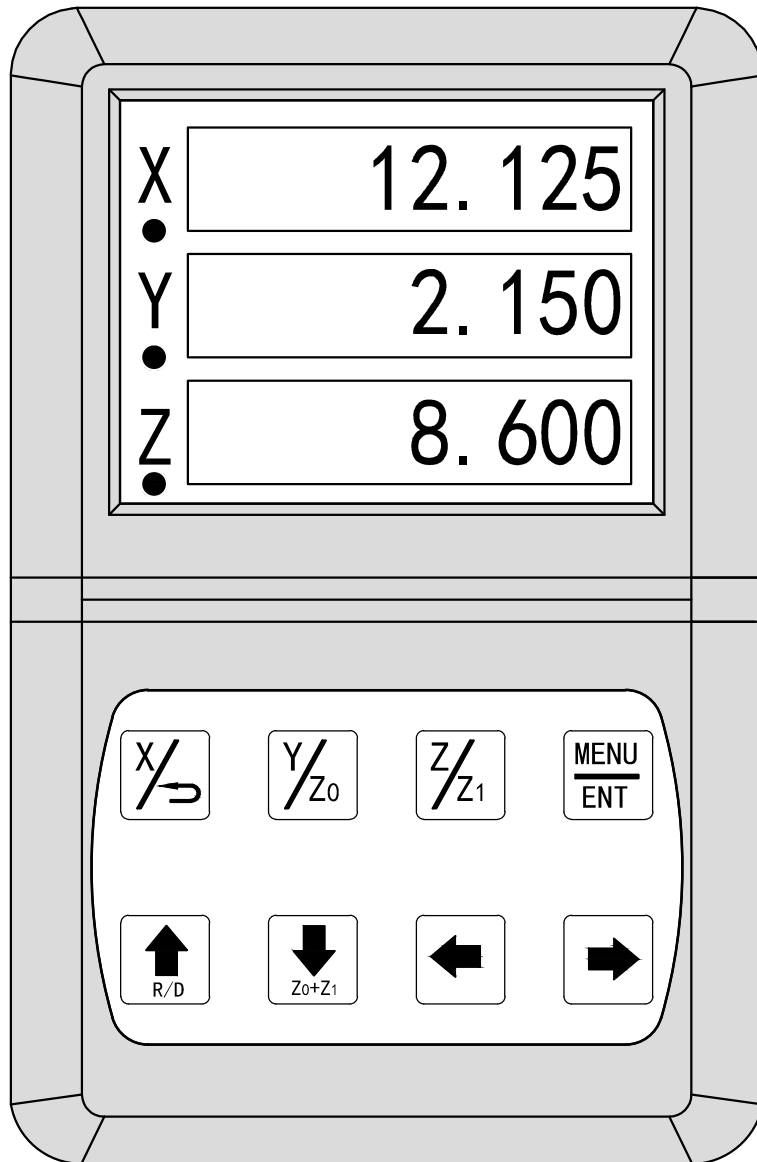


DL50 SERIES
DIGITAL READOUTS

Operation Manual

(Version 3.0)





1. Basic Functions


1.1 Zeroing, data recovery

Function: Operator could zero the displayed coordinate at any position.

Example 1: Zero the displayed value of X axis at the current position.

Press  key to zero the displayed data of X axis;


Press  key to zero the displayed data of Y axis;

Press  key to zero the displayed data of Z axis;


Data recovery

Function: Recover the data which has been zeroed by mistake at any position.

Example 2: Realize the data recovery of X axis.









Press  key to recover the displayed data of X axis;

Press  key to recover the displayed data of Y axis;

Press  key to recover the displayed data of Z axis;





1.2 Coordinate inputting



Function: This function allows the operator to set the current position as any value.



