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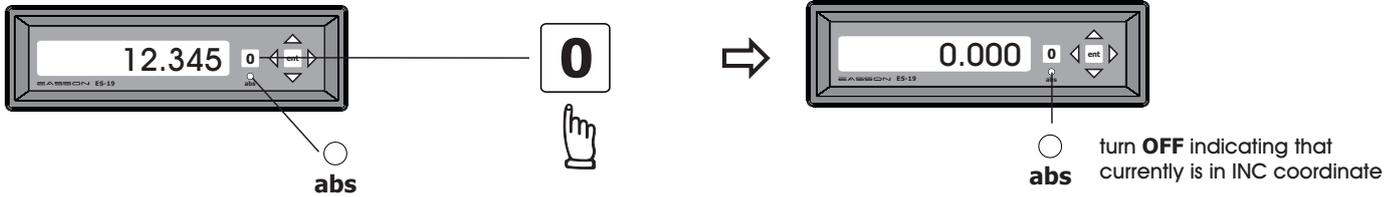
## **ES-19 Embedded Digital Readout Operation Manual**

## Set display to ZERO

**Purpose :** Set the current position to ZERO and swap the coordinate display to INC.

In case operator don't want this function, this function can be disabled by the SETUP procedure.

**Example :** To set the current position to ZERO



ES-19 provides ABS and INC display coordinates, when the display is in ABS coordinate, the **abs** LED light up.

The ABS coordinate is the machine coordinate which always reference to the **REF mark of the incremental scale** or the **true absolute value of the AS-10 series absolute scale**.

The ABS coordinate cannot be reset to zero by the ZERO button as per above.

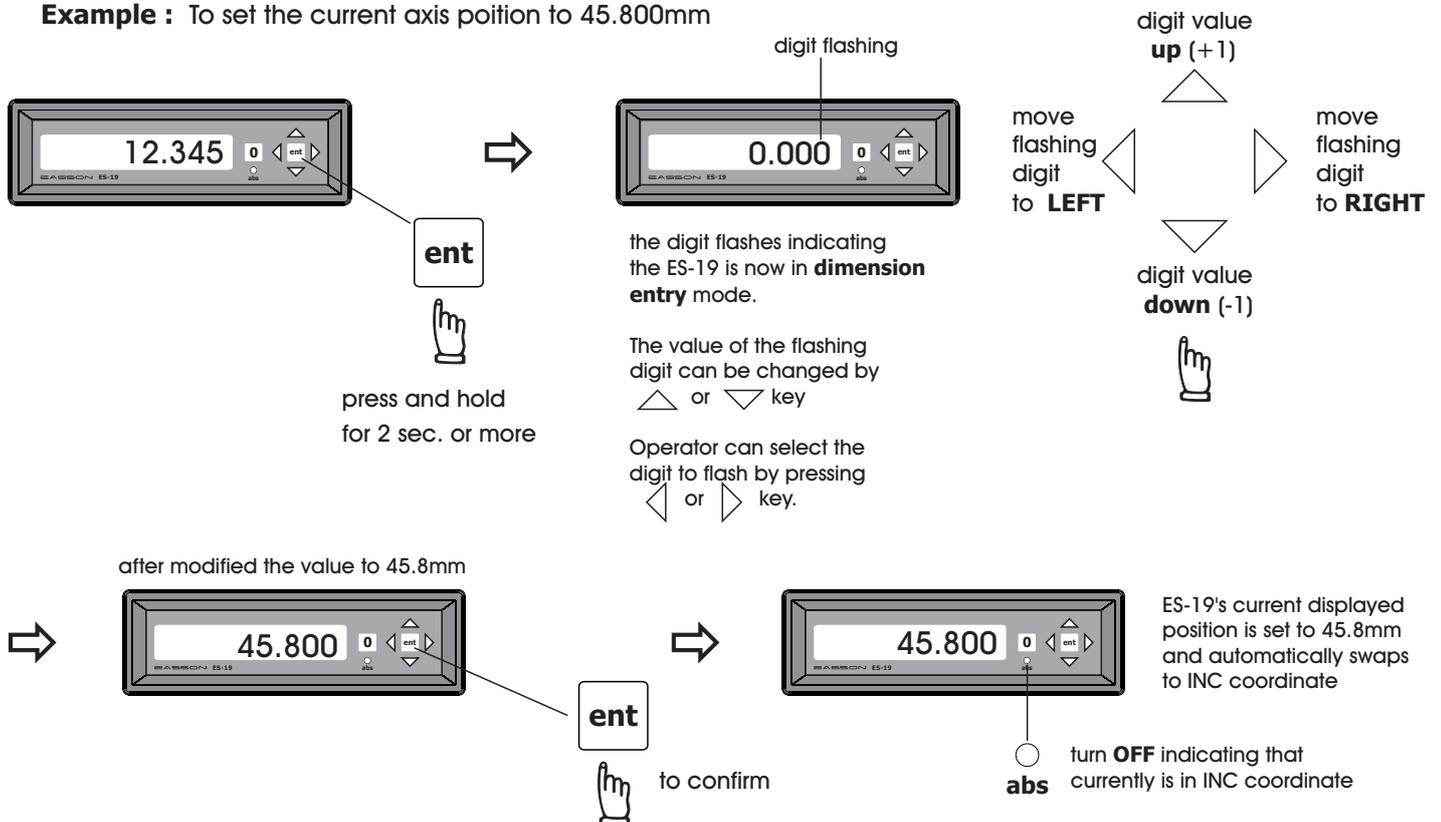
Whenever the display is set to zero by the zero button, ES-19 will automatically swapped to INC coordinate and **abs** LED will turn off to indicate currently is in INC coordinate display.

