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ISL-LCD7

DIGITAL READOUTS

OPERATION MANUALMANUAL

INSIZE

V0

1 Description for DRO

1.1 Front panel

| Normal | INC | mm | --- | 15：19 |

X 163.3660

Y 163.3660

Z 163.3660

| Setup | Reference | Display | Function | Extra | ScreenOff |

F1 F2 F3 F4 F5 F6

△ ▽

1 2 3 ←
4 5 6 ABS/INC
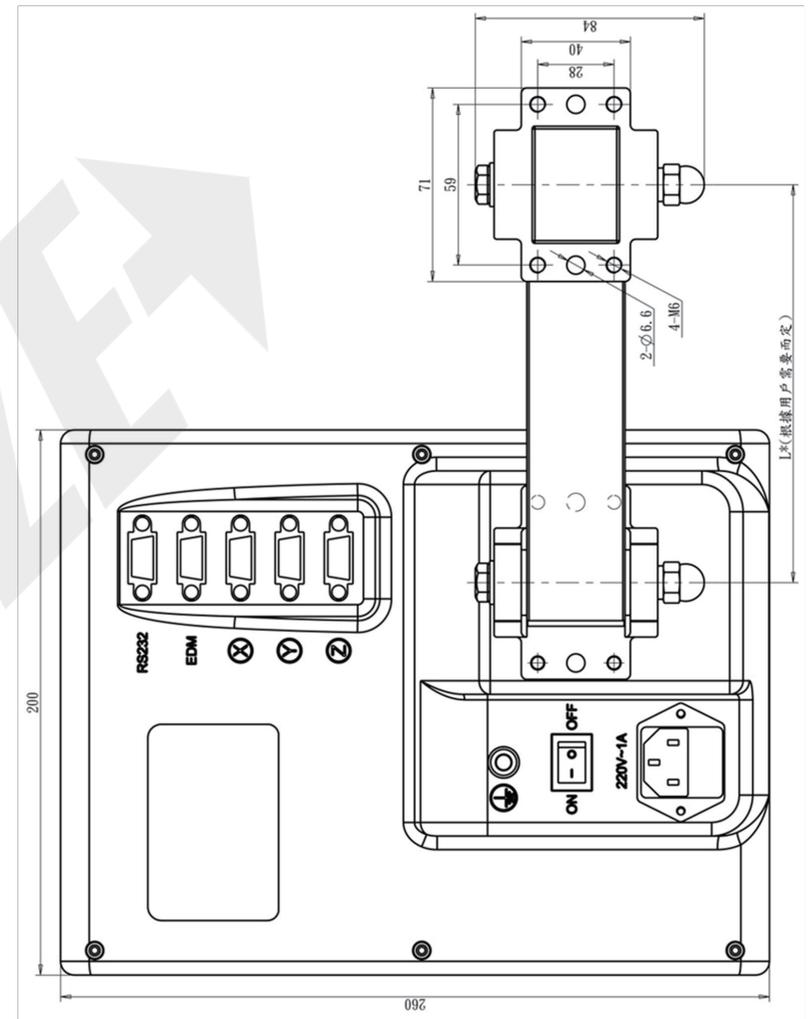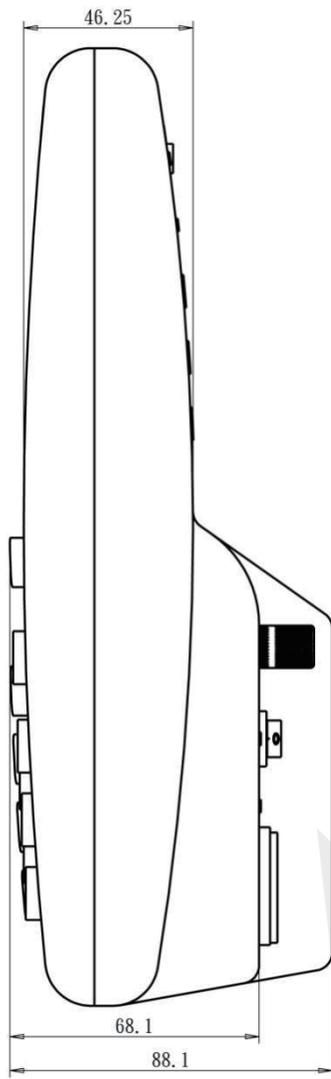7 8 9 CANCEL
○ 0 +/- ENTER

1/2 Xo
PRE Yo
Zo
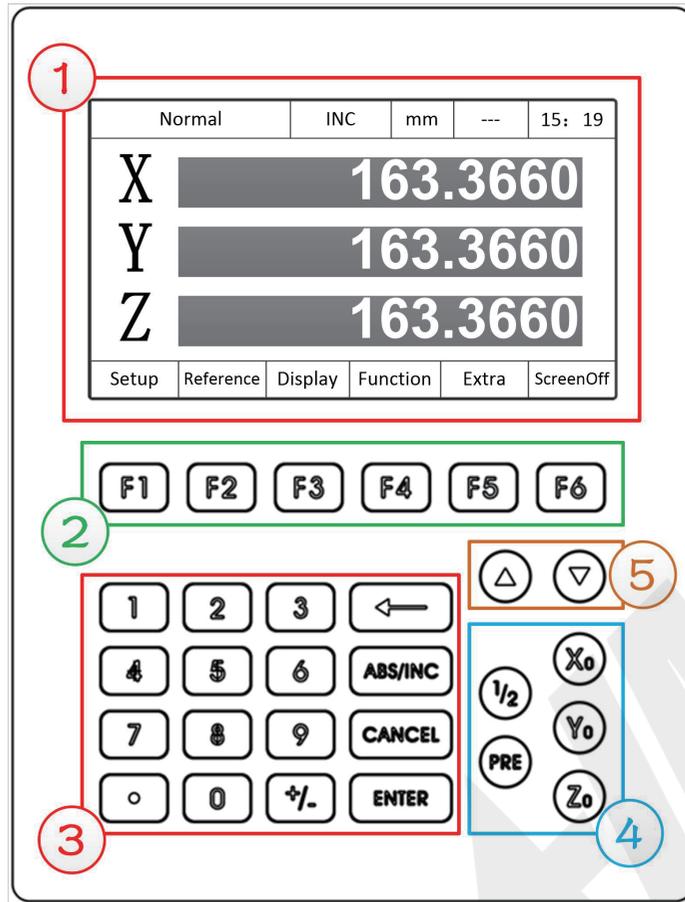
Note:

