1. Summary

1.0 The function of Total Flow Meter

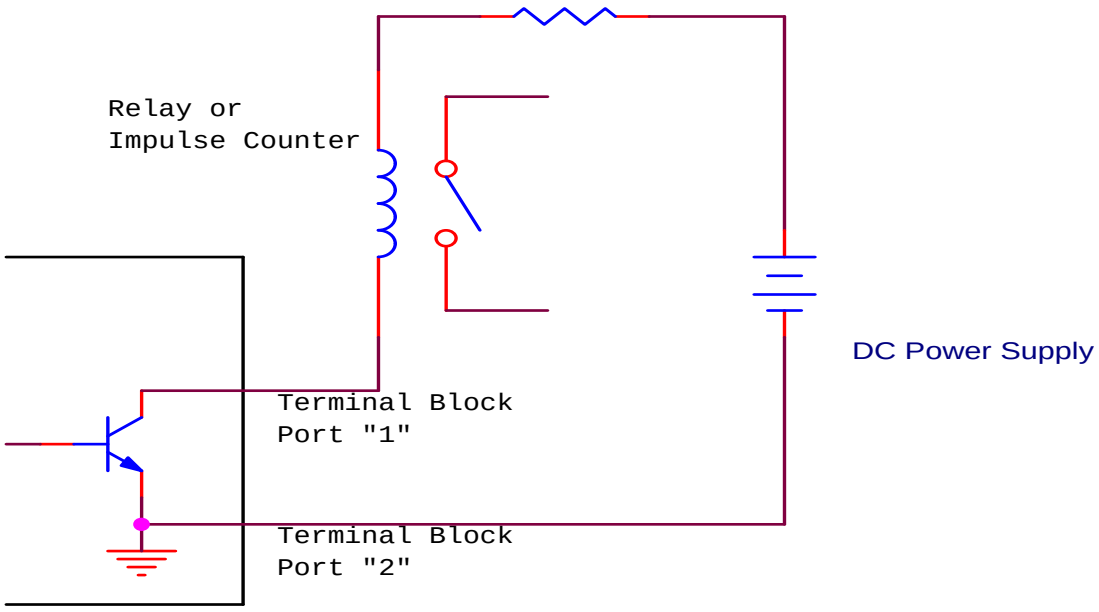
- By converting input pressure into range of instantaneous setting value, the instantaneous value can be found.
- By using instantaneous value, accumulate the total value according to the time rate
- You can input the Pulse with calculated total value
- In case the pulse is higher than maximum frequency of its output, "PLS-OV" mark will be displayed on the LCD monitor.

1.1 Pulse Output

1.2.1 The appearance and definition of port.

1: Pulse Output+ , 2: Pulse Output-

1.2.2 Wiring Structure



[In case of operating external Relay or Counter]

1.2.3 Spec.

- Scaled Pulse : A Single pulse is output for a specified flow amount.
- Pulse Width : 10ms, 50ms, 100ms selectable (Negative going pulse)
- Duty Cycle : 49 Pulse/sec. Max.
- Output Type : Open Collector, 30V, 500mA Max.
- Duty_cycle = Flow_rate / (Pulse_Scale * Unit_Time[s])

  Unit_Time = MIN:60, HOUR:3600, ….

  Ex) Flow_rate : 17,640

  Flow_rate_unit : normal cubic meter per hour

  In case of Pulse_Scale : 0.1

  Pulse Duty Cycle = 17,640 / (0.1 * 3600) = 49 [Pulse/sec]
- Flow_rate = Duty_cycle * Pulse_Scale * Unit_Time[s]

  Unit_Time = MIN:60, HOUR:3600, ….