## Enter Dimensions

**Purpose :** Set the current position to an entered dimension

In case operator don't want this function, this function can be disabled by the SETUP procedure.

**Example :** To set the current axis position to 45.800mm



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## ABS/INC coordinate display

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**Purpose :** ES-19 provides two sets of basic coordinate display, they are ABS ( absolute ) and INC ( incremental ) displays.

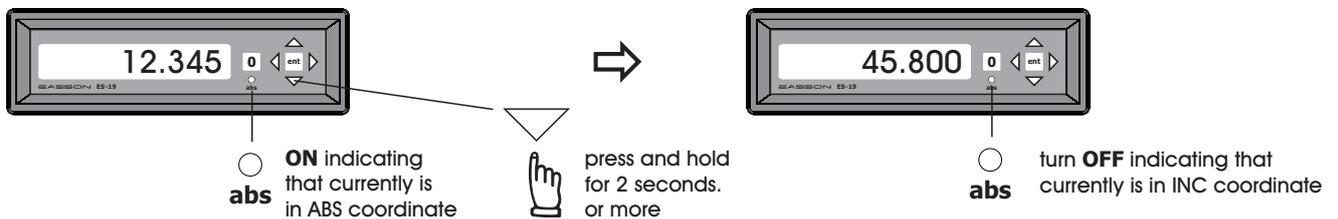
ABS coordinate is the machine coordinate that always reference to the REF mark of the scale or the true ABS coordinate of the AS-10 Absolute scale. The ABS coordinate cannot be changed by any function in ES-19. Whenever the ES-19 is in ABS coordinate, the **abs** LED lights UP.

The ES-19's ZERO button or dimension preset function allow operator to set up the work datum ( work piece ZERO position ) anywhere in INC coordinate. Whenever the ES-19 is in INC coordinate, the **abs** LED lights OFF.

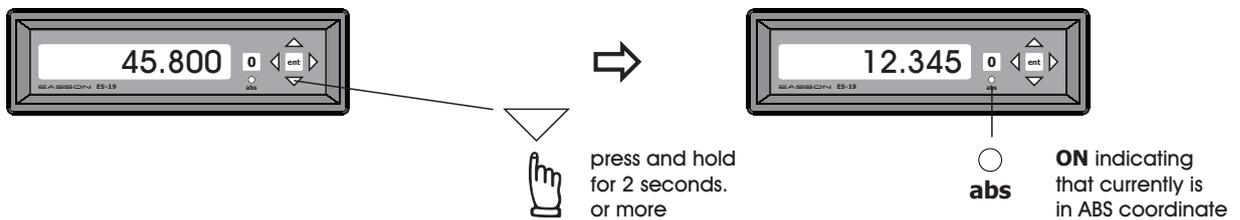
Operator can swaps between ABS ( absolute ) and INC ( incremental ) coordinate by the ABS/INC swap function.

In case operator don't want this function, this function can be disabled by the SETUP procedure.

**Example 1 :** Currently in **ABS** display coordinate, to switch to **INC** display coordinate



**Example 2 :** Currently in **INC** display coordinate, to switch to **ABS** display coordinate



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## Resolution Swap

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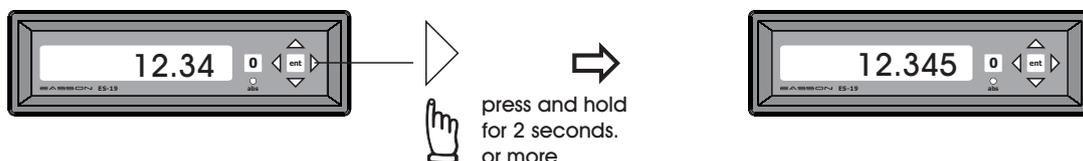
**Purpose :** ES-19 provides resolution swap function to switches between 0.00 and 0.000 display

In case operator don't want this function, this function can be disabled by the SETUP procedure.