①TFT screen display area

②Function keys area

③Numerical input/delete/cancel/enter

④Zero clearing/ 1/2 /preset

⑤Up/down function keys
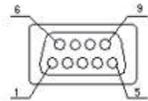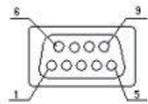
1.2 Back Panel& Mounting Dimension

46.25

68.1

88.1

84

40

28

71

59

2-Φ6.6

4-M6

L*（根据用户要求而定）

200

260

RS232

EDM

X

Y

Z

OFF

ON

220V~1A

Note: PIN Diagram

A   Standard connection

PIN No.	Signal
1	+5V
2	0V
3	A
4	B
5	RI

B   RS232 Connection

PIN No.	Signal
1	NC
2	TXD
3	RXD
4	NC
5	GND

C   EDM Connection
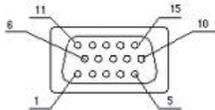
PIN No.	Signal
1	
2	DO0NC
3	DO0COM
4	DO0NO
5	IN-
6	
7	
8	DO0COM
9	
10	IN+
11	
12	
13	DO0NO1

1.3   Normal Display Interface
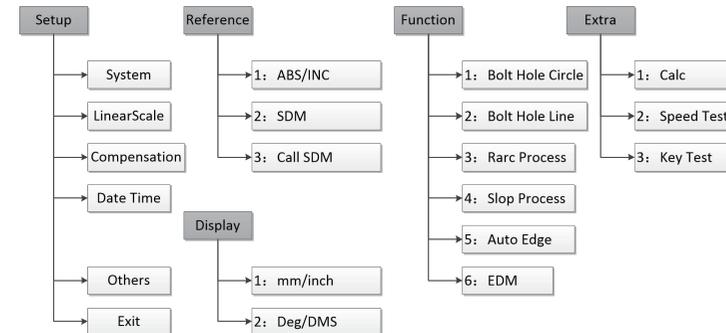
注：Note

①indicates system state

②indicates coordinate mode

③indicates unit

④indicates time

⑤indicates position values

⑥system function menu

1.4   Function menu

1.4.1 Various operating modes

2   DRO Operation

2.1 Coordinate System

ISL-LCD7 DRO provide 3 ways to show coordinate system: ABS, INC, 500 sets SDM (SDM000-SDM499).

1. The origin of the workpiece is set at the origin of ABS coordinate.

2. When changing ABS origin, the relative distance between the origins of SDM and ABS remains unchanged.

3. Zero clearing under ABS-- INC coordinate is cleared accordingly; Zero clearing under INC-- there is no impact on ABS coordinate.

2.1.1 ABS/INC Coordinate Conversion

Reference   1: ABS/INC

Indicate the current coordinate as ABS/INC, and coordinate can be switched by pressing ABS/INC on the panel.

2.1.2 SDM Coordinate Conversion

Reference   2: SDM

Indicate the current coordinate as SDM.

2.1.3 Call SDM Coordinate

Reference   3: Call SDM

Under SDM, enter its number (shown as the figure below), coordinate will be switched to the corresponding number under SDM.

SDM

Number:

2.1.4 SDM number increases 1&decreases 1

When the SDM returns to normal display state, press ▲, the SDM number will decrease by 1, and press ▼, the SDM number will increase by 1.

2.1.5 SDM Zero Clearing

Clear the setup of origin from user coordinate SDM 0 to SDM 499. After clearing, the indication values between SDM and ABS equal.

Operation:

Setup   Others   In the menu "Administrator", enter password "123" to clear.

2.2 Display Mode

Display

2.2.1 mm/inch

Display   1: mm/inch

When the axis type is set as Linear Unit, it indicates the current unit as mm or inch.

2.2.2 DEG/DMS

Display   2: Deg/DMS

When the axis type is set as Angle Mode, it indicates

the current unit as DEG or DMS.

2.3 Zero clearing /Preset / 1/2

There are 3 ways to set up a value -- preset a value, clear a value, and take a value and divide it by two.

2.3.1 Zero Clearing Mode

When the DRO is under normal display state, clear the value of coordinate axis. Zero clearing is generally used to set and display the datum point of the current coordinate system it processes.

Note: ①Zero clearing is available under ABS/INC/SDM.

②Zero clearing under ABS-- INC indicate value is cleared accordingly; Zero clearing under INC-- there is no impact on ABS/SDM value.

③After clearing, if the linear scale doesn't move, press the zero clearing key at the same axis, then previous zero clearing is canceled.

④The purpose of zero clearing is to set the current point as the coordinate's origin of the current axis. Zero clearing keys for DRO's X/Y/Z axis are X₀/Y₀/Z₀, respectively. Under normal state, press one of the keys to clear the value for the corresponding axis.

