DXL360/S V2 Digital Protractor
User Guide

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Features:

1) DXL360S: High accuracy ±0.05°, high resolution 0 .01°
   DXL360: ±0.1°, resolution 0.02°, detail check s pecification
2) Dual and Single axis with user friendly LCD display angle
3) Rechargeable
4) V Shape metal case for easy to fit at the corner or pipe.
5) 5 Side Magnetic base
6) Audible alarming at settable angle range
7) Any angle measurement *DXL360s only
8) USB to pc connection *DXL360s only, for DXL360 need USB
adapter

Specifications

Accuracy:	DXL360S: 0 to 20°: ± (0.05°) 20 to 70°: ± (0.1°) 70 to 90°: ± (0.05°) DXL360: 0 to 20°: ± (0.1°) 20 to 70°: ± (0.2°) 70 to 90°: ± (0.1°) *After Calibrated
Measuring range:	Single axis: 360°, Dual axis: ±40°
Resolution:	DXL360S: 0.01° DXL360: 0.02°
Any Angle Measurement Accuracy *DXL360s**:**	0.5°
Gyro Rotation Speed *DXL360s**:**	<50°/s
Response time:	<0.4 second
Audio sound:	60dB @ 30cm
Zero offset drift angle per °C:	0.0058° (typical)
Operating temperature:	0 to 50°C

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Storage temperature: -10 to 60°C
User Interface: Mono-color LCD with backlight
Supply Power: Rechargeable Li-Polymer 3.7V
Charger port: 5V 500mA Mini type-B USB port
Power Consumption: Standby: 10uA, Operation: 20mA.
Standby Battery Life: 4000 hours
Operating Battery Life: 40 hours
Dimensions (in mm):   70(L) x 70(W) x 23(H)
Magnetic Base: affix at 4 corner
Magnetic Force: N48
Weight: 120gram

Button Functions

Button	Function Descriptions	
	Normal Mode	**MENU Mode**
POWER	In normal operation, this button turns the device ON/OFF.	Serves as the escape key at menu mode
ZERO	When pressed, the current reading is set to zero; subsequent measurements are relative to this reading. The LCD will show the ⬧ icon to indicate the device is in zero mode. Press and hold for 3 seconds to enable or disable sound. The 🔊 icon on LCD will be displaced accordingly. The buzzer alarming could be set at different accuracy	Serves as the upward key for option selection.

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	level. Refer to section "**Angle Alarming**".	
HOLD	When pressed, the current value will freeze; the unit icon ⌜ ⌷ ⌟ flashes to indicate the reading is on hold.	Serves as the downward key at menu mode
SET *DXL360 only	Press and hold for 3 seconds to enter MENU mode, for set mode options.	Serves as the Set key.

ANGLE *DXL360s only	Any angle measurement start button. Refer to section "Any Angle" Press and hold for 3 seconds to enter MENU mode, for set mode options.	Serves as the Set key.

LCD Icons Representations

▭ ▱ ▬	Battery status indication icons These icons indicate the battery level. There are 3 levels representing empty, half and full.
◯	In dual-axis mode, the LCD displays the direction of tilt graphically. It will show as E bubble to display the direction of tilt
[○]	Degree mode. Flash when unit is in HOLD mode
[mm]	mm/M, the height of one end for 1m long plate.
[%] *DXL360S Only	Gradient % mode. Flash when unit is in HOLD mode
◁	Sound notification on. Blank as off

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	Show this logo as relative value is showing. When the Zero button is pressed, the unit reset current angle to zero.
	Direction of tilt icons, show the tilt angle direction
	Dual-Axis Mode. Both the X and Y axis angle will be showed. Dual axis mode measures inclination up to +-40 degree for each axis before it automatically switch to single axis mode.
	Single Axis Mode. Measure slope up to +-90 degree. The triangle icon indicates the direction of tilt with respect to the bottom right corner of the unit.

Battery Charging

It has a built in Lithium Ion rechargeable battery. A standard charger is supplied that the input voltage is 110V to 240V AC, 50/60Hz, and the output is 5V DC, 500mA. The charger operating procedure is list below:

1) Plug the Charger into AC socket, the RED indicator on the charger should turned ON,
2) Plug the USB charging cable to the Charger,
3) Insert the other end of the USB cable to the unit,
4) The battery icon on the LCD blinks to indicate charging in process. Upon charging complete, the icon stops blinking.
5) The charging time is approx. 3 hours.