**Example 1 :** Currently in 0.000 display, to swap to 0.00 display



**Example 2 :** Currently in 0.00 display, to swap to 0.000 display



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## Center Find

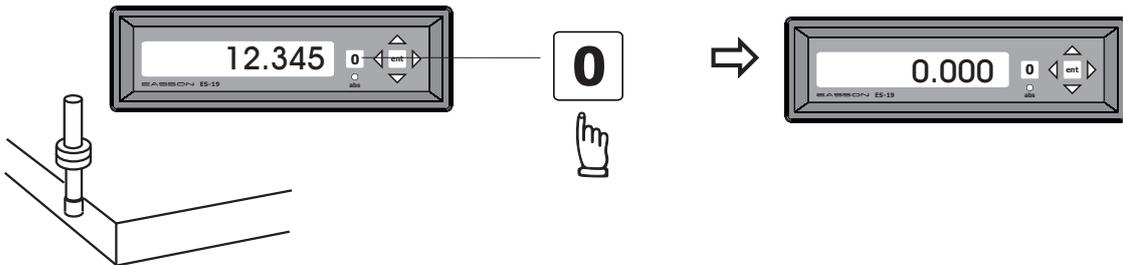
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**Purpose :** ES-19 provides center find function by setting the current display coordinate to half of the original value, so that the zero position of the work piece is located at the center of the work piece.

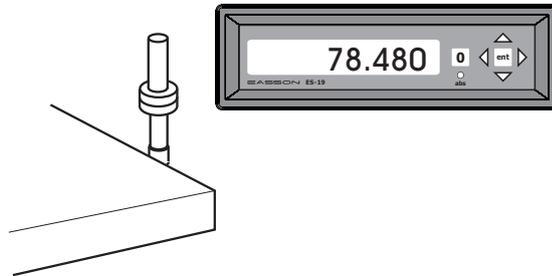
In case operator don't want this function, this function can be disabled by the SETUP procedure.

**Example :** To set the current axis zero position at the center of the work piece

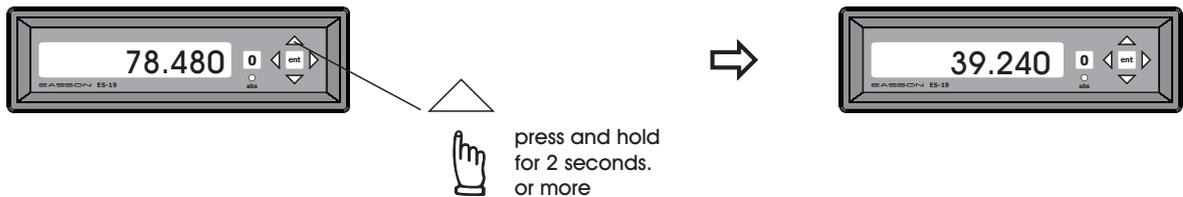
**Step 1 :** Locate the edge finder at one end of the work piece, then zero the axis.



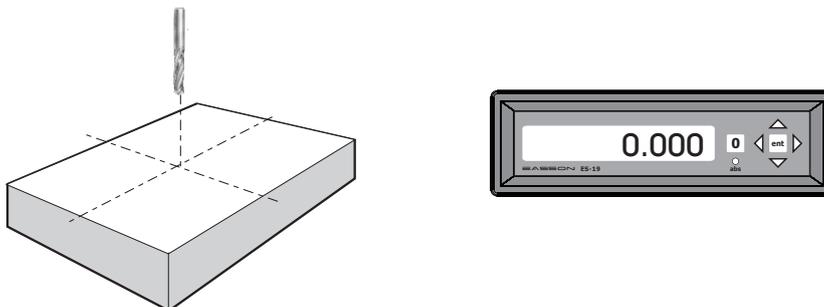
**Step 2 :** Located the edge finder at the opposite end of the work piece.



**Step 3 :** Then half the display coordinate using centre find function as per follows



Now the axis zero position ( 0.000 ) is located right at the centre of the work piece