  Ex) Duty_cycle : 10

  Flow_rate_unit : kilograms per minute

  In case of Pulse_Scale : 1 …

  Flow_rate = 10 * 1 * 60 = 600 Kg/min

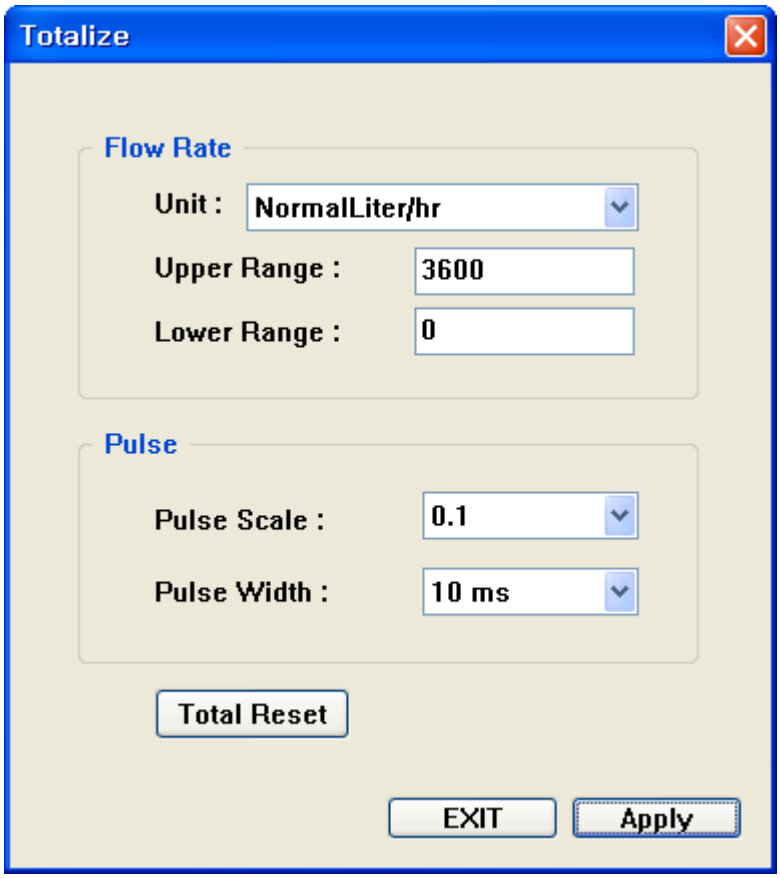
2. SST 20 Setting Method

It can be used on the STT-20 Ver 2.3.2 or more upgraded version.

If you search APT-3100F on the STT 20 Ver 2.3.2 or more upgraded version, "APT-3100F" mark will be shown on the Product Type.

2.1 Setting concerning Total flow quantity

When you choose the "Transmitter Setup/Totalize menu, the following window will be displayed.

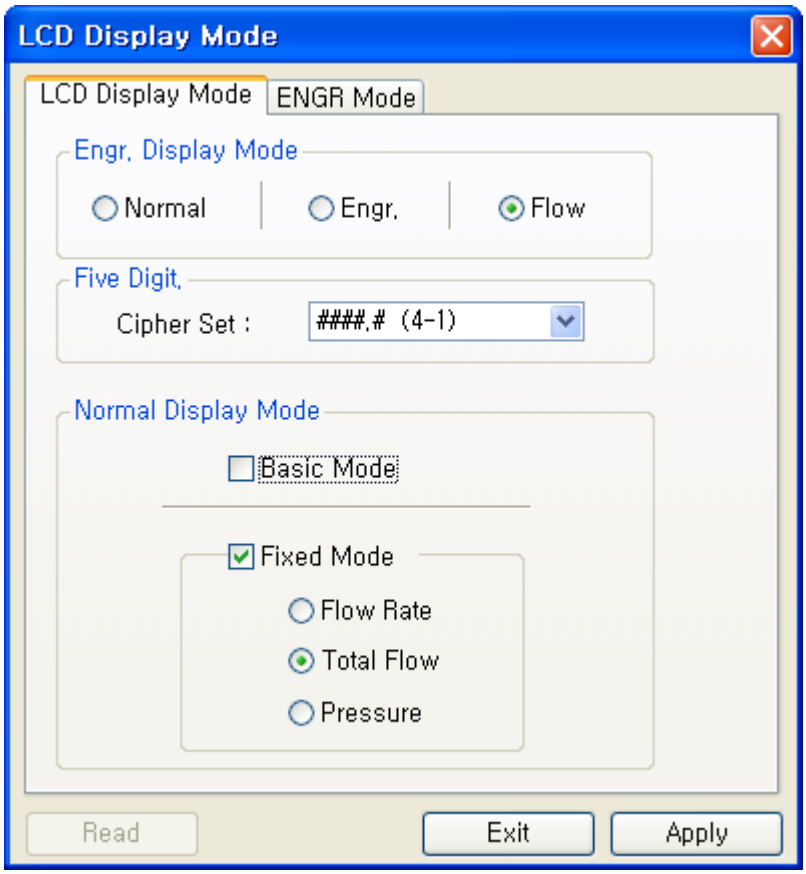


- Unit: You can select the unit which is applied for instantaneous value. The total value is automatically set with the unit which
- Upper Range : input instantaneous value equivalent to 100% pressure (20mA)
- Lower Range : input instantaneous value equivalent to 0% pressure (4mA)
- Pulse Scale : You could select total value for 1 pulse output and the total value is same unit that you select on flow rate unit. The selectable value is the multiple of 10 between 0.001 to 10000.
- Pulse Width :Select Pulse width among 10ms, 50ms, 100ms