2.3.2 Preset Mode

When the DRO is under normal display state, preset the indication value for one of the current axes.

注：Note: ①Value can be preset under ABS/INC/SDM.

②Under SDM, if the SDM mode is input as "0",

indication value equals to input value; if the SDM is input as "1", indication value equals to the opposite of the input value (SDM input value can be set in Setup).

Operation: Press PRE on the panel, and press X₀/Y₀/Z₀ to select the axis that needs to preset, before entering value through the numeric key on the panel.
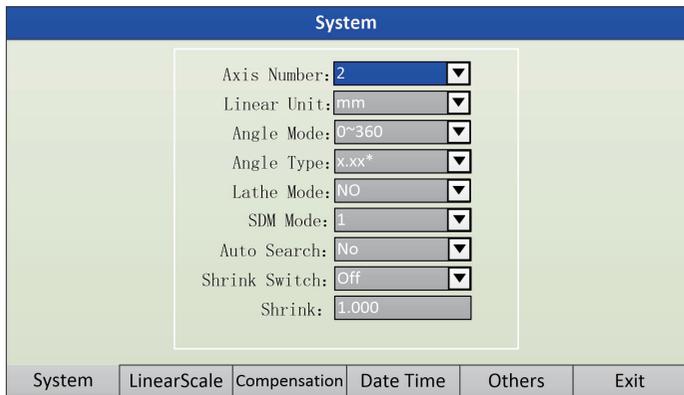
2.3.3 1/2 Mode

Divide the current indicate value by two. Zero point can be set at the center of the workpiece by utilizing this function.

Operation: Press 1/2 on the panel, and press X₀/Y₀/Z₀ to select the axis that needs to divide by two.

2.4 Setup

2.4.1

System			
Axis Number:	2		
Linear Unit:	mm		
Angle Mode:	0~360		
Angle Type:	x.xx°		
Lathe Mode:	NO		
SDM Mode:	1		
Auto Search:	No		
Shrink Switch:	Off		
Shrink:	1.000		

System	LinearScale	Compensation	Date Time	Others	Exit

2.4.1.1 Axis number

According to the axis number connected to the lathe, set the axis number for DRO.

2.4.1.2 Linear Unit

Set DRO's unit as mm or inch.

2.4.1.3 Angle Mode

There are 3 modes to display angle : from 0 to 360°, from -360° to 360°, from -180° to 180°, respectively.

Operation: 1）Press ▲▼ to select "Angle Mode".

2）Press ENTER to enter mode setup.

3）Press ▲▼ to select the mode.

4）Press ENTER to confirm.

5）Press F6 to exit.

2.4.1.4 Lathe Mode

Installed with two axes in the same direction, the position of machine is the sum of the displacements of two axes. This is called Lathe Mode.

When Lathe Mode is set as "NO", Lathe Mode is disabled.

When Lathe Mode is set as "X=X+Y", it indicates X axis indication value = X axis normal indication value + Y axis normal indication value;

When Lathe Mode is set as "X=X+Z", it indicates X axis indication value = X axis normal indication value + Z axis normal indication value.

2.4.1.5 SDM Mode

There are two modes under SDM.

Mode 0: indication value equals to input value.

Mode 1: indication value equals to the opposite of the input value.

2.4.1.6 Auto Search

After Auto Search is set, it responds to external zero setting signal on Z axis under normal display state.

0: Under normal display state, it does not respond to external zero setting signal on Z axis.

1: Under normal display state, it responds to external zero setting signal on Z axis.
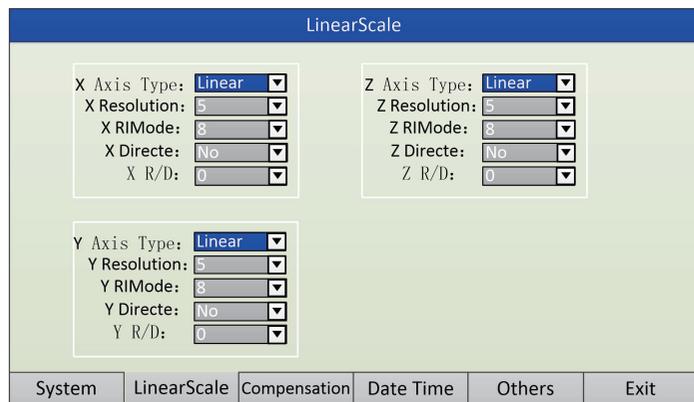
2.4.1.7 Shrink

It needs to set shrinkage rate before using. Shrinkage rate ranges from 0.1 to 10. After it's set, when processing mold, it's processed directly according

to the sizes of finished products, without the need of separate size calculation.

Size displayed = actual size * Shrinkage rate

2.4.2 Linear Scale Setup


```
                    LinearScale
  X Axis Type: [Linear ▼]    Z Axis Type: [Linear ▼]
    X Resolution: [5 ▼]        Z Resolution: [5 ▼]
    X RIMode: [8 ▼]            Z RIMode: [8 ▼]
    X Directe: [No ▼]          Z Directe: [No ▼]
    X R/D: [0 ▼]               Z R/D: [0 ▼]

  Y Axis Type: [Linear ▼]
    Y Resolution: [5 ▼]
    Y RIMode: [8 ▼]
    Y Directe: [No ▼]
    Y R/D: [0 ▼]

  System | LinearScale | Compensation | Date Time | Others | Exit
```

2.4.2.1 Axis Type

According to whether each axis of the lathe is connected to linear scale or encoder, select and set up accordingly.

