14bits, single turn, absolute position sensor

Sept 04/ 2007, www.dmm-tech.com

Interface for D-Sub 9 pin, Female

1: Serial data in for both UART and SPI, input-
2: Serial data in for both UART and SPI, input+
3: Clock signal for SPI input-
4: Clock signal for SPI input+
5: +5Vdc
6: NC
7: Serial data out for both UART and SPI, output-
8: Serial data out for both UART and SPI, output+
9: Gnd

Note: Interface IC for the sensor is SN65C1168

Communication modes

UART universal asynchronous receive/transmit
SPI Synchronous peripheral interface

Default Communication mode after Power On Reset(POR)

The default communication mode is UART mode, and default baudrate is 38400 after Power On Reset(POR) every time.

Power supply

Absolute maximum applied voltage: 6.0(V)
operating supply voltage: 5Vdc +/- 5%, current:60(mA)

Sensor Ready Time

At least 30(ms) is necessary for the sensor to output information after +5V is applied.

Resolution: 16384(14bits) counts for one turn,360(deg) range.

Accuracy: 4096(12bits) counts for one turn, 360(deg) range.

Allowable axial move: +/- 0.25(mm)

Allowable shaft run out: 0.10(mm)

Maximum speed: 6000 (rpm)

Sensor data update rate: every 100(us)

Allowable field magnetic strength: < 10G

Operating temperature: -25˚C ~ 65˚C

Storage temperature: -45˚C ~ 85˚C

Humidity without condensing: < 90%

Weight: 45(g)

Evaluating and saving absolute position (Pos1~Pos7) by using the compass - DmmDrv.exe

By using the RS232 buffer cable and the Sensor intermediate card, the absolute position sensor can be connected to the PC through RS232 port.

Then by using the dialogue box compass of DmmDrv.exe, the real time sensor position will be displayed by the point of compass in the range of 0 to 360(deg), also several saved position can be read also be saved again by setting the valid range value from 0 to 16383(0x0000~0x3fff).

The information bank of sensor

Address	Information Bank (High Byte, Low Byte)
0	Absolute Position of Sensor, 16bits
1	For saving customer position, 16bits
2	For saving customer position, 16bits
3	For saving customer position, 16bits
4	For saving customer position, 16bits
5	For saving customer position, 16bits
6	For saving customer position, 16bits
7	For saving customer position, 16bits
8	For saving customer position, 16bits, Reserved
9	High Byte reserved, Low Byte = Communication mode,0xff for UART, 0x00 for SPI
10~15	Reserved

Note: Even 16bits for storing absolute position, only lower 14bits are effective.

The 8bits function Code

The function code must be sent to sensor first, no matter you are trying to read current absolute position or save current absolute position into a particular location.

The function code is performed by a Byte, the high nibble is the function code described below, and the low nibble is the address of information bank.

So the function code = (H , L), L is the address of information bank, H is 4bits, and L is 4bits too, the function code is a 8bits(one byte).

H	**Function**
0	Read information bank located by L(=0~15)
b	Save current absolute position into the sensor bank address of L(=1~7)
2	Switch from UART to SPI, no matter the value of L
3	Shift to instructed baud rate by L for UART mode only L = 0 : 38400 L = 1 : 19200

L = 2 : 9600
L = 3 : 4800

5	L = 5, for continuing one packet for SPI mode only
Others	Reserved

For example, (H,L) = (0,0) = 0x00, means reading current absolute position.

UART Mode

The default communication mode is UART mode, and default baudrate is 38400 after Power On Reset(POR).

Frame structure as: One start bit, 8 data bits, One stop bit. Frame length is 10bits.

For reading absolute position Packet

	Byte1	Byte2	Byte3
Sent Bytes :	00h		
Received Bytes :		high byte of Pos	Low Byte of Pos

For this read packet in UART mode, only send one byte then receive two absolute position bytes.

For saving current absolute position into indicated by L (=4) address Packet

	Byte1	Byte2	Byte3
Sent Bytes :	b4h	b4h	b4h

After three consecutive save command be received, the current position will be saved to the indicated memory, takes about 15ms.

The packet have to be issued one after another, there would be chaos if a new Packet is issued but previous one have not been finished.

SPI Mode

The suggested communication baud rate 100kbps ~ 350kbps, or the clock from 100kHz ~ 350kHz, clock is provided to the sensor.