The unit could also be charged by connecting the USB cable to the unit and a computer's USB port. This has the same effect when charging the unit with the provided adaptor.

Note: When the unit is turned OFF, and plug in the USB charge cable, the LCD will no show anything, it is NORMAL. Once the unit is turned ON, the battery icon should flash indicating the unit is in charging mode.

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Relative/ Absolute Measurement

Relative Measurement
LCD Icon:

Absolute Measurement
LCD Icon: **Blank**

Relative and Absolute Mode Switching:
1   Press and release the "ZERO" key to set the relative measurement zero point
2   Press and release the "ZERO" key to cancel the relative zero point and back to absolute measurement mode.

Hold Function

Holding Mode:
LCD Icon blinking:

Holding function:

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1. Press and release the "HOLD" key to activate holding function, digit will freeze.
2. Press and release the "HOLD" key to cancel the holding function.

Auto Power Off

For no movement in 30 minutes, the unit will power off.
Or we can set to never sleep mode at below instruction.
Power auto off setting:

1. Press and hold "ZERO" key and enter MENU mode
2. Select "POWER" by "ON/OFF" and "HOLD" key, press "ZERO" key to enter Power mode
3. Scroll "NEVER" or "30MIN" by "ON/OFF" and "HOLD" key
4. Press "ZERO" key to confirm NEVER or 30MIN (30 minutes) sleep

Restore Factory Setting

When you find that the unit is abnormal, you can restore the unit to factory setting.
All calibration setting will be restored to factory setting.

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*Not suggest restore to factory setting in normal status, for accuracy drift, please follow **Calibration.** After factory set, please redo calibration to ensure the accuracy.*

Restore to factory setting:
1. Press and hold "ZERO" key and enter MENU mode
2. Select "FACTORY SET" by "ON/OFF" and "HOLD" key, press "ZERO" key to enter FACTORY SET mode
3. Scroll "YES" or "NO" by "ON/OFF" and "HOLD" key
4. Press "ZERO" key to confirm

Angle Alarming

Alarming Mode:

LCD Icon:

Alarming Angle setting:
1. Press and hold "ZERO" key and enter MENU mode
2. Select "BUZZER" by "ZERO" and

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┌─────────────────────┐
│       BUZZER        │
│ >SINGLE :   00.00   │
│  DUAL. X:   00.00   │
│  DUAL. Y:   00.00   │
│  RANGE :    00.50   │
│  ACTIVE : IN  OUT   │
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"HOLD" key, press "SET" or "ANGLE" key to enter BUZZER setting

Press and hold "ZERO" and "HOLD" key for fast scrolling the digit.

3. Press "SET" or "ANGLE" to enter setting value

SINGLE	Vertical / Single axis mode alarming angle (Degree)
DUAL.X	Horizontal/ Dual axis mode X axis alarming angle (Degree)
DUAL.Y	Horizontal/ Dual axis mode Y axis alarming angle (Degree)
RANGE	The range (Degree)that will trigger the audible alarming For example: SINGLE. set to 20.00 RANGE set to 01.00 While the unit is in +19° to +21° or -19° to -21° , the unit will alarm
ACTIVE	IN or OUT to set the alarm will alarm in of range or out of range

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Calibration

Calibrate the unit, once you found that there is accuracy drift on the unit.
You can verify the accuracy at below step:
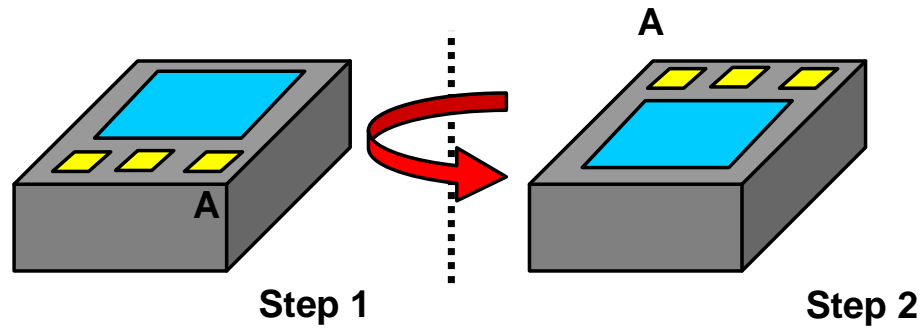
At Step1, you measured X and Y value, X1 and Y1
At Step2, you measured X2 and Y2, in theory X1=-X2, Y1=-Y2.
If the error is too large, you can enter calibration mode to eliminate the error

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Accuracy drift is causing by large ambient temperature change (5 to 10 Degree Celsius) or the unit has been dropped.