- Total Reset : Initialize the accumulated total value with 0
- All the settings except Total Reset are applied in case you click the "Apply" button after choosing the all the setting values,

LCD Mode Setting

- Only flow mode is added in the existing model.

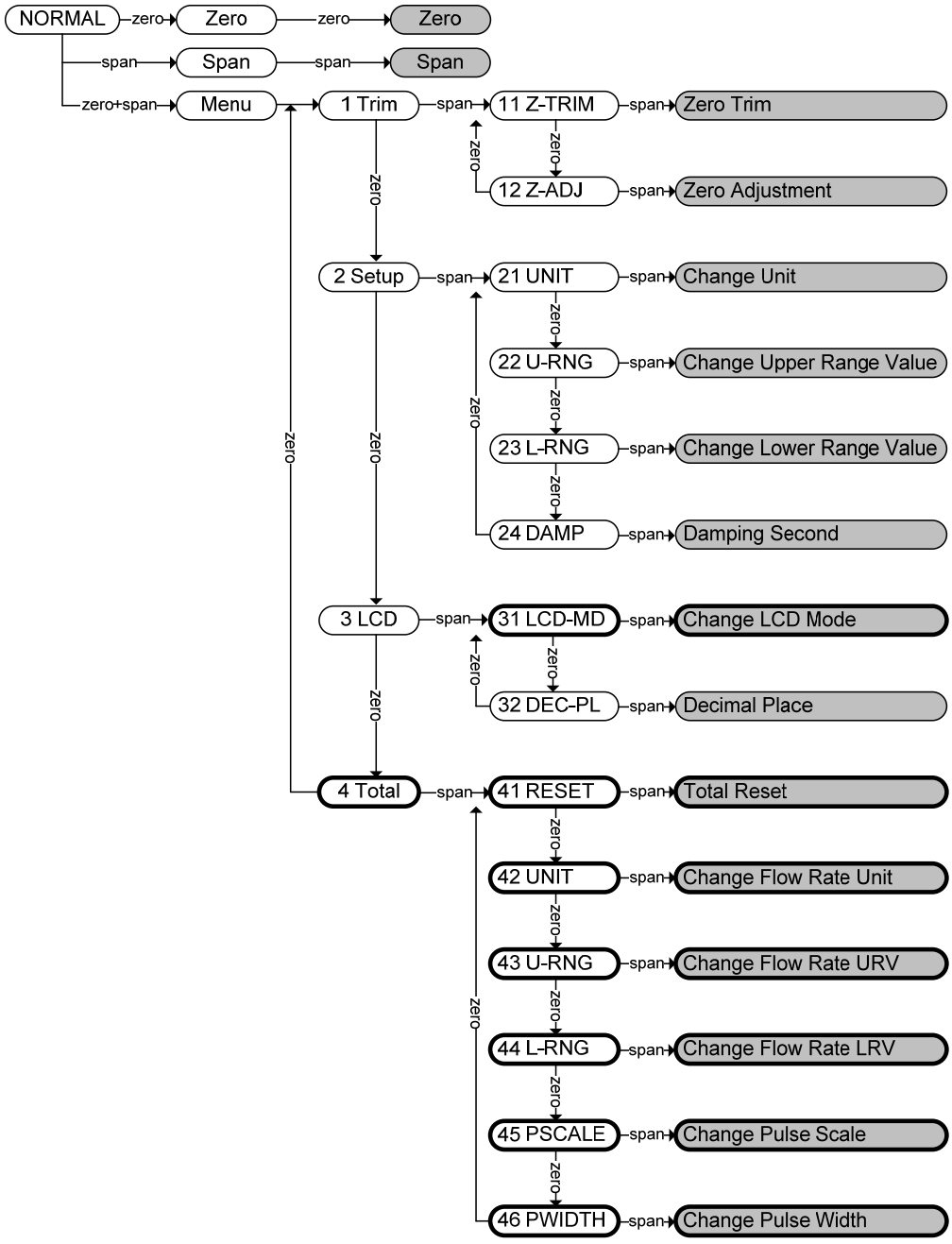


- In case you choose Basic Mode, Flow / Total /PV will be shown by turn.
- In case you choose Fixed Mode, related option Flow Rate / Total Flow / Pressure will be shown by turn.

