SMART POSITIONER
YT-3300/3301 SERIES

ytc
YOUNG TECH Co., Ltd

VERSION 1.02

Contents

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1. Introduction

1.1   General Information for the users

Thank you for purchasing Young Tech Co., Ltd products.   Each product has been fully inspected after its production to offer you the highest quality and reliable performance. Please read the product manual carefully prior to installing and commission the product.

- ➢ For the safety, it is important to follow the instructions in the manual.   Young Tech Co., Ltd will not be responsible for any damages caused by user's negligence.
- ➢ The manual should be provided to the end-user.
- ➢ Any modifications or repairs to the product may only be performed if expressed in this manual.
- ➢ The manual can be altered or revised without any prior notice.   Any changes in product's specification, design, and/or any components may not be printed immediately but until the following revision of the manual.
- ➢ The manual should not be duplicated or reproduced for any purpose without prior approval from Young Tech Co., Ltd, Gimpo-si, South Korea.

1.2   Manufacturer Warranty

- ➢ For the safety, it is important to follow the instructions in the manual.   Manufacturer will not be responsible for any damages caused by user's negligence.
- ➢ Manufacturer will not be responsible for any damages or accidents as a result of any alteration or modification of the product and its parts.   If any alteration or modifications are necessary, please contact Young Tech Co., Ltd directly.
- ➢ Manufacturer warrants the product from the date of original purchase of the product for eighteen (18) months, except as otherwise stated.
- ➢ Manufacturer warranty will not cover products that have been subjected to abuse, accidents, alterations, modifications, tampering, negligence, misuse, faulty installation, lack of reasonable care, repair or service in any way that is not contemplated in the documentation for the product, or if the model or serial number has been altered, tampered with, defaced or removed; damages that occurs in shipment, due to act of God, failure due to power surge, or cosmetic damage.   Improper or incorrectly performed maintenance will void this limited warranty.
- ➢ For detailed warranty information, please contact Young Tech Co., Ltd – South Korea.

2. Product Description

2.1 General

YT-3300 series Smart Valve Positioner accurately controls valve stroke in response to an input signal of 4-20mA from the controller. Built-in micro-processor optimizes the positioner's performance and provides unique functions such as **Auto-Calibration, PID Control, Alarms, and HART Protocol Communications.**

2.2 Main Features and Functions

➢ LCD display enables users to monitor the positioner status.

➢ Positioner operates normally during sudden changes in supply pressure and / or high vibration environment.

➢ Low air consumption level and low voltage use (8.5 V) yield to lower plant operating costs. The YT-3300 is compatible with most of controllers.

➢ Variable orifice can be used to minimize the hunting occurrence and optimize operating conditions.

➢ Valve system feedback is greatly improved by the accuracy and fast response of the YT-3300.

➢ Different valve characteristics can be adjusted – Linear, Quick Open, Equal Percentage, and Custom which user can make 16 points characterizations.

➢ Tight Shut – Close and Shut - Open can be set.

➢ PID parameters can be adjusted in the field without any additional communicator.

➢ A/M switch can be used to direct supply air to the actuator or to manually operate the positioner or valve.

➢ Split range 4-12mA or 12-20mA can be set.

➢ Operating temperature is -40 ~ 85'C.

➢ Manual Operation allows the user to operate the valve manually.

2.3 Label Description
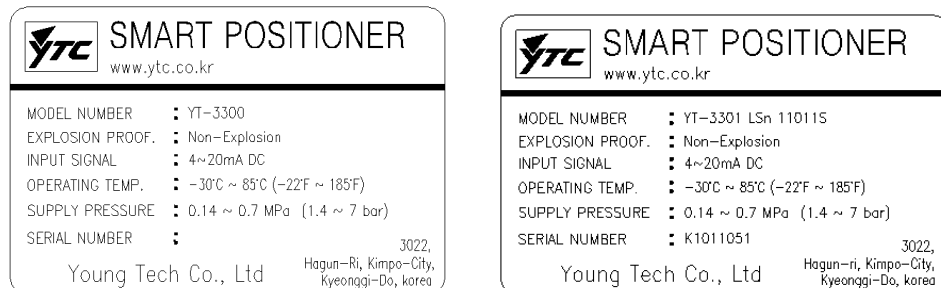
YT-3300/3301 Body Label

A.	Model:	Indicates the model number of the positioner.
B.	Explosion Proof:	Indicates certified explosion proof grade.
C.	Input Signal:	Indicates input signal range.
D.	Operating Temp.:	Indicates the allowable operating temperature.
E.	Supply Pressure:	Indicates the supply pressure range.

2.4   Product Number

YT-3300/3301	1	2	3	4	5	6	7	8

1	Motion Type		L	Linear
			R	Rotary

2	Acting Type		S	Single Acting
			D	Double Acting

3	Explosion Proof		N	Non-explosion
			i	Ex ia IIC T5 / T6

4	Lever Type	L	1	20 ~ 100 mm
			2	90 ~ 150 mm
			3	16 ~ 30 mm (adapter)
			4	16 ~ 60 mm (adapter)
			5	16 ~ 100 mm (adapter)
		R	5	NAMUR

5	Connection Type		1	PT 1/4
			2	NPT 1/4

6	Communication		0	None
			2	HART Protocol

7	Option (YT-3300)		0	None
			1	+ PTM
			2	+ L/S (Mechanical)
			3	+ L/S (Proximity)
			4	+ PTM & L/S (Mechanical)
			5	+ PTM & L/S (Proximity)
	Option (YT-3301)		0	None
			1	+ PTM

8	Ambient Temp.		S	-30 ~ 85'C
			L	-40 ~ 85'C

**   YT-3300 series can be used for direct-mounting application.**

**   YT-3301 standard cable length is 5 meters.   Maximum cable length is 20 meters.**

2.5   Product Specification

Model	YT-3300L		YT-3300R		YT-3301L		YT-3301R	
Acting Type	Single	Double	Single	Double	Single	Double	Single	Double
Input Signal	4~20mA DC							
Min. Current Signal	3.2mA(Standard), 3.8mA(Hart Included)							
Supply Pressure	0.14~0.7 MPa (1.4~7 bar)							
Stroke	10~150 mm		0~90°		10~150 mm		0~90°	
Impedance	Max.450Ω @ 20mA DC							
Air Connection	PT, NPT 1/4							
Gauge Connection	PT, NPT 1/8							
Conduit Entry	PF(G) 1/2							
Protection Grade	IP66							
Explosion Proof	Ex ia IIC T6 / T5				Non-Explosion Proof			
Ambient Temp.	Operating Temp. :-30~85℃				Operating Temp : -30 ~ 85℃ Sensor Temp: -40 ~ 120℃			
Linearity	±0.5% F.S. (cable length: 5 m)							
Hysteresis	0.5% F.S.(cable length: 5 m)							
Sensitivity	±0.2% F.S (cable length: 5 m)							
Repeatability	±0.3% F.S.(cable length: 5 m)							
Flow Capacity	70 LPM (Sup.=0.14 MPa)							
Air Consumption	Below 2 LPM (sup = 0.14 MPa), Below 3 LPM (sup = 0.7MPa)							
Output Characteristic	Linear, Quick Open, EQ%, User Set (16 point)							
Vibration	No Resonance upto 100Hz @ 6G							
Humidity	5-95% RH @ 40℃							
Communication	HART Communication							
Feedback Signal	4~20mA (DC 10~30V)							
Material	Aluminum Diecasting							
Weight	2.0kg				Body: 2.2 kg Sensor: 0.6 kg			
Painting	Epoxy Powder Coating							

⚠ Tested under ambient temperature of 20'C, absolute pressure of 760mmHg, and humidity of 65%.   Please contact Young Tech Co., Ltd for detailed testing specification.   * Explosion proof certification is in progress.

YT-3300L series exploded view   YT-3300R series exploded view
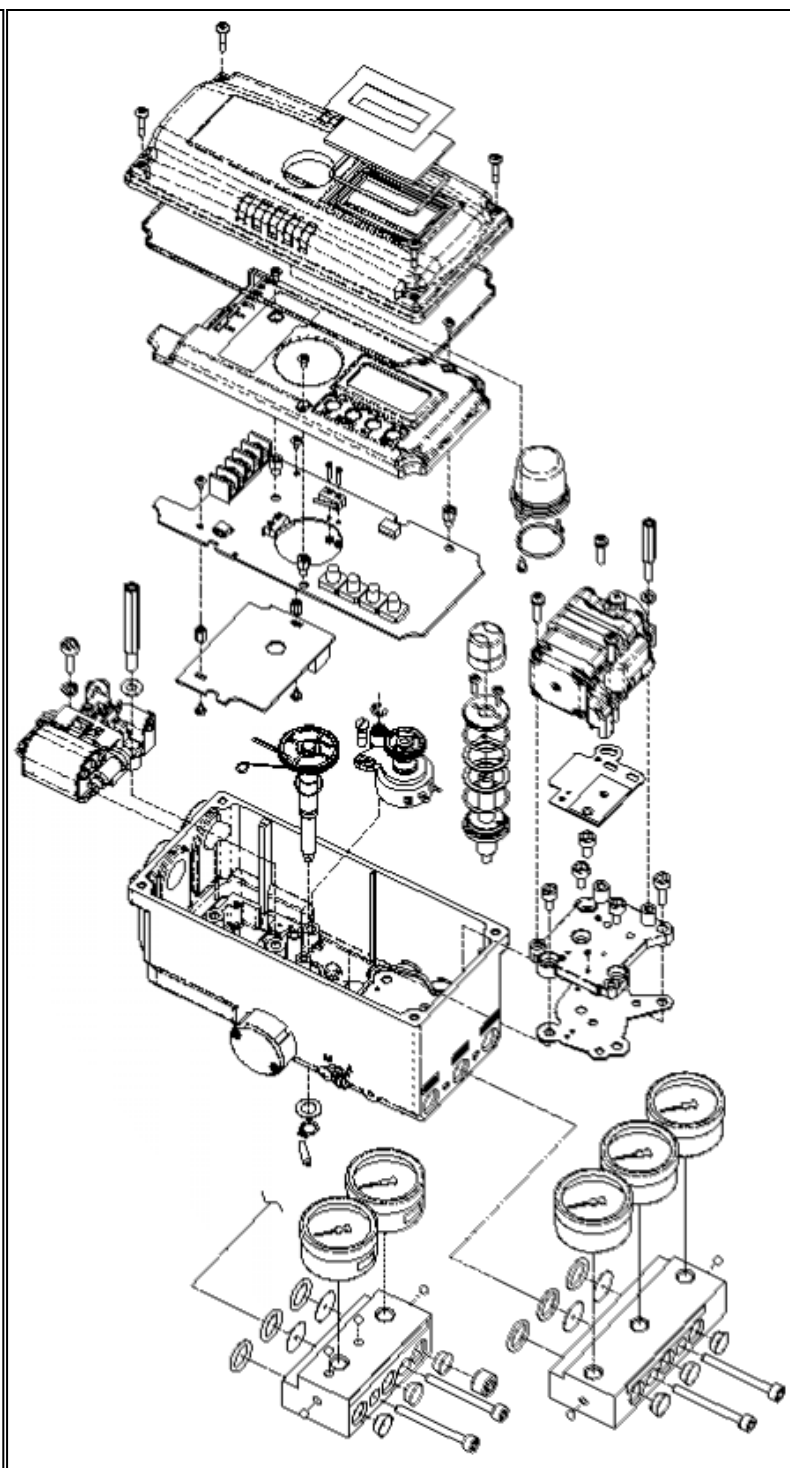
2.7   Parts and Assembly – YT-3301L & YT-3301R

