DONG DO EI

Resolution : 0.01° ~ 0.001°
Accuracy : ±0.05°~ 0.015°

Color Display & Touch pad

High Precision 2-Axis Digital Electronic Inclinometer

IM-2DT(P)

User's Guide

The contents of this manual could be different according to the software version and it can be changed without notice.
Please use this good after reading the manual thoroughly.

Table of Contents

Introduction

Thanks for buying our product.
IM-2DT is a high precision dual axis inclinometer with a color TFT and touch panel. It is possible to do high speed horizontal plane setting for high precision machines or home appliance as like laundry machine.
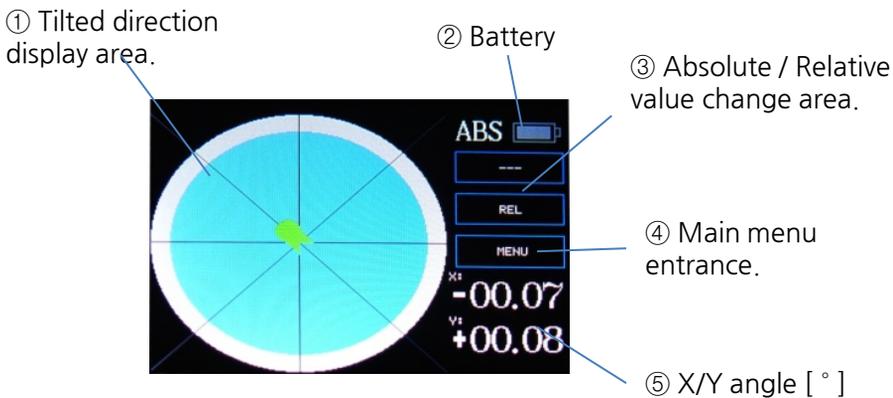
Specialty of IM-2DT
1. Easy to set the level of the space with 2 axis angles display at once.
2. Level up the visual-effects by the color LCD!
3. Small & light so that possible to use to a sensor unit.
4. Possible to insert to high precision systems.
5. Included the RS232C output.
6. Built-in Li-ion rechargeable battery. (Rechargeable to USB port on PC)

Product features & composition

Touch Pad

Master button

IM-2DT
Color Display

+Y

0 → +X

REL

ABS

MENU

X AXIS [°]
+00.00
Y AXIS [°]
-00.01

2 Axis Digital Electronic Inclinometer   Made in Korea

⟨IM-2DT⟩   Color TFT LCD

⟨Cable for charging⟩

① Tilted direction display area.

② Battery

③ Absolute / Relative value change area.

ABS

REL

MENU

④ Main menu entrance.

X:
-00.07
Y:
+00.08

⑤ X/Y angle [°]

Charge & RS232C port

• Master button
- Master button has 4 functions below,
1. Power On : Pushing the key once if power is off then the power is on with a sound.
2. Power Off : Pushing the key for around 2 sec when the power is on. Then the power is off.
3. Touch pad Calibration : Pushing the key for over 5 sec. Then it is in the calibration mode of touch pad.
    - This function is used when the touch pad doesn't work well.
   - The power should be on to enter this calibration mode.

• Touch Pad
- There're 3 sections on the touch pad that have their own function. The below functions are exceeded if each sections are touched.
1. Main menu entrance: To enter the main menu, touch the 'MENU' area.
2. Absolute / Relative value change area : To change the X / Y to absolute or relative value. (ABS ↔ REL)
    - Absolute value : The displayed values of X / Y are from the absolute coordinate system.
      The absolute coordinate system is set from the factory or user's updating at the calibration menu.
    - Relative value : To make current X / Y values to zero.
3. Tilt direction display area : To change the tilted direction display method. (Line ↔ bubble)

• Main Menu
-The main menu is composed as like the picture 1.
-Each functions can be chosen by touching the letters.
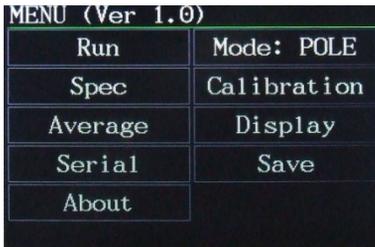

Picture 1 - main menu

1. Run : To exit the main menu and display the measuring screen.
2. Mode : To change the mode of display.
3. Spec : To setup the specifications for the FLAT mode.
4. Calibration : To calibrate the absolute zero.
5. Average : To change the number of inputting row data to average them.
6. Display : To change display options as like brightness, power on time, etc.
7. Serial : To change the RS232C serial output method.
8. **Save : To save whatever user has changed, it should be done.**
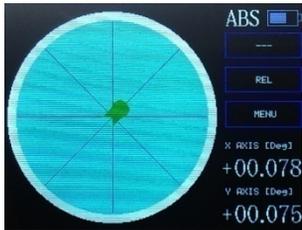9. About : To see the information of the manufacturer.