2.4.2.2 Resolution

10 types of resolutions are available for ISL-LCD7: 0.05μm, 0.1μm, 0.2μm, 0.5μm, 1μm, 2μm, 5μm, 10μm, 20μm, 50μm. After linear scale is installed, if its resolution is not the same with the current one, it's required to set linear scale's resolution at the DRO, otherwise the reading will be incorrect. This parameter, however, should be set by installation personnel instead of the user.

Factory default value: 5μm

2.4.2.3 RI Mode

It provides 8 RI modes from Mode 1 to Mode 8, under which each mode corresponds to different waveforms of A, B, RI

Default Mode: MODE 8

2.4.2.4 Direction

The counting direction of linear scale is set by installation personnel, and the user should not change it at will.

Default value: 0

2.4.2.5 R/D

When processing a cylindrical surface, the workpiece is cut with the feed of the lathe tool. In the radial direction, the reduction in the diameter of the cutting workpiece is twice the feed of the lathe tool. Therefore, in order to accurately display the diameter of the workpiece during the cutting process, the indication value is twice the displacement value. This indication mode is called "Diameter Mode", and the normal indication mode is called "Radius Mode".

Factory default value: D

2.4.3 Compensation

Compensation

X Compensate: No ▼
　　No
　　Linear
　　Segment

Z Compensate: No ▼

Y Compensate: No ▼

| System | LinearScale | Compensation | Date Time | Others | Exit |
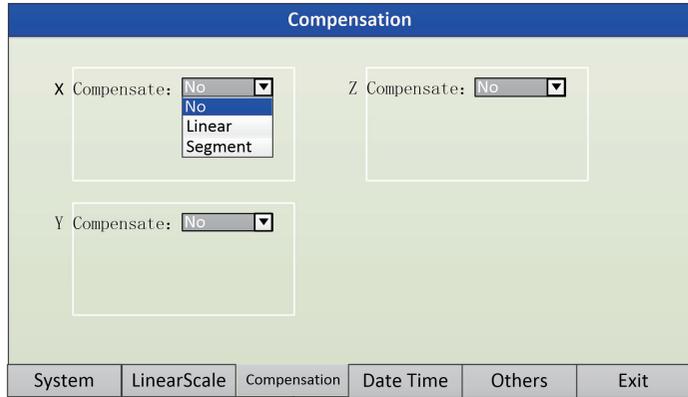
The user may use linear compensation and segment compensation. If select "No", compensation is disabled by the system.

This function is recommended to operate by the installation personnel.

### 2.4.3.1 Method&Operating Steps for Linear Compensation

If the indication value observed by moving the linear scale before compensation is 400.010mm, and the actual standard value is 400.000mm, input directly at the compensation interface.

Actual value: 400.010

Nominal value: 400.000

2.4.3.2 Method&Operating Steps for Segment Compensation

Input the password (400) for Segment Compensation, and enter into the interface.

X Segmentcomp

Node	Standard	Observed	Counter	▲
				▼

| Find RI | Add Node | Del Node | Edit Node | | Exit |
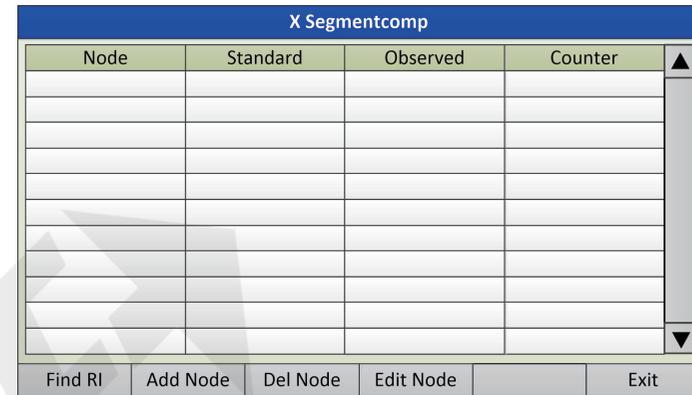
Note: Only RI function is found can add, delete, and edit.

Step 1: Press F1 to pop up the interface for finding RI, and move the linear scale to find RI.

Find RI

Please Move X Linear !

Step 2: Press F2 to pop up the interface for inputting standard value, move the linear scale to the first position, and enter standard value.

X Standard

X Standard: 0 mm

Segmentcomp: -1.580000 mm
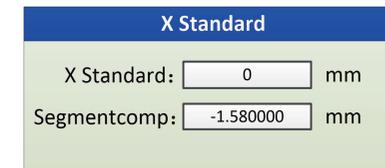
And press ENTER to finish the compensation for the first node, as the results shown below.

X Segmentcomp				
Node	Standard	Observed	Counter	▲
0	0.000000	-1.580000	-316	
				▼
Find RI	Add Node	Del Node	Edit Node	Exit

Step 3: Similarly, operate as Step 2 for other nodes (compensation direction: Negative →Forward).

Step 4: Press F6 to finish.

Delete: Press F3, enter Password 123 to delete the last node, and enter Password 400 to Edit: Press F4 to edit the standard value for the node.

Eg: Edit X Node 0, and X Standard 10mm, shown as below.

Edit Standard		
X Node：	0	
X Standard：	10	mm

And press ENTER to finish.

X Segmentcomp				
Node	Standard	Observed	Counter	▲
0	10.000000	-1.580000	-316	
				▼
Find RI	Add Node	Del Node	Edit Node		Exit

2.4.4 Date Time

Date Time
Date : 2018 – 05 – 18
Time: 15 : 30 : 18
2018-05-18 15:30:18
System | LinearScale | Compensation | Date Time | Others | Exit

Set system time and date.