FEED BACK MODULE
LINEAR TYPE

FEED BACK MODULE
ROTARY TYPE
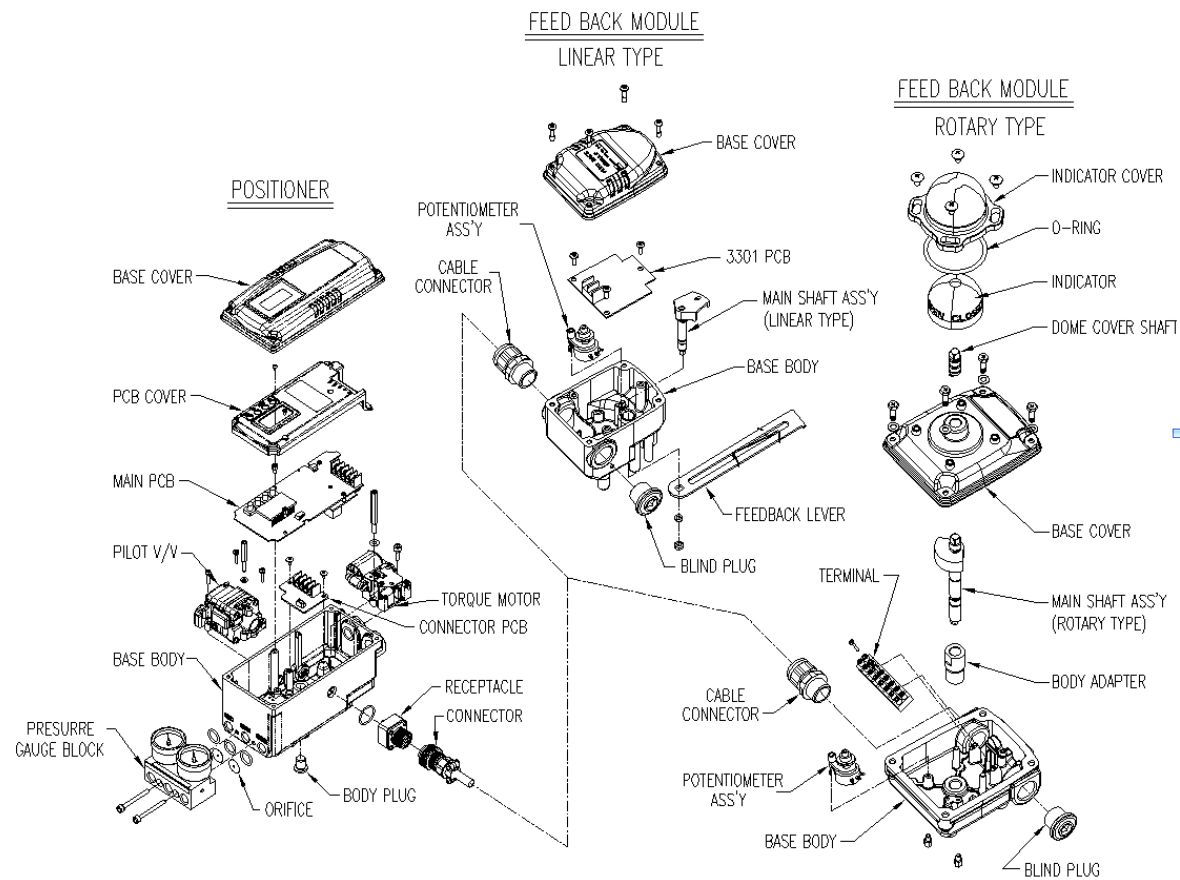
POSITIONER

2.8   Product Dimension

2.8.1   YT-3300L
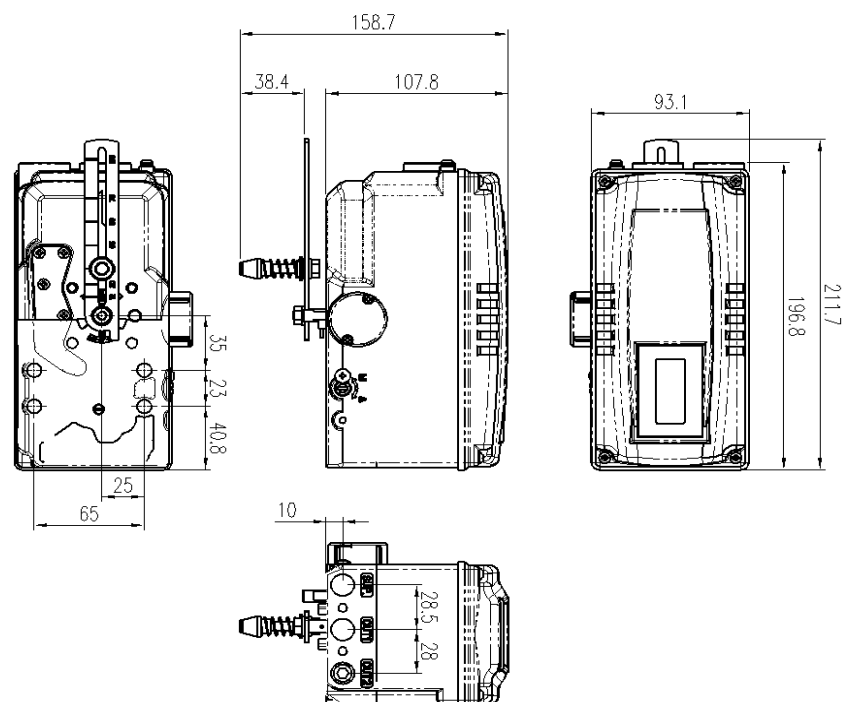
2.8.2   YT-3300R

2.8.2.1   YT-3300R standard
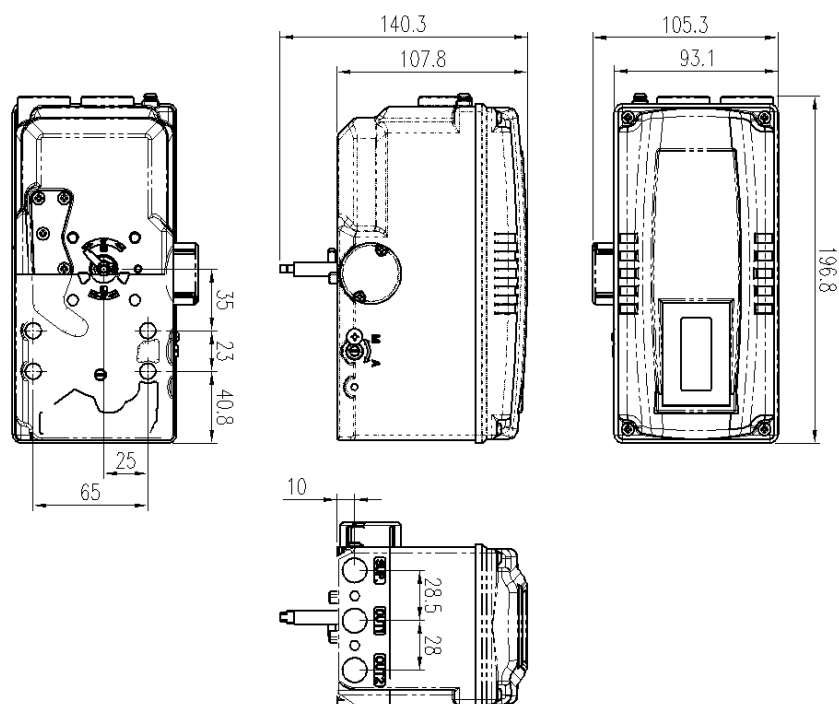
2.8.2.2   YT-3300R with L/S option

2.8.3   YT-3301L

OUT1
PT(NPT) 1/4
OUT2
PT(NPT) 1/4

SUPPLY
PT(NPT) 1/4

6-M8*1.25P TAP
OUT1 PLUG
4-M6*1P TAP

Conduit entry

FEED BACK MODULE
(PTM-5V)

2.8.4   YT-3301R

OUT1
PT(NPT) 1/4
OUT2
PT(NPT) 1/4

SUPPLY
PT(NPT) 1/4

6-M8*1.25P TAP
OUT1 PLUG
4-M6*1P TAP

Conduit entry

4-M6 TAP DP.8

FEED BACK MODULE
(YT-850)
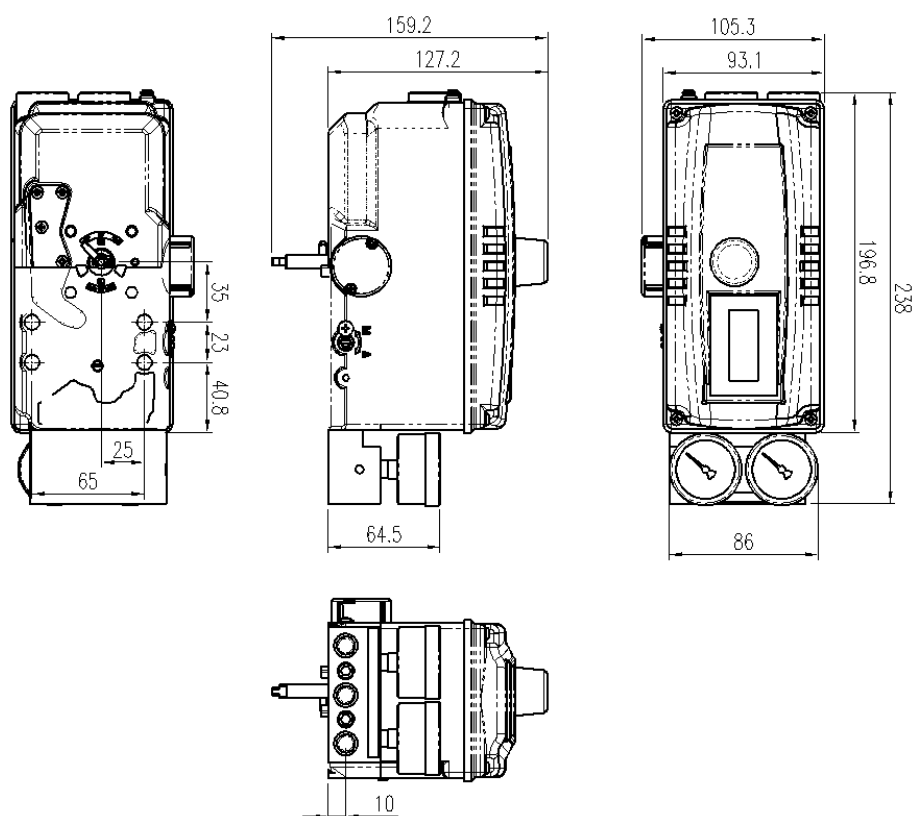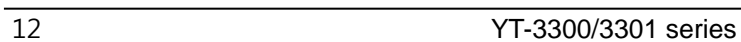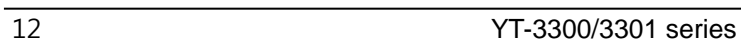
3. Installation

3.1 Safety

When installing a positioner, please ensure to read and follow safety instructions.

➢ Any input or supply pressures to valve, actuator, and / or to other related devices must be turned off.

➢ Use bypass valve or other supportive equipment to avoid entire system "shut down".

➢ Ensure there is no remaining pressure in the actuator.

3.2 YT-3300/3301L Installation

YT-3300/3301L should be installed on linear motion valves such as globe or gate type which uses spring return type diaphragm or piston actuators. Before proceeding with the installation, ensure following components are available.

➢ Positioner unit

➢ Feedback lever and lever spring

➢ Flange nut (bottom side of YT-3300/3301L)

➢ 4 pcs x hexagonal headed bolts (M8 x 1.25P)

➢ 4 pcs x M8 plate washer

3.2.1 Installation Steps

1. Proper bracket must be made in order to adapt the positioner on the actuator yoke. Please consider following important points when a bracket is being designed.

➢ Positioner's feedback lever must be parallel to the ground at 50% of the valve stroke.

➢ Feedback lever connection with the pin of the actuator clamp should be installed in such a way that the valve stroke length coincides with the corresponding figure in "mm" marked on the feedback lever. Improper setting may cause poor linearity and may create unnecessary hunting during the operation.

2. Assemble the positioner with the bracket made in previous step by fastening the bolts. Please refer to the backside of the positioner for size of the bolts. The standard bolt size is M8 x 1.25P. Please contact Young Tech Co., Ltd for other bolt sizes.
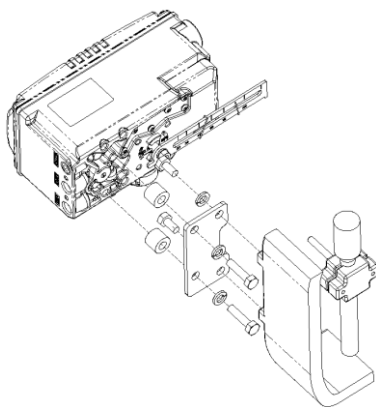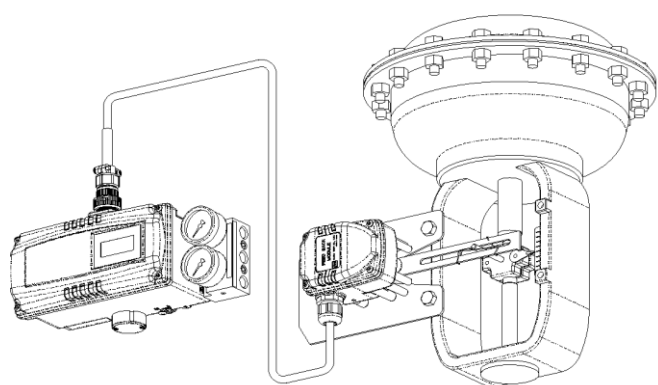
YT-3300L   YT-3301L

3. Attach the positioner with bracket to the actuator yoke – **DO NOT TIGHTEN POSITIONER COMPLETELY.**

4. Connect positioner's feedback lever to the actuator clamp. The hole gap on the feedback lever is 6.5mm. The connection pin's outer diameter should be less than 6.3mm.

5. Connect supply pressure to the actuator temporarily. Supply enough supply pressure to the actuator in order to position the actuator clamp at 50% of the total valve stroke.

6. Insert connection pin into the feedback lever. The pin should be inserted when the actuator clamp is at 50% of the total valve stroke.
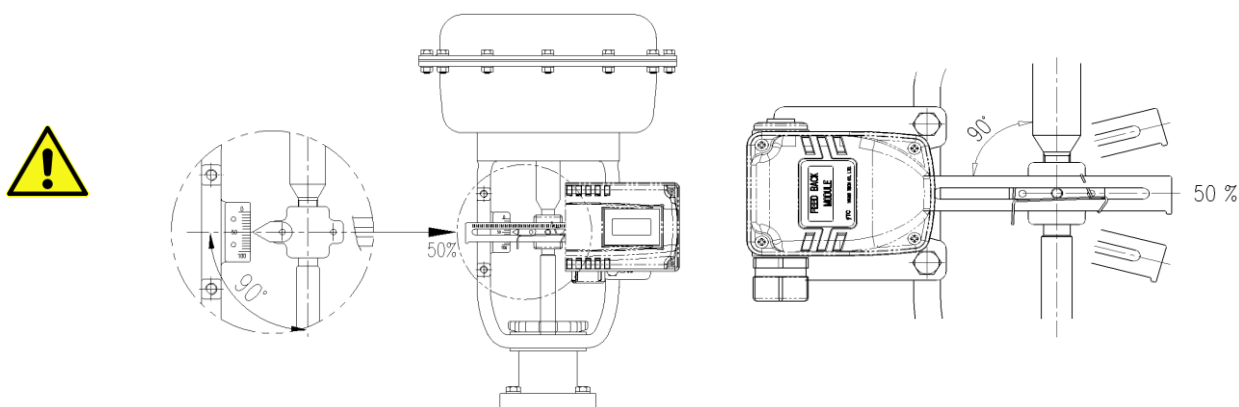
Proper way to connect feedback lever, connection pin, and lever spring <YT-3300 and YT-3301 sensor>

7. Check if feedback lever is parallel to the ground at 50% of the valve stroke. If it is not parallel, adjust the bracket or feedback link bar to make parallel. Improper installation may cause poor linearity and may create unnecessary hunting during the operation.

8. Check the valve stroke. The stroke marks are indicated on the feedback lever of the positioner. Position the connection pin at the number on the feedback lever which corresponds to the desired valve stroke. To adjust, move the bracket, the connection pin or both.
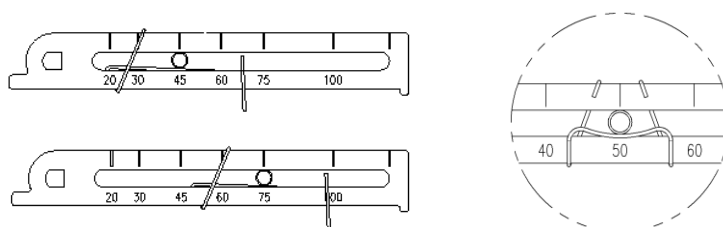
Proper way of Pin Insertion

9. After installing the positioner, operate the valve from 0% to 100% stroke by using direct air to the actuator (manual position). On both 0% and 100%, the feedback lever should not touch the lever stopper, which is located on the backside of the positioner. If the feedback lever touches the stopper, the positioner should be installed further away from the yoke.
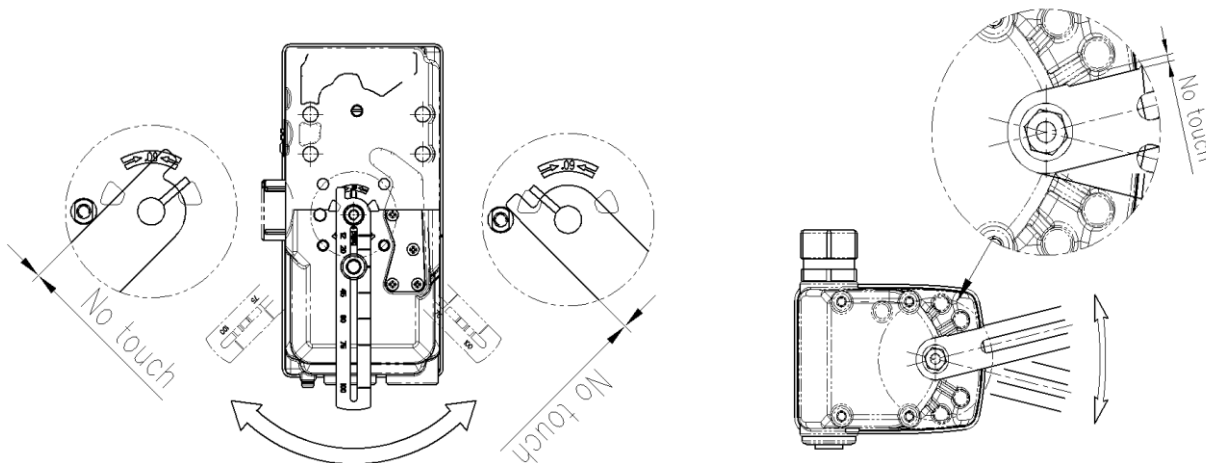
Feedback lever should not touch lever stopper 0% ~ 100% valve stroke.