1. Run
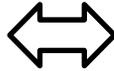- To exit the main menu and display the measuring screen.
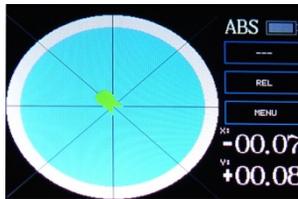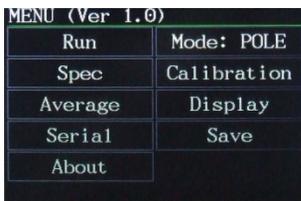
2. Mode
- To change the mode of display.

〈 Pole mode 〉　　　　〈 Pole2 mode 〉　　　　〈 Flat mode 〉

* The composition of the screen for Flat mode (to adjusting 4 legs machines)

Absolute value /
Relative value
To change ABS & REL, touch this area.

Battery remains

The height to adjust

The amount to turn
the adjusting screw legs

X/Y angle [°] /
To enter the main menu, touch this area.

The adjusting points display area.
-The heights of the each points are already calculated
 depends on the tilted angles. So users can adjust
 the horizontal plane faster and easier.

The direction of tilted space

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3. Spec
- To setup the spec. for the FLAT mode.

Spec	
Return	Tolerance
Model:0	X:1000mm
Pit:10.00mm	Y:1000mm
Angle:360	R-Zero

1. Go Back : To exit the 'Spec' menu.
2. Tolerance : To setup the tolerance of the tilted direction display line.
3. Model : 10 memory spaces are given to save the users' specification setting. And user could recall them later.
4. X : The width of the setting points.
5. Y : The length of the setting points.
6. Pitch : The pitch of the screwed legs at the home appliances or other machines.
7. Angle : It is set by 360 deg. normally.
8. R-Zero: Relative zero setting
   -Tolerance / Zero Time : IM-2DT is set a relative zero if the value is stable in this tolerance during the Zero Time.

4. Calibration
- To calibrate the absolute zero. Please follow the steps carefully. If not, it can not be guaranteed the angle data.

Step 1 [XY Calibration]

Put the inclinometer on the surface as like Fig.1 and choose the 'XY 1st'. Then you might see 'XY 1st Please Touch Screen'. If the inclinometer is settled well on the surface, touch the screen and wait until the inclinometer gathers the data and averages them.

Put the inclinometer as like Fig.2 and choose the 'XY Rev'. And touch the screen if the inclinometer is settled.
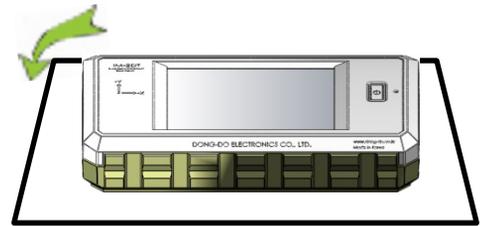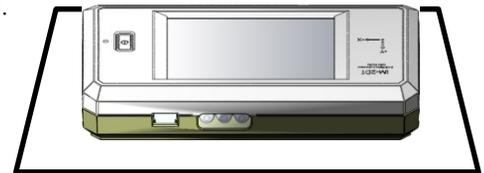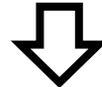
Fig.1

Fig.2

Step 2 [X Calibration]

Put the inclinometer on the surface as like Fig.3 and choose the 'X 1st'. Then you might see 'X 1st Please Touch Screen'. If the inclinometer is settled well on the surface, touch the screen.

