm Diameter - Standard Mounting
LP1	50mm diameter - Low Profile

Region Specific Part Number	
C5	Standard

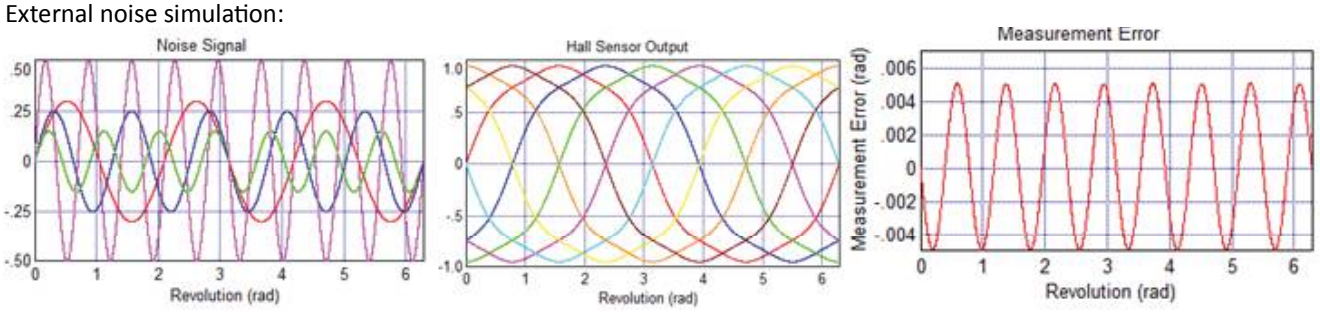
Specification

Encoder Type	Absolute	Protection	IP00
Single-Turn Resolution	16-bits (65,536) count	Battery Voltage	3.6V
Multi-Turn Resolution	16-bits (65,536) turns	Main Power Supply Voltage	+5 VDC ± 10 %
Total Resolution	32-bits	Main Supply Current Draw	150 mA Max.
Accuracy	12-bits Max.	Low Power Current Draw	<1mA
Positive Direction	CW (from motor shaft)	Insulation Voltage	800V
Rotor Inertia	0.01 kg·cm^2	Sensor Type	Magnetic - InAs Hall
Operating Temperature	-30 °C ~ +100 °C	Actuator Source	Neodynium Magnet
Storage Temperature	-40 °C ~ +100 °C	Interface Circuit	RS485 Differential
Max Rotation Speed	10,000rpm	Protocol	DMM Proprietary
Mount Tolerance	0.1mm (Radial + Axial)	RS485 Pulse Rise/Fall Time	50 ns MAX.
Weight	0.2 kg	Data Packet	4 bytes per packet

Single Turn Accuracy

12-bit (4,096) single turn accuracy is obtained from proprietary calibration and sensor calculation. Accuracy can still be reliable even under typically high external electromagnetic noise environment. Encoder calculation can still maintain stable accuracy even under non-linear sensor response.

External noise simulation:

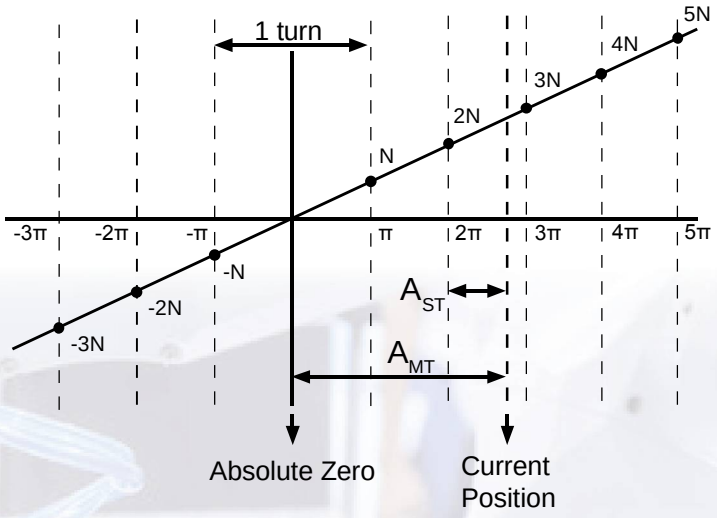


12-bit overall single turn accuracy is combined possible accumulative error from sensor non-linearity, sensor mounting and encoder mounting tolerances.