## REF function

**Function :** ES-19 is designed to work with both Absolute ( AS-10 ) and normal Incremental Scale.

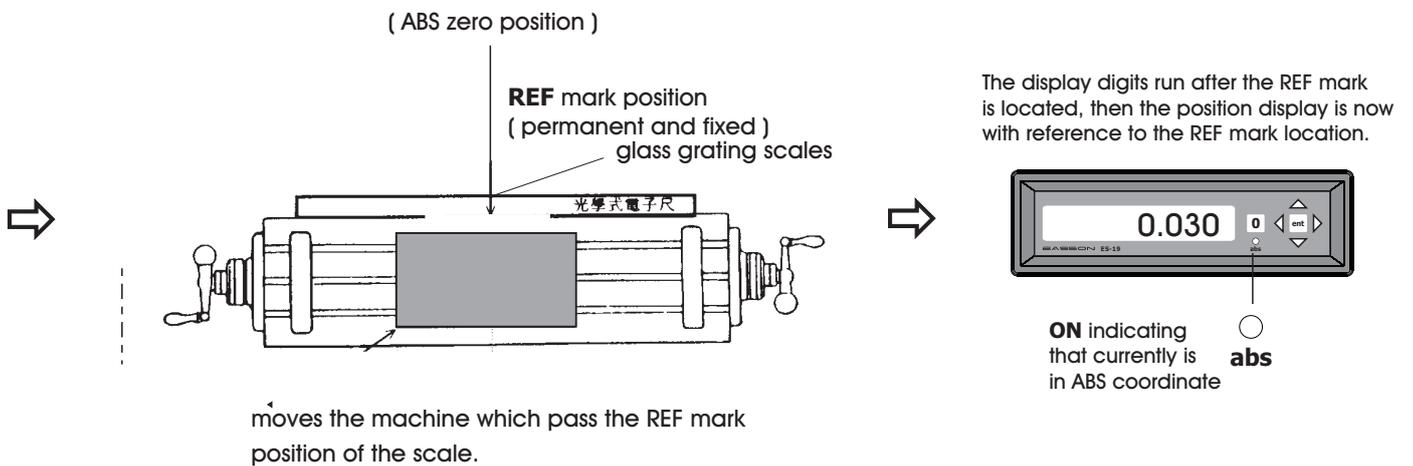
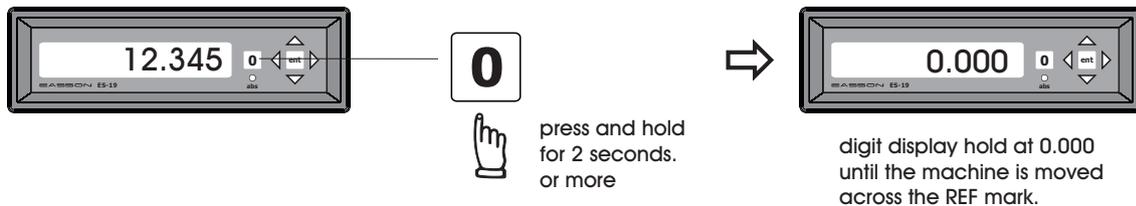
ES-19 have two work coordinates, it is ABS and INC coordinates respectively, in case normal incremental scale is used with ES-19, the ABS coordinate is the hardware coordinate which always reference to the REF mark of the scale, it provides unique ZERO position which always reference to the REF mark location of the scale.

The REF function allows operator to setup the ABS machine coordinate ( ZERO position is reference to the REF mark of the scale. )

Whenever ES-19 is in ABS coordinate, the **abs** LED with turn **ON** to indicate currently is in ABS coordinate

In case operator don't want this function, this function can be disabled by the SETUP procedure.

**Example :** To setup the ABS coordinate using REF function



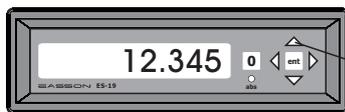
## RECALL function

**Function :** ES-19's RECALL function is designed to work with normal Incremental Scale only. In case ABS scale is used, no need to operate the RECALL function because the INC coordinate always resume automatically

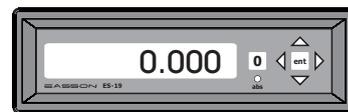
RECALL function resumes the work ( INC ) coordinate after the ES-19 have been powered OFF. In order to have RECALL function work correctly, the INC coordinate must be set after the correct ABS coordinate setup by the REF function.

In case operator don't want this function, this function can be disabled by the SETUP procedure.

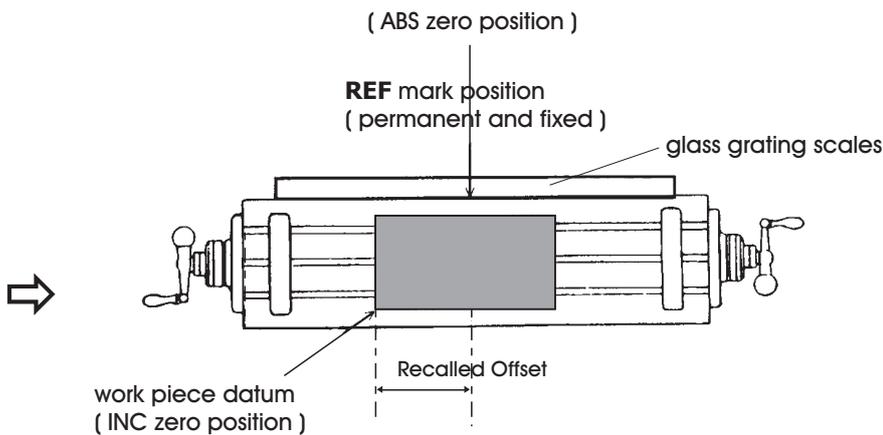
**Example :** To resume the INC coordinate using RECALL function



press and hold  
for 2 seconds.  
or more



digit display hold at 0.000  
until the machine is moved  
across the REF mark.



The display digits run after the REF mark  
is located, then the position display is now  
with reference to the REF mark location.



turn **OFF** indicating  
that currently is in  
INC coordinate

**abs**

↑  
moves the machine which pass the REF mark  
position of the scale.

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## Parameters Setup Procedure - Introduction

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### Parameters Setup

Each ES-19 is configured as it leaves the factory, however, in order to enable each ES-19 to be individually set up for particular application, following SETUP function is used.

The SETUP function is written in a menu mode which enable you to using the "UP" or "DOWN" keys to scroll through the top level selection menu, simply press "ent" to come into the respective setup function, and then make your parameters choice by the "LEFT" or "RIGHT" keys or numerical parameter by the pseudo numerical keyboard constructed by "UP", "DOWN", "LEFT", "RIGHT" keys.. after your choice or parameter entry completed, you must press "ent" to confirm.