3. Button Input method.

3.1 Changed function.

- Zero or Span function is executed in the same way it is done on the existing model.
- In case you push Zero+ Span button, Menu function is executed.



[Button input structure]

(1) Item movement between menus : Zero

(2) Movement to lower menus or function execution: Span

(3) Movement to Top menu: Zero+ Span

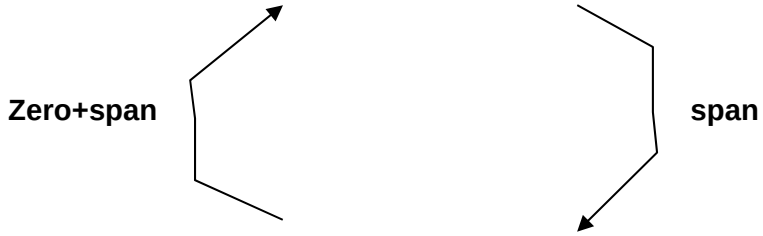
3.2 The way of figure input

- 12 Zero Adjustment, 22 Change Upper Range Value, 23 Change Lower Range Value, 24 Damping Second, 43 Change Flow Rate URV, 44 Change Flow Rate LRV

- The figure input method: After choose the increased value (10^n), increase or decrease the target value to the same amount of previously changed value.

  For example, to input 3810: choose 1000 as increased value → with 1000 increase per one time, proceed with increase three times. → choose 100 as the increase value → With 100 per one time, proceed with increase 8 times → choose 10 as increased value → with 10 per once, proceed with increase one time.

Figure Input Start → Increase/Decrease value choice → Zero+Span → Figure Input Finish



Target Value Revision
(LCD: VALUE)
[Figure Input Process Chart]

3.2.1 Increase, Decrease, Step choice: "SelInc" message is shown on the lower part

- Choose Step with Zero button: Per push of the zero button, the figure increase by one exponent of 10.
- After choose the step setting you want, proceed with 3.2.2 article by pushing the span button

3.2.2 With Zero, Span button, change of the setting value you want: "VALUE" message will be on the lower part of the LCD displayer.

- By pushing Zero button, the figure increase as the Step set on Article 1.
- By pushing Span button, the figure decreases as the Step set on Article 1.
- After change the figure into value you want, proceed with Article 5.2.1 by pushing Zero + Span button.

3.2.3. By proceeding with Article 3.2.1. and 3.2.2, set the target value.

After completing final setting of target value, finish the input procedure by pushing Zero+Span in the process of Article 5.2.1,

3.3 Example.

3.3.1 Zero Trim

- Proceed with Menu by pushing Zero+Span button.
- When the "1 TRIM" message is shown, move to the lower menu by pushing the Span.
- When 11Z-TRIM message is displayed, proceed with Zero Trim Function by pushing Span button

3.3.2 Zero Adjustment: Change PV into 14.

- Proceed with Menu by pushing Zero+ Span
- When 1 TRIM message is shown, move to the lower menu by pushing the Span button.
- When 11 Z-TRIM message is shown, move to menu by pushing the Zero button.
- When 12 Z-ADJ message is shown, proceed with Zero Adjustment function by pushing the Span button.
- "When "SelInc" message is shown on LCD, repeat pushing Zero button until "10.0" is shown on the LCD.
- When "10.0" is shown on LCD, revise Value by pushing Span button.
- When "VALUE" message is shown, push Zero+Span button after change the indicating value into "10.0 by pushing Zero button once
- When "SelInc" message is shown on LCD, repeat pushing Zero button until "1.0" is shown on the LCD.
- When 1.0 is shown on LCD, revise value by pushing Span button
- When "VALUE" message is shown, after change LCD indicating value into "14.0" by pushing Zero button four times, push Zero+Span button.
- When "SelInc" message is shown, save the setting value by pushing Zero+Span.

3.3.3 Change Unit

- Proceed with Menu by pushing Zero+Span button.
- When 1 TRIM message is shown, move to the menu by pushing the Zero button.
- When 2 SETUP message is shown, move to lower menu by pushing Span button.
- When 21UNT message is shown, proceed with Change Unit function by pushing Span button
- Repeat pushing Zero button until the Unit you want is shown on the LCD.
- When the Unit you want is shown, save the setting value by pushing Span button.