Under ABS mode, press the  with no stop until the data start to blink to enter the coordinate inputting for X axis. Press the   to choose the data, and then press   to switch to next digit for setting. After setting well, press  to exit the coordinate inputting. Under ABS mode, press the  with no stop until the data start to blink to enter the coordinate inputting for Y axis. Under ABS mode, press the  with no stop until the data start to blink to enter the coordinate inputting for Z axis.



1.3 1/2 function

Function: DRO provides automatic centre find function which divides the current displayed position by 2 and sets the zero point at the centre of work piece.

When the DRO is under the ABS, INC or SDM mode, press  to enter the 1/2 function. Press    to half the value on the corresponding axis.

Half the value on the X axis, press the  to enter the 1/2 function, then press the .






Half the value on the Y axis, press the  to enter the 1/2 function, then press the .



Half the value on the Z axis, press the  to enter the 1/2 function, then press the .



1.4 Diameter/radius Conversion

(Applicable to DL50 lathe DROs)

Function Introduction

When the DRO set as the Lathe mode,  has special function. Press the  first, and then press the . The the X axis will display the diameter, the color of X axis column will change to red. If press the  and then  again, the displaying on axis will change to radius. The red color of the X axis column will disappear.



Switch radius to diameter on Y axis, press the  and then , the displaying on Y axis will be diameter.

Switch radius to diameter on Z axis, press the  and then , the displaying on Z axis will be diameter.

1. Basic Functions

1.5 Y+Z function (apply to 3 axis lathe)

Function Introduction

When the DRO used on 3 axis lathe, we can combine the value of Y and Z, the combined value will display on Y axis. Press , then the combined value of Y and Z will display on the Y axis. The column color of Y and Z will change to red. Press  again, the red color of both axis will disappear, the displayed value on both axis will come back to normal.

1.6 Power Off Memory Function

In case of sudden powering off during machining process, DRO provides data storage module which could store the coordinate and data before powering off. When DRO is powered on again, all the data before powering off will recover automatically.

1.7 Linear compensation

Function: Linear error compensation function is used to correct the system errors of the grating ruler measurement system linearly.

Note: the calculation formula of correction coefficient is:

$$\text{Correction coefficient } S = (L - L1) / (L / 1000) \text{ mm/m}$$

L: Stands for the actual measured length (mm)

L1: Stands for the displayed value (mm) on the DRO

S: Stands for correction coefficient (mm/m)








(+ indicating lengthening and – indicating shortening)

Compensation range: - 1.9 mm/m to + 1.9 mm/m

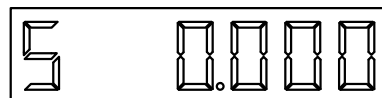
Example: The actual length of the machine's X axis table is 1000.000mm and the displayed value on the DRO is 999.880mm. The correction coefficient is calculated as follows:

$$S = (1000.000 - 999.880) / (1000.000 / 1000.000) = 0.120$$

The steps for the linear compensation:

Under counting mode, press  to enter the linear compensation. Press  to enter the compensation of X axes. By pressing     to input the compensated value. After setting well, press  to save and exit the linear compensation. It is the same operation to do the compensation for Y and Z axes.


Linear compensation interface



Note: If the displayed value is input, the DRO cannot enter the linear compensation function. Please zero the corresponding value, then enter this function.

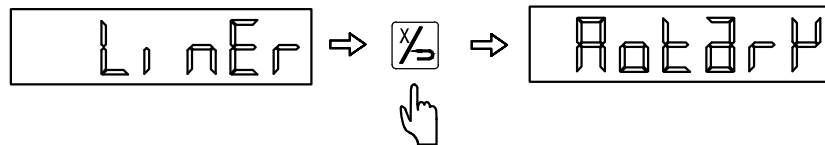
2. System Parameters Setting

2. System parameter setting

The power switch of the DRO is located on its back. The DRO enters the self-checking state firstly after booting, which includes checking whether the LED display is normal and whether the setting of system resolution and model is appropriate. The self-checking state will sustain until DRO enters normal display state. Press the  key once during the self-checking process, then the DRO will enter system parameter setting state.