2.4.5 Others

Others

Lauguage: English
RS232 BandRate: 115200
Parity: NO
DataBits: 8
StopBits: 1
Smooth: Off
Management: PassWord
Ver: 1.00

System	LinearScale	Compensation	Date Time	Others	Exit

2.4.5.1 Language

3 languages can be set for the system -- English, Simplified Chinese, and Traditional Chinese (password: 123).

Factory default: English.

2.4.5.2 RS232 Band Rate

RS232 Baud Rate can be set as 9600, 19200, 57600, 115200.

Factory default: 115200

2.4.5.3 Parity

Enable Parity to resolve the problem of flashing at the last digit of DRO under normal display state.

Factory default: NO.

2.4.5.4 Management

By inputing password for management, it achieve special setup for the system. System default setup can be restored by inputting Password 1999.

2.5 Special Functions

Function　　Enter into Process Function.

Note: Before entering into Process Function, move the machine tool and set up the origin of coordinate system.
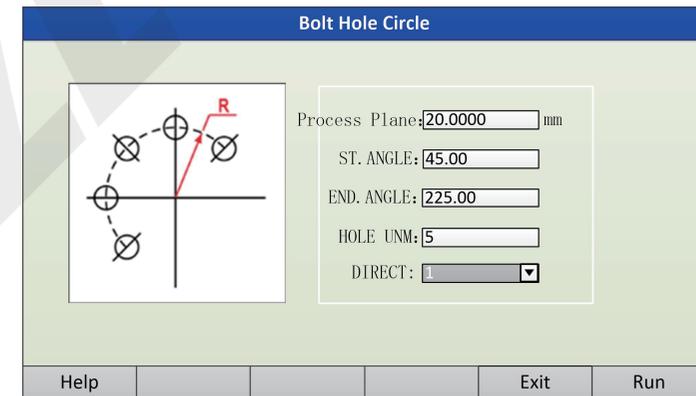
2.5.1 Bolt Hole Circle

Function　　1：Bolt Hole Circle　　Enter into the parameter setup interface for Bolt Hole Circle (shown as the figure below). This mode allows the operation of circular drilling at XY processing plane.

Bolt Hole Circle

Process Plane: 20.0000 mm
ST. ANGLE: 45.00
END. ANGLE: 225.00
HOLE UNM: 5
DIRECT: 1

Help				Exit	Run

Parameter setup

（RADIUS）　　　RADIUS

（ST.ANGLE）：　The angle of the center of the first hole on the arc

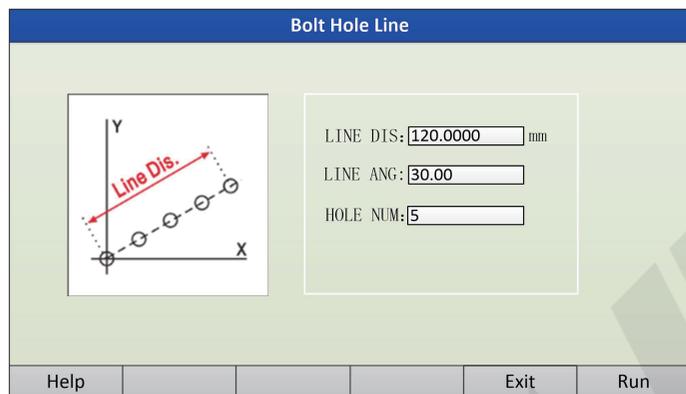END.ANGLE: The angle of the center of the last hole on the arc

HOLE NUM

DIRECT

After the parameters are set, press "Run" to

process, the operator presses ⬆ or ⬇ to choose hole number, then the lathe tool move to X axis and Y axis where both indicate 0.000, which is the position of the hole, and then begin to drill.

2.5.2 Bolt Hole Line

[Function] [2: Bolt Hole Line] Enter into the parameter setup interface for Bolt Hole Line (shown as the figure below). This mode allows the operation of line drilling at XY processing plane.

Bolt Hole Line

LINE DIS: [120.0000] mm
LINE ANG: [30.00]
HOLE NUM: [5]

| Help | | | | Exit | Run |

Parameter setup

LINE DIS: The distance between the center of the first hole and the center of the last hole

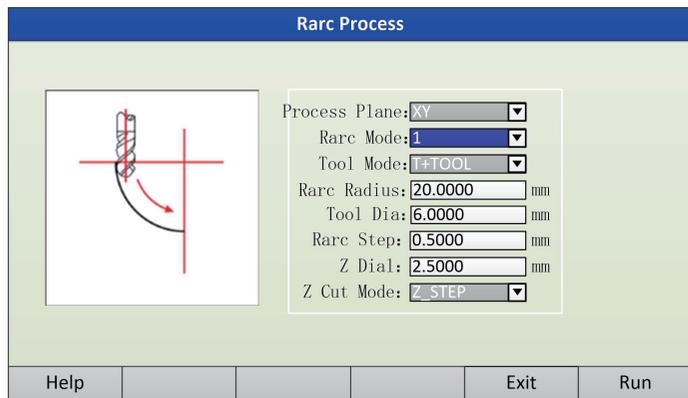LINE ANG: The included angle between the line and the positive X axis

HOLE NUM

After the parameters are set, press "Run" to

2.5.3 Racr Process

[Function] [3: Rarc Process] Enter into the parameter setup interface for Arc Processing (shown as the figure below). When processing at XZ and YZ planes, there are 8 modes for option. Flat milling cutter or radius milling cutter may be used, and set the diameter as 0.0000 for the tool when processing by flat milling cutter. When processing through this function at XY plane, it also has 8 modes. The tool is perpendicular to the processing plane, and each mode is divided into inner arc processing and outer arc processing. Therefore, when processing XY plane, it's required to select tool compensation type --T+TOOL or T-TOOL. When processing XY plane, set tool diameter according to actual value, regardless of round or flat.