10. After the installation, tighten all of the bolts on the bracket, the feedback lever, and the connection pin.

3.3   YT-3300L Direct-Mounting Installation

YT-3300L can be installed on direct-mounting / tube-less type actuator.

3.3.1   Installation Steps

1. Please remove the plug which blocks OUT port on the back of the YT-3300 unit. OUT ports on the side of the positioner should be blocked by plugs.
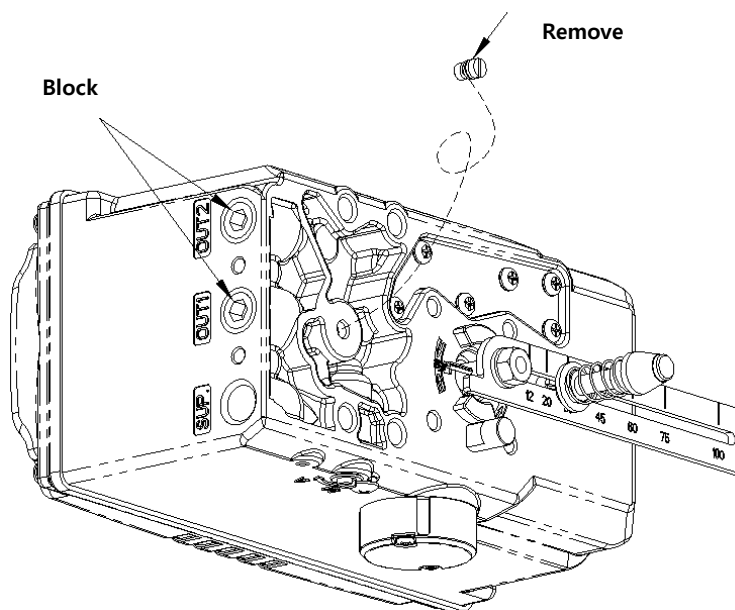
2. Mount YT-3300L onto actuator's yoke by using 2 bolts.   As you mount the positioner, please be careful not to lose o-rings from the air channel.   Please ensure that the lever adapter connection has been properly installed onto actuator's stem before tightly fastened.
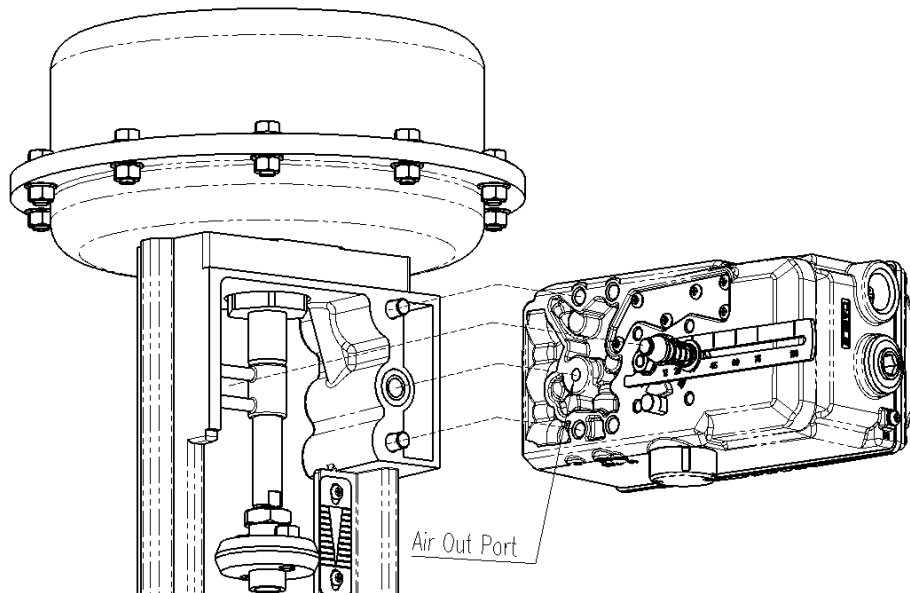
3.4   YT-3300R Installation

YT-3300R should be installed on rotary motion valve such as ball or butterfly type which uses rack and pinion, scotch yoke or other type of actuators which stem rotates 90 degrees. Before proceeding with the installation, ensure following components are available.

➢   Positioner unit
➢   Fork lever and lever spring
➢   Standard rotary bracket (included with the positioner)
➢   4 pcs x hexagonal headed bolts (M8 x 1.25P)
➢   4 pcs x M8 plate washer

3.4.1   Bracket information

YT-3300R series is supplied with standard bracket.   This bracket can be used for both fork and NAMUR lever.   Please refer to below table how to adjust the bracket.

Actuator stem	Markings of bolt holes		
	A	B	C
30 x 80 x H20mm	80	45	106
30 x 80 x H30mm	80	55	106
30 x 130 x H30mm	130	55	156
30 x 130 x H50mm	130	75	156
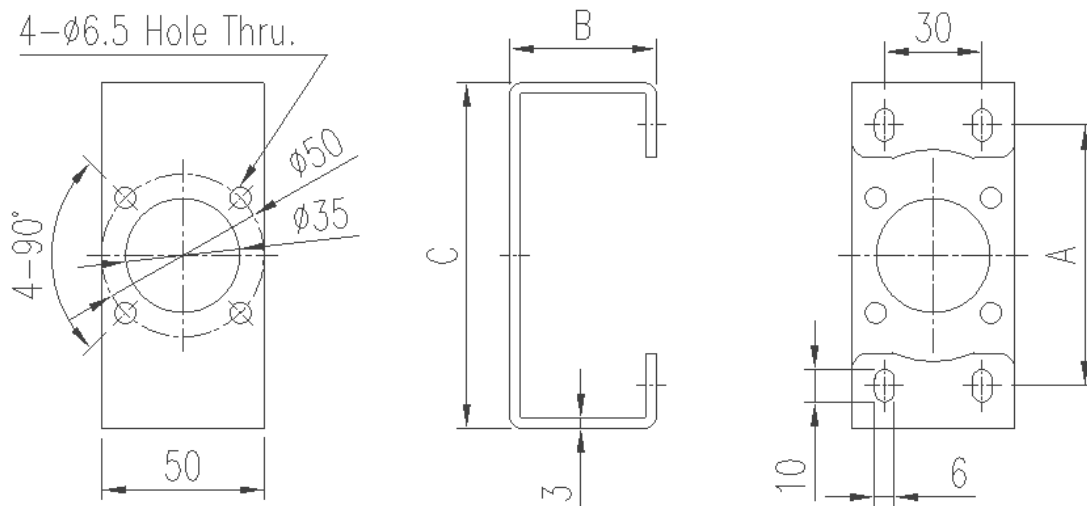
Using hexagonal bolts and washer, fasten YT-3300R with the supplied bracket. Do not tighten bolts completely before correct mounting of YT-3300R has been confirmed. Insert YT-3300R's main shaft into actuator's stem, and place the bracket align to the actuator's bolt holes. After the alignment, please fasten all of the bolts.

4. Connections

4.1   Safety

  ➢ Supply pressure should be clean and dry air – avoiding moisture, oil or dust.
  ➢ Always recommended to use air filter regulator (i.e. YT-200 series).
  ➢ Young Tech Co., Ltd **has not tested positioner's operation with any other gases other than clean air.   Please contact Young Tech Co., Ltd for any questions.**

4.2   Supply Pressure Condition

  ➢ Dry air with at least 10℃ lower than ambient temperature.

  ➢ Avoid from dusty air.   Positioner's inner filter can only filter 5 micron or larger.
  ➢ Avoid oil.
  ➢ Comply with ANSI/ISA-57.3 1975(R1981) or ISA S7.3-1975(R1981).
  ➢ Supply pressure range is 1.4 ~ 7 kgf/cm^2 (140-700 kPA)
  ➢ Set air filter regulator's pressure level 10% higher than actuator's spring range pressure.

4.3   Piping Condition
  ➢ Ensure inside of pipe is clean of obstructions.
  ➢ Do not use pipeline that is squeezed or shows any type of damamges.
  ➢ Pipeline should have more than 6mm of inner diameter (10mm outer diameter) to maintain flow rate.

➢ The length of pipeline system should not be extremely long. Longer pipeline system may affect flow rate due to the friction inside of the pipeline.

4.4   Connection – Actuator
4.4.1   Single acting actuator – YT-3300
Singe acting type positioner is set to use OUT1 port. OUT1 port should be connected with supply pressure port from actuator when using single acting type of spring return actuator.
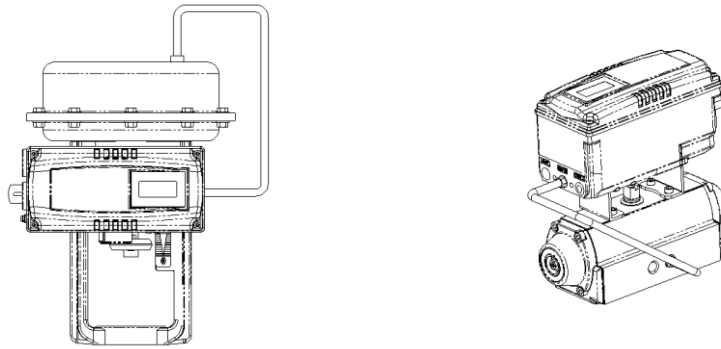
Singe acting linear (left) and rotary (right) type actuator

4.4.2   Double acting actuator – YT-3300
Double acting type positioner is set to use OUT1 and OUT2 port.   As input signal increases, the supply pressure will be supplied through OUT1 port.
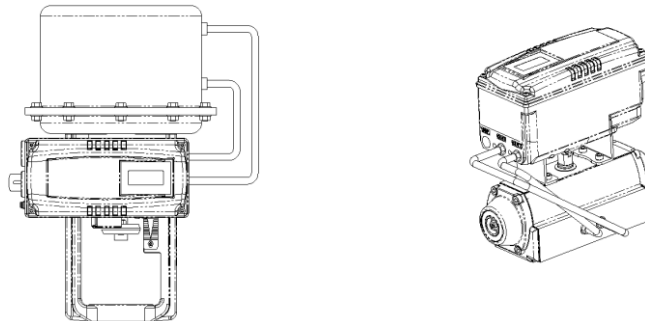
Double acting linear (left) and rotary (right) type actuator

4.4.3   Single acting actuator – YT-3301
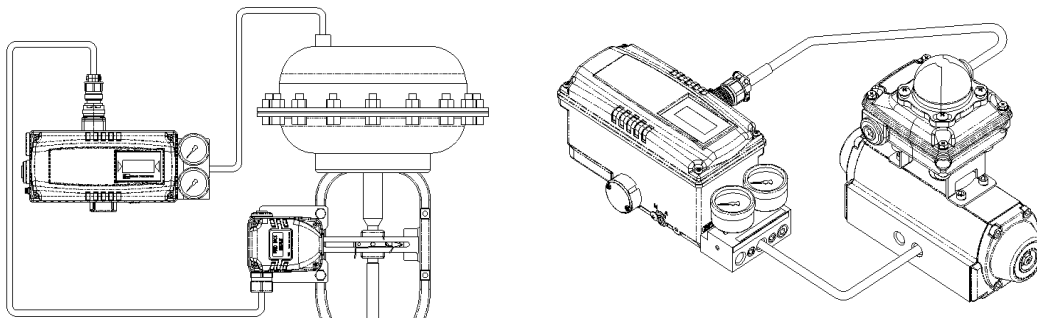
Single acting linear (left) and rotary (right) type actuator

4.4.4   Double acting actuator – YT-3301
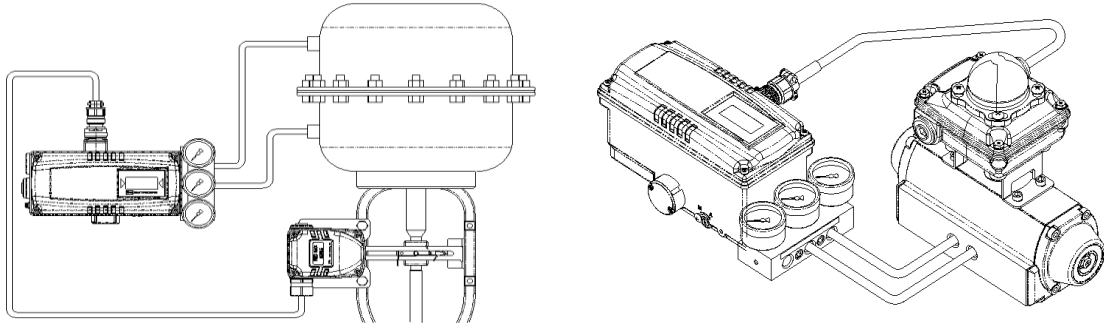
Double acting linear (left) and rotary (right) type actuator

4.5   Connection – Power

4.5.1   Safety

> When installing in hazardous and explosive gas area, conduit tube or pressure-proof packing union must be used.   The compound charging box should be the flameproof type and must be sealed completely.

> Conduit entry connection tap is PF 1/2 or G 1/2.

> Before connecting terminal, ensure that the power is off completely.   **Do not open the cover when the power is still alive.**

> Please use ring-type rug to protect against vibration or any other external impact.

> Standard positioner operates on 4-20mA loop power.   Positioner with PTM options must be supplied 10~28V DC.   For L/S option, 12-24V DC must be supplied.   **For both options, it should not exceed 30V DC.**

> Positioner should be grounded.