In the system parameter setting, we can set parameters as follows: 1) encoder type selection (linear encoder or rotary encoder); 2) resolution setting (Fixed resolution: 0.1um, 0.2um, 0.5um, 1um, 2um, 2.5um, 5um and 10um.); 3) Counting direction setting (0 indicates positive direction, 1 indicates negative direction); 4) compensation type setting (linear or nonlinear compensation); 5) parameter setting of rotary encoder; 6) DRO type selection;

2.1: Encoder type selection (LINER stands for a linear displacement transducer matching the axis. Rotary stands for a rotary encoder matching the axis);



Press  key to alter the encoder type of X axis;

Press  key to alter the encoder type of Y axis;




Press  key to alter the encoder type of Z axis;

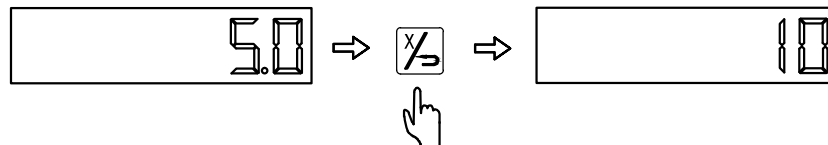
Press  key to enter step 2 and press  key to save and exit parameter setting.


2.2: Resolution setting (Set resolution for the corresponding encoder)

For linear encoder, set the resolution as follows:

Fixed resolution selection: 0.1um, 0.2um, 0.5um, 1um, 2um, 2.5um, 5um and 10um.

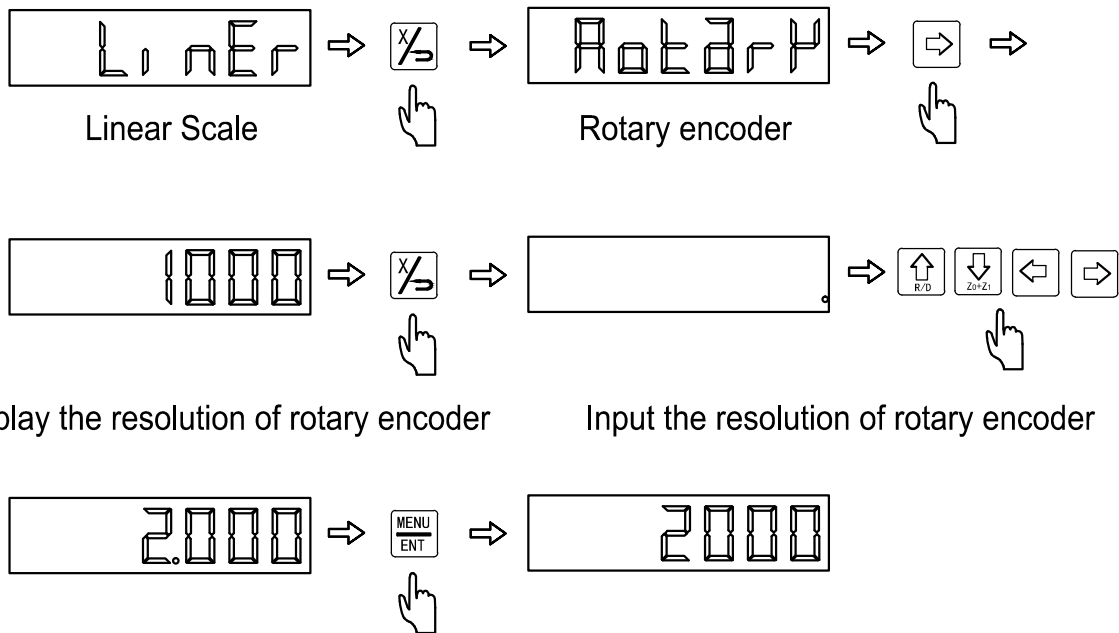
Press  key to alter the resolution of X axis. Press  key to alter the resolution of Y axis. Press  key to alter the resolution of Z axis.