**The top level menu headers in orders are as follows :**

- InCH** To set the display to Inch display ( \*\* default is metric (mm) )  
0 - Display is in Metric unit ( mm )  
1 - Display is in Inch unit ( Inch )  
\* Please notice that this selection valid only when disp is in LEn( Length ) mode  
if the display is in Ang( Angle ), this selection have no effect.
- dIr** To set the reverse of Count Direction of the Encoder/Linear Scale  
0 - ES-19 count as per the normal count direction of the Encoder/Linear Scale (POSITIVE)  
1 - ES-19 will reverse the count direction of the Encoder/Linear Scale(NEGATIVE)
- rESOL** To set the Linear display resolution  
0.005 - to set the linear display resolution = 0.005 mm  
0.001 - to set the linear display resolution = 0.001 mm  
0.0005 - to set the linear display resolution = 0.0005 mm  
0.0001 - to set the linear display resolution = 0.0001 mm  
\* Please notice that this selection valid only when disp is in LEn( Length ) mode  
if the display is in Ang( Angle ), this selection have no effect.
- rAd\_dIA** To specify the display in rAd( Radius mode - normal display ) or dIA( diameter mode - 2X of the true diemension ) , if the dIA mode is selected, a "d" character display will be shown at the first display digit of the axis.  
rAd - Radius mode - normal display  
dIA - Diameter mode - 2X of the true dimension.
- ZEro** To specify the enable or disable of the ZERO function.  
0 - disable the ZERO function  
1 - enable the ZERO function
- PrESET** To specify the enable or disable of the PRESET function.  
0 - disable the PRESET function  
1 - enable the PRESET function
- rEF** To specify the enable or disable of the REF function.  
0 - disable the REF function  
1 - enable the REF function

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## Parameters Setup Procedure - Introduction

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### Parameters Setup... 2

- recAL** To specify the enable or disable of the RECALL function.  
0 - disable the RECALL function  
1 - enable the RECALL function
- AbS** To specify the enable or disable of the ABS function.  
0 - disable the ABS function  
1 - enable the ABS function
- CEnt** To specify the enable or disable of the Center Find function.  
0 - disable the Center Find function  
1 - enable the Center Find function
- rESL** To specify the enable or disable of the Resolution Swap function.  
0 - disable the Resolution Swap function  
1 - enable the Resolution Swap function
- SEnSOr** To specify the type of sensor/transducer used in ES-19.  
"Lin SCL" - Linear scale  
"rOt Enc" - Rotary Encoder
- dISP** ES-19 can readout the sensor counts and display the physical displacements in either Length ( LEn ) or Angle ( Ang ), this selection is to specify the type of physical displacements.  
"dISP LEn" - Length display  
"dISP Ang" - Angle display
- EnC. LInE** ES-19 can use the Rotary Encoder as the input sensor/transducer, in case Rotary Encoder is used. To make ES-19 displays the physical displacement correctly, the number of Encoder Lines per revolution must be specified to ES-19 to let ES-19 knows how many count pulses per revolution.  
"?????" - The No. of Encoder lines per revolution. // \*\* ? : number 0 ~ 9
- Ang. rESL** To set the Angular display resolution  
0.1 - to set the Angular display resolution = 0.1 degree  
0.01 - to set the Angular display resolution = 0.01 degree  
0.001 - to set the Angular display resolution = 0.001 degree  
0.0001 - to set the Angular display resolution = 0.0001 degree  
\* Please notice that this selection valid only when disp is in Ang( Angle ) mode  
if the display is in Len( Length ), this selection have no effect.
- dEgrEE** ES-19 's Angular display can display the angle in normal degree or conventional degree, minutes, second.  
0 - display in degree value  
1 - display in Degree\_Minute Second format

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## Parameters Setup Procedure - Introduction