> Please use twisted cable with conductor section are 1.25mm^2 and that is suitable for 600V (complying to the conductor table of NEC Article 310.)   The outer diameter of the cable should be between 6.35 ~ 10mm.   Use shield wire to protect against electro-magnetic field and noise.

> Please do not install the cable near high noise equipments, such as high-capacity transformer or motor.
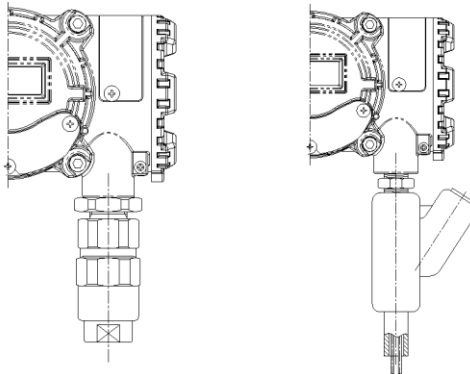
4.5.2   Terminal Overview

Earth (External)
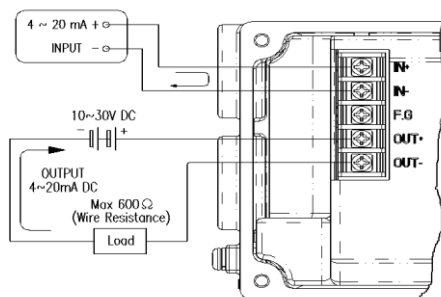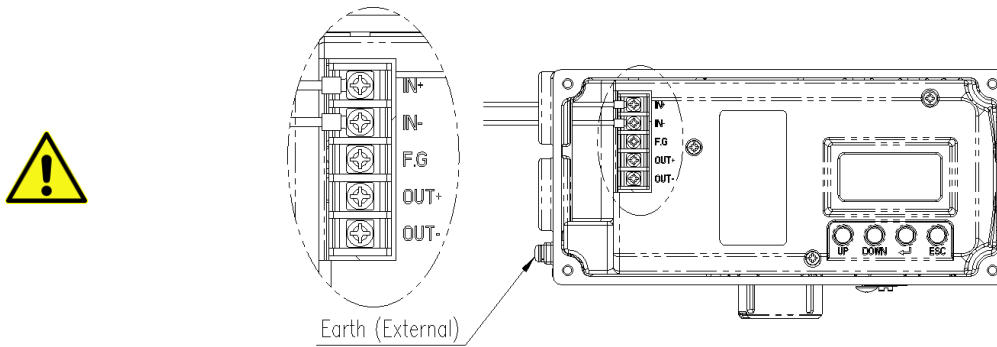
Positioner Terminal

IN +:   Input Signal (+)

IN -:   Input Signal (-)

FG: Ground

OUT+:   Feedback Signal (+)

OUT-:   Feedback Signal (-)

4.5.2.1   Limit Switch Terminal – Mechanical Type <YT-3300>
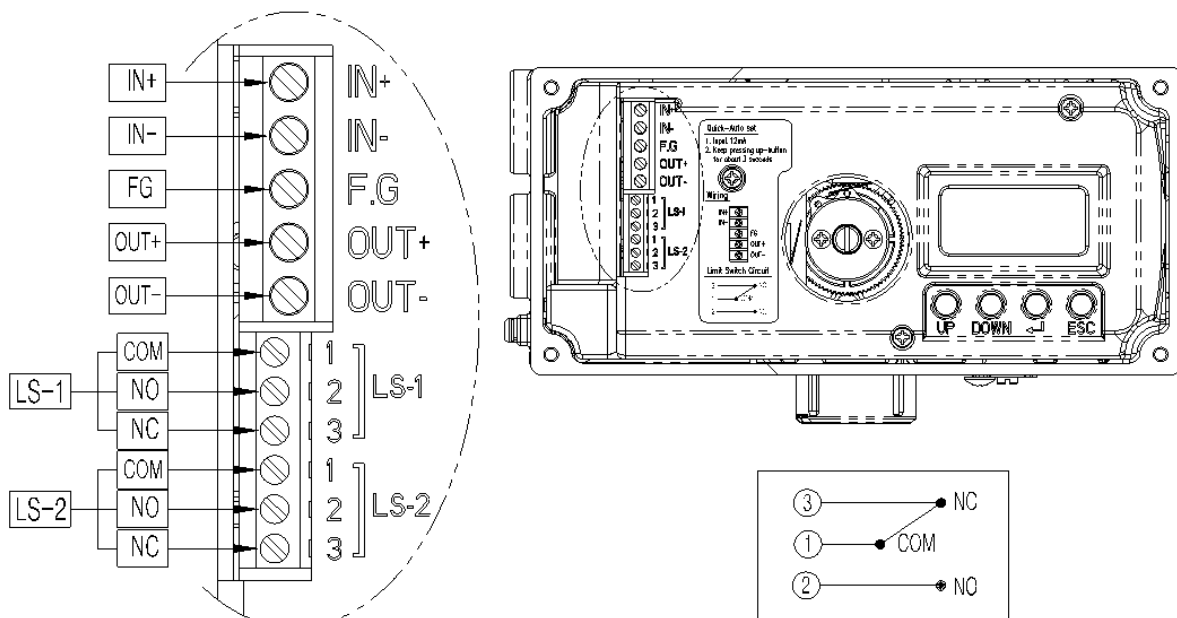
4.5.2.2 Limit Switch Terminal – Proximity Type <YT-3300>
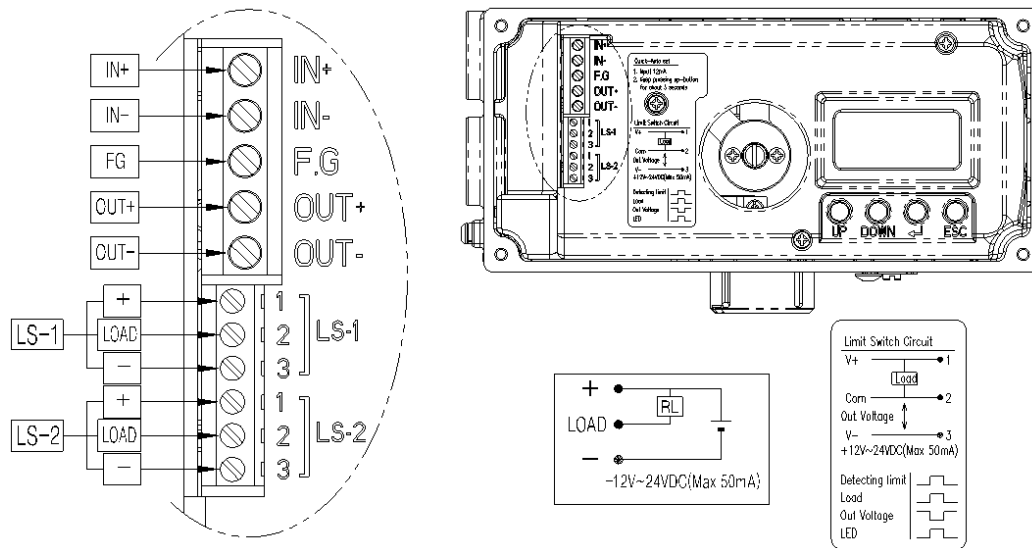
4.5.2.3 Ground

1. Ground must be done before operating the positioner.

2. Open terminal cover and locate ground terminal plate on the right hand bottom side of the terminal plate.   The outer cable entry is located at outside of the terminal.   Please make sure that the resistance is less than 100ohm.

3. When using external ground, use (+) screw driver to unscrew the ground bolts.   Insert outside ground bolts and spring washer into ring type terminal of the ground cables and tighten them with bolts.

4. When using inside ground, use 3mm wrench to loosen locking bolts of the terminal box cover.

5. Adjustments

5.1 Limit Switch Adjustment

YT-3300 series can have limit switch option.   If user wants to adjust the position, please loosen cam bolts and adjust cam.

Mechanical Type   Proximity Type
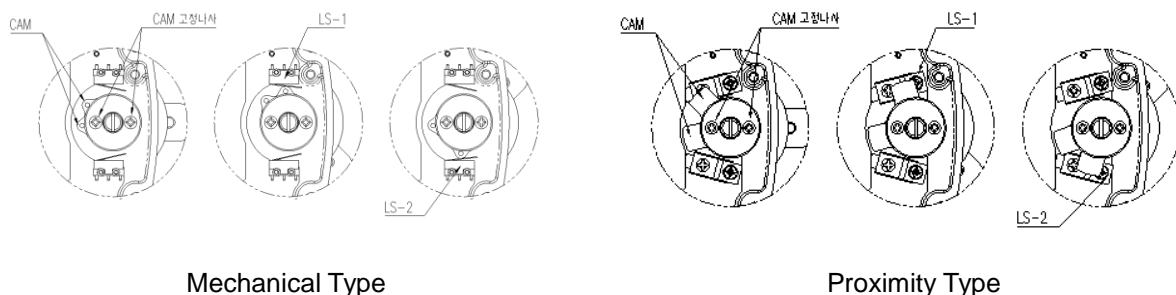
5.2   Auto/Manual Switch (A/M Switch)

Auto/Manual Switch allows the positioner to be functioned as by-pass.   If switch is set as Auto, the positioner will operate per input signal.   If switch is set as Manual, the positioner will send supply pressure directly to the actuator.
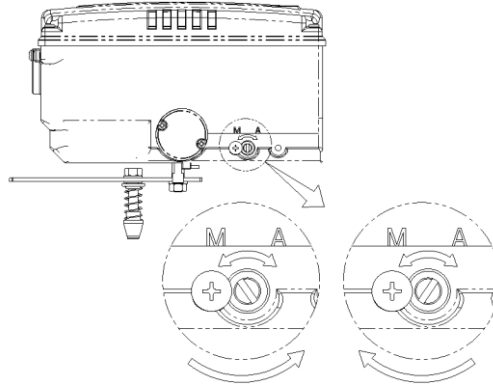
5.3   Variable Orifice Adjustment

Positioner can cause hunting with extremely small size of the actuator.   To adjust flow rate to the actuator, variable orifice can be inserted.   The sizes of orifice are 1 pie and 2 pie.
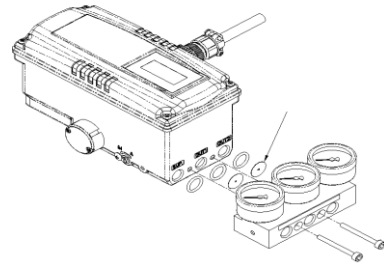
5.4   Option PCB Adjustment

By adding option sub-pcb, the positioner can have options.   There are 3 types of sub-pcb's

HART only   PTM only   PTM + HART
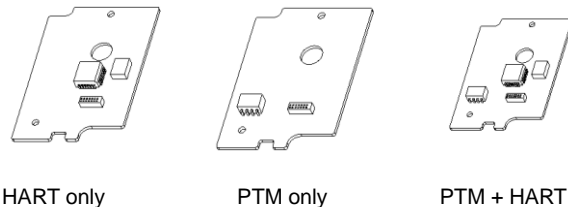
Installation Steps

1.   Open the cover and remove the main PCB from the positioner.
2.   Mount support PCB and plug sub-PCB into main PCB connector.

Option Jumper

.
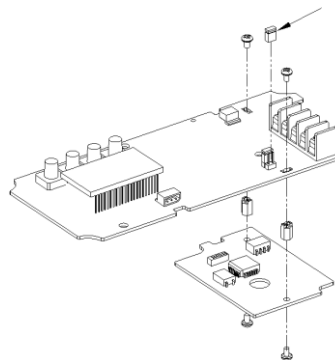
** **Option Jumper must be removed, when HART option included sub-PCB is being mounted.**

6. Operation

6.1 Safety

⚠️ **Following process will operate valve and actuator. Before proceed with any AUTO Calibration, please separate valve from the entire system, so AUTO Calibration will affect entire valve process.**

6.2 Button Description

Positioner has 4 buttons, and they enable to perform various functions.
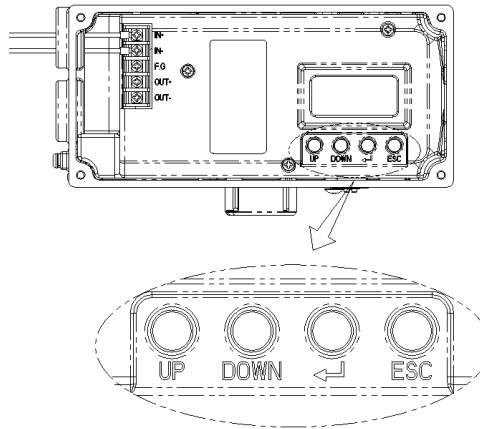
Fig. 11:   \<ENTER>:   Enter to main and sub menus, and save
                \<ESC>:   Return to previous menu
                \<UP> & \<DOWN>:   Move to next menu, and adjust.

6.3 Run Mode (RUN)

After power connection to the positioner, Run Mode will be appeared on positioner's LCD screen within 6 seconds. "RUN" indicates that the positioner adjusts the valve stroke according to the receiving signal. There are six types of display message in "RUN" Mode.
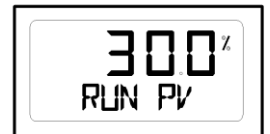
1. Run PV: Process Value - valve stroke %
2. Run SV %:   Set Value – input signal 0~100%
3. Run SV mA: Set Value – input signal 4~20mA
4. Run MV: Manipulate Valve – Motor Manipulate Value (digit)
5. Run Vel: Velocity – Current valve stem's velocity (digit)
6. Run Err: Error – Difference between SV and PV (%)

To change display, push \<ESC> + \<UP> buttons at the same time. The display will change in the order indicated above. If \<ESC> + \<DOWN> pushed, the order will be appeared in opposite order. By pressing \<ESC>, the display will return to "RUN" mode.

6.3.1 Auto Calibration (AUTO CAL)

Auto Calibration (AUTO CAL) automatically calibrates the positioner. "AUTO CAL" process takes about 2~3 minutes, and the duration of the process varies upon the size of the actuator. There are 3 types of AUTO CAL.