Rarc Process

Process Plane: XY
Rarc Mode: 1
Tool Mode: T+TOOL
Rarc Radius: 20.0000 mm
Tool Dia: 6.0000 mm
Rarc Step: 0.5000 mm
Z Dial: 2.5000 mm
Z Cut Mode: Z_STEP

| Help | | | | Exit | Run |

Parameter setup

Processing plane: XY/XZ/YZ

Processing mode: 8 modes in total

Arc mode: This is unique for XY plane

Arc radius

Tool diameter

Arc step: Arc length per processing

Z Dia: When installing Z axis on lathe, it is used to simulate to move the position on Z axis.

Z Step Mode: For processing YZ or XZ plane, step mode can be selected when processing

Z_STEP

MAX_CUT

After the parameters are set, press "Run" to process, the operator presses ▲ or ▼ to choose hole number, then the lathe tool move to X axis and Y axis where both indicate 0.000, which is the position

process, the operator presses ▲ or ▼ to choose hole number, then the lathe tool move to X axis and Y axis where both indicate 0.000, which is the position of the hole, and then begin to drill.

2.5.3 Racr Process

| Function | 3: Rarc Process | Enter into the parameter setup

interface for Arc Processing (shown as the figure below). When processing at XZ and YZ planes, there are 8 modes for option. Flat milling cutter or radius milling cutter may be used, and set the diameter as 0.0000 for the tool when processing by flat milling cutter. When 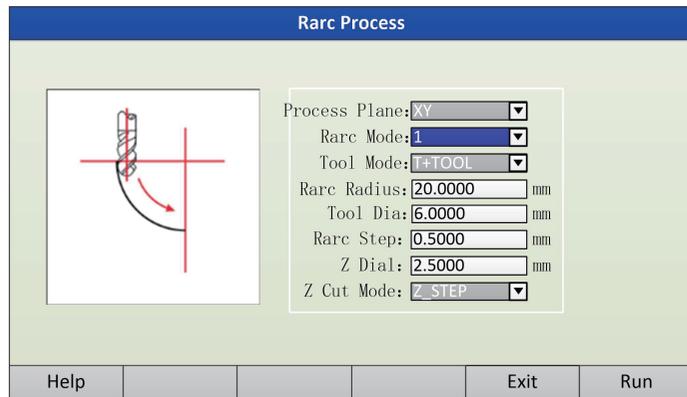processing through this function at XY plane, it also has 8 modes. The tool is perpendicular to the processing plane, and each mode is divided into inner arc processing and outer arc processing. Therefore, when processing XY plane, it's required to select tool compensation type --T+TOOL or T-TOOL. When processing XY plane, set tool diameter according to actual value, regardless of round or flat.

Rarc Process

Process Plane: XY ▼
Rarc Mode: 1 ▼
Tool Mode: T+TOOL ▼
Rarc Radius: 20.0000 mm
Tool Dia: 6.0000 mm
Rarc Step: 0.5000 mm
Z Dial: 2.5000 mm
Z Cut Mode: Z_STEP ▼

| Help | | | | Exit | Run |

Parameter setup

Processing plane: XY/XZ/YZ

Processing mode: 8 modes in total

Arc mode: This is unique for XY plane

Arc radius

Tool diameter

Arc step: Arc length per processing

Z Dia: When installing Z axis on lathe, it is used to simulate to move the position on Z axis.

Z Step Mode: For processing YZ or XZ plane, step mode can be selected when processing

Z_STEP

MAX_CUT

After the parameters are set, press "Run" to process, the operator presses ▲ or ▼ to choose hole number, then the lathe tool move to X axis and Y axis where both indicate 0.000, which is the position

of the hole, and then begin to drill.

2.5.4 Slop Process

| Function | **4: Slop Process** | Enter into the parameter setup

interface for Slop Processing (shown as the figure below).

Slop Process

Process Plane: ZX ▼
Slop Angle: 45.00
Slop Step: 1.2000 mm
Z Dial: 2.5000 mm
Slop Mode: Z_STEP ▼

| Help | | | | Exit | Run |

Parameter setup

Processing plane: XY/XZ/YZ as the slop processing planes

Slop Angle: At XY and XZ planes, it's the included angle between slop and positive X axis; At YZ plane, it's the included angle between slop and positive Y axis.

Processing step: Cutting output

Z Dia: When installing Z axis on lathe, it is used to simulate to move the position on Z axis.

Z Step Mode: For processing YZ or XZ plane, step mode can be selected when processing
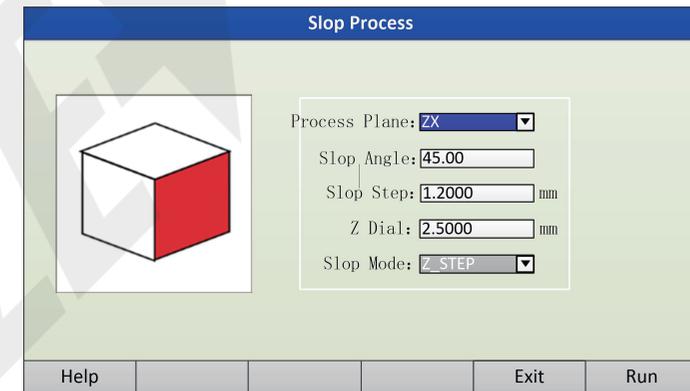
Z_STEP

MAX_CUT

After the parameters are set, press "Run" to process, the

operator presses ▲ or ▼ to choose hole number, then the lathe tool move to X axis and Y axis where both indicate 0.000, which is the position of the hole, and then begin to drill.

