



YT-3300 (PA/FF)



YT-3350 (PA/FF)

Contents

1	Introduction	5
1.1	General Information for the users	5
1.2	Manufacturer Warranty	5
1.3	Explosion Proof Warning (Only for Intrinsic safety type positioners).....	6
2	Product Description	7
2.1	General	7
2.2	Main Features and Functions	7
2.3	Label Description	8
2.4	Product Code	11
2.5	Product Specification	12
2.6	Certifications	13
2.7	Parts and Assembly	14
2.8	Product Dimension	15
2.8.1	YT-3300	15
2.8.2	YT-3350	16
3	Installation	17
3.1	Safety	17
3.2	Tools for installation	17
3.3	Linear positioner Installation	18
3.3.1	Linear positioner Installation of Standard lever type.....	18
3.3.1.1	Safety	18
3.3.1.2	Standard lever type positioner Installation Steps	19
3.3.2	Installation of Adapter lever type (on tubeless actuator)	22
3.3.2.1	Safety	22
3.3.2.2	Adapter lever type positioner Installation Steps	23
3.4	Rotary positioner Installation	25
3.4.1	Components.....	25
3.4.2	Rotary Bracket Information	26
3.4.3	Rotary positioner Installation Steps	27
4	Connection - Air	29
4.1	Safety	29
4.2	Supply Pressure Condition	29
4.3	Piping Condition.....	29
4.4	Connection – Piping with actuator	30
4.4.1	Single acting actuator	30
4.4.2	Double acting actuator	30
5	Connection – Power	31
5.1	Safety	31
5.2	Connection.....	31

5.3	Ground	32
6	Adjustments	33
6.1	A/M switch adjustment	33
6.2	Orifice Installment	34
7	Maintenance	35
7.1	Supply air	35
7.2	Seals	35
8	Typical connection of YT-3300 with Profibus PA and Foundation Fieldbus	36
8.1	Profibus PA	36
8.2	Configurations for high speed solution & low speed solution	37
8.3	Foundation Fieldbus	37
9	Auto Calibration and PCB Operation	38
9.1	Warning	38
9.2	Button Description	38
9.3	Run Mode (RUN)	38
9.4	Auto Calibration mode (AUTO CAL)	39
9.4.1	AUTO1 Calibration (AUTO1)	39
9.4.2	AUTO2 Calibration (AUTO2)	40
9.4.3	AUTO 3 Calibration (AUTO 3)	40
9.4.4	AUTO HF Calibration (AUTO HF)	40
9.5	Manual Mode (MANUAL)	41
9.6	Parameter Mode (PARAM)	41
9.6.1	Dead-Zone (dEAdZONE, %)	42
9.6.2	P Value (KP)	42
9.6.3	I Value (KI)	43
9.6.4	D Value (Kd)	43
9.6.5	P_ (KP_), I_ (KI_), D_ (Kd_) Values	43
9.6.6	KF Up Value (KFUP)	44
9.6.7	KF Down Value (KFdN)	44
9.6.8	Control mode (CTRL)	45
9.7	Hand Calibration Mode (HAND CAL)	46
9.7.1	Zero-Point (PV ZERO) and End-Point (PV END) for Valves	46
9.8	Valve Mode (VALVE)	47
9.8.1	Acting Adjustment (ACT RA / dA)	47
9.8.2	Valve flow Characteristic Adjustment (CHAR)	48
9.8.3	User defining flow Characteristics (USER SET)	49
9.8.4	Tight Shut Open (TSHUT OP)	51
9.8.5	Tight Shut Close (TSHUT CL)	51
9.8.6	Interpolation Mode (ITP ON/OFF, ITP USER SET)	52
9.8.7	Acting Type (SINGLE / dDOUBLE)	52

9.8.8	Lever Type (STd / AdT)	53
9.9	Diagnostic (DIAGNO)	54
9.9.1	Diagnosis Limit Configuration (LIMT CFG).....	54
9.9.1.1	Deviation (dEV).....	55
9.9.1.2	Deviation Time (dEV TIME)	55
9.9.1.3	Travel Accumulator Limit (TVLA LMT)	56
9.9.1.4	Low Limit Alarm (LO ALRM) and High Limit Alarm (HI ALRM)	56
9.9.1.5	Low Low Limit Alarm (LL ALRM) and High High Limit Alarm (HH ALRM)	57
9.9.2	PST Introduction	58
9.9.3	PST Mode (PST).....	59
9.9.4	PST Configuration (PST CFG)	59
9.9.4.1	Start Position (START PO)	60
9.9.4.2	Target 1 (TARGET 1)	60
9.9.4.3	Target 2 (TARGET 2)	60
9.9.4.4	Interval (INTERVAL)	61
9.9.4.5	Tolerance (TOL).....	61
9.9.4.6	Limit Time (LIMIT TM).....	61
9.9.4.7	Latency (LATENCY).....	62
9.9.5	PST Result (PST RSLT)	62
9.10	View Mode (VIEW)	63
10	Warning / Alarm Code	65
11	Main Software Map	68

1 Introduction

1.1 General Information for the users

Thank you for purchasing Rotork YTC Limited 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 commissioning the product.