Put the inclinometer as like Fig.4 and choose the 'X Rev'. And touch the screen if the inclinometer is settled.
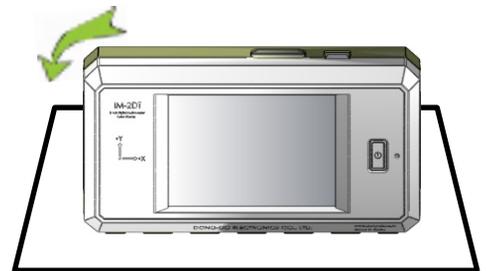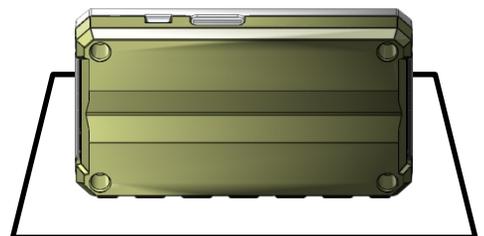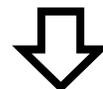
* [Y Calibration]

User doesn't have to do the Y calibration because the Y calibration is done automatically if the X calibration is done.

Fig.3

* [Default]

If the calibration is not done well, user can choose the 'default'. Then IM-2DT will recall the zero setting values at the factory.

Fig.4

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5. Average
- To change the number of inputting row data to average them. It can be set from 1 to 100.

6. Display
- To change display options as like brightness, display off time, etc.

Display	
Return	Touch Calib.
Display Off	Brightness
Power Off	Line Width
Unit	Digit

1. Go back : To exit the 'Display' menu.
2. Touch Calib. : To calibrate the touch pad.
   It is the same with pushing the master button for over 5 sec when power is on.
3. Brightness : To change the brightness of the screen.
4. Display Off : To change the display on time. The screen will be off after this time.
5. Power Off : To change the power on time. The power will be off after this time.
6. Line width: To change the width of the tiled direction indicating line
   at the POLE mode
7. Unit: °(degree) ←→ mm/m unit change
8. Digit: To change the digit number of the data.

[Touch pad calibration method]
- Just touch the blue crosses at the five points in order.

7. Serial
- To change the RS232C serial output method.

1. Send mode : There're 4 RS232C output method as like below.
   - Command : X / Y data is outputted once whenever it gets 'CALL+ID' command.
     (Default ID is 00 so that the command should be 'CALL00')
   - Polling : X / Y data is outputted continuously.
   - Polling 1 sec. : X / Y data is outputted every 1 sec.
   - Polling 10 sec. : X / Y data is outputted every 10 sec.
2. ID : IM-2DT can have the id from 0 to 99
   so that user can get the tilted data from the various IM-2DTs.
3. USBPWR : Set 'On' to use ISC-TP(RS232C communication cable with recharging, please check page 8.)
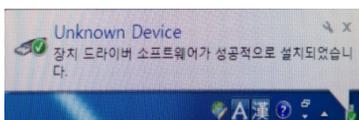
'USBPWR = OFF'
Not to see under 'Unknown Device' message from windows when the mini-usb cable is Used for only recharging,

'USBPWR = ON'
To use ISC-TP cable to connect RS232C with recharging. If it is set 'OFF', the RS232C doesn't work when usb power is connected.

'USBPWR = ON & OFF'
Both setting is fine to use ISC-T cable for RS232C connection.

Functions

8. Save**

- **To save whatever user has changed, it should be done. If user doesn't want to save the current changes, just turn off the power by pushing the master button for around 2 sec.**

9. About

- To see the information of the manufacturer.

How to use the FLAT mode

FLAT mode is used to adjust the 4 legs machines, as like laundry machine, etc., very easily.
There are shown the 3 points, that makes a plane, with the heights to raise up.

ABS
64%
X:+01.10
Y:−10.05

P1	P2
19.20	0.00
1.9t	0.0t

P3	
196.42	
19.6t	

P1 :
It should be up 19.2mm
(1.9 turns up if there's
a screwed leg)

P2 :
The highest point.
So, it doesn't have to be
raise up anymore.

P3 :
should be up 196.42mm
(19.6 turns up)

P4 :
Floated point
**(It should be chosen
by user.)**

* The floated point should be taught by user. It could be P1, P2, P3, or P4 depend on situation.
If user touches the area of the floated point on the screen, IM-2DT calculates and displays the heights of the other 3 points. The floated point should be filled up at the last after user finishes to adjust the 3 points level.