Example :

For start SPI communication Packet1

	Byte1	Byte2
Sent Bytes :	20h	20h
Received Bytes :	XXh	XXh

X means do not care.

Note: Time interval between Byte1 and Byte2 at least be 200(us),also After Power On, sensor is in UART mode, must use Packet1 to switch mode into SPI mode.

For reading absolute position Packet2

	Byte1	Byte2	Byte3
Sent Bytes :	00h	55h	55h
Received Bytes :	XXh	high byte of Pos	Low Byte of Pos

Note:Time interval between Byte1 and Byte2 or Byte2 and Byte3 at least be 10(us)

For consecutive read by repeating packet2, suggested interval time Between two reading packet be N x 100(us), N = 1,2,3,.. such as 100, 200,300,400,..(us)

For asking the communication status Packet3

	Byte1	Byte2	Byte3
Send Bytes :	09h	55h	55h
Received Bytes :	XXh	XXh	Status

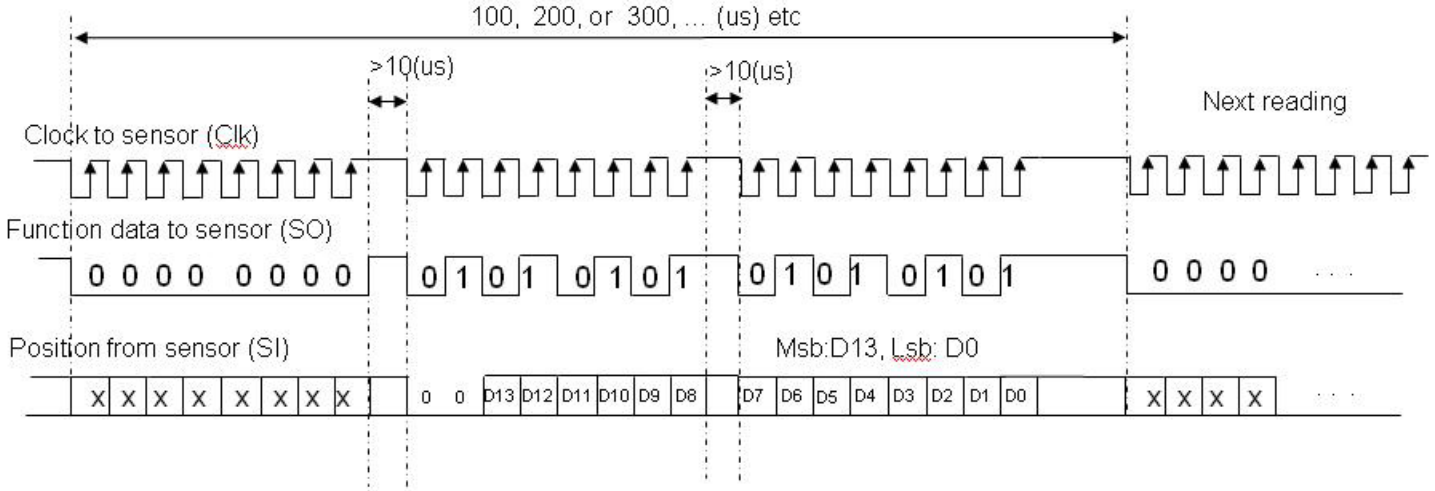
Note:Time interval between Byte1 and Byte2 or Byte2 and Byte3 at least be 10(us)