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### Parameters Setup... 3

- SC. PITCH** ES-19 allows to display Length ( in mm ) even when rotary encoder is used as the sensor, in such case, a ball screw must be used to convert rotary displacement into linear displacement. This selection is to specify the screw pitch per revolution of the ball screw, to allow ES-19 convert the rotary displacement to linear displacement correctly.  
“???.” - The Screw Pitch ( movement in mm per revolution ) of the ball screw.  
\* Please notice that this selection valid only when disp is in Len( Length ) mode and Sensor is ( Rotary Encoder ). For other setup configuration, this selection have no effect.
- rELAy** To specify the enable or disable of the Relay Output function.  
0 - disable the Relay Output function  
1 - enable the Relay Output function
- rL\_Lt** ES-19 allows to adjust the length of RELAY ON time of the Relay Outout function, this function is designed to suit different specific requirements of PLCs, to make sure reliable trigger signal is sent to the PLC.  
“????” - The Length of RELAY ON time in dec. sec ( 0.1 second ) // \*\* ? : number 0 ~ 9
- P. LI** ES-19 allows two limit signals output, when the current display dimension is bigger than the positive limit, RELAY ON is output. This selection is to specify the POSITIVE LIMIT dimension.  
“???.” - The Positive Limit dimension which will trigger the RELAY output. // \*\* ? : number 0 ~ 9
- N. LI** ES-19 allows two limit signals output, when the current display dimension is smaller than the negative limit, RELAY ON is output. This selection is to specify the NEGATIVE LIMIT dimension.  
“???.” - The Positive Limit dimension which will trigger the RELAY output. // \*\* ? : number 0 ~ 9
- PrObE** To specify the enable or disable of the Ultra High Speed Probe Trigger Latch function.  
0 - disable the Ultra High Speed Probe Trigger Latch function  
1 - enable the Ultra High Speed Probe Trigger Latch function  
\* Please notice that this selection valid only when the ultra high speed Probe Trigger Latch circuitry ( optional purchase item ) is installed. If ES-19 have no high speed Probe Latch circuitry installed, this selection have no effect.
- Pr\_Lt:** ES-19 allows to adjust the length of ON time of the Probe Output Signal, this function is designed to suit different specific requirements of PLCs or interface, to make sure reliable trigger signal is sent to the PLC.  
“????” - The Length of PROBE ON time in dec. sec ( 0.1 second ) // \*\* ? : number 0 ~ 9  
\* Please notice that this selection valid only when the ultra high speed Probe Trigger Latch circuitry ( optional purchase item ) is installed. If ES-19 have no high speed Probe Latch circuitry installed, this selection have no effect.

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## Parameters Setup Procedure - Introduction

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### Parameters Setup... 4

- F.PrESS** To specify the enable or disable of the Foot Press Trigger Latch function.  
0 - disable the Foot Press Trigger Latch function  
1 - enable the Foot Press Trigger Latch function
- FP\_Lt** ES-19 allows to adjust the length of ON time of the Foot Press Output Signal, this function is designed to suit different specific requirements of PLCs or interface, to make sure reliable trigger signal is sent to the PLC.  
“????” - The Length of Foot Press RELAY ON time in dec. sec ( 0.1 second ) // \*\* ? : number 0 ~ 9
- USb** To specify the enable or disable of the USB 2.0 Interface.  
0 - disable the USB 2.0 Interface.  
1 - enable the USB 2.0 Interface.
- rS-232** To specify the enable or disable of the RS-232C Interface.  
0 - disable the RS-232C Interface.  
1 - enable the RS-232C Interface.  
\* Please notice that this selection valid only when the RS-232C interface circuitry ( optional purchase item ) is installed. If ES-19 have no RS-232C interface circuitry installed, this selection have no effect.  
For the ease of ES-19 setup, ES-19 supports only the RS-232C in following parameters.  
baud : 115200 bps ; 8 bit data ; one stop bit ; no parity check.
- bt** To specify the enable or disable of the bluetooth Interface.  
0 - disable the bluetooth Interface.  
1 - enable the bluetooth Interface.  
\* Please notice that this selection valid only when the bluetooth interface circuitry ( optional purchase item ) is installed. If ES-19 have no bluetooth interface circuitry installed, this selection have no effect.
- LIn. Err** To specify the Linear Error Compensation for the readout dimension in PPM value.  
0 - disable the Linear Error Compensation for the readout dimension.  
“????” - enable the Linear Error Compensation for the readout dimension, the compensated value is in PPM ( Part Per Million ) // \*\* ? : number 0 ~ 9
- brIghT** To specify the brightness of the readout display digits.  
1 - 8 : 1 - lowest brightness ~ 8 - highest brightness

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## Parameters Setup Procedure - Introduction

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### Parameters Setup... 5

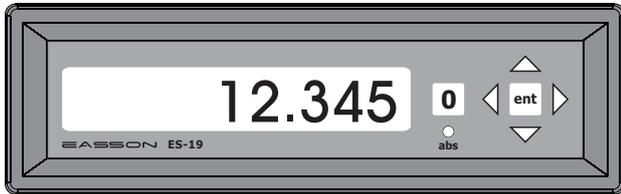
- nl.Err** To specify the enable or disable of the non-linear error compensation.  
0 - disable the non-linear error compensation.  
1 - enable the non-linear error compensation.  
\* ES-19 offers one of the highest accuracy non-linear error compensation features in this industry as the standard feature. However, since the ES-19 have no numerical keyboard, the parameters of non-linear must be send to the ES-19 via the USB 2.0 interface through a normal computer.
- SCL** To specify the type of Linear Scale to be used in ES-19.  
"InC" - Normal Incremental Scale.  
"AbS" - Easson AS-10 Absolute Linear Scale.  
\* Please notice that this selection effective only when the EAD ( Easson Absolute Decoder ) circuitry ( optional purchase item ) is installed. If ES-19 have no EAD circuitry installed, this selection have no effect, and the normal INC scale is always be assumed to be used.
- QUIT** Setup Completed, Quit from the SETUP menu of ES-19..

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## Parameters Setup Procedure - Enter into SETUP

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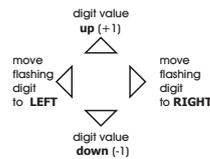
Followings are the control keys that are used in the SETUP function.