	Zero Point	End Point	KP, KI, KD	RA / DA	BIAS	V_D
AUTO 1	O	O	X	X	X	X
AUTO 2	O	O	O	O	O	O
AUTO HF	O	O	O	O	O	O
BIAS	X	X	X	X	O	X

⚠️ **It is recommend to perform AUTO2 calibration for initial positioner setting.**

6.3.1.1 AUTO1 Calibration (AUTO1)

AUTO1 changes zero and end points; however, KP, KI, KD will not be adjusted. It is recommended to perform AUTO1 when the positioner has been set by the valve manufacturer already, and the field user wants to re-calibrate the positioner.
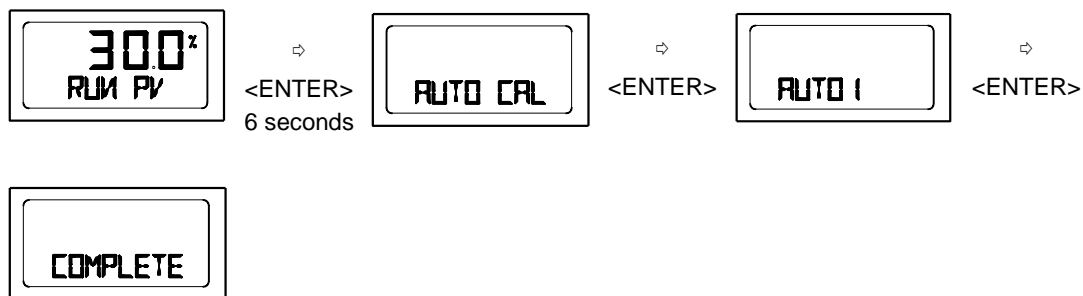
6.3.1.2 AUTO2 Calibration (AUTO2)

AUTO2 changes all of the parameters. It is recommended to perform AUTO2 when the positioner has been installed on the valve for the first time.
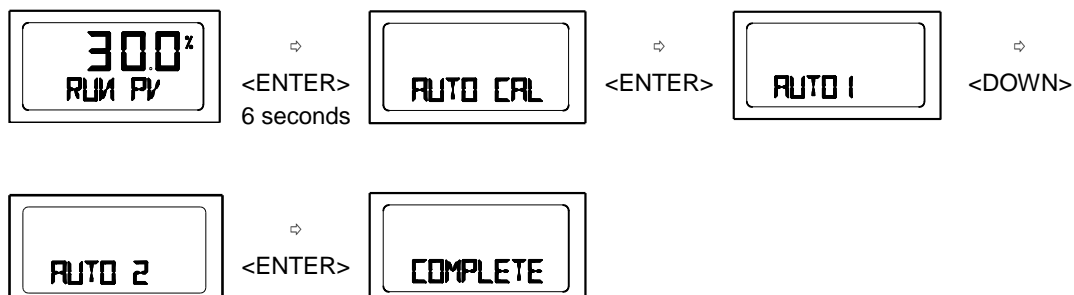
6.3.2 Manual Mode (MANUAL)

Manual mode is used to maneuver valve stem manually.   During "MANUAL", the positioner bypasses supply air to the actuator.   The movement of the stroke does not affect the positioner's save data valves.

30.0% RUN PV	⇨ <ENTER> 6 seconds	**AUTO CAL**	⇨ <DOWN>
MANUAL	⇨ <ENTER>		

30.0% *MA 300	<UP> ⇨ <DOWN>	**25.0**% *MA 243	⇨ <ESC>
MANUAL			
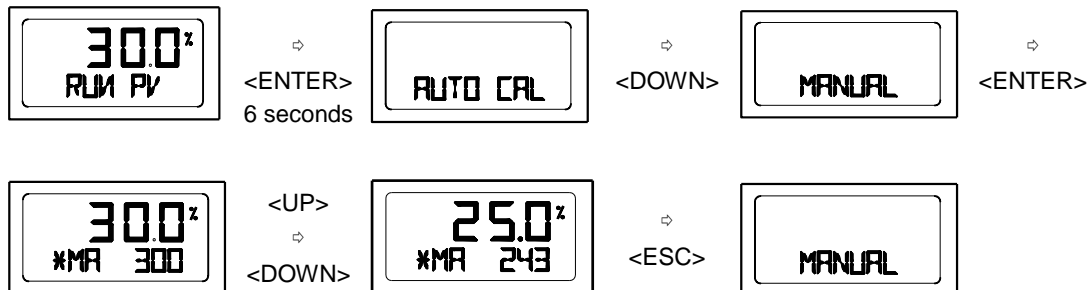
6.3.3 Parameter Mode (PARAM)

AUTO CAL optimizes most of the valve actuator control values.   However, in some instances, hunting or oscillation may occur when the valve actuator control values are not optimized.   Hunting or oscillation can be prevented by adjusting parameter values.

Once parameter values have been changed, the changed values are being affected as soon as you save the value.   To save the changes, please ensure to press "ENTER" button.   There is no need to go back to "RUN" mode after changes are being made to observe the changes.

6.3.3.1 Dead-Zone (dEAdZONE)

Dead-Zone indicates the percentage of error allowance.   In case of high level of packing friction, which may cause hunting, creating Dead-Zone can stable the valve operation.

30.0% RUN PV	⇨ <ENTER> 6 seconds	**AUTO CAL**	⇨ <DOWN> 2 times
PARAM	⇨ <ENTER>		

5.0% dEAdZONE	⇨ <ENTER>	**5.0**% *EAdZONE	⇨ <UP>/<DOWN> <ENTER>
2.0% +EAdZONE	⇨ <ESC> 3 times		
30.0% RUN PV			
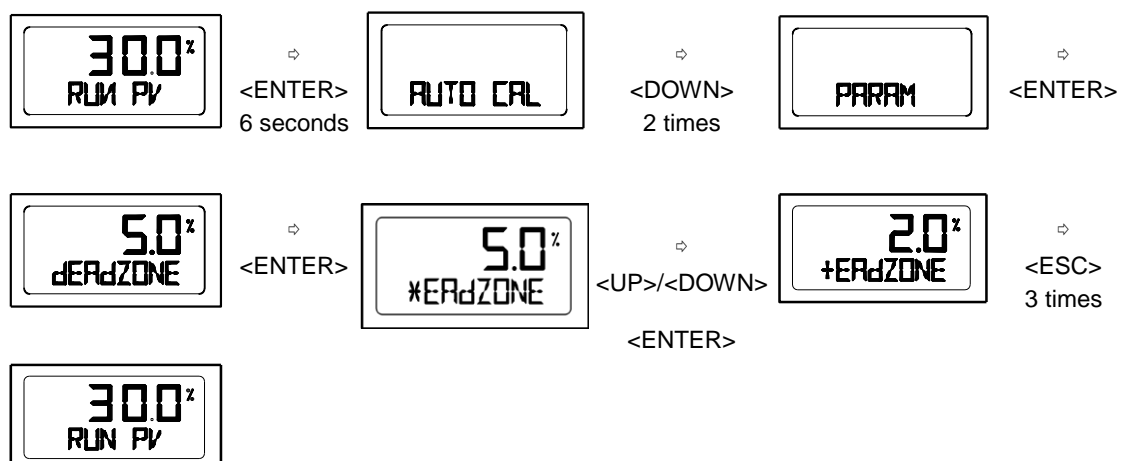
6.3.3.2 P value (KP)

P value indicates the ratio of the compensation signal based on the percentage of error allowance.   As the value increase, the positioner finds the target value quickly, but it is more likely to have hunting.

PARAM	⇨ <ENTER>	5.0 % dEAdZONE	⇨ <DOWN> 1time	30.0 % KPi 20	⇨ <ENTER>
30.0 % *KPi 20	⇨ <UP>/<DOWN> <ENTER>	30.0 % +KPi 30	⇨ <ESC> 3 times	30.0 % RUN PV	
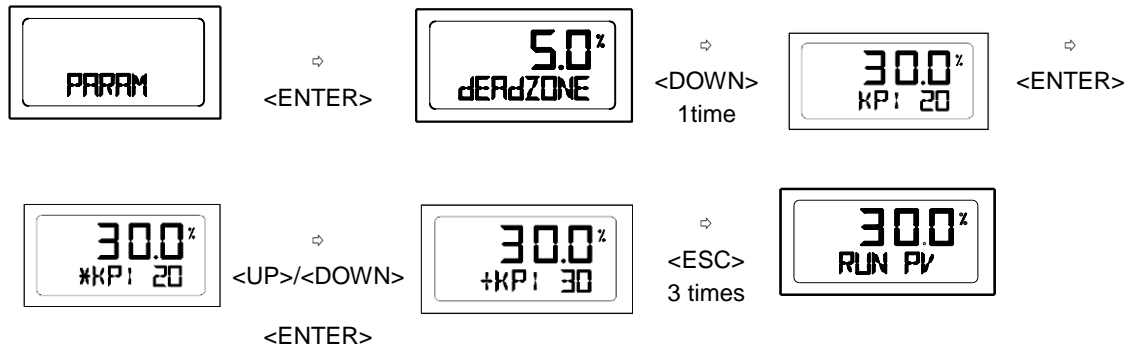
6.3.3.3 D value (Kd)

D value indicates the derivative value of the compensation signal based on the percentage of error allowance.   As the value increase, it is more likely to have hunting.   As the value decreases, it can have poor linearity.

PARAM	⇨ <ENTER>	5.0 % dEAdZONE	⇨ <DOWN> 2 times	30.0 % Kdi 19	⇨ <ENTER>
30.0 % *Kdi 19	⇨ <UP>/<DOWN> <ENTER>	30.0 % +Kdi 25	⇨ <ESC> 3 times	30.0 % RUN PV	
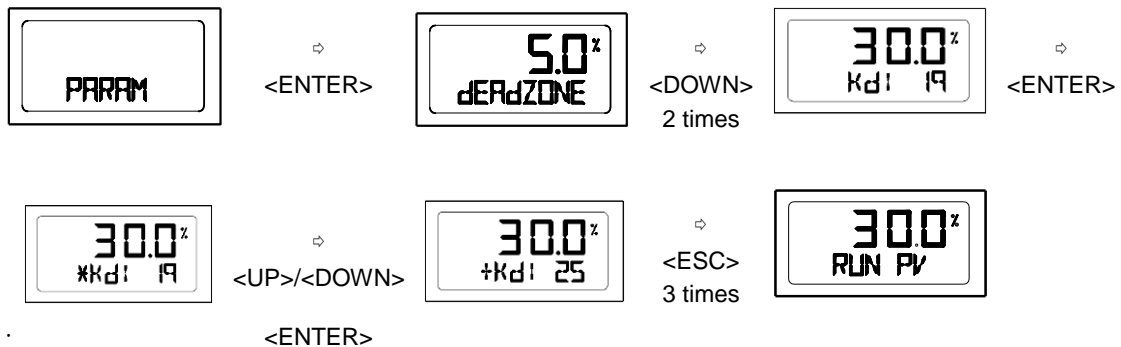
6.3.3.4 I value (KI)

I value indicates the additional compensation signal based on the percentage of error allowance.   As the value increase, it is more likely to have hunting.   As the value decreases, the positioner will move slowly to the target position.

PARAM	⇨ <ENTER>	5.0 % dEAdZONE	⇨ <DOWN> 3 times	30.0 % KI 21	⇨ <ENTER>
30.0 % *KI 14	⇨ <UP><DOWN> <ENTER>	30.0 % +KI 14	⇨ <ESC> 3 times	30.0 % RUN PV	
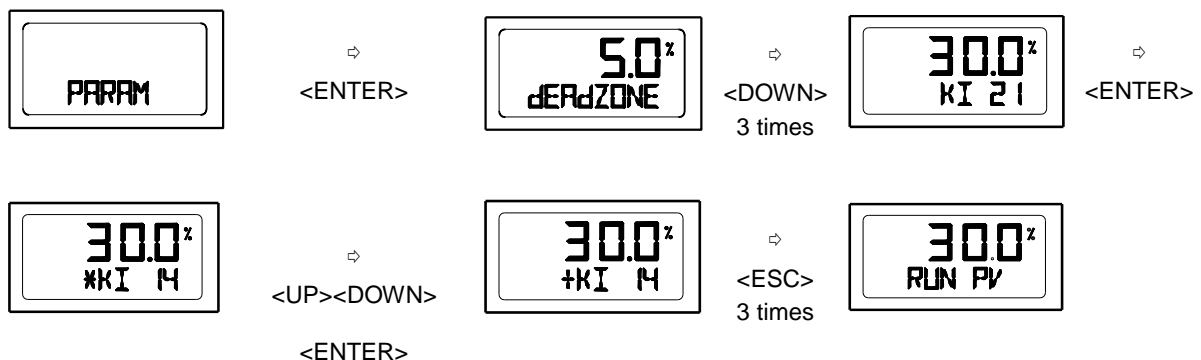
6.3.3.5 P_ (KP_), D_ (Kd_) , I_(KI_) values

P_, D_, and I_ values' principles are same as P, D, and I values, but these values will be activated when the error percentage is within 1%.

6.3.4 Hand Calibration Mode (HAND CAL)

The positioner can be manually calibrated by entering into Hand Calibration Mode.

6.3.4.1 Zero-Point (PV_ZERO) and End-Point (PV_END) for Valves

PZ_ZERO adjusts the zero point of the valve, and PV_END adjusts the end point of the valve.