For saving current absolute position into indicated by L (=4) address Packet4

	Byte1	Byte2	Byte3
Send Bytes :	b4h	55h	55h
Received Bytes :	XXh	XXh	XXh

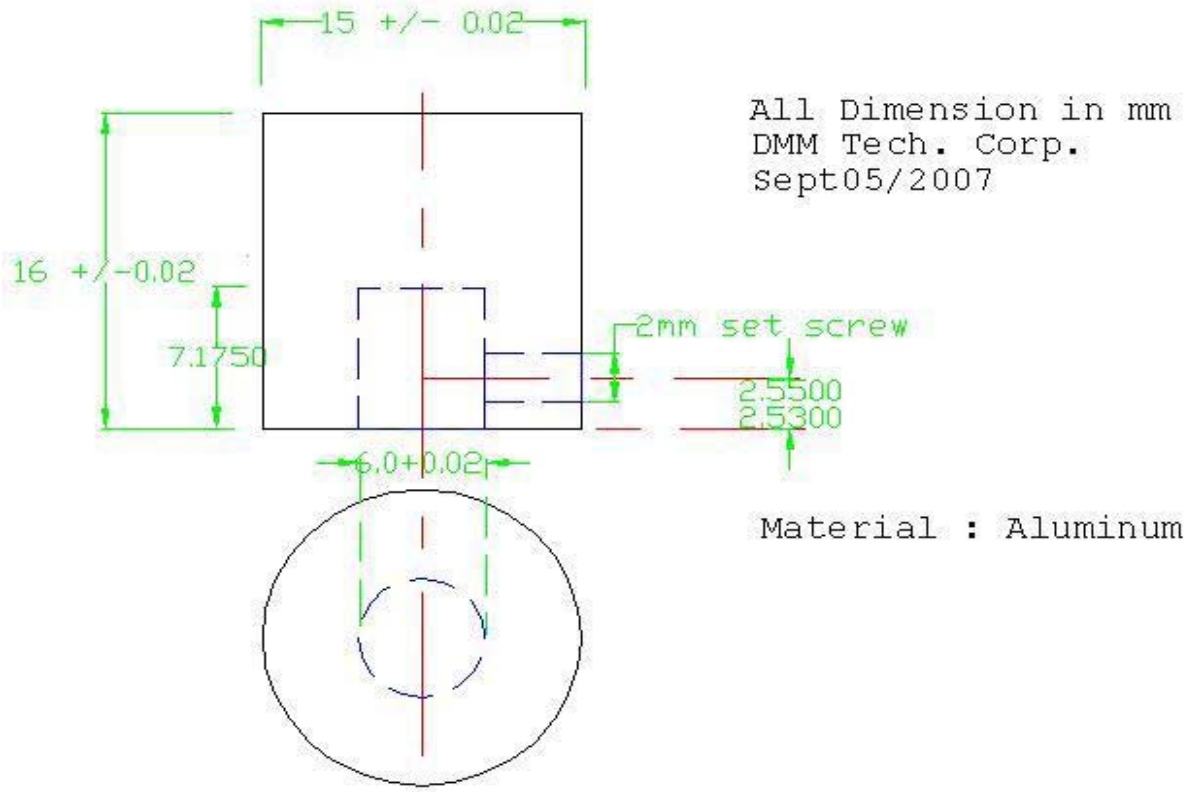
Note:time interval between any two packet at least be 20(us)

time interval between Packet4 and Packet1 or any other packet at least be 15(ms) for writing EEPROM.

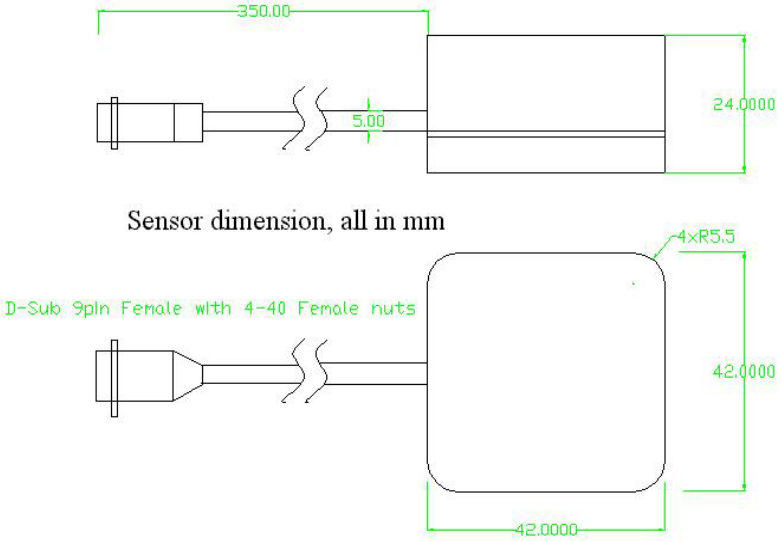


For reading current absolute position(Packet2)