 **ent** Setup Activate & Confirm key

 **Setup Function selection keys**

 **Parameters Selection keys**

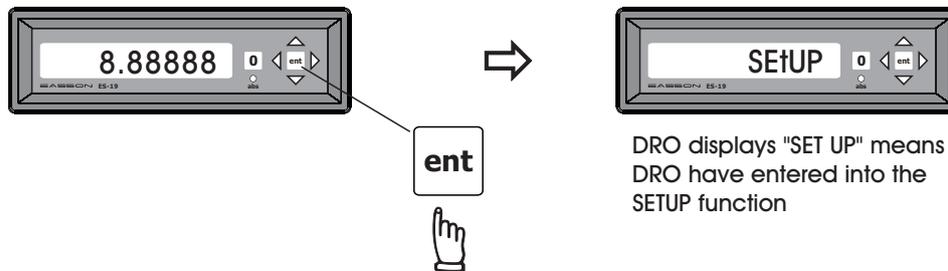


**Numerical Parameters Entry keys  
( Pseudo Numerical Keyboard )**

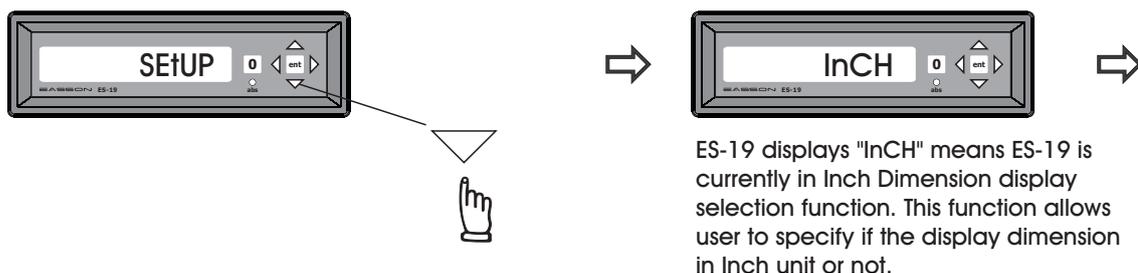
### Operating Procedure of SETUP function :

To enter into the SETUP procedure, after the ES-19 is switched on, press the "ent" key to enter into the SETUP function as per follows.

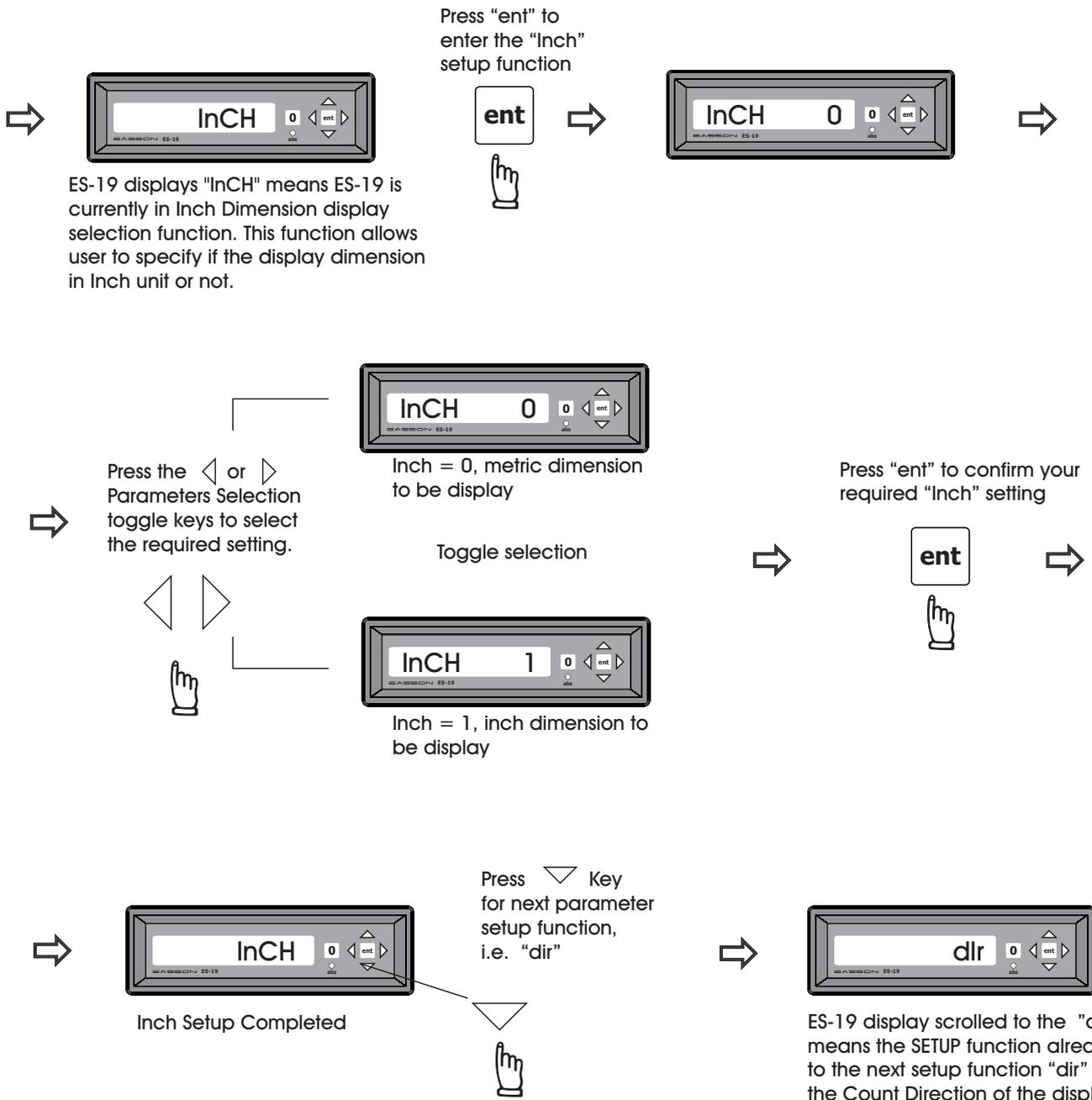
- 1) Switch off the ES-19.
- 2) Switch on the ES-19, then immediate press "ent" key to enter the parameter SETUP function.