Calibration Procedure:

Step 1: Press and hold the "SET" or "ANGLE" key enter Menu mode. Select "Calibration" mode, press "SET". Place the unit on a flat table (no need perfect level table)
LCD display "CALIBRATE DUAL AXIS PRESS SET", press "SET" and buzzer will beep; wait until the beep sound stop. While the buzzer is beeping keep the unit stable.
Step 2: Then rotate the unit 180 degree with the other side against the same place. Press the Set button again, and wait for the beep finished.

Step 1   **Step 2**

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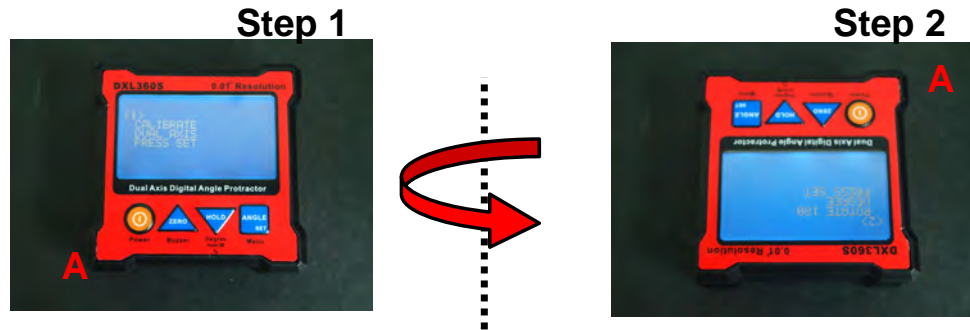
Step 3: LCD display "CALIBRATE HORIZONTAL PRESS SET". Place the unit horizontal like the picture "STEP 3" and then press "SET", wait until the beep sound stop.

Step 4: Then rotate the unit 180 degree at the same place. Press the "ZERO" button again, and wait for the beep finished.

Step 3

Step 4

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Step 5: LCD display "CALIBRATE VERTICAL PRESS SET", mention that the ON/OFF Key at upper side, hold on a flat wall. And then press "ZERO" Key. Wait for the "Beep" sound stop.

Step 6: Then rotate the unit 180 degree with the other side against the same place of wall (ON/OFF Key at upper side). Press the Set button again, and wait for the beep finished. Now, the LCD should go back to the selection menu. The calibration is done, by selecting "Back" to go back for normal operation

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Wall

Wall

Step 5

Step 6

ANY ANGLE measurement: *DXL360S only

Any angle measurement is using gyro technique.

You can measure the angle between two faces, not only in earth gravity direction.

1)   Press Angle key at the first face, and then rotate slowly and must keep the rotation axis to another testing face

2)   It will then show the angle once you not move the unit.

The rotation axis:

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Any Angle Measurement Method:
Example: Measure angle between two wooden walls is 88.9°
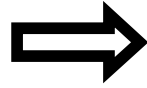

Place at the first position, press Angle

Rotate to final position, keep the rotational axis, LCD show the angle

Calibrate Gyro *DXL360S

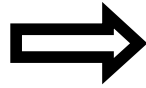1)   Place Unit At Flat Table And then Press Set

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2) Flip 360 degree in clockwise and then press set
   Please rotate slowly to increase the accuracy

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3) Place unit at flat table and then press set

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4) Flip 360 degree counter clockwise and then press set
   Please rotate slowly to increase the accuracy

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PC Communication

It has a PC data logging function.
For DXL360S you can directly plug the USB cable between PC and protractor by mini USB cable

For DXL360 You can not directly plug the USB cable between PC to protractor by a general USB cable.
You need to optional purchase the PC adapter SVRS232
You can continue to data logging X and Y inclination data to PC.
Sampling time is around 2 Hz.

Specification:
1) RS232 Com Port 9600 baud rate
2) USB connection (include a RS232 to USB adapter)
3) Format will output ASCII: example for x is 0, Y is -88.88
X+0000Y-8888

Detail can visit our website or contact our sales person.