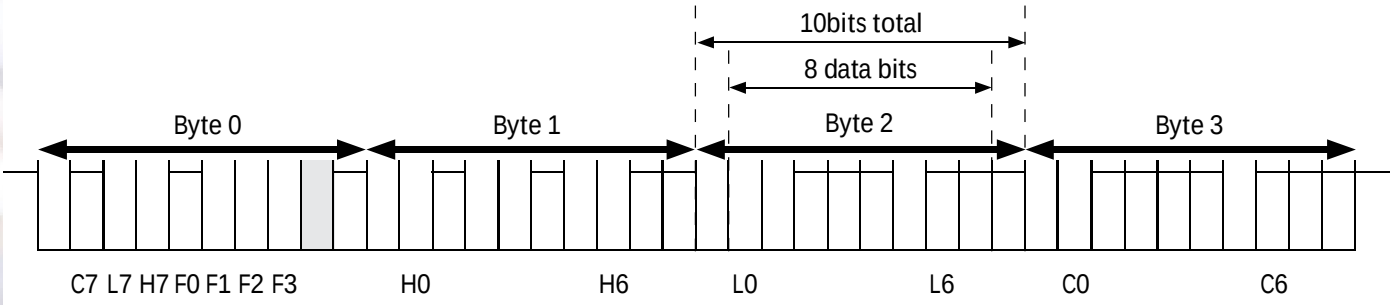
Multi-Turn Counting

Starting from absolute zero position, Single-Turn absolute position A_{ST} counts from -2^{15}~2^{15}-1. Multi-Turn absolute position A_{MT} counts from -2^{31}~2^{31}-1.

Absolute zero position can be set by external controller such as servo drive.



Protocol Reference



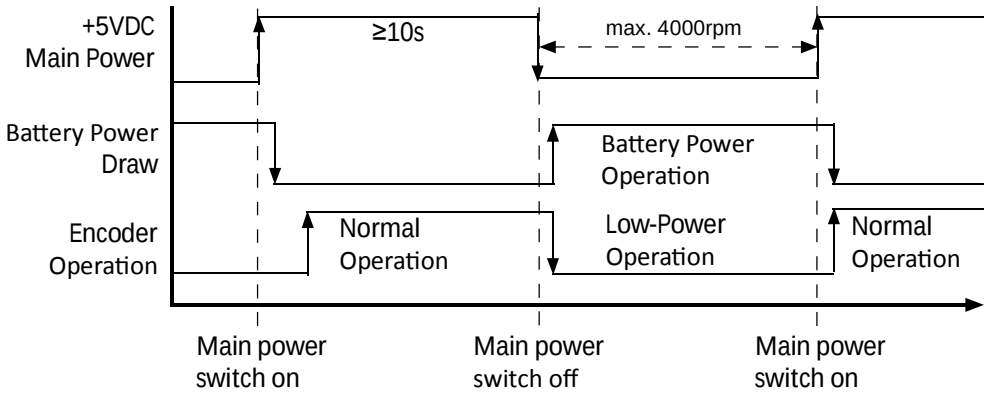
C0~C7 = 8 bits CRC
F0~F3 = 4 bits function code
L0~L7 = 16-bits position low byte
H0~H7 = 16-bits position high byte

Function Code:
- Single or Multi-Turn 16-bits Data
- Read/Write to EEPROM
- Encoder Alarms/Status

Operation Principle

Multi-Turn with Battery (MB1 Type)

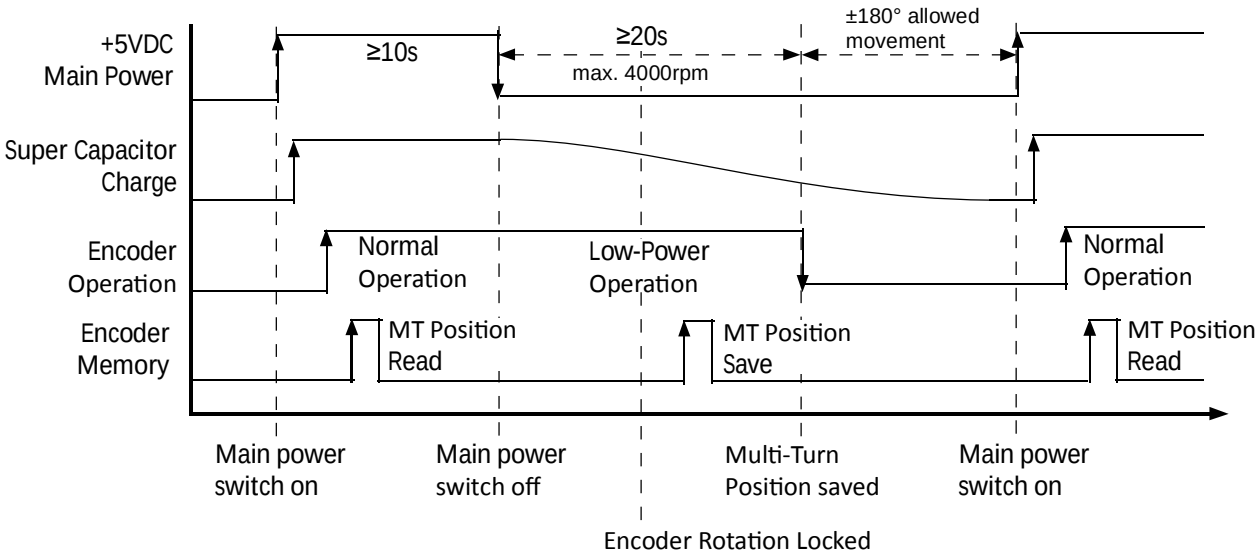
- Uses external 3.6V battery to maintain power to encoder when main +5VDC power is off
- Typical 2000mAh non-rechargable battery can maintain battery power for 3 months continuously
- Battery power not consumed when main +5VDC power is active
- Encoder outputs alarm when battery voltage drops below operational level