** Before measuring!
To use this flat mode, user also has to set the below parameters.

Spec

Go Back	Tolerance
Model: 0	X: 1000 mm
Y: 1000 mm	Pitch: 10 mm
Angle: 360	
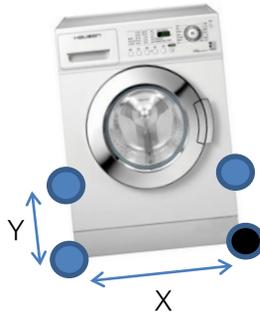
1. Model : 10 memory spaces are given to save the users' specification setting. And user could recall them later.
2. X : The width of the setting points.
3. Y : The length of the setting points.
4. Pitch : The pitch of the screwed legs at the home appliances or other machines.
5. Angle : It is set by 360 deg. normally.

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* **ISC-T :**
It is necessary to do RS232C serial communication with
IM-2DW / IM-2DT.

•**ISC-TP :**
RS232C serial cable with USB recharging.

Communication protocol(ASCII)

Baud Rate	9600bps
Parity	None
Data bit	8
Stop bit	1

Output Data :

1	1	6					1	1	1	6						1	1
x	=		+	3	.	0	2	,	y	=	−	1	7	.	4	5	CR	LF

When calling in master :

	4			2	
C	A	L	L	0	0

ID number

EX)

POLLING MODE

COM7:9600baud - Tera Term VT

File   Edit   Setup   Control   Window   Help

X= +0.36,Y= +0.21
X= +0.36,Y= +0.21
X= +0.37,Y= +0.20
X= +0.39,Y= +0.20
X= +0.39,Y= +0.20
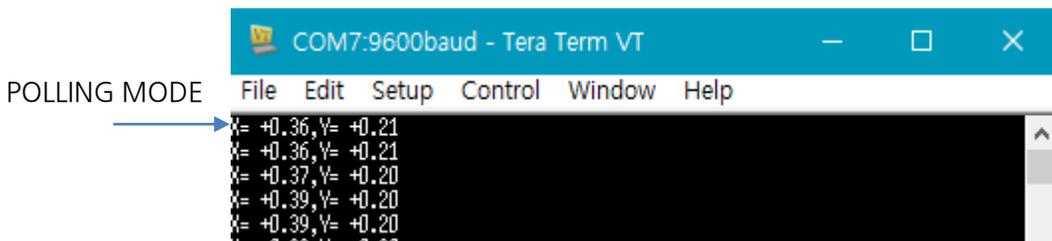
Specifications

System

Model	IM-2DT	IM-2DT-P
Measuring range	± 30°	± 15°
Resolution	0.01° (0.17mm/m)	0.001° (0.02mm/m)
Accuracy	±0.03° at +/-3° ±0.05° at +/-30°	±0.015°at +/-3° ±0.03°at +/-15°
Non linearity	‹ 1% FS	‹ 1% FS
Response time	‹ 1.0 sec	‹ 4.0 sec

•Caution: Upper specifications are guaranteed on XY surface only.
 For X or Y view, the value can be different. But 0 position should be ok.

Input / Output port

Charging / RS232C	Mini type 5 pin USB connector

Power & Other features

| Power	Li-ion Battery 3.7V (Rechargeable)
Operation time	Around 7 hours with fully charged battery. *
Charging	5 pin mini type USB cable to PC or USB connector type adapters.
LCD	320 x 240 pixel, Color TFT LCD
Size(W/L./H)	115 x 66 x 25mm
Weight	180g
Operation environment	Temp. : 0°C ~ +45°C / Humidity : below 80%

* Tip to save the battery power:
1. Reduce the brightness of the LCD.
2. Reduce the display on time if it's not uncomfortable.
3. Reduce the power on time if it's not uncomfortable.

Specifications

Dimensions

IM-2DT / IM-2DT-P

115mm

66mm

25mm

98mm

50.5mm
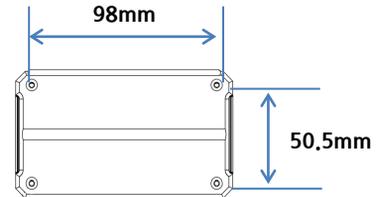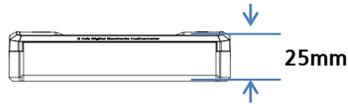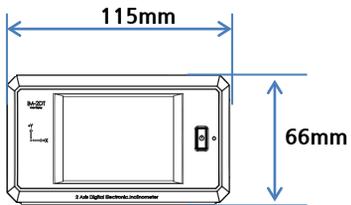
M6 mounting threads

High Precision 2-Axis Digital Electronic Inclinometer

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