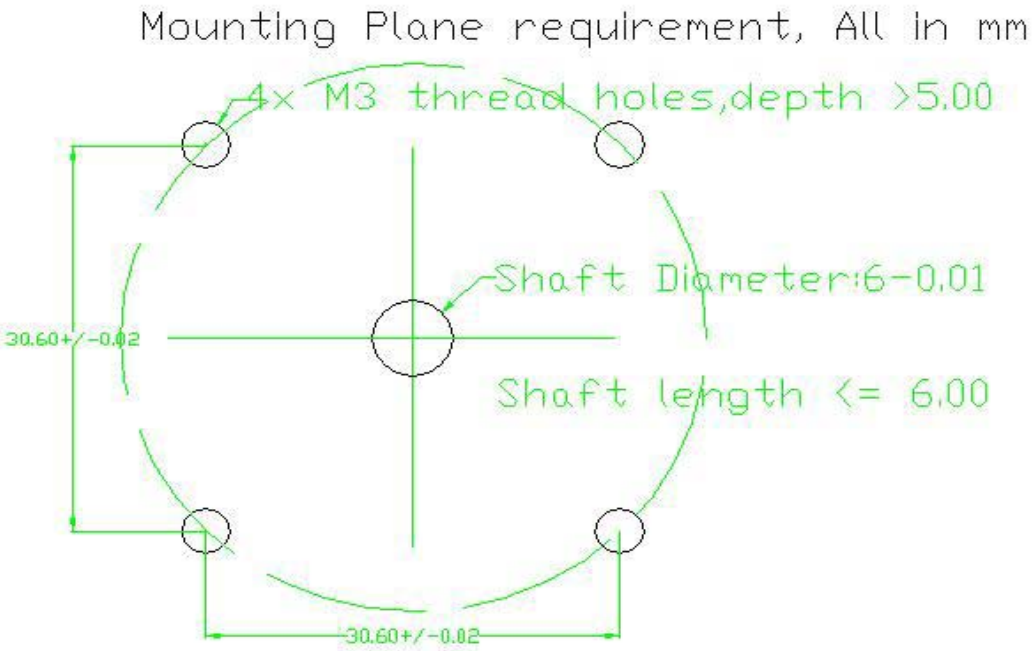
Magnet hub


15 +/- 0.02
16 +/-0.02
7.1750
2mm set screw
2.5500
2.5300
6.0+0.02
All Dimension in mm
DMM Tech. Corp.
Sept05/2007
Material : Aluminum

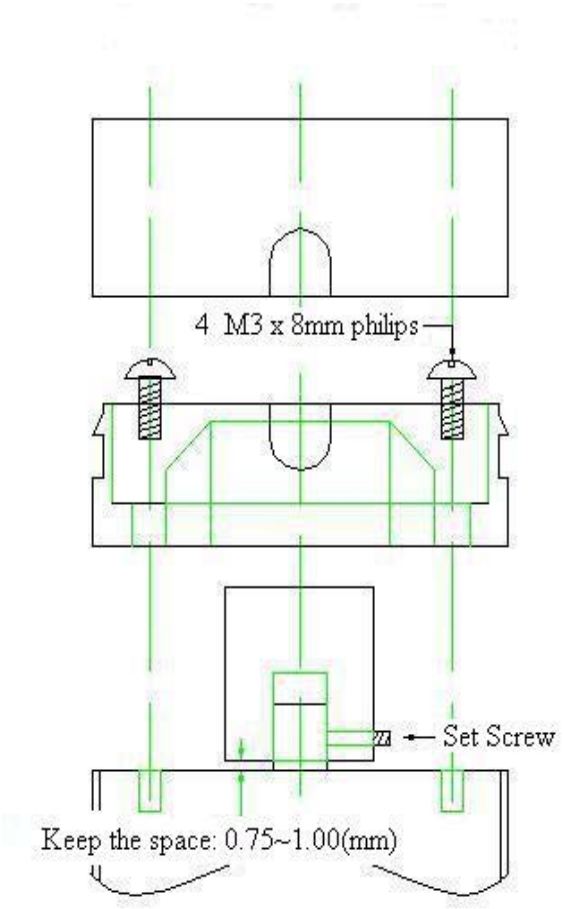
Sensor dimension



Mounting plane requirement



Sensor mounting steps



Step 3:
Mount the sensor cover

Step 2:
Mount the sensor base by use four M3 philips bolts, make sure center hole is concentric with magnet hub.

Step 1:
Mount magnet hub,use set screw to fix it, be careful for the space.

Order form: