WE6800 DRO OUNTER

OPERATION MANUAL

WE6800-2

WE6800-3

WE6800-EDM

Please read this manual before your operation, and place it at where easy to take

Rational Precision Instrument Co. LTD

DIRECTORY

0.   FORWARD

Attention points for installation, application and maintenance of WE6800 DRO

Note: The document and specifications will be changed without notice.

0.1 Installation environment

(1) Avoid exposing under the Sun or high temperature environment. And the operating temperature is $0℃$ to $40℃$;

(2) Keep away from high voltage, large current or strong magnetic machines; Signal cable should be kept away from power line;

(3) Avoid of installing in the oil, water or dust and high vibration environment ; Don't install at the vibrational or unsteady worktable to avoid of fall or break down even hurt the worker;

(4) Keep away from corrosive chemicals;

(5) Metal avoid falling in or insert the DRO from the holes or groove lest electroshock or fire brought by short or touch dangerous voltage points;

(6) WE6800 DRO use 100V~250V、50~60Hz power. Be sure that grounding is OK. Pullout the plug of power in thunder.

0.2 Attention points for application of digital read-out

(1) Check if the appearance is undamaged after unpacking. Contact our company or distributors if any malfunction is found, never tear down to repair by yourself;

(2) Before switch off, don't open the shuck or pullout the plug of the linear scale;

(3) Don't press the power line with anything. And the power line should not interfere the run of machine or human walking. Ensure the current rating exceed the sum of current on power.

0.3   Ordinary maintenance

(1) Switch off the power when cleaning;

(2) Rub with soft dry cloth or cotton;

(3) Don't clean the external shuck with methyl benzene or ether;

(4) Front display window can be rubbed with alcohol or neuter detergent.

0.4 Occasion of repair

When the following events occurred, you should shut the power and contact the maintenance man to repair:

(1) The power plug mangled;

(2) Liquid is splashed on the DRO;

(3) DRO or the shell is damaged;

(4) DRO's performance transform abnormally;

(5) You operate according to the manual, but the DRO didn' work yet.

0.5 warranty

We guarantee maintenance the WE6800 DRO with the factory's original warranty. You must return the warranty card to our company. The valid warranty card must fill in with the specific model, machine NUM and date of installed.

1 PANEL, REAR PANEL AND KEY FUNCTIONS

1.1 Illustration of panel
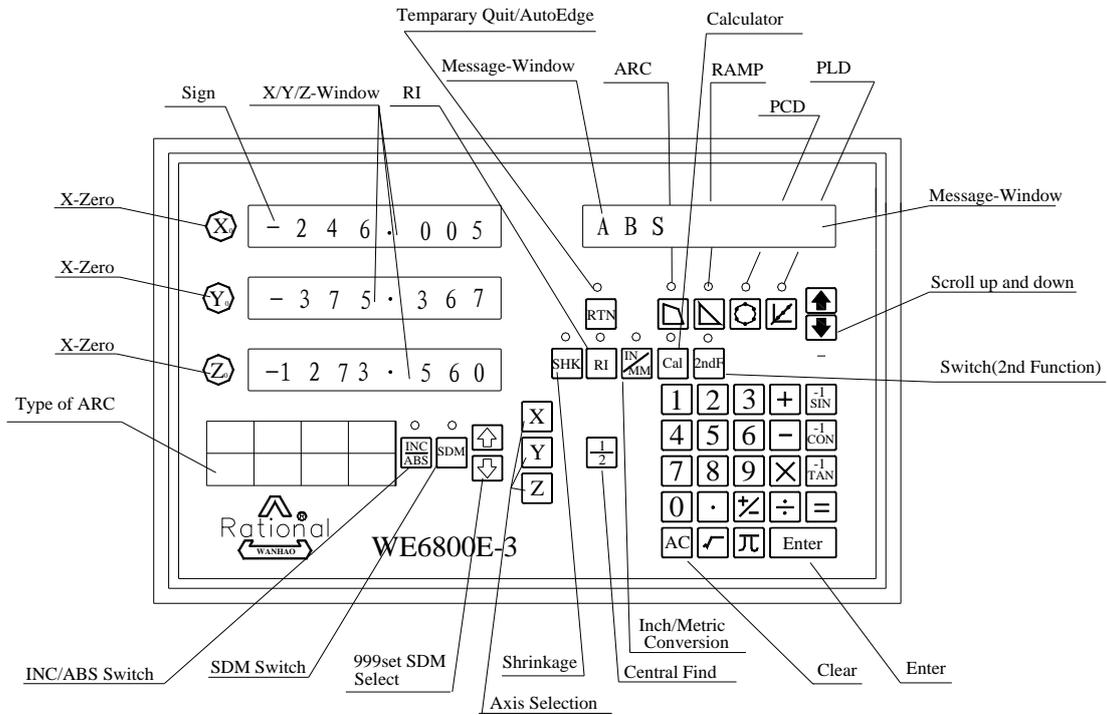
1.2 Illustration of rear panel

1.3 Description of key functions

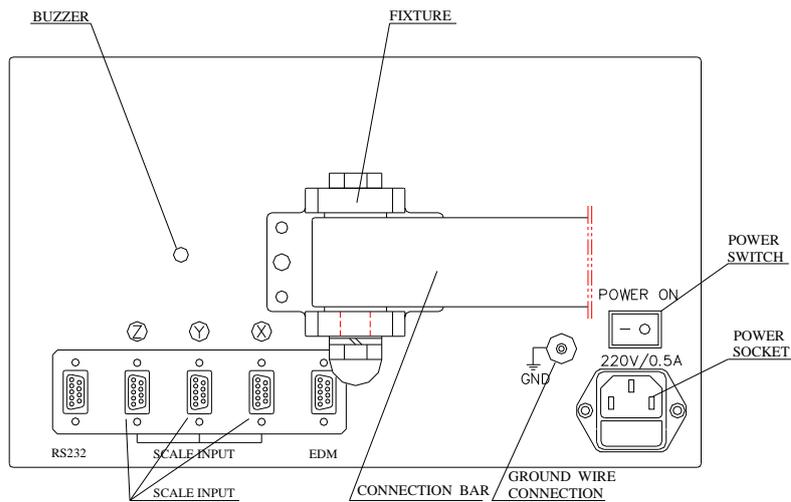|	KEY MARK	KEY NAME	FUNCTION INSTRUCTIONS	MILLING MACHINE	EDM	LATHE
1	$\widehat{X_0}$ $\widehat{Y_0}$ $\widehat{Z_0}$	Clear to zero	Clear the display value of designated axis			
2	X Y Z	Select axis	Select axis			
3	IN/MM	Metric or imperial conversion	Toggle display unit between Metric or imperial conversion			
4	$\frac{1}{2}$	Central finding function	Display value divided by 2			
5	INC/ABS	Absolute/Incremental conversion	Toggle between ABS and INC coordinate			
6	RI	Search origin of the linear scale	Search origin to of the linear scale in ABS state			
7	SHK	Shrinkage	Convert between shrink and normal (unshrink)			
8	SDM	SDM coordinate	Provides 1000 programs auxiliary coordinate to preset processing point			
9	⬇ ⬆	SDM coordinate scroll up/down	Scroll in 1000 programs coordinate			
10	0 ---- 9	Numeral	Enter number			
11	·	Decimal point	Enter decimal point			
12	+/−	+/- sign	Plus or minus sign to a data number			
13	Enter	Enter	Confirm every enter operation			
14	AC	Clear	Clear incorrect operation			
15	RTN	Quit Temporary	Return to normal state temporarily			
16	Cal	Calculator	Enter or exit calculator			
17	2ndF	Switch (2nd function)	1 Calculate inverse trigonometric function in calculating state. 2 Enter SDM coordinate NUM.			
18	SIN^{-1} CON^{-1} TAN^{-1}	Trigonometric function	Calculating trigonometric and inverse trigonometric function			
19	+ − × ÷	Add, decrease, multiply, divide	Add, decrease, multiply, divide operator			
20	√	Radical sign	Square root or square			
21	π	Circumference ratio	Enter circumference ratio			
22	=	Equality	Confirm calculating result			
23	DEEP SET	EDM DEEP	Setup EDM processing depth	X		X
24	E.COMP	EDM COMP	Setup EDM processing electrode consuming	X		X
25	EDM	EDM processing	Enter EDM procession	X		X
26	⬡	PCD	Find the position of a series of points around a circle			

Continuation:

	KEY MARK	KEY NAME	FUNCTION INSTRUCTIONS	MILLING MACHINE	EDM	LATHE
27		PLD	Pitched Line Divid			
28		ARC	Process a certain plane of a work-piece to an ARC plane		X	
29		RAMP	Process a certain plane of a work-piece to an incline plane		X	
30	LATHE	Lathe	Enter or exit lathe function	X	X	
31		Scroll up and down	Used to switch among process point in 26-29 items			

Remarks: *"X" indicates that there isn't such function.*

1.4 Pin assigment of Linear Scale Input

1) 9P D-Type Female
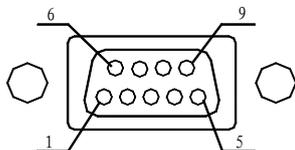
Pin No.	Signal Name	Color of wire
1	+5V	RED
2	0V	BLACK
3	A+	BROWN
4	B+	YELLOW
5	RI	ORANGE

2) High Density 15P D-Type Female
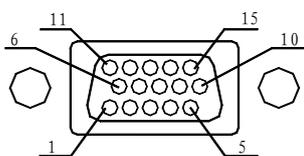
Pin No.	Signal Name	Color of wire
1	+5V	RED
2	0V	BLACK
3	A+	BROWN
4	B+	YELLOW
15	RI	ORANGE

3) DIN 7Pin Connector
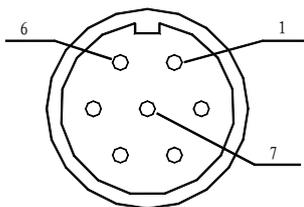
Pin No.	Signal Name	Color of wire
1	OV	RED
2	NC	
3	A+	BROWN
4	B+	YELLOW
5	+5V	RED
6	RI	ORANGE
7	FG	SHIELD WIRE

1.5 RS232 Interface
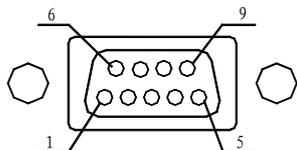
Pin No.	Signal Name	Color of wire
1	NC	
2	TXD	YELLOW
3	RXD	ORANGE
4	NC	
5	GND	BROWN
6-9	NC	

1.6 EDM Interface
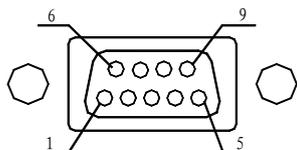
Pin No.	Signal Name	Color of wire
1	NC	
2	PUBLIC	ORANGE
3	OPEN	BROWN
4	NC	
5	IN+	RED
6	CLOSE	YELLOW
9	IN-	BLACK

2 <u>SETUP OPTION</u>

Set up various parameters to operate the linear scale as the customer.

<u>MENU ITEM</u>	<u>MEANING</u>
SEL SYS	Active axis select
DIRECT	Change the direction of measurement for each axis.
LIN COMP	Set a linear error compensation ratio
R OR D	Toggle of displaying NORMAL to DIAMETER format for each axis
Z DIAL	Z-DIAL value
RESOLUTE	Select the resolution for measurement to display
RELAY.MOD	RELAY mode
EDM MODE	select the mode of EDM
SDM DIR	Select the input mode of SDM
ERROR	Enable / Disable error message display
SHRINK	set shrinkage.
DEEP. COMP	Enable or Disable the electrode compensation in EDM mode
SLOP. MODE	mode in the SLOP function
LATH.MODE	Set lathe mode
RI MODE	Set RI mode
AUTO.SCH	Search border automatically or not
AUTO SET	Set parameters of an axis automatically.
ALL CLS	Clear all data (in EEPROM), resume default setup
EXIT	Save what you have setup and exit setup.

Remarks: *What you have changed would not been saved if you quit "SETUP" without select EXIT function (except the "AUTO SET" and "ALL CLS" functions). If you turn off the power or power outage, your setup would not work and you should set up again.*

2.1   Enter SETUP

After switching on, the DRO will automatically go through a brief self-test routine. Press [Enter] during this routine. The message-window will display "SETUP" when self –test is over. This indicates that you have entered "SETUP". Then press [↓] or [↑] to reach the option you wish to set up.

Remarks: *The [↓] and [↑] in this chapter refer to the arrow keys below the message window.*

2.2   Set numbers of linear scale installed

1. After entering "SETUP", press [↓] or [↑] until the message-window displays "SEL SYS".

2. Press [Enter] ,
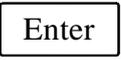
Y-window displays "1"or "2" or "3".

"1" indicates linear scale has only been installed in X-axis.

"2" indicates that linear scales have been installed in X-axis and Y-axis.

"3" indicates that linear scales have been installed in X-axis, Y-axis and Z-axis.

3. Press $\boxed{1}$; Y-window displays "1";

 Press $\boxed{2}$, Y-window displays "2";

 Press $\boxed{3}$, Y-window displays "3".

4. Press $\boxed{\text{Enter}}$ to confirm your selection and exit;

 Press $\boxed{\text{AC}}$ to cancel your selection and exit.

2.3   Linear scale direction

1. After you have entered "SETUP", press $\boxed{\downarrow}$ or $\boxed{\uparrow}$ until the message-window displays "DIRECT".

2. Press $\boxed{\text{Enter}}$ to enter direction setup;

 X-window, Y-window and Z-window will display "0" or "1" separately.

 "0" and "1" indicate converse linear scale measurement direction.

 The message-window displays "SEL AXIS". This indicates that the next step is to select axis.

3. Select an axes

 Press $\boxed{\text{X}}$ to change X-axis measurement direction;

 Press $\boxed{\text{Y}}$ to change Y-axis measurement direction;

 Press $\boxed{\text{Z}}$ to change Z-axis measurement direction.

4. Press $\boxed{\text{Enter}}$ to confirm your selection and exit.

 Press $\boxed{\text{AC}}$ to cancel your selection and exit.

2.4   Linear error compensation

This option allows you to correct errors between measuring value and standard value.

Correction range: ±9.999 mm/m

$$\text{Calculating method of correcting value} = \frac{(\text{Measuring value} - \text{Standard value}) \times 1000,000}{\text{Standard value}}$$

For example: Measuring value   1001.000 mm

 Standard value   1000.000 mm

 Correcting value   (1001.000-1000.000) ×1000 = 1000

Correcting value unit: µm/m.

1. After entering "SETUP", press ⬇ or ⬆ until the message-window displays "LIN COMP".

2. Press Enter ,

   X-window, Y-window and Z-window displays the original liner error separately.

   Correcting value is an integer with µm as unit.

   The message-window displays "SEL AXIS". This indicates that the next step is to select axis.

3. Selection of axes.

   Press X to select X-axis. Number on X-window flashes indicating that you can input the linear error compensation of X-axis;

   Press Y to select Y-axis. Number on Y-window flashes indicating that you can input the linear error compensation of Y-axis;

   Press Z to select Z-axis. Number on Z-window flashes indicating that you can input the linear error compensation of Z-axis.

   The message-window displays "ENTR.PPM", indicating it is waiting for data.

4. Press numeric keys to enter numbers.

   If you input incorrect numbers, press AC to cancel it, and then input again.

5. Press Enter to confirm your selection and return to "SEL AXIS" state.

6. Press Enter to quit line error compensation setup,or set up another axis by repeating the steps 3 -5.

2.5   Select R/D mode

1. After entering "SETUP", press ⬇ or ⬆ until the message-window displays "R   OR   D".

2. Press Enter , X-window, Y-window and Z-windows displays "0"or "1" separately.

   Remarks:

   *"0" indicates **R** mode, the display value equal to the actual value.*

   *"1" indicates **D** mode, the display is two double of the actual value.*

   The message window display "SEL AXIS", it indicate that the next step is to select axis.

3. To select axis

   Press X change the R/D mode of X axis;

   Press Y , change the R/D mode of Y axis;

   Press Z , change the R/D mode of Z axis

4. Press Enter to confirm the new setup and exit the setup.

Press [AC] to cancel your selection and exit.

2.6   Z Dial

When only install linear scale on the X axis and Y axis, you should set the Z dial to emulate the Z offset value. The Z dial indicates the distance the Z axis go when run a circle.

1. After entering "SETUP", press [↓] or [↑] until the message-window displays "Z DIAL".

2. Press [Enter], Y-axis displays the original Z dial and the message-window displays "Z DIAL".

3. Enter number, the number should be a positive real value;

   For example: the Z dial is 17.050mm, enter

   [1] [7] [·] [0] [5] [0] in due order.

   If incorrect number has been input, press [AC] and input again;

   If minus has been input, it's absolute value will be used instead.

4. Press [Enter] to confirm your selection and exit Z DIAL setup.

2.7   Scale Resolution

Resolution options: 0.05µm, 0.1µm, 0.2µm, 0.5µm, 1µm, 2µm, 5µm, 10µm, 20µm, 50µm.

0   After entering "SETUP", press [↓] or [↑] until message-window displays "RESOLUTE";

1   Press [Enter] ,

   X-window, Y-window and Z-window displays resolution of each axis separately.

   The message-window displays "SEL AXIS", indicating the next step is to select axis.

2   Axes selection

   Press [X] to change linear scale resolution of X-axis. Numbers on X-window flash;

   Press [Y] to change linear scale resolution of Y-axis. Numbers on Y-window flash;

   Press [Z] to change linear scale resolution of Z-axis. Numbers on Z-window flash.

3   Press [↓] or [↑] to scroll through 0.05, 0.10, 0.20, 0.50,1.00, 2.00, 5.00, 10.00,   20.00, 50.00.

   As the right resolution displayed, press [Enter] to confirm your selection and return to "SEL AXIS" state.

   Press [AC] to cancel your selection.

5 You can select another axis to set resolution by repeating 3-4 steps or press $\boxed{\text{Enter}}$ to exit resolution setup.

2.8   RELAY mode

1. After entering "SETUP", press $\boxed{\downarrow}$ or $\boxed{\uparrow}$ until message-window displays "RELAY.MOD".

2. Press $\boxed{\text{Enter}}$, Y-window displays "0" or "1".

3. Press $\boxed{0}$ or $\boxed{1}$ to convert RELAY mode.

4. Press $\boxed{\text{Enter}}$ to confirm your selection and quit RELAY mode setup.

    Press $\boxed{\text{AC}}$ to cancel your selection and quit RELAY mode setup.

In RELAY state:

RELAY MODE	SWITCH ON	ENTER EDM	PROCESS TO TARGET POSITION	EXIT EDM
MODE 0	OFF	OFF	ON	OFF
MODE 1	ON	ON	OFF	ON

2.9   EDM mode

1 After you have entered "SETUP", press $\boxed{\downarrow}$ or $\boxed{\uparrow}$ until message-window displays "EDM MODE".

2 Press $\boxed{\text{Enter}}$, Y-axis displays "0", "1" , "2", "3", "4" or "5".

3 Press $\boxed{0}$, $\boxed{1}$, $\boxed{2}$, $\boxed{3}$, $\boxed{4}$, or $\boxed{5}$ to convert EDM mode.

4 Press $\boxed{\text{Enter}}$ to confirm your selection and quit EDM mode setup.

   Press $\boxed{\text{AC}}$ to cancel your selection and quit EDM MODE setup.

2.10   Select input mode in SDM coordinate

1. After entering "SETUP", press $\boxed{\downarrow}$ or $\boxed{\uparrow}$ until the message-window displays "SDM DIR";

2. Press $\boxed{\text{Enter}}$, Y-window displays "0" or "1".

    "0" indicates that display value is equal to input value in SDM window.

    For example: Press $\boxed{5}$ $\boxed{0}$ $\boxed{\cdot}$ $\boxed{3}$ $\boxed{0}$ $\boxed{\text{Enter}}$, the display value is 50.30

"1" indicates that display value is equal to the negative of the enter value.

For example: Press $\boxed{5}$ $\boxed{0}$ $\boxed{\cdot}$ $\boxed{0}$ $\boxed{3}$ $\boxed{\text{Enter}}$, the display value is –50.03.

3. Press $\boxed{0}$ or $\boxed{1}$ to convert data input mode.

4. Press $\boxed{\text{Enter}}$ to confirm your selection and quit SDM DIR setup.

Press $\boxed{\text{AC}}$ to cancel your selection and quit SDM DIR setup.

2.11   ERROR signal display enable/disable

1. After entering "SETUP", press $\boxed{\downarrow}$ or $\boxed{\uparrow}$ until the message-window displays "ERROR";

2. Press $\boxed{\text{Enter}}$, Y-window displays "0" or "1".

"0" means no ERROR signal displayed if there is something wrong with linear scale or encoder (suppress the error warning), it will continue to work.

"1" means error message will be displayed when error occurs. If it does not affect the work, the user can

press $\boxed{\text{AC}}$,then the display get right and the work continue.

3. Press $\boxed{0}$ or $\boxed{1}$ to convert;

4. Press $\boxed{\text{Enter}}$ to confirm your selection and exit.

Press $\boxed{\text{AC}}$ to cancel your selection and quit ERROR setup.

2.12   Shrinkage ratio setup

1. After entering "SETUP" , press $\boxed{\downarrow}$ or $\boxed{\uparrow}$ until the message-window displays "SHRINK";

2. Press $\boxed{\text{Enter}}$, Y-window displays the original shrinkage ratio and the message-window displays "SHRINK".

3. Enter the shrink ratio you wish to apply. The ratio is a positive real value between 0.1 to 10.

If incorrect numbers have been entered, press $\boxed{\text{AC}}$ and input again.

4. Press $\boxed{\text{Enter}}$ to confirm your selection and .

Remarks: $Shrinkage\ ratio = \dfrac{Dimensions\ of\ the\ finished\ product}{Dimensions\ of\ the\ working\ piece}$

2.13 Deep compensation enable/disable

1. After entering "SETUP", press ⬇ or ⬆ until the message-window displays "DEEP.COMP".

2. Press [Enter], Y-window will displays "0" or "1".

    "0" indicates disable deep compensation;

    "1" indicates enable deep compensation.

3. Press [0] or [1] to convert.

4. Press [Enter] to confirm your selection and quit.

    Press [AC] to cancel your selection and quit.

2.14 Ramp process mode

1. After you entering "SETUP", press ⬇ or ⬆ until the message window displays "SLOP.COMP";

2. Press [Enter], Y-window will displays "0" or "1".

    "0" indicates **Z_STEP** mode.   Input the Z-axis Tool feed step;

    "1" indicates **MAX CUT mode.**   The feed step is constant cut value.

2 Press [0] or [1] to convert.

3 Press [Enter] to confirm your selection and exit.

    Press [AC] to cancel your selection and exit.

Remarks: *The definition of **MAX CUT** and **Z STEP**:*
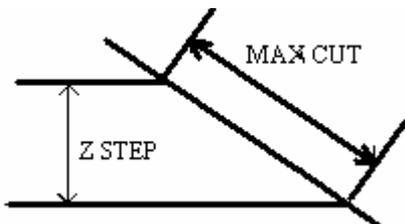
2.15 Select lathe mode

1 After entering "SETUP", press ⬇ or ⬆ until the message window displays "LATH.COMP".

2 Press [Enter], Y-window displays "0" or "1" or "2".

    "0" indicates Lathe Mode 0 (disable Lathe function).

    "1" indicates Lathe Mode 1.

"2" indicates Lathe Mode 2.

3 Press ⬚0⬚ or ⬚1⬚ ⬚2⬚ to convert (*refer to 3.16*).

4 Press ⬚Enter⬚ to confirm your selection and exit.

Press ⬚AC⬚ to cancel your selection and exit.

2.16 Set up RI mode

1 After entering "SETUP", press ⬚⬇⬚ or ⬚⬆⬚ until the message-window displays "RI MODE".

2 Press ⬚Enter⬚ to enter RI setup,

X-window, Y-window and Z-window will displays the *RI mode* of linear scale separately.

The message-window displays "SEL AXIS". This indicates that the next step is to select axis.

3 Select the axes

Press ⬚X⬚ to change the *RI mode* of X-axis, the X-window will flashing;

Press ⬚Y⬚ to change the *RI mode* of Y-axis, the Y-window will flashing;

Press ⬚Z⬚ to change the *RI mode* of Z-axis, the Z-window will flashing.

4 Press ⬚⬇⬚ or ⬚⬆⬚ , then 0, 2, 4, 6, 8, 10, 12, 14 will displayed in turn. Select the RI mode you wanted

and Press ⬚Enter⬚ to confirm, and go back to the select axis state. Press ⬚AC⬚ to cancel your selection

and go back to the select axis state.

5 Repeat step of 3 and 4 to set up the other axis's RI mode. Or you can press ⬚Enter⬚ to quit the RI mode
setup.

The definition of RI value:

RI is explained with a BYTE from b1 to b3.

b3	b2	b1
RI_POL	B_POL	A_POL

RI-POL   RI signal polarity
B_POL   B signal polarity
A_POL   A signal polarity

2.17 Enable/disable search border automatically

Set up whether search border automatically or not in EDM.

1   After entering "SETUP", press ⬇ or ⬆ until the message-window displays "AUTO.SCH".

2   Press ENTER, Y-window displays "0" or "1";

"0" indicates disable the search automatically function, "1" indicates enable it.

3   Press ⬜0 or ⬜1 to convert;

4   Press ⬜Enter to confirm your selection and exit.

Press ⬜AC to cancel your selection and exit.

2.18   Set up a certain axis automatically

Clear data message of a certain axis and then set data to the axis automatically.

After you have operated this function you must reset the origin of the linear scale.

This function includes the followings:

1: ABS zero;

2: INC zero;

3: All number of SDM (1000 group) coordinate is clear to zero;

4: Linear scale is installed to the axis set from X-axis at least;

5: Set the resolution to 5 µm;

6: The shrinkage is set to 1.000.

Operating steps:

1   If entering "SETUP", Press ⬇ or ⬆ until the message-window displays "AUTO SET".

2   Press ⬜Enter, the message window will show "SEL SYS".

3   Select an axis:

Press ⬜X to set up X-axis automatically and press ⬜Y to set up Y-axis, press ⬜Z to set up Z-axis . Then the message-window will display "WAITING", it's setting the system automatically now. It needs about 15 seconds. After finish the message-window will display "SET OK" 2 seconds. And then show you "SEL SYS", you can set another axis now.

4   Press ⬜AC to exit auto setup.

2.19   All clears

Description :   Clear all data except the linear compensation and the numbers the linear install. And the system will set parameters automatically.

After all clears you must set the origin of linear scale.

The original data can't be resumed after all clear.

Operating steps:

1 After entering "SETUP", press ⬇ or ⬆ until message-window displays "ALL CLS".

2 Press $\boxed{\text{Enter}}$ and the message-window displays "CLS ALL" and flash to remind the operator if he is sure to proceed.

At this moment there are two selections:

A. Press $\boxed{\text{AC}}$ to quit "ALL CLS";

B. Press $\boxed{\text{Enter}}$ to proceed "ALL CLS".

3 Press $\boxed{\text{Enter}}$ to clear all, the message-window displays "WAITING", indicating "ALL CLS" is processing. When it finishes clear, the message-window will display "CLS OK" for about two seconds, and then exit.

The value of parameters after all clear (factory default):

0   The counting direction of the linear scale is "0".
1   The mode of R/D is R.
2   Z DIAL =0.
3   RESOLUTE=5μ.
4   The EDM mode is manual detect mode (Mode 0).
5   The input mode is "0" in SDM state, and the display value equal to the input value.
6   Disable deep compensation, lathe mode is mode 0.
7   RELAY mode is 0, Ramp process mode.

2.20 Exit SETUP

1 After entering "SETUP", press ⬇ or ⬆ until message-window displays "EXIT".

2 Press $\boxed{\text{Enter}}$ to exit "SETUP".

Remarks: *The modified data is valid only after quit "SETUP" by "EXIT" (except "AUTO SET" and "ALL CLS").
If you switch off in the process of setting up or power outage, the change doesn't work and you should set up again.*

3 BASIC OPERATING

3.1 Switch ON

Function: When you Switch on POWER, the digital read-out (DRO) will automatically go through a brief of self-test routine. If don't enter "SETUP", it will enter normal monitor status when self-test is over. It can memorize the followings when it works normally.

> A: The position when last power off;
> B: ABS/INC/SDM mode;
> C: The shrink is set or not
> D: Metric/imperial mode.

If linear scale is moved before the power switched on, you must search the origin of the linear scale again.

Nouns definition:

Normal monitor state:

> *The state DRO automatically enter after you switch on the or quit "SETUP". In normal monitor state, X-window, Y-window or Z-window displays the value of X-axis, Y-axis or Z-axis separately. The message-window displays "ABS" or "INC" or "SDM ***" (*** indicates the NUM of SDM coordinate, which with an range 000~999). When you switch among ABS/INC/SDM, MM/INCH, or shrinkage/un-shrink, you will not leave this state. When you enter CALCULATOR function, input data to X(or Y or Z) axis, function of searching the origin (RI)of the linear scale or special function (PCD, PLD, ARC, RAMP and EDM function), DRO is not in the normal monitor state.*

3.2 Clear to ZERO

Function: When the DRO is in the *normal monitor state*, it zeros the value of axes.
Remarks:

> *1 When the DRO is in the other states (for example, in the state of calculate function or in special function), you can't clear the axis. And you should return to the normal monitor state;*
> *2 You can clear in SDM/ABS/INC states;*
> *3 When you clear in ABS coordinate, you clear the INC display value simultaneously.*
> *When you clear in INC mode, there is no effect to ABS and SDM display value.*

Operating steps:

1 Return to *normal monitor state*.

2 Press (X₀) to zero X-axis;

Press (Y₀) to zero Y-axis;

Press (Z₀) to zero Z-axis.

3.3 Preset Data

Function: Set up the display value of the current position in *normal monitor state*.

Remarks:

1   When the DRO is in other states(e.g. calculator function or special functions), you can't preset data. In this case, you should first return to *normal monitor state*.

2   You can preset data in *SDM/ABS/INC* state.

3   In SDM state, input mode in SDM coordinate is "0" indicates that display value is equal to enter value; input mode in SDM coordinate "1" indicates that display value is equal to the negative of enter value. (Please refer to 2.10).

4   Input data range: the minimum value to the maximum value could displayed on an axis window.

Operating steps: To enter a value of –125.457 in X-axis:

1   Return to *normal monitor state*.

2   Press $\boxed{\text{X}}$, X-window displays "0", waiting for entering data.

3   Press $\boxed{1}\ \boxed{2}\ \boxed{5}\ \boxed{\cdot}\ \boxed{4}\ \boxed{5}\ \boxed{7}\ \boxed{\pm}$ in due order.

If it is in SDM state and SDM input mode is "1", you needn't input $\boxed{\pm}$, Otherwise, you must enter $\boxed{\pm}$.

If you input incorrect numbers, press $\boxed{\text{AC}}$ and then input again.

4   Press $\boxed{\text{Enter}}$ to confirm your input value.

5   Input data in Y-axis and Z-axis in the same way.

3.4 Imperial/Metric conversion

Function: Switch display dimension modes between "mm" and "inch".

Remarks: *You can't convert when the digital read-out is in other states (e.g. calculator function or special function). In this case, you must first return to normal monitor state.*

Operating steps:

1   Return to *normal monitor state*;

2   Press $\boxed{\substack{\text{IN}\\\text{MM}}}$ to convert.

3.5 Search the center of work-piece

Function: Divide the current display value by 2. With this function, you can set origin at the center of the work-piece.

Example: Set up the central point of X-axis for the work piece.

Operating steps:

1. Return to normal monitor state.

2. Locate to your first position (one edge of your work-piece) and press ⬡ⓍⓍ to zero X-axis.

3. Locate to the second position (the other edge of the work-piece) and press ⌊½⌋ to locate the central point. The message-window displays "1/2 AXIS".

4. Press ⌊X⌋, you have set up the central find of X-axis.

5. Move until the display value of X-axis is "0"and it is the central of the work-piece.

3.6 Transform in shrink state and un-shrink state

Function: After setting up shrinkage ratio, you can process the mould tools according to dimensions of the finished products without calculating dimensions of materiel.

Display dimension = product actual dimension $\times$ shrink ratio (Please refer to 2.12).

Operating steps:

1   Return to *normal monitor state*.

2   Press ⌊SHK⌋ and don't release until the Y-window display displays the shrinkage you wish to apply and the message-window displays "SURE AGN". This indicates that you need to confirm once again if you want to enter shrink state.

3   Press ⌊Enter⌋ to enter shrink state. (Press any other key to return to un-shrink state)

4   In shrink state, DRO will transform to un-shrink state when ⌊SHK⌋ is pressed. (Shrink LED will be off)

Remarks:

1   *Press ⌊SHK⌋ and don't release until you press ⌊Enter⌋ simultaneously to enter SHRINK state.*

2   *With this function, you can look up the shrink ratio which set by SETUP (refer to 2.12):*

   Press ⌊SHK⌋, Y-window displays shrink ratio, then press any key to return to the original state.

3   *In shrink state, shrink LED will flash.*

3.7 Switch to ABS coordinate

Function: DRO provides three coordinates: ABS, INC and a number of 1000 sets of SDM (0 ~ 999).

1. Origin of the work-piece is set at the origin of ABS coordinate;

2. The relative distance value of the SDM and ABS retains when you change ABS origin;

3. If ABS coordinate is zeroed, the INC coordinate of this point is zeroed accordingly.
    If INC coordinate is zeroed, ABS coordinate retains.

Operating steps:

1   Return to *normal monitor state*.
2   **A.** If the message-window displays "ABS", this indicates that you have entered ABS state.
     B. If the message-window displays "INC", this indicates that it is in INC state.

     Press INC/ABS , then the message-window displays "ABS". This indicates there is in ABS state.

     C. If the message-window displays "SDM", this indicates that it is in SDM state.

     In this case, you should first press INC/ABS or SDM to enter "ABS" or "INC" state.

     If you have entered INC state, then press INC/ABS and you will switch to "ABS" state.

3.8 Switch to INC state

Function: Please refer to 3.7.

Operating steps:

1.   Return to *normal monitor state*;
2.   **A**. If the message-window displays "INC", this indicates that it is inINC state.
      B. If the message-window displays "ABS", this indicates it is in ABS status;

      Press INC/ABS and the message window will display "INC". This indicates that it is in INC state.

      C. If the message-window displays "SDM", this indicates that it is in SDM state.

      You should first press INC/ABS or SDM to return to "ABS" or "INC" state.

      If you are in ABS state, then press INC/ABS to switch to "INC" state.

3.9 Switch to SDM state

Function: Please refer to 3.7.

Operating steps:

1   Return to *normal monitor state*.
2   **A**. If the message-window displays "SDM", this indicates that it is in SDM state.
     B. If the message-window displays "ABS" or "INC", this indicates that it is in ABS or INC state.

     Press SDM until the message-window displays "SDM ***", *** indicates the SDM coordinate NUM last time.

3.10   Set SDM program number

Function: Enter new SDM coordinate NUM in SDM state

Operating steps:

1   Enter SDM state.

2   Press $\boxed{\text{2ndF}}$, message-window display flashes, this indicates you can at present input new coordinate NUM.

3   Enter coordinate NUM:

       For example: Press $\boxed{6}$ $\boxed{6}$ $\boxed{6}$

4   Exit

     Press $\boxed{\text{2ndF}}$, SDM display will stop flashing and the program numbers change to 666.

3.11   Increase SDM program number

Function: In SDM state, press $\boxed{\downarrow}$ (next) and SDM program number will increase 1.

For example: The original coordinate NUM is 777, and the message-window displays "SDM 777". Press $\boxed{\downarrow}$, The message-window will display "SDM 778" and it will update the display value of X-axis, Y-axis, Z-axis according to the origin of 778th SDM coordinate.

    When the coordinate NUM is 999, press $\boxed{\downarrow}$ will cause the coordinate NUM to 000.

3.12   Decrease SDM group number

Function: In SDM state, press $\boxed{\uparrow}$ and SDM program number will decrease 1.

For example: The original coordinate NUM is 777, and the message-window displays "SDM 777". Press $\boxed{\uparrow}$, the message-window will display "776" and it will update the display value of X-axis, Y-axis, Z-axis according to the origin of 776th SDM coordinate.

    When the coordinate NUM is 000, press $\boxed{\uparrow}$ will cause the coordinate NUM to 999.

3.13   SDM all clear

Function: Clear the origin of all 0-999 SDM coordinate. After clearing, the display value in SDM is equal to the display value in ABS coordinate.

Operating steps:

1   Return to *normal monitor state*.

2   Press $\boxed{\frac{\text{INC}}{\text{ABS}}}$ and $\boxed{\text{AC}}$ simultaneously for 2 seconds, the message-window will display "CLS SDM". This indicates that SDM CLEAR is going. The message-window will display "CLS OK" when clearing finished after 10 seconds and return to the previous state.

3.14   Search linear scale origin (RI)

Function: Search the origin of the linear scale and store the distance from the position when you switch off to the origin of the linear scale. If the linear scale moves before the power is on, you should also search the origin of the linear scale again.

Operating steps:

1   Switch to ABS coordinate. (Please refer to 3.7)

2   Press $\boxed{\text{RI}}$, then the message-window displays "SEL AXIS".

3   Select the axis on which you need to search the origin.

4   Move the linear scale to search the origin. After the origin has been found, the alarm will sound, the window stops flashing. DRO adjust the display value according to the origin and quit this setup to return to the *normal monitor state*.

   If you want to cancel in the process of searching, you can press $\boxed{\text{AC}}$ during the search process.

Example:

   Press $\boxed{\text{Z}}$ if you want to search RI on Z-axis. The message-window displays "FD. Z REF", Z window flashes. Move the linear scale on Z axis until the buzzer sound.

3.15   Clear error information of the linear scale

   When ERROR signal display is enable, the message-window will display "E1" if the signal of **A** phase and **B** phase of the linear scale changed at the same time; the message-window will display "E2" if the linear scale run too fast; the relative window will display "E3" if the two conditions occur simultaneously,. When error signal appeared, the distance the linear scale record is incorrect. So you need to search the origin of linear scale again. If you thought that it doesn't affect your work, press $\boxed{\text{AC}}$ to clear error information and continue your work.

3.16   Lathe function

Function:

   (1) Lathe mode 0: normal display (The lathe function is disable);

   (2) Lathe mode 1: X-Window value =X-axis normal value + Y-axis normal value;

   (3) Lathe mode 2: X-Window value =X-axis normal value + Z-axis normal value;

Operating steps:

1.   In SETUP set LATH.MODE to 1 (Please refer to 2.14).

2.   Press $\boxed{\text{LATHE}}$ key In *normal monitor state* to enter Lathe mode in which the lamp of LATHE is on.

3.   In lathe state, press $\boxed{\text{LATHE}}$ key to exit the Lathe mode, then the lamp of LATHE turns off.

4.SPECIAL FUNCTIONS

Remarks:

1 ⬇ *or* ⬆ *of this chapter refer to* ⬇ *or* ⬆ *below the message-window.*

4.1   PCD process (Pitch Circle Diameter)

Function: WE6800 series DROs provide the operator with the function to find the position of a series of points around the circumference of a circle. All the operator need to do is to enter the following parameters:

RADIUS:	Radius
ST. ANGLE:	Start angle
END. ANGLE:	End angle
HOLE NUM:	Number of hole
DIRECT:	Angle direction

After the parameter entered, it will automatically calculate the position of each hole. Press ⬇ or

⬆ to select hole number and move the machine tool until X-window displays "0" and Y-window displays "0" and it is the position of the hole.

For example:

Radius (RADIUS):	100
Start angle (ST. ANGLE)	30°
End angle (END. ANGLE)	150°
Number of hole (HOLE NUM)	5
Angle direction (DIRECT)	0

Remarks: "0" indicates that it is counterclockwise from ST. ANGLE to END. ANGLE.
"1" indicates that it is clockwise from ST. ANGLE to END. ANGLE.

Operating steps:

1   Transform the display unit to millimeter (Please refer to 3.4).
Move the machine until the top point of the tool fixes on the center of the circle. X-axis clears, Y-axis clears (please refer to 3.2).

2   Press ⬡ to enter PCD function. If you have enter parameter, press | Enter | to enter procession.

3   Enter radius,
Y-window displays the original radius, the message-window displays "RADIUS".

Press | 1 | | 0 | | 0 | | Enter | in due order.

Remarks:

1. *If incorrect parameter has been entered and you haven't press* | Enter |*, press* | AC | *to clear*

directly and input again; if you have pressed Enter *, and begin to set up the next parameter,*
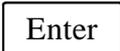
you should press ⬆ *to return to RADIUS set and input again. Treat with other error parameters in the same way.*

2. *The radius couldn't be 0;*

4   Input ST. ANG

The message-window displays "ST. ANG", Y-window displays the original start angle.

Press 3 0 Enter *in due order.*

5   Input END.ANG

The message-window displays "END.ANG", Y-window displays the original end angle.

Press 1 5 0 Enter *in due order.*

6   Set   Number of Holes

The message-window displays "HOLE NUM"; Y-window displays number of holes.

Press 5 Enter *in due order.*

7   Select direction

The message-window displays "DIRECT"; Y-window displays the original direction.

Press 0 Enter *in due order to input the angle direction.*

8   The message-window displays "HOLE 1";

Move the machine until X-window and Y-window display "0.000" and begin to punch.

9   Press ⬇ or ⬆   to change among the holes.

10   Press ⬡ to return to *normal monitor status*.

Remark: *In the course of PCD process, press* RTN *and leave PCD function temporarily to return to the normal Monitor state of X,Y or Z-axis in order to check the position the DRO has calculated. And then press*

RTN *again to return to PCD function.*

4.2   PLD process (Pitch Line Divided)

Function: WE6800 series DRO provide PLD function. All of the operator need to do is to enter the following parameters:

LINE DIS	Pitch line distance
LINE ANG	pitch line angle
HOLE NUM	number of hole

The DRO will automatically calculate the position of holes after you have input the parameter. Press

⬇ or ⬆ to select hole number and move the machine until the display value of X-window and Y-window is "0" and it is the position of the hole.

Example:

LINE DIS   500.6

LINE ANG   60°

HOLE NUM   5

Operating steps:

1   Transform the display unit to millimeter (Please refer to 3.4).

Move the machine until the top point of the tool fixes to the start point, then clear the X-axis and the Y-axis. (Please refer to 3.2)

2   Press [⊿] to enter PLD function. If parameters had been input, press [Enter] to enter processing state directly.

3   Set LINE DIS (Line length)

Y- window displays the original line length. The message-window displays "LINE DIS".

Press [5] [0] [0] [·] [6] [Enter] in due order.

4   Set LINE ANG (Line angle)

Y-window displays the original line angle; The message-window displays "LINE ANG".

Press [6] [0] [Enter] in due order.

5   Set HOLE NUM (number of holes)

Y-window displays hole numbers ; The message-window displays "HOLE NUM".

Press [5] [Enter] in due order. Then begin to process.

6   The message-window displays "HOLE 1";

Move the machine until the display value of X-window and Y-window is "0.000".   Then you can drill a hole at this point.

7   Press [↓] or [↑] to convert among holes.

8   Press [⊿] to return to normal monitor state.

Remark: *In the course of PLD process, the operator can press* [RTN] *to leave this function temporarily and return to normal display of X, Y or Z-axes in order to check the position which the DRO calculated.*

Then press [RTN] *once more to return to PLD function.*

4.3   ARC process

Function:

1. There are 8 type ARC processing modes as illustrated as the figure on the following page.

2. When you use a flatbottomed tool for ARC process, set the tool diameter to 0.

3. When you select tool compensation direction to process YX and XZ planes, the tool is in the same plane with the process plane. There is only one type of tool compensation direction for each ARC model. When you process in XY plane, the tool is vertical to process plane. There are internal ARC process and external ARC process for each type. So there are two tool compensation directions:

T+TOOL and T-TOOL.

The following figure shows you the eight types of preset R process mode:

Type of ARC(Type 1-8)
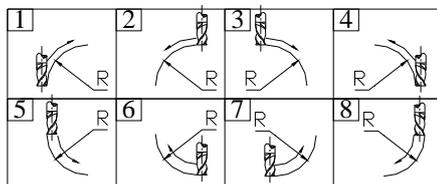
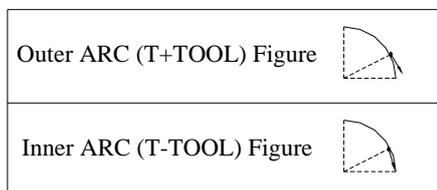## Direction of Tools Compensation (for XY pane)

Enter the following data for ARC processing:

	TYPE 1-8	Type of ARC	
*	T+ TOOL / T-TOOL	Select between T+ TOOL / T-TOOL (particularly for XY plane)	
	RADIUS	The radius of Arc that will be processed.	
	TOOL DIA	Tool diameter	
*	MAX CUT	Feed Step	(special for XY plane)
**	Z STEP	Feed Step	(special for YZ, XZ plane)

Example 1:
SIMR	XY
TYPE	2
T+TOOL	
RADIUS	200mm
TOOL DIA	5mm
Z STEP	1mm
SHRINK	shrinkage isn't taken into consideration.

Operating steps:

1. In *normal monitor state*, select the mm conversion.   The shrink lamp doesn't light up.
2. Enter ARC processing state:

   Press [⬜] to enter ARC processing state.

   If parameters have been entered, press | Enter | to enter processing state directly.

3. Select processing plane;

   Press | Z |, | Enter | to select ZX plane and enter state of selecting processing mode.

Remarks: $\boxed{X}$ indicates XY plane;

$\boxed{Y}$ indicates YZ plane;

$\boxed{Z}$ indicates ZX plane.

You can press $\boxed{\downarrow}$ or $\boxed{\uparrow}$ near $\boxed{\text{SDM}}$ to switch among XY plane, YZ plane or ZX plane.

4.   Select processing mode;

The message-window displays "TYPE-8"; Y-window displays the previous processing mode;

Press $\boxed{2}$, $\boxed{\text{Enter}}$ to enter Mode 2 and enter the state to select   T+TOOL   or   T-TOOL;

5.   Select T+TOOL mode

Press $\boxed{+}$, $\boxed{\text{Enter}}$ to select the T+TOOL mode and then go to set arc radius value.

Remarks : $\boxed{+}$ indicates T+TOOL

$\boxed{-}$ indicates   T-TOOL

6.   Set   ARC radius

The message-window displays "RADIUS", Y-window displays the previous set radius value;

Press $\boxed{2}$ $\boxed{0}$ $\boxed{0}$ $\boxed{\text{Enter}}$ in due order.

7   Set Tool diameter

The message-window displays "TOOL DIA"; Y-window displays the previous set tool diameter;

Press $\boxed{5}$ $\boxed{\text{Enter}}$ in due order.

8   Set Z-axis Feed STEP

The message-window displays "Z STEP"; Y-window displays the previous set step value.

Press $\boxed{1}$ $\boxed{\text{Enter}}$.

Complete the ARC parameter setting and then go to execute ARC process (Step 9) automatically.

9   Arc process

The message-window displays "POIN 1".   Process until the display value of X-axis and Y-axis is "0".

You have finish processing the first point; Press $\boxed{\downarrow}$ to transform to the second point and repeat the

above steps. Press $\boxed{\downarrow}$ or $\boxed{\uparrow}$ to select the processing points.

The coordinate that X-window and Y-window display is the coordinate of the top point of the tool.

10   When you finish processing, press $\boxed{\diagup}$ to exit.

Remark:

In the ARC processing, the operator can press $\boxed{\text{RTN}}$ *to leave this function temporarily to return to normal display of X,Y or Z-axis in order to check the position the DRO has calculated.*

Press $\boxed{\text{RTN}}$ *again to return to ARC function.*

If Z-axis hasn't been installed, press ⬇ *or* ⬆ *to emulate the Z-axis.*

S*teps:*

1   *Set up Z dial in SETUP.*

2   *Before you process, you should first locate the machine to the Z-axis of the R start point and clear the value on Z-axis's to 0.*

3   *In the course of processing, the message-window displays the emulated height of Z-axis. It is the height of Z-axis of the current position when the operator stops processing.*
If you process XY plane, X-window displays the position of X-axis. You complete process at X direction when the display value of X-axis is "0".   The first two digits of the number displayed on Y-window is the number of the dial circles, the latter five digits is the number of graduation. It means that you only need to process to the graduation of the circle as regards to the current processing point.
If you process YZ plane, Y-window displays the position of Y-axis. You needn't process at Y direction when the display value of Y-axis is "0"; The first two digits of the number displayed on X-window is the number of the dial circles, the latter five digits is the number of graduation. It means that you only need to process to this position as regards to the current process point.

4.4   RAMP process

Function introduction: WE6800 series provide function of RAMP. All the operator need to input is as follows:

INCL ANG   ramp angle
MAX CUT   the ramp length each time process.

After data has been input, the DRO will automatically calculate the position of each ramp points. Press ⬇ or ⬆ to select sequence number of process point and process with the tool until the display value of X and Y axes of the plane is "0" and it is the position of the point.

Example:

1. PLANE   YZ
2. INCL ANG   240°
3. MAX CUT   1.2

Remarks: The definition of Z STEP and MAX CUT.
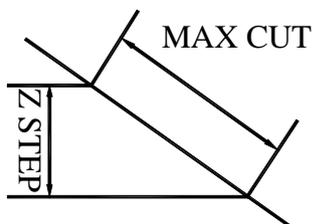
Operating steps:

1.   Select the display unit to mm. (please refer to 3.4)
Set SLOP.MODE to 1 in SETUP (refer 2.14). If 3rd parameter is "Z STEP", set SLOP.MODE to 0.
Move the machine to the central point of the circle until X axis clear and Y-axis clear.(Refer to 3.2)

2.   Press ◻ to enter RAMP processing function.

    Press ┌ Enter ┐ to start RAMP process if the parameters are input already.

3.   Select the processing plane:

    Press │ Z │, │ Enter │ and select ZX plane to enter processing selecting mode.

    Remarks: │ X │ indicates XY plane;

        │ Y │ indicates YZ plane;

        │ Z │ indicates ZX plane.

    You can also press ⬇ or ⬆ near │SDM│ to switch among XY plane, YZ plane or ZX plane.

4.   Enter the ramp angle

    The message-window displays "INCL ANG"; Y-axis displays the original incline angle.
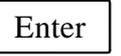
    Press │ 2 │ │ 4 │ │ 0 │ │ Enter │ in due order.

5.   Set incline length of each time

    The message-window displays "MAX CUT"; Y-axis displays the original incline length.

    Press │ 1 │ │ · │ │ 2 │ │ Enter │ in due order.

6.   Procession

    The message-window displays "POIN   1".

    Process until Y axis and Z axis display 0, then press ⬇ and proceed to the next step.

7.   Press ⬇ or ⬆ to select the points, and process as step 6.

8.   Press ◻ again to exit BVEL process (return to *normal monitor state*).

Remark:

    If Z-axis hasn't been installed, press ⬇ or ⬆ to emulate the Z-axis.

    Press ⬇ to emulated Z-axis to move to the next position or press ⬇ to move the previous position.

    Steps:

    1   Set Z DIAL in SETUP;

    2.   Before processing, set the machine to the Z-axis of the RAMP start point and clear Z-axis position to "0.000";

    3.   In the course of processing, the message-window displays the emulated height of Z-axis. It is the height of Z-axis of the current position if the operator stops processing;
    If you process XY plane, X-axis displays the position of X-axis. If X-axis displays "0", this indicates that you have complete processing at X direction; The left two digits of the numbers displayed in Y-axis is the numbers of the circles, the latter five digits is the numbers of *graduation.* This indicates that you process to *this position as regards to the current point;*
    If you process YZ plane, Y-axis displays the position of Y-axis. If Y-axis displays "0", this indicates that

you needn't process at Y direction; The front two digits of the numbers displayed in X-axis is the numbers of the circles, the latter five digits is the numbers of graduation..   This indicates that you process to this position as regards to the current point;

In the course of RAMP processing, by pressing RTN *the operator can temporarily leave this function to display the normal value of the X, Y, Z axes which in order to check the position the DRO has calculated.*

Repress RTN *to return to RAMP function.*

4.5   Set up EDM DEEP, EDM HOME

Function: To control EDM processing depth.

Example: Set depth to 156.125mm

EDM HOME to 30.05mm

(EDM HOME value is the height the electrode exit from the process plane when EDM finish processing. Only the exit distance exceed this height the relay can be reset.)

Operating steps:

1   In *normal monitor state*, switch to metric system in MM/IN state.

2   Press DEEP SET ,

Y-axis displays the previous set depth; The message-window displays "EDM DEEP".

3   Press 1 5 6 · 1 2 5 Enter in due order.

4   Enter   EDM HOME

Y-axis displays EDM HOME value.   The message-window displays "EDM HOME".

5   Press 3 0 · 0 5 Enter in due order.

6   Press DEEP SET to quit EDM DEEP setup.

4.6   Electrode compensation setting

Function: When processing depth with electric discharge machine(EDM),the electrode of the EDM will wear out. The amount of electrode compensation equal the length wear out in the each processing.

Example: Electrode compensation amount equal 1.25mm.

Operating steps:

1   In *normal monitor state*, switch the display unit to mm.

2   Set up DEEP.COM to "1" in "SETUP"(refer 2.13).

3   Press E.COMP ,

Y-axis displays the previous set electrode compensation value.

The message-window displays "EDM COMP".

4 Press $\boxed{1}$ $\boxed{\cdot}$ $\boxed{2}$ $\boxed{5}$ $\boxed{\text{Enter}}$ in due order.

5 Press $\boxed{\text{E.COMP}}$ to quit from the setup and return to *normal monitor state*.

4.7 EDM process

EDM has 6 processing modes: manual and automatic modes.

MODE0	Manual mode 1
MODE1	Automatic mode 1
MODE2	Manual mode 2
MODE3	Manual mode 3
MODE4	Automatic mode 2
MODE5	Automatic mode 3

You can select one in SETUP. (Please refer to 2.9)

Remark: *Difference between diversified modes:*

EDM MODE	SEARCH BORDER AND CLEAR AUTOMATICALLY	PORCESS DIRECTION WHEN THE DEPTH IS MINUS	EXIT AFTER THE FIRST PROCESSION	THE PLUS DIRECTION OF Z-AXIS
0	NO	DOWN	EXIT	DOWN
1	YES	DEPTH CAN'T BE MINUS	DON'T EXIT	DOWN
2	NO	DOWN	DON'T EXIT	DOWN
3	NO	UP	EXIT	DOWN
4	YES	UP	DON'T EXIT	UP
5	YES	DEPTH CAN'T BE PLUS	DON'T EXIT	UP

MODE 0 EXAMPLE:

1 With normal manual process, SHRINKAGE isn't taken into consideration.
2 The EDM DEEP is 20mm and the EDM HOME is 5 mm.
3 Electrode compensation is 0.01 mm.

Operating steps:
1 Set EDM MODE to 0 when you enter SETUP after switching on (Please refer to 2.9).
   DEEP.COM was set to 1, means there is Electrode compensate.
2 Shrinkage isn't taken into consideration (Please refer to 3.6).
3 Transform the display unit to mm(Please refer to 3.4).
4 Set EDM DEEP to 20 mm, EDM HOME to 5 mm(Please refer to 4.5).
5 Set Electrode compensation to 0.01 mm(Please refer to 4.6).

6 Move the electrode header, until it touch the process plane, then press $\boxed{Z_0}$ to clear Z-axis.

7 Enter EDM function.

Press $\boxed{\text{EDM}}$, message-window displays "EDM RUN".

Z-window displays the current position of the electrode; X-window displays the EDM DEEP +

EDM COMP; Y-window displays the maximum depth of the previous processing.

8   The alarm will sound when Z-window value = EDM DEEP + EDM COMP. Then message-window displays "BACKWARD", the operator stops processing and the electrode header quit;

When withdrawing the electrode, Z-window displays the current position of the electrode; X-window displays the EDM DEEP + EDM COMP; Y-window displays the maximum depth processed.

If the electrode does not exit in 25 seconds, DRO exit the process automatically.

If the electrode exit distance exceeds EDM HOME value, quit this process.

9   When the electrode is withdrawn from the holes, the alarm still sounds, DRO quit the process. After adjust X-axis and Y-axis of the electrode, Press ⌷EDM⌷, repeat step 7~step9 to process next hole.

The light of EDM is flash during process if the depth compensate is enable.

During EDM process, you can press ⌷EDM⌷ to quit the procession.

Remark: *In the course of EDM process, by pressing ⌷RTN⌷ the DRO can temporarily quit EDM function and return to normal XYZ display in order to check the position the DRO calculates. Repress ⌷RTN⌷ to return to EDM function.*

MODE 1 EXAMPLE:

1   With normal manual process, SHRINKAGE is taken into consideration.

2   The EDM DEEP is 100 mm and EDM HOME is 30 mm.

3   Electrode compensation is 0.01 inch.

4   EDM COMP is 0.5 mm.

5   The Z-axis direction is down.

Operating steps:

1   Set EDM MODE to 1 when you enter SETUP after switching on (Please refer to 2.9).

DEEP.COM was set to 1 which means the EDM COMP is enabled.

2   Transform to shrinkage state (Please refer to 3.6).

3   Set the display unit to mm (Please refer to 3.4).

4   Set EDM DEEP to 100 mm, EDM HOME to 30 mm (Please refer to 4.5).

5   Set EDM COMP to 0.5m (Please refer to 4.6).

6   Enter EDM function:

Press ⌷EDM⌷, the message-window display "SCH BD", Z-window display the current position of the electrode; X-window displays the EDM DEEP + EDM COMP; Y-window displays the maximum depth of the previous procession.

7   Search border and clear:

Move the electrode header until it touching the process plane, Z axis is cleared automatically, and the procession begin. You can press $⟨Z_0⟩$ to clear Z-axis also (if you had set "AUTO SCH" 0, you have to clear Z-axis manually by pressing $⟨Z_0⟩$).

8   Z-window display the current position of the electrode; X-window displays the EDM DEEP + EDM COMP; Y-window displays the maximum depth processed; Message-window displays "EDM RUN".

9   The alarm will sound when Z-window value = EDM DEEP + EDM COMP. Then the message-window displays "BACKWARD", the procession stop and the electrode header quit.

When withdrawing the electrode, Z-window displays the current position of the electrode; X-window displays the EDM DEEP + EDM COMP; Y-window displays the maximum depth processed.

If the electrode does not exit in 25 seconds, exit the process.

If the electrode exit distance exceeds EDM HOME value, exit this process.

10   When the electrode is withdrawn a distance equal EDM HOME from the processing panel, you can process another hole by repeat steps 7~9.

11   Press [EDM] to exit the procession.

MODE 2 EXAMPLE:

1   Automatic process, shrinkage isn't taken into consideration;
2   EDM depth is 100mm;
3   Electrode compensation is 0.5mm;
4   The EDM HOME is 3mm when withdrawing the electrode.

Operating steps:

1   After entering SETUP, set EDM MODE to 1 (Please refer to 2.9).
     Set DEEP.COM to 1 (If the previous setting is mode 2, you needn't set up).
2   Shrinkage isn't taken into consideration (Please refer to 3.6).
3   Select mm as the display unit (Please refer to 3.4).
4   EDM DEEP is 12mm (Please refer to 4.5).
5   EDM COMP is 0.01mm (Please refer to 4.6).

6   Move the electrode until it touches the processing panel. Press ⟨Z₀⟩ to clear the Z-axis.

7   Enter EDM function.

     Press [EDM], Z-window displays the current position of the electrode; X-window displays EDM DEEP + EDM COMP, Y-window displays the maximum depth processed. Message window "EDM RUN".

8   When Z-axis value = EDM DEEP + EDM COMP, the buzzer sound continuously, message-window display "BACKWARD", the procession stop and the electrode withdraw.

     When the electrode exit, Z-window displays the current position of the tool, X-window displays the EDM DEEP + EDM COMP, Y-window displays the maximum depth processed.

10   After the electrode exited, adjust the X-axis and Y-axis, and then press [EDM] to process another hole.

Remark: *A pressing on EDM when the tool down can cause exit from procession.*

MODE 3 AND MODE 4:

Mode 3 procession has the same steps as mode 0 and mode 4 procession has the same steps as mode 1, the difference between mode 3 and mode 0, mode 4 and mode 1 is the processing direction when the EDM DEEP is minus (refer the list on 4.7).

MODE 5 EXAMPLE (the plus direction of Z-axis is up, and the depth is minus):

1. Automatic process, shrinkage is taken into consideration.
2. EDM depth is 100mm.
3. Electrode compensation is 0.5mm.
4. The EDM HOME is 30mm.
5. The plus direction of Z-axis is up.

Operating steps:

1. After entering SETUP, set EDM MODE to 5 (Please refer to 2.9).
   Set DEEP.COM to 1 (If the previous setting is mode 2, you needn't set up).
2. Transform to shrinkage state (Please refer to 3.6).
3. Select mm as the display unit (Please refer to 3.4).
4. EDM DEEP is -100mm, EDM HOME is 30mm(Please refer to 4.5).
5. EDM COMP is 0.5mm (Please refer to 4.6).
6. Enter EDM function:

   Press [EDM], message-window display "SCH BD",
   Z-window displays the current position of the electrode; X-window displays EDM DEEP + EDM COMP, Y-window displays the maximum depth processed.
7. Search border and clear Z-axis:
   Move the electrode until it touches the processing panel, then Z-axis is clear automatically and the procession begin. You can also press (Z₀) to clear the Z-axis (if you had set "AUTO SCH" 0, you have to clear Z-axis manually by pressing (Z₀)).
8. Z-window displays the current position of the electrode; X-window displays EDM DEEP + EDM COMP, Y-window displays the maximum depth processed. Message window "EDM RUN".
9. When Z-axis value = EDM DEEP + EDM COMP, the buzzer sound continuously, message-window display "BACKWARD", the procession stop and the electrode withdraw.
   When the electrode exit, Z-window displays the current position of the electrode, X-window displays the EDM DEEP + EDM COMP, Y-window displays the maximum depth processed.
10. When the electrode withdraw a distance equal EDM HOME from processing panel , you can repeat steps 7~9 to process another hole.
11. Press [EDM] to exit procession after precession complete.

4.8   Auto Edge Detect

Function: ① search border automatically; ② measure dimension of work-piece; ③ search the center of work-piece.

Remark: *Only the WE6800 series DROs with EDGE DETECTOR have this special function.*

Example:

    1   Dimension (Radius) of EDGE DETECTOR = 5 mm.

    2   Work-piece dimension on X axis = 65 mm.

    3   Measure by using the linear scale installed at X-axis.

Operating Steps:

1   In the *normal monitor state,* select mm as display unit.

2   Press [RTN] to entry the "Auto Edge Detect" function.

        Message-window displays "SEL AXIS", the absolute value of Y-window value is the radius of edge detector. The sign is the sign of the value displayed when detector touches the first edge (The last input value).

3   Input the radius and sign of detector.

        Press [5] [+/−] [Enter], Y-window display "-5.000".

        Remark: *If the last value display on Y-window is same with we want to set, skip this step.*

4   Select the axis.

        Press [X] to select x-axis in this example. The X-window displays "0.000" and flashes, wait for detecting edge. Y-window, and Z-window display the current coordinate value.

        Press [Y] to select Y-axis, and press [Z] to select Z-axis as the same.

5   Move the EDGE DETECTOR to touch the first edge, then the X-window will shown the position of the detector with "-5.000". The displayed value in X-axis is measure value. You can touch the edge many times.

6   Move the EDGE DETECTOR to touch another edge. The X-window will show the length of the work-piece with "65.000".

7   Press [1/2] to exit this function. Moving the EDGE DETECTOR until the X-window displays "0.000", which means that this position is the center of the work-piece at the X-axis direction.

   Remark: *1*   *In the " Edge Detect" function, Press* [RTN] *will exit this function.*

                 2   *If you detect edge only, you needn't do step 6 and step 7.*

                 3   *If do not find the center point, you needn't do step 7.*

5. Calculator function

5.1   Enter calculator function

Press the $\boxed{\text{Cal}}$ to enter calculator function in *normal monitor state*.
In calculator modem, LED of Cal is ON.

5.2   Calculating example

Example 1:   123 + 76 ×58 – 892 / 63

$$\boxed{1}\boxed{2}\boxed{3}\boxed{+}\boxed{7}\boxed{6}\boxed{\times}\boxed{5}\boxed{8}\boxed{-}\boxed{8}\boxed{9}\boxed{2}\boxed{\div}\boxed{6}\boxed{3}\boxed{=}$$

Example 2: $358 + 456 * \sin^{-1}(-0.5)$

$$\boxed{3}\boxed{5}\boxed{8}\boxed{+}\boxed{4}\boxed{5}\boxed{6}\boxed{\times}\boxed{0}\boxed{\cdot}\boxed{5}\boxed{\text{+/-}}\boxed{\text{2ndF}}\boxed{\text{SIN}^{-1}}\boxed{=}$$

Remarks:

1. *If incorrect number has been input, press* $\boxed{\text{AC}}$ *and input again.*
2. *Errors would occur while calculating incorrectly, such as "0" is used as divisor or proceeding arcsine or arccosine when absolute value is more than 1. In this case, the message-window will display "ERR…".*

   You can cancel this error message by pressing $\boxed{\text{AC}}$ *and input again.*
3. *The absolute value of data input and calculated result should be in the range of 0.000001 to 9999999, or it can't be display.*

5.3   Transfer the calculating results to selected axis

After finishing a calculation, you can press $\bigotimes{X_0}$ to transfer the calculating result to X-axis, and press $\bigotimes{Y_0}$ to transfer the calculating result to Y-axis, press $\bigotimes{Z_0}$ to transfer the calculating result to Z-axis.

Remarks: *Value over the scope of display couldn't be transferred.*

5.4   Transfer the current display value of X-axis, Y-axis and Z-axis to the

calculator

Press $\boxed{\text{X}}$, the display value of X-axis is transferred to calculator;

Press $\boxed{\text{Y}}$, the display value of Y-axis is transferred to calculator;

Press $\boxed{\text{Z}}$, the display value of Z-axis is transferred to calculator.

5.5   Exit calculator function

Press $\boxed{\text{Cal}}$ to exit calculator function and return to n*ormal monitor state*.

6 <u>Troubleshooting</u>

Symptom	Cause	Remedy
1. Nothing happens when the DRO is switched on.	1. The DRO is not connected to power line properly. 2. The power lead is damaged. 3. The fuse is false.	1. Ensure that the Power connect properly. 2. Replace the damaged Power cord. 3. If fail, change fuse by the 250VAC/1A lag type fuse.
2. After self test LED on, all LED gone off.	1 Power is too low 2 The internal connector of power lead is not connect properly	Check internal Connector of DC 5.0V power and clean it.
3. Err 1	1. Traveling Speed too fast 2. GROUND not good	1. Slow the speed (the max aped: 1m/sec @1u) 2. Connect the Ground properly
4. Err 2	1. Change the phase of A and B signal at same time 2. Scale is malfunction.	1. Connect the Ground properly 2. Check scale connect is good 3. Swap the scale connector to check the problem is either scale or DRO.
5. DRO work properly, but measurements are inaccurate	1. Shrink mode is set. 2. Set resolution incorrect. 3. R/D mode is set. 4. Compensation value set incorrect. 5. EDM compensation value is set. 6. Tool compensation is set. 7. Machine problem	1. Check the parameter and chose the correct mode. 2. Check the machine's backlash effect, ABBE effect etc.

Remark: *If you can't fix your problem, contact your local dealer.*

7 <u>Specification</u>

Weight   :   Approx 1400g

Size   :   297mm×184mm×48mm(60mm)

Power   :   AC   90V ~ 250V
Scale Signal   :   TTL, 50KHz   (MAX)
RS232   :   9P   D-Type
Touch Probe   :   Contact   or   DC (internal photo couple)