For rotary encoder, Enter system parameter setting and select rotary encoder. Information screen displays L/R TYPE and X axis displays Rotary, then press  key to enter the resolution setting of the rotary encoder when information screen displays XYZ-RES. The resolution varies among different types of encoder, so you have to enter resolution for the corresponding rotary encoder type. When entering resolution, negative value results in degrees/minutes/seconds (DMS) counting mode and positive value results in degree (D) counting mode. This DRO supports a maximum resolution of 99999.

2. System Parameters Setting

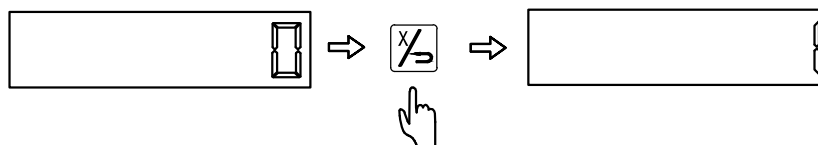
Example: Set the resolution of rotary encoder as 1000P/R



After inputting the resolution of the rotary encoder, press the to save. The way to set the Y and Z axes is same with the X axes.

2.3: Counting direction selection

When selecting counting direction, it is divided into positive and negative direction (0 on the left window indicates positive counting direction of the window. 1 on the left window indicates negative counting direction of the window.) The operations are shown in the chart below.



Press $\frac{X}{Z}$ key to alter the counting direction of X axis.

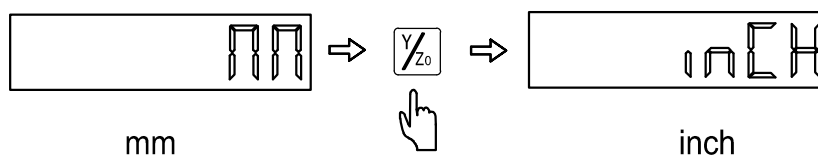
Press $\frac{Y}{Z_0}$ key to alter the counting direction of Y axis

Press $\frac{Z}{Z_1}$ key to alter the counting direction of Z axis.




Press \rightarrow key to enter step 4 and press key to save and exit parameter setting.

2.4 Inch and Metric Conversion

When entering the Inch and Metric setting, press to choose. Setting way will be as follow.

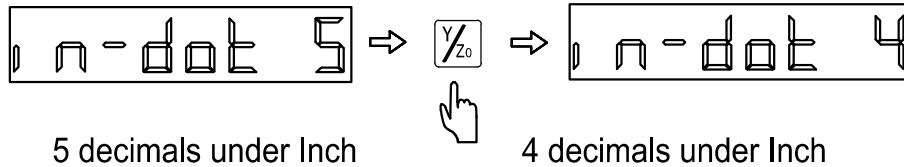


2. System Parameters Setting

After setting well,press  to save and exit.If select the Metric,at this moment press the  to enter the DRO mode setting.If select the Inch,at this moment press  to enter the decimal point setting.



2.5 Decimal point setting under Inch

When the DRO is under Inch mode,it supports 4 or 5 decimals.The factory default is 5 decimals.Users may do the setting according to the need,setting way will be as follow.



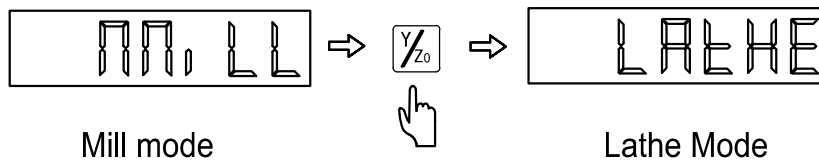
5 decimals under Inch

4 decimals under Inch

After setting well,press  to save and exit,then press  to enter the DRO mode setting.