- 3) Press  or  key to select next function in the setup menu, the next function after the SETUP is "InCH" which specifies the Inch Dimension display.



## Parameters Setup Procedure - Example

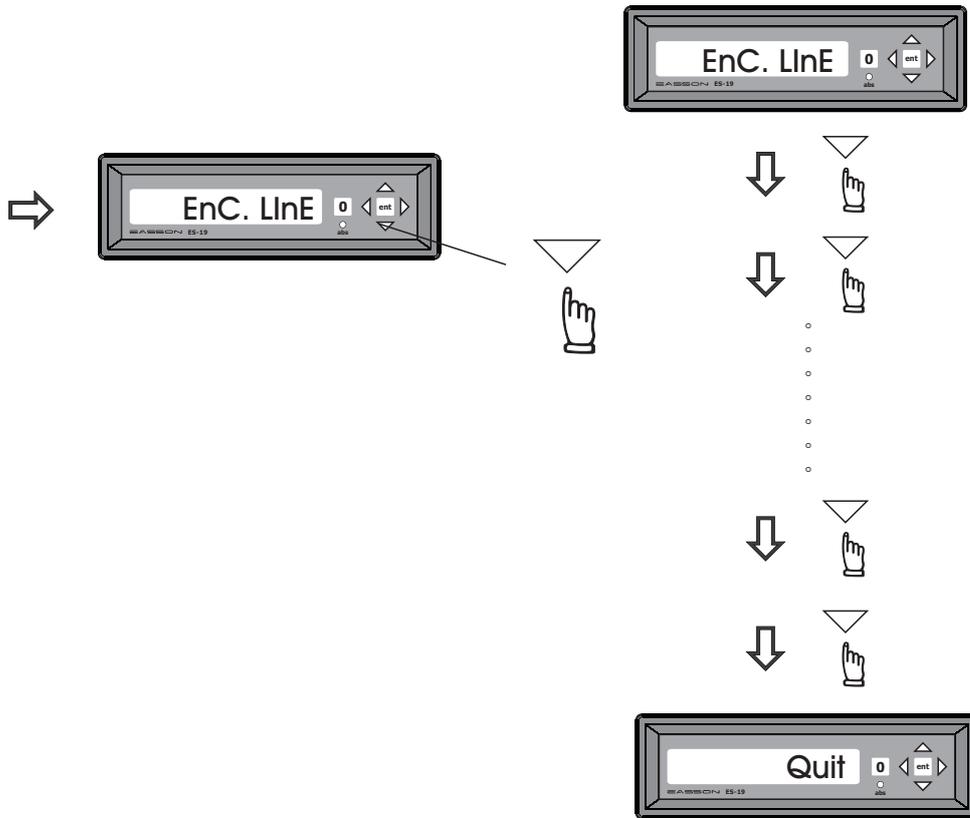


ES-19's setup functions have only two types of parameters entry as per follows :

- 1 ) Parameters selection, ES-19 offers fixed parameters for user's choices. i.e. "Inch", "dlr", "rESL", ..and etc...
- 2) Numerical Parameters entry, ES-19 request user to entry a numerical parameter. i.e. "EnC LinE", "SC. PltCH", "Lin Err", .. and etc...



## Parameters Setup Procedure - Example



Exact the same operating steps and procedures as "Inch" or "EnC LinE" are to be performed in ES-19's SETUP function to select the correct parameters you required.

To save print pages in this manual, we will not present the all setup functions procedures here one by one because the operating steps & procedures are exactly the same as "Inch" or "Encoder line" setup functions..

Please read carefully the setup menu items description in the introduction pages ( Pages 1~5 ) , so that you can choose the setup parameters correctly.

User try to play with the ES-19's setup and then will naturally understand the operation procedures, The setup of ES-19 is very easy and we believe everybody can understand and handle.

After all setup parameter entered, to quit from SETUP function, scroll to the "QUIT" display and press "ent" to quit and back to normal DRO operation.