3.3.4 Change Upper Range Value

- Proceed with Menu by pushing Zero+ Span button
- When 1 Trim message is shown, move to the menu by pushing Zero button.
- When "2 SETUP" message is shown, move to the lower menu by pushing Span button.
- When 21 UNIT message is shown, move to the menu by pushing Zero button.
- When 22 U-RNG message is shown, proceed with the function by pushing Span.
- The method of value input is the same as that of Zero Adjustment.

3.3.5 Change Lower Range Value

- Proceed with the menu by pushing Zero+Span button.
- When "1 TRIM" message is shown, move to menu by pushing Zero button.
- When 2 SETUP message is shown, move to the lower menu by pushing Span button.
- When 21 UNIT message is shown, move to menu by pushing Zero button.
- When 22 U-RNG message is shown, move to menu by pushing Zero button.
- When 23L-RNG message is shown, proceed with the function by pushing Span button.
- The method of value input is the same as that of Zero Adjustment.

3.3.6 Change LCD Mode

- Proceed with Menu by pushing Zero+Span buttons.
- When "1 TRIM" message is shown, move to menu by pushing Zero button.
- When 2 SETUP message is shown, move to menu by pushing Zero button.
- When 3 LCD message is shown, move to the lower menu by pushing Span button.
- When 31 LCD-MD message is shown, proceed with function by pushing Span button.
- When setting function of LCD Mode is processed, the mode set presently is shown on the second line of LCD and the details are as follows.

Message	Detail	Reference
NOR_RO	Normal Rotate. It shows PV / % / mA by turn.	
NOR_PV	It Shows PV value.	
NOR_%	It shows Percent as per Range.	
NOR_mA	It shows output current 4~20mA	
ENG_RO	Engineering Rotate. It shows (Flow Rate/Total/PV) by turn	
ENG_PV	It shows Engineering Value	
FL_RO	Flow Rotate. It shows (Flow Rate / Total / PV)by turn	
F_RATE	It shows Flow Rate	
FTOTAL	It shows Total Flow Rate	

- Whenever you push Zero button, LCD Mode is changed. After you choose Mode you want, save the setting values by pushing Span.

3.3.7 Decimal Place

- Proceed with Menu by pushing the Zero+Span button.
- When "1 TRIM" message is shown, move to the menu by pushing Zero button.
- When 2 SETUP message is shown, move to the menu by pushing Zero button.
- When 3 LCD message is shown, move to the lower menu by pushing Span button.
- When 31 LCD-MD message is shown, move to the menu by pushing Zero button
- When 32 DEC-PL message is shown, proceed with the function by pushing the Span button.
- When setting function of Decimal Place is processed, the decimal figure will be shown. And the details are as follows.

Message	Description	The maximum indicating value	Reference
AUTO	According to the figure you want to show, automatically decimal point is indicated.	99999	
5-0	It does not indicate decimal point.	99999	
4-1	It indicates to the extent of the first decimal place.	9999.9	
3-2	It indicates to the extent of the second decimal place.	999.99	
2-3	It indicates to the extent of the third decimal place.	99.999	
1-4	It indicates to the extent of fourth decimal place.	9.9999	

- In the first line of LCD, show how to express"0" that you select the decimal place method.
- Whenever Zero button is pushed, the display method is changed. After you choose the indicating method you want, save the setting value by pushing Span button.
- The method to express Decimal Place that you select is only effected for the PV, engineering mode and flow value not for mA and %. These two factors always show 3-2(0.00) form.
- The setting values in Decimal Place can be valid when they are expressed with PV, Engineering unit, flow quantity. Regardless of setting information, mA or % is expressed with 3-2 format.
- In case the values higher than the maximum limit on LCD is shown during operation, the "LCD_OV" message and presently set Unit letter are shown by turn in the second line of LCD.

3.3.8 Total Reset

- Proceed with the menu by pushing Zero+Span buttons.
- When "1 TRIM" message is shown, move to menu by pushing Zero button.
- When 2 SETUP message is shown, move to the lower menu by pushing Span button.
- When 3LCD message is shown, move to menu by pushing Zero buttons.
- When 4 TOTAL message is shown, move to the lower menu by pushing Span button.
- When 41 RESET message is shown, proceed with function by pushing Span button.
- Accumulated total value is initiated with 0.