Multi-Turn Battery-Less (ML1 Type)

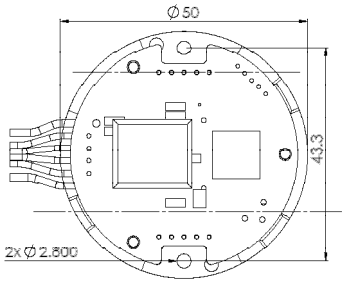
(October 2018) Battery-Less multi-turn ecoder patent pending.

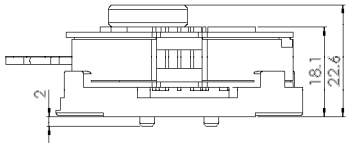
- Has built-in super capacitor circuit to delay encoder shut off
- When +5VDC main power switched off, encoder powered by super capacitor power
- During super capacitor powered state, encoder stores and saves multi-turn position in memory
- External device (such as electromagnetic brake) stops encoder movement during power off state
- Can maintain mlti-turn position indefinitely without use of battery
- All timing and internal functionality controlled by encoder, easy to use



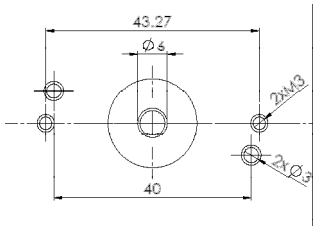
Dimensions

ABS-16-□□□C5-00
50mm Diameter

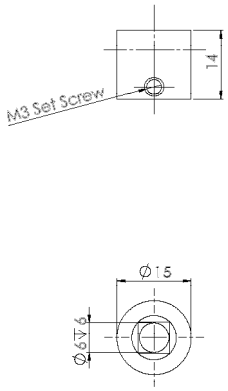




MB1 Height = 18.1mm
ML1 Height = 22.6mm

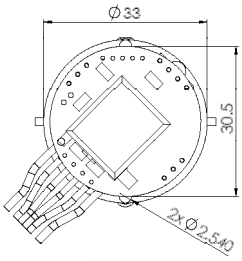


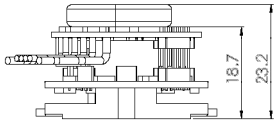
Mounting



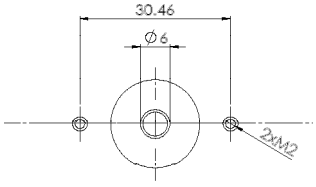
Magnet Actuator

ABS-16-□□□C5-01
33mm Diameter

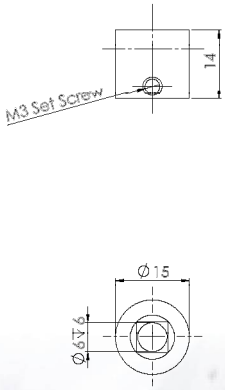




MB1 Height = 18.7mm
ML1 Height = 23.2mm



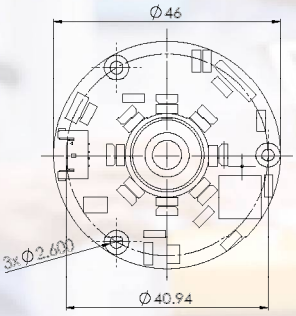
Mounting



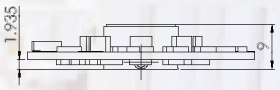
Magnet Actuator

ABS-16-MB1C5-LP1
Low Profile, with Battery

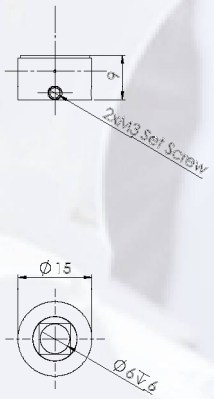
*LP1 encoder not available with ML1 Battery-Less option



Connector: Molex 5040500691
Plug: Molex 5040510601



* Please contact DMM for LP1 model mounting dimensions



Magnet Actuator

Interface Cable

- Shielded, Twisted Pair Lead Wire
- Heat-resistant pvc sheath 105 °C 30V
- AWG28 copper conductor
- Lenth ≥200mm
- Connector: J.S.T. HILP-04V-1-S (Battery-Less)
  J.S.T. HILP-06V-1-S (with Battery)
- Pin: SHIF-01T-P0.5 (JST)

Twisted Pair	Color	Data
1	Red	+5 VDC
	Black	GND
2	Green	S +
	Blue	S -
3	--	BAT+
	--	BAT-

Electrical Interface