2.6 DRO mode setting(Mill for Mill mode,Lathe for Lathe mode)

Mode setting will be as the follow



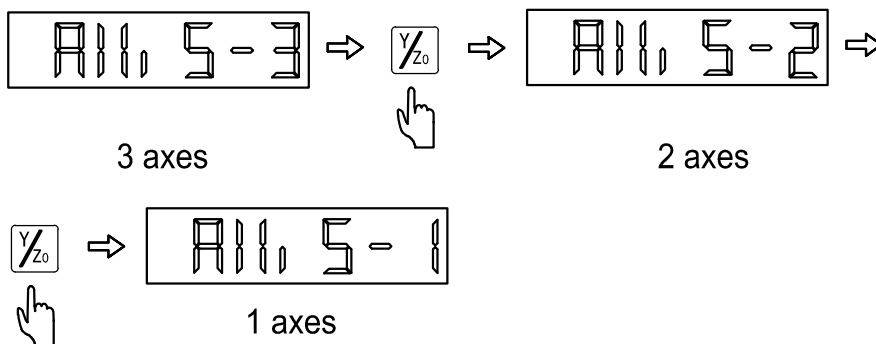
Mill mode

Lathe Mode

After setting well,press  to save and exit,then press  to enter the axes number setting.

2.7 Axes number setting



Users may turn on or turn off 1 or 2 of the axes.This function is unavailable for single axes DRO.The setting ways will be as follow:



3 axes

2 axes

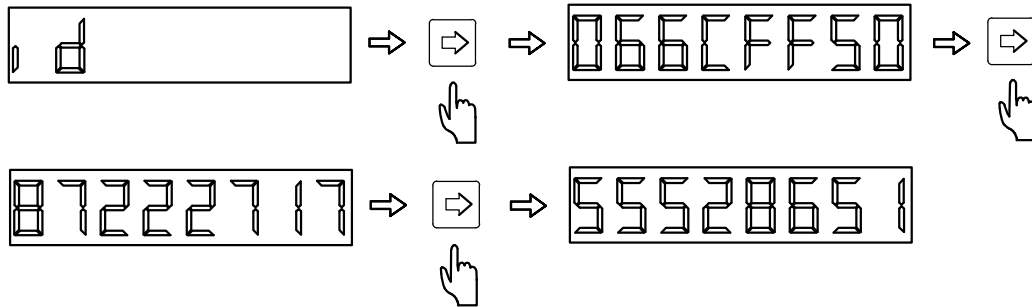
1 axes

After setting well,press  to save and exit,then press the  to check the ID of the DRO.

2. System Parameters Setting

2.8 Checking the ID of the DRO

Every set of DL50 has an only ID, it is constitutive of 24 digits. To check the ID should follow the below way:



Note: When the DRO is single axes, the ID will display on X axes. It will display on Y axes for 2 axes DRO which need to press to check the complete ID. Press to get back. It will display on X, Y and Z axes for 3 axes DRO. After checking the ID, press the to exit the system menu.

2.9 Notices for Usage:

1. Supply voltage: AC 80 V - - 260 V, 50 - - 60 Hz
2. Power: 5 W
3. Operating temperature: -10°C - - 60°C
4. Storage temperature: -30°C - - 70°C
5. Relative humidity (RH): <90% (25)>
6. Axis to be displayed : 1 axis, 2-axis , 3-axis
7. Input signal allowed by the DRO: RS422/TTL
8. Allowable input signal frequency: < 2 MHz
9. Length resolution: 0.1 um, 0.2 um, 0.5 um, 1 um, 2 um, 2.5 um, 5 um and 10 um
10. Minimum resolution of angle display: 0.0001/ pulse
11. Weight: 0.4 KG
12. Volume size: 160 x 105 x 67 (mm)
13. Interface definition of the grating ruler: (DB 9-pins socket)

Pin	1	2	3	4	5	6	7	8	9
signal	A-	0V	B-	PE	R-	A	+5V	B	R