3.3.9 Change Flow Rate Unit

- Proceed with Menu by pushing Zero+Span
- When 1 TRIM message is shown, move to menu by pushing Zero button.
- Whne 2 SETUP message is shown, move to menu by pushing Zero button.
- When 3 LCD message is shown, move to menu by pushing Zero button.
- When 4 TOTAL message is shown, move to the lower menu by pushing Span button.
- When 41RESET message is shown, move to the menu by pushing Zero button.
- When 42 UNIT message is shown, proceed with the function of Change Unit by pushing the Span button.
- Repeat pushing Zero button until Unit of Flow Rate you want is shown on the lower part of the LCD.
- When the Unit you want is shown, save the setting value by pushing the Span button.

3.3.10 Change Flow Rate URV

- Proceed with the Menu by pushing the Zero+Span buttons.
- When 1 TRIM message is shown, move to menu by pushing the Zero button.
- When 2 SETUP message is shown, move to menu by pushing Zero button.
- When 3 LCD message is shown, move to menu by pushing Zero button.
- When 4 TOTAL message is shown, move to lower menu by pushing the Span button.
- When 41 RESET message is shown, move to menu by pushing Zero button
- When 42 UNIT message is shown, move to the menu by pushing Zero button
- On showing message "43 U-RNG" in LCD, execute the function with pushing "Span" button
- When 43 U-RNG message is shown, proceed with the function by pushing Zero button
- Input the instantaneous value equivalent of 100% pressure (20mA).
- The method of value input is the same as that of Zero Adjustment.

3.3.11 Change Flow Rate LRV

- Proceed with the menu by pushing Zero+Span buttons
- When the 1 TRIM message is shown, move to the menu by pushing Zero button
- When the 2 SETUP message is shown, move to the menu by pushing Zero button
- When the 3 LCD message is shown, move to the menu by pushing Zero button
- When the 4 TOTAL message is shown, move to the lower menu by pushing Span button
- When the 41 RESET message is shown, move to the menu by pushing Zero button
- When the 42 UNIT message is shown, move to the menu by pushing Zero button
- When the 43 U-RNG message is shown, move to the menu by pushing Zero button
- When the 44 L-RNG message is shown, move to the menu by pushing Span button
- Input the instantaneous value equivalent of 0% pressure (4mA).
- The value input method is the same as that of Zero Adjustment.

3.3.12 Change Pulse Scale

- Proceed with Menu by pushing Zero+ Span button

  When the 1 TRIM message is shown, move to the menu by pushing Zero button

  When the 2 SETUP message is shown, move to the menu by pushing Zero button

  When the 3 LCD message is shown, move to the menu by pushing Zero button

  When the 4 TOTAL message is shown, move to the lower menu by pushing Span button

  When the 41 RESET message is shown, move to the menu by pushing Zero button

  When the 42 UNIT message is shown, move to the menu by pushing Zero button

  When the 43 U-RNG message is shown, move to the menu by pushing Zero button

  When the 44 L-RNG message is shown, move to the menu by pushing Zero button

  When the 45 PSCALE message is shown, move to the menu by pushing Span button
- You could select total value for 1 pulse output and the total value has same unit that you select on flow rate unit.
- Whenever Zero button is pushed, Setting value is shown with multiple number of 10. After you choose the value you want, save the setting value by pushing Span button.

3.3.13 Change Pulse Width

- Proceed with Menu by pushing Zero+ Span button
- When the 1 TRIM message is shown, move to the menu by pushing Zero button
- When the 2 SETUP message is shown, move to the menu by pushing Zero button
- When the 3 LCD message is shown, move to the menu by pushing Zero button
- When the 4 TOTAL message is shown, move to the lower menu by pushing Span button
- When the 41 RESET message is shown, move to the menu by pushing Zero button
- When the 42 UNIT message is shown, move to the menu by pushing Zero button
- When the 43 U-RNG message is shown, move to the menu by pushing Zero button
- When the 44 L-RNG message is shown, move to the menu by pushing Zero button
- When the 45 PSCALE message is shown, move to the menu by pushing Zero button
- When the 46 PWIDTH message is shown, move to the menu by pushing Span button
- Choose one output Pulse width among 10ms, 50ms, 100ms
- Repeat pushing Zero button until the value you want is shown on lower part of LCD.
- When the value you want is shown, save the setting value by pushing Span button.