30.0ˣ RUN PV	⇨ <ENTER> 6 seconds	RUTO CRL	⇨ <DOWN> 3 times	HRNd CRL	⇨ <ENTER>

163 PV_ZERO	⇨ <ENTER>	**0** *PZ 163	⇨ <UP>/<DOWN>	**0** +PZ 260	⇨ <ESC>
Zero Adjustment			<ENTER>		
260 PV_ZERO	⇨ <DOWN>	**30 12** PV_ENd	⇨ <ENTER>	**100.0ˣ** *PE 30 12	⇨ <UP>/<DOWN>
		End Adjustment			<ENTER>
100.0ˣ +PE 2072	⇨ <ESC>	**2072** PV_ENd			
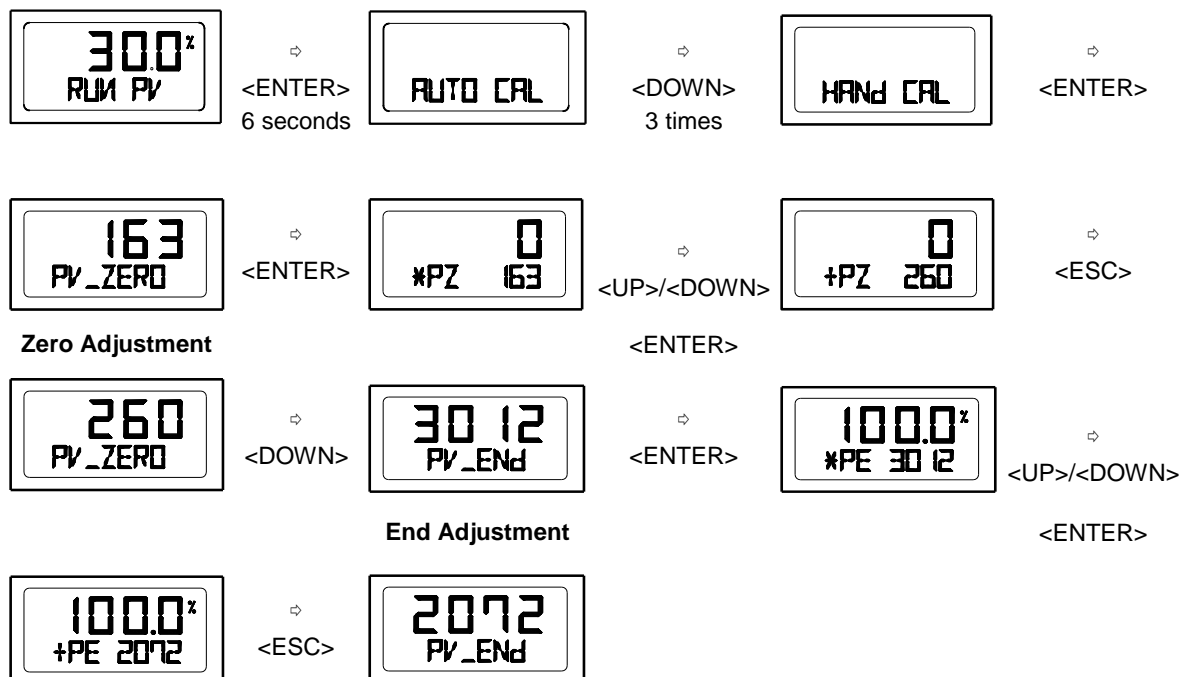
6.3.4.2 Zero-Point (TR_ZERO) and End-Point (TR_END) for Transmitter

TR_ZERO adjusts the zero point of the transmitter (4-20mA feedback), and TR_END adjusts the end point of the transmitter (4-20mA feedback)

2072 PV_ENd	⇨ <DOWN>	**300** TR_ZERO	⇨ <ENTER>	**300** *R_ZERO	⇨ <UP>/<DOWN)
		Zero Adjustment		**Match feedback signal with 4mA**	<ENTER>
250 +R_ZERO	⇨ <ESC>	**250** TR_ZERO	⇨ <DOWN>	**4095** TR_ENd	⇨ <ENTER>
				End Adjustment	

```
┌─────────────┐          ┌─────────────┐          ┌─────────────┐
│    4095     │    ⇨     │    4080     │    ⇨     │    4080     │
│   *TR_ENd   │          │   +TR_ENd   │          │   TR_ENd    │
└─────────────┘ <UP>/<DOWN)└───────────┘  <ESC>   └─────────────┘
```
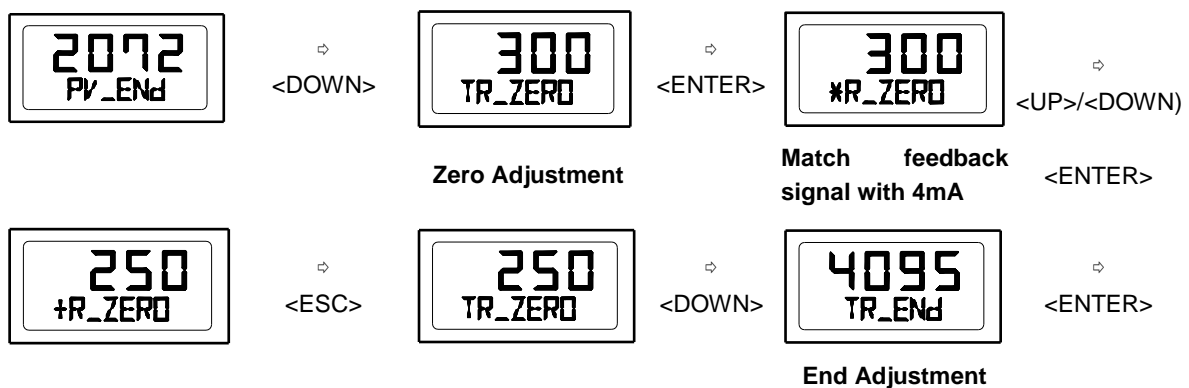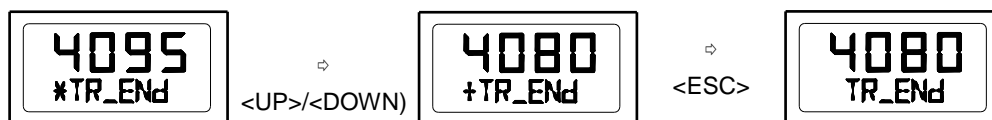
Match feedback signal with 20mA   <ENTER>

6.3.4.3 End-Point Ratio for Valve (PE_TRIM)

When reverse acting operating is used, End-Point can be adjusted within 10% of total valve stroke, without adjusting valve's zero point.

```
┌─────────────┐          ┌─────────────┐          ┌─────────────┐          ⇨
│             │    ⇨     │     260     │    ⇨     │      0 %    │
│  HANd CAL   │          │   PV_ZERO   │          │   PE TRIM   │    <ENTER>
└─────────────┘ <ENTER>  └─────────────┘ <DOWN>   └─────────────┘
                                         4 times
```

```
┌─────────────┐          ┌─────────────┐          ┌─────────────┐
│      0 %    │    ⇨     │     5.0 %   │    ⇨     │    30.0 %   │
│  *PE TRIM   │          │   +PE TRIM  │          │   RUN PV    │
└─────────────┘ <UP>/<DOWN)└───────────┘  <ESC>   └─────────────┘
                                         3 times
                <ENTER>
```
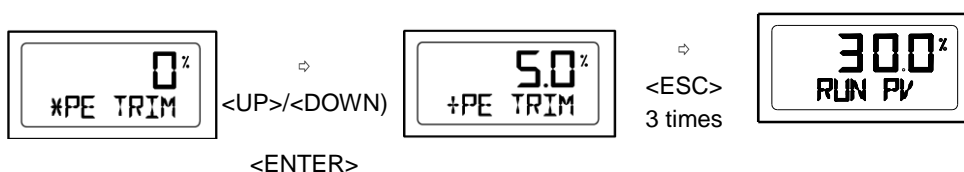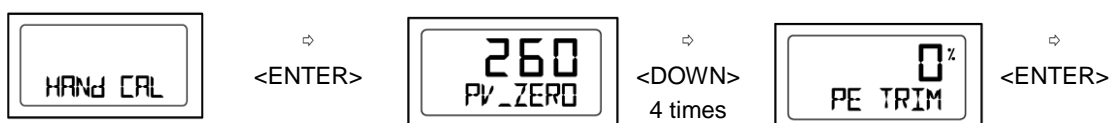
6.3.4.4 Normal / Reverse Feedback Signal (TR_NORM / REV)

The feedback signal from the positioner can be viewed as normal or as reverse.

```
┌─────────────┐          ┌─────────────┐          ┌─────────────┐          ⇨
│             │    ⇨     │     260     │    ⇨     │             │
│  HANd CAL   │          │   PV_ZERO   │          │  TR NORM    │    <ENTER>
└─────────────┘ <ENTER>  └─────────────┘ <DOWN>   └─────────────┘
                                         5 times
                         **Zero Adjustment**
```

```
┌─────────────┐          ┌─────────────┐          ┌─────────────┐          ⇨
│             │    ⇨     │             │    ⇨     │             │
│  *TR NORM   │          │  *TR REVS   │          │  +TR REVS   │    <ESC>
└─────────────┘ <DOWN>   └─────────────┘ <ENTER>  └─────────────┘    3 times
```

```
┌─────────────┐
│    30.0 %   │
│   RUN PV    │
└─────────────┘
```

6.3.4.5 Normal / Reverse HART Signal (HT_NORM / REVS)

HART signal from the positioner can be viewed as normal or as reverse.

```
┌─────────────┐          ┌─────────────┐          ┌─────────────┐          ⇨
│             │    ⇨     │     260     │    ⇨     │             │
│  HANd CAL   │          │   PV_ZERO   │          │  HT NORM    │    <ENTER>
└─────────────┘ <ENTER>  └─────────────┘ <DOWN>   └─────────────┘
                                         6 times
                         **Zero Adjustment**
```

```
┌─────────────┐        ┌─────────────┐        ┌─────────────┐
│             │   ⇨    │             │   ⇨    │             │   ⇨
│  *HT NORM   │<DOWN>  │  *HT REVS   │<ENTER> │  +HT REVS   │<ESC>
│             │        │             │        │             │3 times
└─────────────┘        └─────────────┘        └─────────────┘
```

```
┌─────────────┐
│   30.0 ˣ    │
│   RUN PV    │
└─────────────┘
```
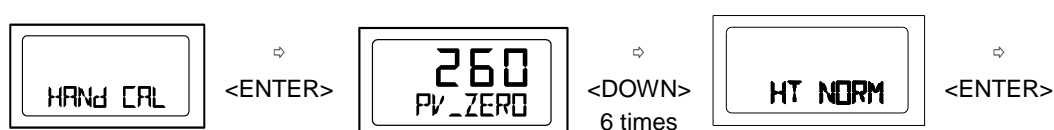
6.3.5 Valve Mode (VALVE)

6.3.5.1 Acting Adjustment (ACT)

The positioner can be set as Direct Action (DA) or Reverse Action (RA).

```
┌─────────────┐        ┌─────────────┐        ┌─────────────┐
│   30.0 ˣ    │   ⇨    │             │   ⇨    │             │   ⇨
│   RUN PV    │<ENTER> │  AUTO CAL   │<DOWN>  │   VALVE     │<ENTER>
│             │6 seconds│            │3 times │             │
└─────────────┘        └─────────────┘        └─────────────┘
```

```
┌─────────────┐        ┌─────────────┐        ┌─────────────┐
│             │   ⇨    │             │   ⇨    │             │   ⇨
│  ACT   RA   │<ENTER> │  *ACT  RA   │<UP>/<DOWN>│ +ACT  dA │<ESC>
│             │        │             │        │             │3 times
└─────────────┘        └─────────────┘        └─────────────┘
                                       <ENTER>
```

```
┌─────────────┐
│   30.0 ˣ    │
│   RUN PV    │
└─────────────┘
```

6.3.5.2 Characteristic Adjustment (CHAR)

The valve characteristic can be set on the field's requirement.   There are 3 types of characteristics – linear (LIN), equal percentage (EQ), and quick open (QO).

```
┌─────────────┐        ┌─────────────┐        ┌─────────────┐
│             │   ⇨    │             │   ⇨    │             │   ⇨
│   VALVE     │<ENTER> │  ACT   RA   │<DOWN>  │  CHAR LIN   │<ENTER>
│             │        │             │        │             │
└─────────────┘        └─────────────┘        └─────────────┘
```
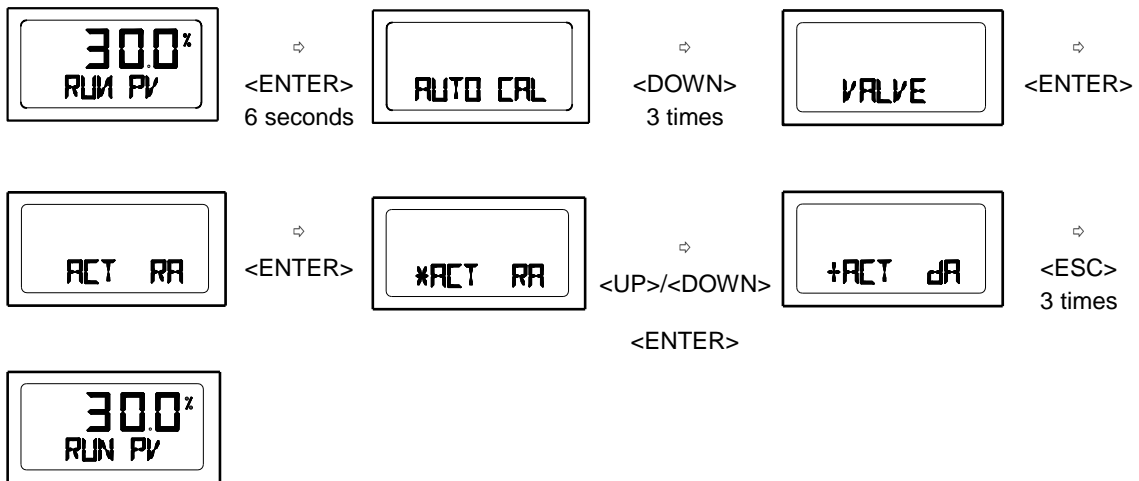
```
┌─────────────┐        ┌─────────────┐        ┌─────────────┐
│             │   ⇨    │             │   ⇨    │   30.0 ˣ    │
│  *HAR LIN   │<UP>/<DOWN>│ +HAR EQ  │<ESC>   │   RUN PV    │
│             │        │             │3 times │             │
└─────────────┘        └─────────────┘        └─────────────┘
         <ENTER>
```
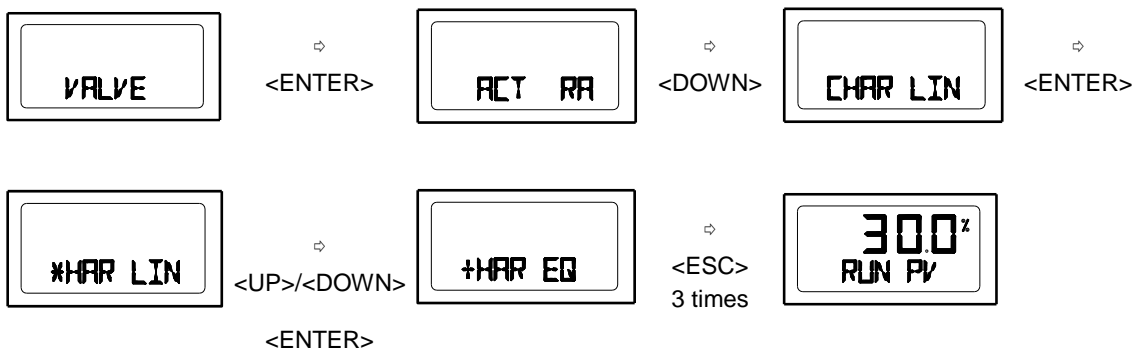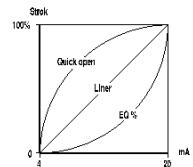
6.3.5.3 User Characteristics (USER SET)

In case positioner requires a specific characteristic, the valve characteristic curve can be made by selecting up to 16 points of the curve.