2.5.5 Auto Edge

| Function | | 5: Auto Edge | Enter into the parameter setup interface for Slop Processing (shown as the figure below).

Auto Edge
Select Axis: X ▼
Edge Radius: -5.0000 mm
Help			Exit	Run

Parameter setup

Select Axis: X, Y, Z are available for edge detection.

Edge radius: The radius for the sensor of the edge detector, the absolute value of the input value is the value for radius, and plus and minus signs are the display signs when the first side is sensed.
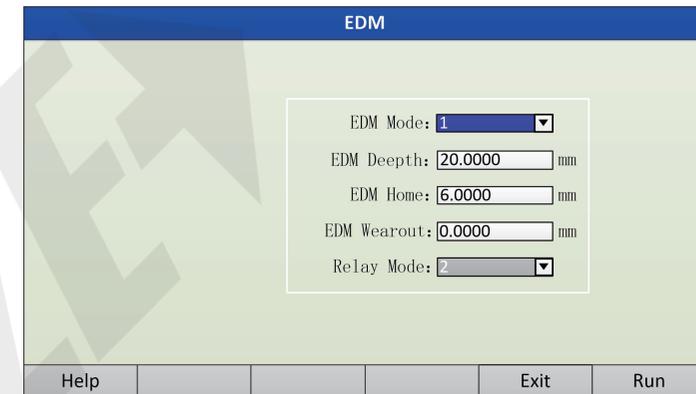
After the parameters are set, press "Run" to process.

2.5.6 EDM

When electrical discharge machine enters into EDM, and detects that Z indication value equals to target value, DRO will send signal to stop EDM , and electrode will exit.

| Function | | 6: EDM | Enter into the parameter setup interface for EDM (shown as the figure below).

EDM
EDM Mode: 1 ▼
EDM Deepth: 20.0000 mm
EDM Home: 6.0000 mm
EDM Wearout: 0.0000 mm
Relay Mode: 2 ▼
Help			Exit	Run

Parameter setup:

EDM Mode: Provides 7 processing modes, and for more details, see the Chart 1 below.

EDM Depth: The depth of the workpiece processed

EDM Home: The height from the position where the electrode exits, to origin.

Electrode wearout: The wearout during electrode processing.

Relay Mode: 4 relay modes are available, for more details, see Chart 2 below.

After the parameters are set, press "Run" to process. During the process, the operator may press "Pause" to exit EDM and return to normal XYZ display to check the positions counted by DRO. After that press "back" to return to EDM interface.

Chart 1: The differences among various modes （╳: NO　√: YES　↑: UP　↓: DOWN)

EDM MODE	Auto edge&zero clearing	Direction during negative processing	Whether or not exit EDM after single processing is finished	Z direction
1	╳	↓	√	↓
2	√	No negative process	╳	↓
3	╳	↓	╳	↓
4	╳	↑	√	↓
5	╳	↑	╳	↓
6	√	↓No positive processing	╳	↑
7	√	↑	╳	↓

表2：Chart 2

RELAY MODE	ON	Enter into EDM	Finish	Exit EDM	OFF
1	Disconnected	Disconnected	Connected	Disconnected	Connected
2	Connected	Connected	Disconnected	Connected	Connected
3	Disconnected	Connected	Disconnected	Disconnected	Connected
4	Connected	Disconnected	Connected	Connected	Connected

2.6 Extra

Extra

2.6.1 Calculator

Extra　　1：Calc　　Enter into the interface for calculator, and perform simple mathematical operations.

2.6.2 Speed Test

Extra　　2：Speed Test　　Enter the interface for Speed Test, which is used to check whether or not the data of linear scale is missed.

Note: 1) Press [←] to clear XYZ value.

2) Press X_0 / Y_0 / Z_0 to switch X/Y/Z RI Mode.

2.6.3 Key Test

Extra　　3：Key Test　　Enter the interface for Key Test, which is used check whether or not the key is faulty.

Appendix 1: ISL-LCD7 Communication Protocol

1　Compressed BCD Code Format

Baud Rate: available in 9600/19200/57600/115200.

Parity check: null

Data Bit: 8

Stop Bit: 1

After receiving a Character "R" （0X52), transmitted by PC, this DRO sends 17 bytes back to the PC immediately, shown as below.

Byte 1st : Head =0x0fe (hexadecimal).

Byte 2nd : Sign Bit

        Bit 5-7=0 : Reserve

        Bit 4 : 0（indicate mm）,1（indicate inch）。

        Bit 3=0 : Reserve

Bit 2: Sign bit for Z axis, 0 indicates "0", 1 indicates "-".

Bit 1: Sign bit for Y axis, 0 indicates "0", 1 indicates "-".

Bit 0: Sign bit for X axis, 0 indicates "0", 1 indicates "-".

Byte 3rd:   State Bit

        Bit 7-3=0: Reserve

Bit 2: Sign bit for Z axis, 0 indicates "OK", 1 indicates "ERROR".

Bit 1: Sign bit for Y axis, 0 indicates "OK", 1 indicates "ERROR".

Bit 0: Sign bit for X axis, 0 indicates "OK", 1 indicates "ERROR".