VALVE	⇨ <ENTER> 6 seconds	ACT RA	⇨ <DOWN> 2 times	USER SET	⇨ <ENTER>

0.0% *PO SET	⇨ <UP>/<DOWN> <ENTER>	3.0% *PO SET	⇨ <ENTER>	6.7% *PI SET	⇨ <UP><DOWN> <ENTER>

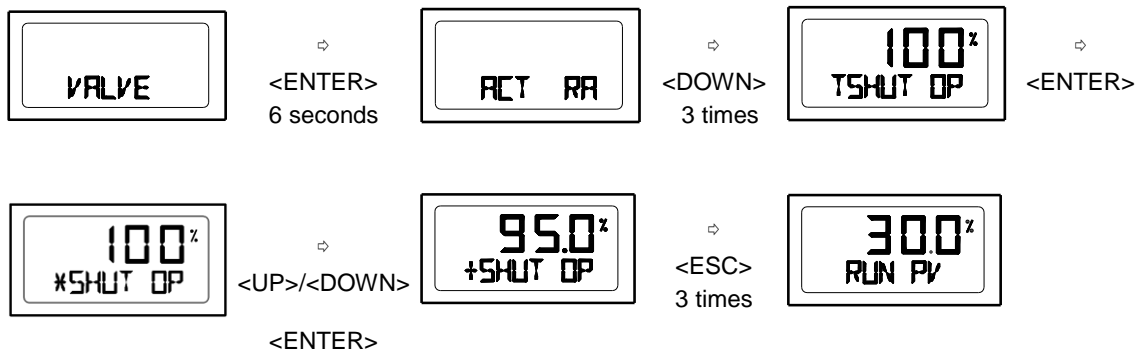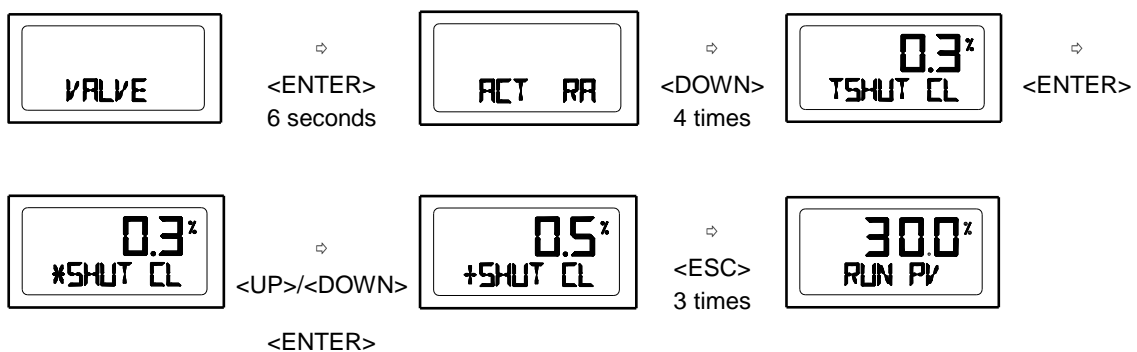| 100.0% *P IS SET	⇨ <ENTER>	+SER SET	⇨ <ESC> 3 times	30.0% RUN PV

Repeat step if necessary
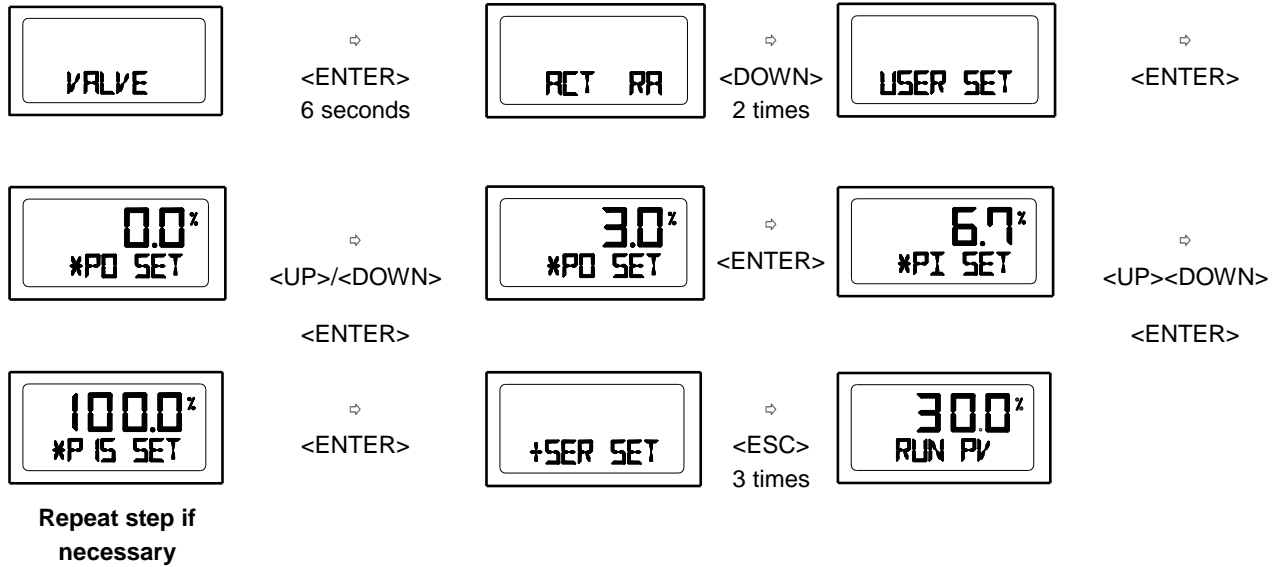
6.3.5.4 Tight Shut Open (TSHUT OP)

Tight Shut Open allows the valve to open completely as the input signal reaches around 20mA.

VALVE	⇨ <ENTER> 6 seconds	ACT RA	⇨ <DOWN> 3 times	100% TSHUT OP	⇨ <ENTER>

100% *SHUT OP	⇨ <UP>/<DOWN> <ENTER>	95.0% +SHUT OP	⇨ <ESC> 3 times	30.0% RUN PV

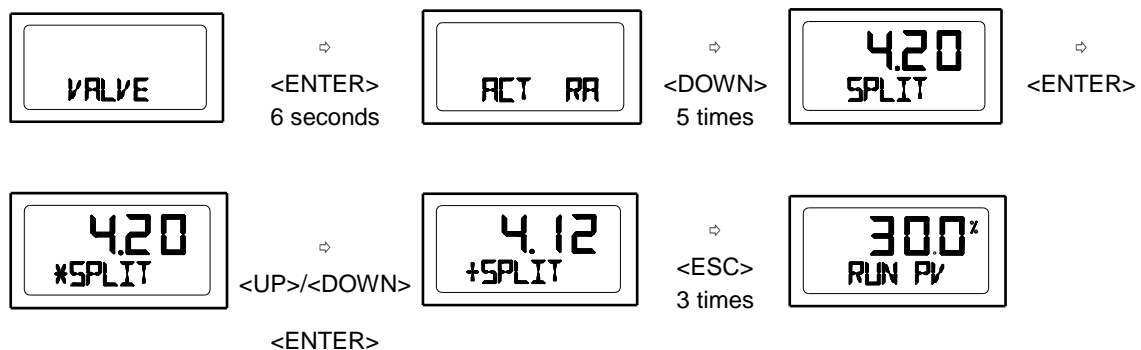### 6.3.5.5 Tight Shut Close (TSHUT CL)

Tight Shut Close allows the valve to close completely as the input signal reaches around 4mA.

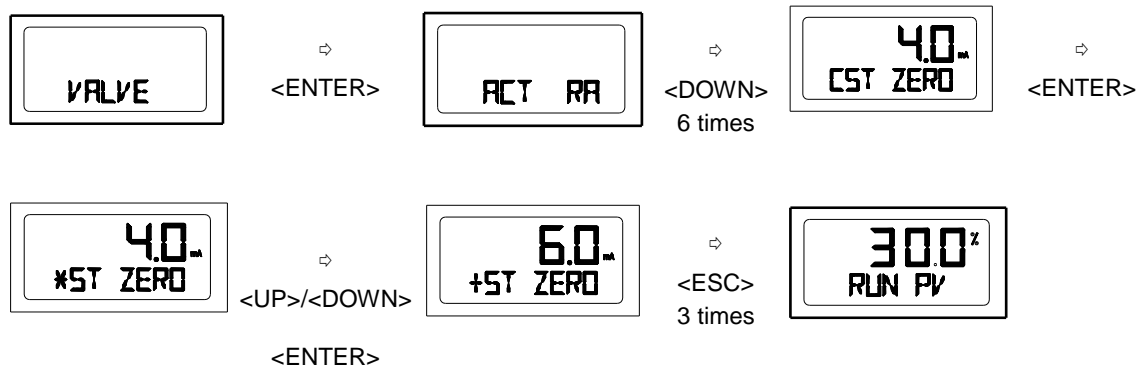| VALVE	⇨ <ENTER> 6 seconds	ACT RA	⇨ <DOWN> 4 times	0.3% TSHUT CL	⇨ <ENTER>

0.3% *SHUT CL	⇨ <UP>/<DOWN> <ENTER>	0.5% +SHUT CL	⇨ <ESC> 3 times	30.0% RUN PV

6.3.5.6 Split Range Mode (SPLIT)

The valve can be operated by split range control – 4~12mA or 12~20mA.

VALVE	⇨ <ENTER> 6 seconds	**ACT RA**	⇨ <DOWN> 5 times

4.20 **SPLIT**	⇨ <ENTER>	

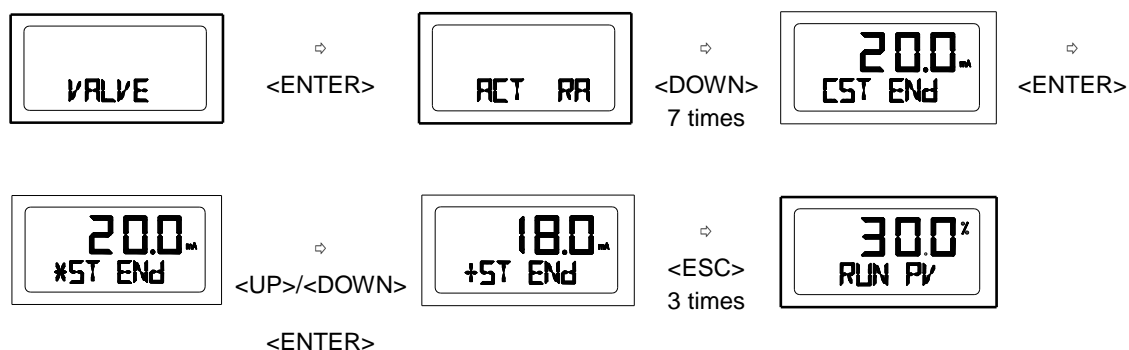|			
4.20 **＊SPLIT**	⇨ <UP>/<DOWN> <ENTER>	**4.12** **＋SPLIT**	⇨ <ESC> 3 times

30.0ˣ **RUN PV**

6.3.5.7 Custom Zero Setting Mode (CST ZERO)

Custom Zero Setting Mode allows the user to set any specific point as zero position. For example, the zero point can be set at input signal of 7mA.

VALVE	⇨ <ENTER>	**ACT RA**	⇨ <DOWN> 6 times

4.0ₘ **CST ZERO**	⇨ <ENTER>

4.0ₘ **＊ST ZERO**	⇨ <UP>/<DOWN> <ENTER>	**6.0ₘ** **＋ST ZERO**	⇨ <ESC> 3 times

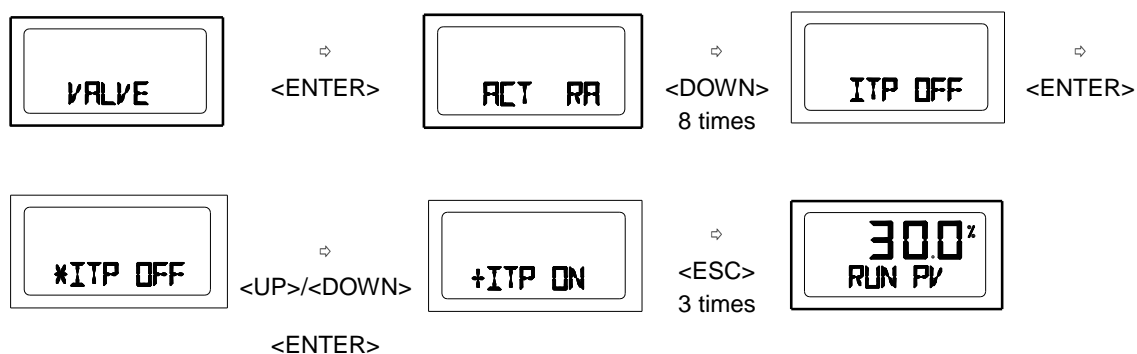| |
|---|
| **30.0ˣ** **RUN PV** |

6.3.5.8 Custom End Setting Mode (CST ENd)

Custom End Setting Mode allows the user to set any specific point as end position. For example, the end point can be set at input signal of 11mA. **The difference between zero and end point must be greater or equal to 4mA.**

VALVE	⇨ <ENTER>	**ACT RA**	⇨ <DOWN> 7 times

20.0ₘ **CST ENd**	⇨ <ENTER>

20.0ₘ **＊ST ENd**	⇨ <UP>/<DOWN> <ENTER>	**18.0ₘ** **＋ST ENd**	⇨ <ESC> 3 times

| |
|---|
| **30.0ˣ** **RUN PV** |

6.3.5.9 Interpolation Mode (ITP OFF / ON)

Positioner can control the valve accurately if the feedback lever angle range is within designed range. For some instance, the angle exceeds the suggested range angle. Positioner can reduce the error through interpolation.

VALVE   ⇨ <ENTER>   ACT RA   ⇨ <DOWN> 8 times   ITP OFF   ⇨ <ENTER>

*ITP OFF   ⇨ <UP>/<DOWN> <ENTER>   +ITP ON   ⇨ <ESC> 3 times   30.0% RUN PV

6.3.6 View Mode (VIEW)

Different information can be shown on the positioner's LCD.

AUTO CAL   ⇨ <DOWN> 4 times   VIEW   ⇨ <ENTER>   YT 3300L   <UP>/<DOWN> <ESC>
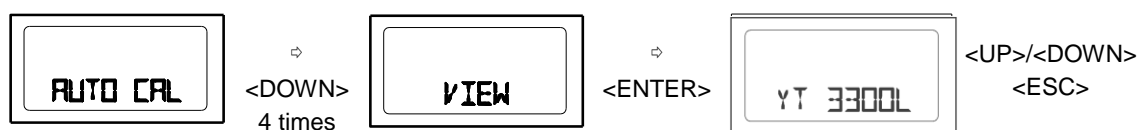
	Description
YT-3300L	Positioner model
VERSION	Main software version
HART V	HART protocol version
POL AddR	HART protocol channel address
bIAS 25	BIAS value when valve position is at 25%
bIAS 75	BIAS value when valve position is at 75%
0Y 0d	Total used time duration. If a unit was used less than 1 minute, the time will not accumulate.
FULL_OP	Time elapsed for valve to fully open
FULL_CL	Time elapsed for valve to fully close.
VM NOR	Type of valve stroke on LCD.　(in percentage or in value)
Erro	Error code or warning message.
VALUE I	Current I value
ABS	Absolute resistance value.

7. Error and Warning Code

7.1   Error code

Error Code	Code Description and Cause	Action
MT ERR L	➢ Positioner is improperly installed. ➢ Positioner is not parallel to the ground at 50% point. Lever is at lower position than actual 50% point.	➢ Re-install the positioner. ➢ Ensure the feedback lever does not touch the lever stopper at 0% and 100%.
MT ERR H	➢ Positioner is improperly installed. ➢ Positioner is not parallel to the ground at 50% point. Lever is at higher position than actual 50% point.	➢ Re-install the positioner. ➢ Ensure the feedback leer does not touch the lever stopper at 0% and 100%.
CHK AIR	➢ Valve does not operate when positioner receive "Full Open" signal during the auto calibration.	➢ Check supply pressure level.
RNG ERR	➢ Operating angle is too small due to improper positioner installation.	➢ Adjust bracket so the positioner can be mounted closer to actuator.
C	Error of 10% or more persists more than 1 minute. ➢ No valve movement. ➢ High level of valve friction ➢ Changes in setting pressure of actuator.	➢ Perform BIAS calibration. ➢ Check setting pressure of actuator.
D	I-value reaches at maximum or minimum limit. ➢ Changes in valve friction. ➢ Changes in setting pressure of actuator.	➢ Perform auto calibration. ➢ Check setting pressure of actuator.

7.2   Warning code

| Warning Code	Description	Action
B	➢ Pv Span – Pv Zero range is below 500. ➢ The angle of feedback lever is too small.	➢ Re-install the positioner. ➢ Ensure the feedback lever does not touch the lever stopper at 0% and 100%. ➢ After re-installation, perform AUTO1.
F	➢ Full open/close elapsed time is less than 1 second. ➢ Actuator size is too small.	➢ Use variable orifice. ➢ Use larger actuator.

G	➢ Pv is below 100. ➢ The angle of feedback lever is too large.	➢ Re-install the positioner. ➢ Ensure the feedback lever does not touch the lever stopper at 0% and 100%. ➢ After re-installation, perform AUTO1
H	➢ Pv is over 4000. ➢ The angle of feedback lever is too large.	➢ Re-install the positioner. ➢ Ensure the feedback lever does not touch the lever stopper at 0% and 100%. ➢ After re-installation, perform AUTO1

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8. PST (Partial Stroke Test)

8.1   Glossary

|	
INTERVAL	**Interval time between current PST and next PST in the schedule mode**
LATENCY	Latency for next movement after valve move
LIMIT TM	limit the stroke time between START PO and TARGET 1,2
Perform PST	Run PST immediately
PST	Partial Stroke Test
PST MODE	Running mode for PST
PST NOW	Run PST immediately
PST OFF	Stop PST Schedule
PST REC1,2,3	Record of PST result
PST SCHD	PST Scheduling mode
START PO	Start position when PST runs
TARGET 1	1st target position
TARGET 2	2nd target position
TOL	Tolerance of start Position when PST runs

8.2   Introduction
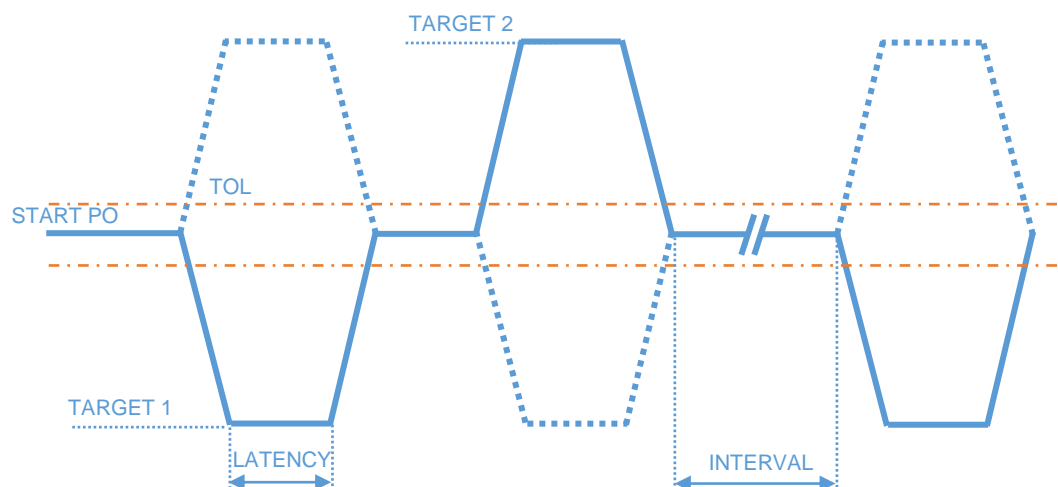
When **PST** runs by **PST NOW** or **SCHD**, if valve position is in the range of **TOL** from **START PO**, Positioner supply or vent air until the valve reach the **TARGET 1, 2**. But **PST** test will stop if valve position goes out of the **TOL** or doesn't reach **TARGET1, 2** within the **LIMIT TM**. After the valve position reach the **TARGET 1, 2**, the valve will pause during the **LATENCY** and move back to the **START PO**. The valve will be under ready state during the **INTERVAL** time after completing 1 cycle of **PST** in the **SCHD** mode.

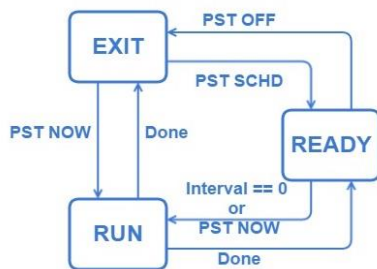## 8.3   How to run PST on the field device

8.3.1   Set PST Configuration
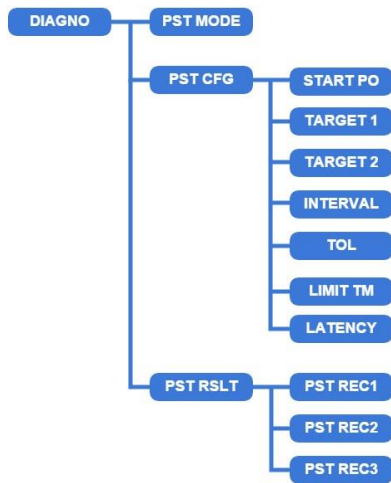
Check Parameter values and configure them if you need

PARAMETER	VALUE	DEFAULTE	UNIT
START PO	0 – 100	100	%
TARGET 1	0 – 100	90	%
TARGET 2	NA , 0-100	NA	%
INTERVAL	1-365	365	Day
TOL	0.1-10	5	%
LIMIT TM	0-600	600	Sec
LATENCY	1-60	10	Sec

8.3.2   Set PST Mode

To run **PST**, select a **PST** mode. There are 3 mode for running PST.

Mode	Description
PST OFF	Stop PST Schedule. It's a default mode
PST SCHD	Run PST immediately. After PST complete, it turns back to the previous mode
PST NOW	PST runs repeatedly by interval value

8.3.3   Check PST Result

It will record or memorize maximum three **PST** results. The longest stroke time from **START PO** to the **TARGET 1,2** or Error messages will be recorded

NAME	VAULE	DEFAULT
PST REC1	OOT,LTO,NR, 0-600(sec)	0
PST REC2	OOT,LTO,NR, 0-600(sec)	0
PST REC3	OOT,LTO,NR, 0-600(sec)	0

Error Message

OOT	When the valve position is out of tolerance(**TOL**) from Start Position(**START PO**)
LTO	When the valve doesn't reach to the target position within the Limit Time(**LIMIT TM**)
NR	When the valve doesn't move

8.4 How to run PST on the HART communication

8.4.1 Set PST configuration

Check the Parameter values in **PST Configuration** under Diagnostic and configure them if you require.
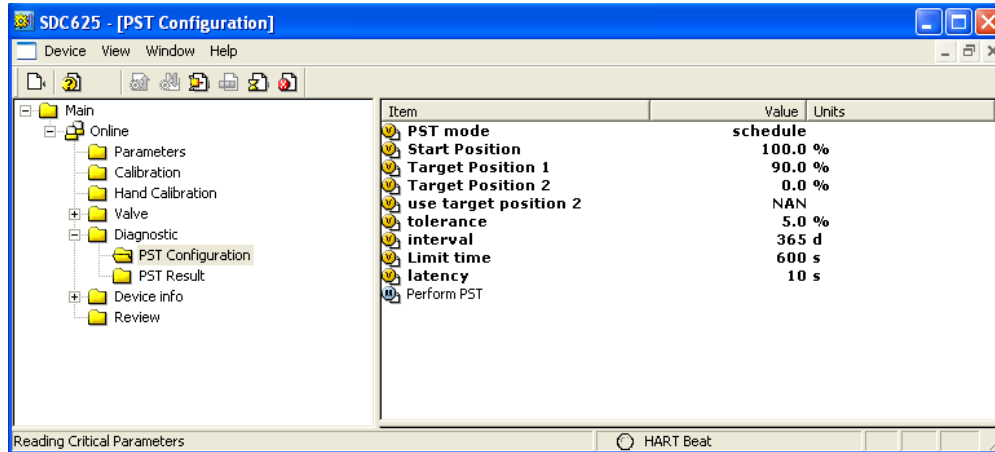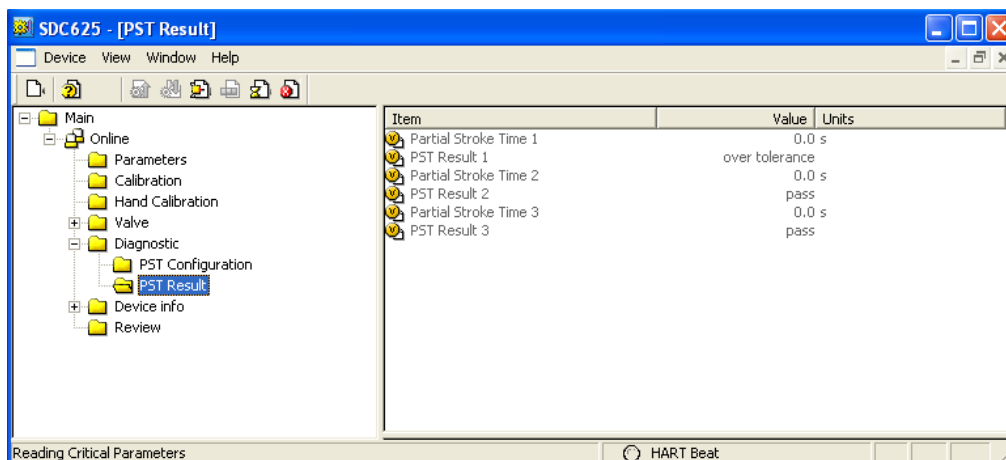

8.4.2 Run PST

There are 2 ways to run **PST**. One way is to start **PST** by set Parameter value as scheduled and the other way is by running **Perform PST**. **Perform PST** is the same as **PST NOW** on the Field Device menu.
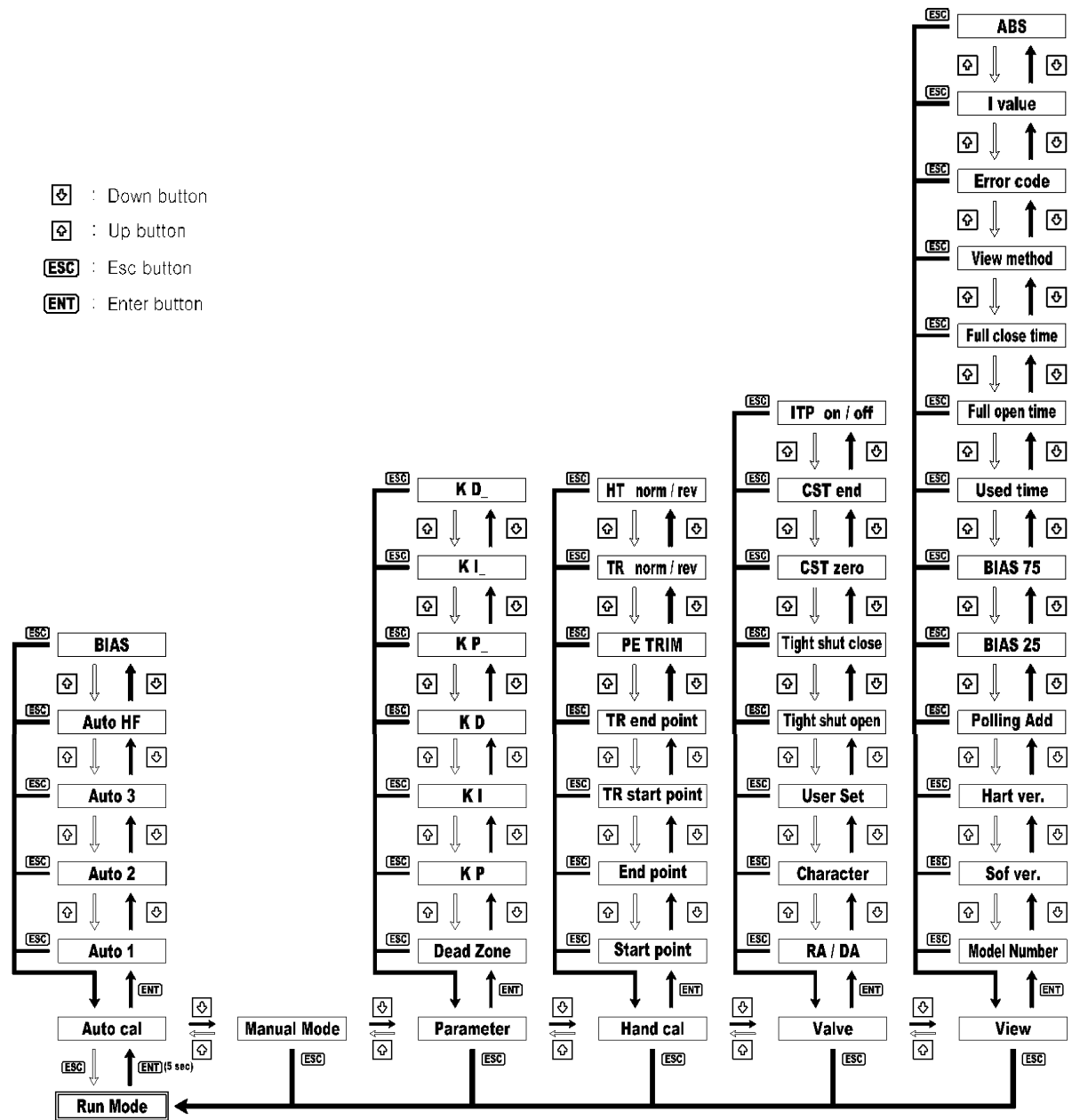

8.4.3 Check PST Result

You can see the results on **PST** result menu.

YT-3300/3301 series

9. Main Software Map

☐ : Down button
☐ : Up button
[ESC] : Esc button
[ENT] : Enter button

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