Byte $4^{th}-7^{th}$: X axis value, which adopts Compressed BCD Code Format.

X-value = $B4 + B5 *10^2 + B6*10^4 + B7*10^6$

Eg: X axis value is supposed to be 1234.567.

So B4=0X67, B5 = 0X45, B6 = 0X23, B7=01

Note: B4 refers to the 4th BYTE, and B5 refers to the 5th BYTE.

Byte $8^{th}-11^{th}$:Y axis value, which also adopts Compressed BCD Code Format.

Y-value = $B8 + B9 *10^2 + B10*10^4 + B11*10^6$

Byte $12^{th}-15^{th}$: Z axis value, which also adopts Compressed BCD

Code Format.

Z-value = $B12 + B13*10^2 + B14*10^4 + B15*10^6$

    Byte $16^{th}-17^{th}$: Reserve

注意 ▶ **Remarks:**

1. Do not care about the value of the axis that does not exist. For instance, if Byte $8^{th}-11^{th}$ is the value of Y-value, then $4^{th}-7^{th}$ and 12th -15th are not in use.

2. B4: refers to the 4th Byte. Others are similar.

3. It's compressed BCD Code Format from B4 to B17.

4. In each byte, there is a start bit and a stop bit, respectively, no parity check, and the length of byte is 8.

2 Examples on Compressed BCD Code Format

In the following, it will illustrates on how to generate contents in 17 bytes.

Suppose that 3 axes X, Y, and Z are -3.509, 123.478, 250.465, respectively.

1. Since X is negative number, and values of other axes are positive numbers, each value of Byte 2nd is as follows.

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	1

indicates mm (millimeter)

Value 1 indicates X axis as negative

Bit 4: 0 (mm)

Bit 3: 0 (Reserve)

Bit 2: 0 (Indicates Z axis value as positive number)

Bit 1: 0 (Indicates Y axis value as positive number)

Bit 0: 1 (Indicates X axis value as negative number)

2. Byte 3th: without ERROR signal

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	0

1. Byte 4th-7th indicate X axis value.

Resolve the value of X axis and then take out the number on each bit 3, 5, 0, 9, respectively, the lower Bit 0 and 9 are stored in Byte 4th, and upper Bit 3 and 5 are stored in Byte 5th. The number (such as hundredths, the unit, etc) the chart signed below is only applicable to this example.

Each bit of Byte 4th is as follows

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	1	0	0	1

Hundreds digit of X axis is 0   Thousandth digit of X axis is 9

Each bit of Byte 5th is as follows.

D7	D6	D5	D4	D3	D2	D1	D0
0	0	1	1	0	1	0	1

Unit digit of X axis is 3   Tenth digit of X axis is 5

Each bit of Byte 6th is as follows.

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	0

Hundreds digit of X axis is 0   Tenth digit of X axis is 0

Each bit of Byte 7th is as follows.

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	0

Ten-thousands digit of X axis is 0   Thousandth digit of X axis is 0

Byte 8th indicates Y axis value.

Resolve the value of Y axis and then take out the number on each bit 1, 2, 3, 4, respectively, the lower Bit 7 and 8 are stored in Byte 8th, and upper Bit 1 and 2 are stored in Byte 10th.

Each bit of Byte 8th is as follows.

D7	D6	D5	D4	D3	D2	D1	D0
0	1	1	1	1	0	0	0

Hundredth digit of Y axis is 7   Thousandth digit of Y axis is 8

Each bit of Byte 9th is as follows.

D7	D6	D5	D4	D3	D2	D1	D0
0	0	1	1	0	1	0	0

Unit digit of Y axis is 3   Tenth digit of Y axis is 4

Each bit of Byte 10th is as follows.

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	1	0	0	1	0

Hundreds digit of Y axis is 1   Tens digit of Y axis is 2

Each bit of Byte 11th is as follows.

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	0

Ten-thousands digit of Y axis is 0   Thousandth digit of Y axis is 0

7. Byte 12th-15th indicate Z axis value.

Resolve the value of Z axis and then take out the number on each bit 2, 5, 0, 4, 6, 5, respectively, the lower Bit6 and 5 are stored in Byte 12th, Bit 0 and 4 are stored in Byte 13, and Bit 2 and 5 are stored in Byte 14th.

Each bit of Byte 12th is as follows.

D7	D6	D5	D4	D3	D2	D1	D0
0	1	1	0	0	1	0	1

Hundredth digit of Z axis is 6   Thousandth digit of Z axis is 5

Each bit of Byte 13th is as follows.

D7	D6	D5	D4	D3	D2	D1	D0

0	0	0	0	0	1	0	0

Unit digit of Z axis is 0   Tenth digit of Z axis is 4

Each bit of Byte 14th is as follows.

D7	D6	D5	D4	D3	D2	D1	D0
0	0	1	0	0	1	0	1

Hundreds digit of Z axis is 2   Tens digit of Z axis is 5

Each bit of Byte 15th is as follows.

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	0	0	0	0

Ten-thousands digit of Z axis is 0   Thousandth digit of Z axis is 0

6. Byte 16th and Byte 17th are reserved.

7. Decimal digits are 3 if unit is mm, and decimal digits are 4 if unit is inch.

8. The contents of 17 bytes introduced above are summed up as follows.

Byte	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Content	0feH	0 1H	00H	09H	35H	00H	00H	78H	34H	12H	00H	65H	04H	25H	00H	00H	00H

9. The maximum of absolute value is 9999.999 when in mm (Metric system), and the maximum of absolute value is 999.9999 when in inch (British system).