- Installation, commissioning, and maintenance of the product may only be performed by trained specialist personnel who have been authorized by the plant operator accordingly.
- The manual should be provided to the end-user.
- 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.
- When the manual refers to "**Valve Zero / Zero**" means the final valve position upon pneumatic pressure has been fully exhausted from positioner's OUT1 port. For example, the valve zero position may differ between linear direct and reverse actions. (DA/RA)
- The manual should not be duplicated or reproduced for any purpose without prior approval from Rotork YTC Limited, Gimpo-si, South Korea.
- In case of any other problems that are not stated in this manual, please make immediate contact to Rotork YTC Limited.
- Positioner is an accessory of the control valve, so please make sure to read the applicable instruction manual of the control valve prior to installation and operation.

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.
- Any modifications or repairs to the product may only be performed if expressed in this manual. Injuries and physical damages caused by customer's modifying or repairing the product without a prior consultation with Rotork YTC Limited will not be compensated. If any alterations or modifications are necessary, please contact Rotork YTC Limited directly.
- The warranty period of the product is (18) months from the date of shipment unless stated otherwise. Date of shipment can be checked by providing the LOT NO. or SERIAL NO. to us.
- 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 the corresponding local Rotork YTC Limited office or main office in South Korea.

1.3 Explosion Proof Warning (Only for Intrinsic safety type positioners)

Please ensure the unit is being used and installed in conformity with local, regional, and national explosion proof within the proper safety barrier environment.



- Refer to “2.6 Certifications”
- Explosion proof type of cables and gaskets should be used, when explosion gases are present at the installation site.
- Positioner has 2 ports for power connection. Explosion proof type wires and packing should be used. Blind plug is required when any port is not being used.
- Ring terminal with surface area of more than 1.25 mm² with M4 spring washer should be used to connect the power.
- For external ground terminal, ring terminal with surface area of more than 5.5 mm² should be used.
- EXPLOSION HAZARD. Do not connect or disconnect wiring unless all sources of power have been removed or the area is known to be non-hazardous.
- The enclosure of models YT-3300 contains aluminum, which is considered to constitute a potential risk of ignition when subjected to impact or friction. Care must be used during installation in locating this equipment to prevent impact or friction
- Some of the enclosure parts are made of non-metallic materials. To prevent the risk of Electrostatic sparking, clean the enclosure only with a damp cloth.
- The product must be installed in such a manner as to minimize the risk of impact or friction with other metal surfaces.
- For Intrinsically Safe installations, the product must be connected to suitably rated intrinsically safe equipment, and must be installed in accordance with applicable intrinsically safe installation standards.
- Special conditions for safe use of sign “X” of ATEX / IECEx :
Equipment must be protected from high risk of mechanical impact hazard and high electrostatic charge hazards.

2 Product Description

2.1 General

YT-3300 / 3350 (PA/FF) series Smart Valve Positioner accurately controls valve stroke in response to an input signal of Communication from the controller. Built-in micro-processor optimizes the positioner's performance and provides unique functions such as **Auto-Calibration, Profibus PA or Foundation fieldbus Protocol Communications.**

2.2 Main Features and Functions

- LCD display enables users to monitor the positioner status.
- User will easily understand the method of using 4 buttons because it work same in all versions of firmware interfaces.
- When unexpected situation like momentary blackout happens, our positioner boot-time only take 0.5 second and this can minimize the travel of valve which consequentially increase the safety of system.
- Positioner operates normally even there are sudden changes in supply pressure and / or high vibration environment.
- The method of Auto Calibration is very simple.
- As an advantage of having very low air consumption, It could greatly reduce operating costs in large-scale plants.
- It is compatible with most of controllers.
- Orifices can be installed even in the field to minimize the hunting occurrence and optimize operating conditions.
- Different valve characteristics can be adjusted – Linear, Quick Open, Equal Percentage, and User Set which user can make 5 or 11 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 without any signal.
- Operating temperature for positioners is -30 ~ 85 °C or -40 ~ 85 °C (Please check certified explosion proof temperature)
- It has IP66 protection grade.
- Polyester powder coating resists the corrosion process. (except YT-3350).
- Maintenance of the positioner is easy because of modularized inner structure.
- SIL2 certified.(For more information, see SIL Safety Instruction on homepage)

2.3 Label Description

- **MODEL :** Indicates the model number and additional options.
- **INTRINSIC SAFETY / NONINCENDIVE :** Indicates intrinsic safety explosion proof grade.
- **INGRESS PROTECTION :** Indicates enclosure protection grade.
- **SUPPLY POWER :** Indicates input electric power.
- **AMBIENT TEMP. :** Indicates the allowable ambient temperature for explosion proof.
- **SUPPLY PRESSURE :** Indicates the supply pressure range.
- **Ui, Ii, Pi, Ci, Li :** Indicates the allowable electrical data in the certificate.
ATEX: Ui = 28 V, Ii = 93 mA, Pi = 651 mW, Ci = 0.6 nF, Li = 10 µH
FM: Ui = 28 V, Ii = 93 mA, Pi = 651 mW, Ci = 0.55 nF, Li = 12 µH
You can also see the details in the certificate.
- **SERIAL NUMBER :** Indicates unique serial number.
- **MONTH.YEAR. :** Indicates manufactured month and year.

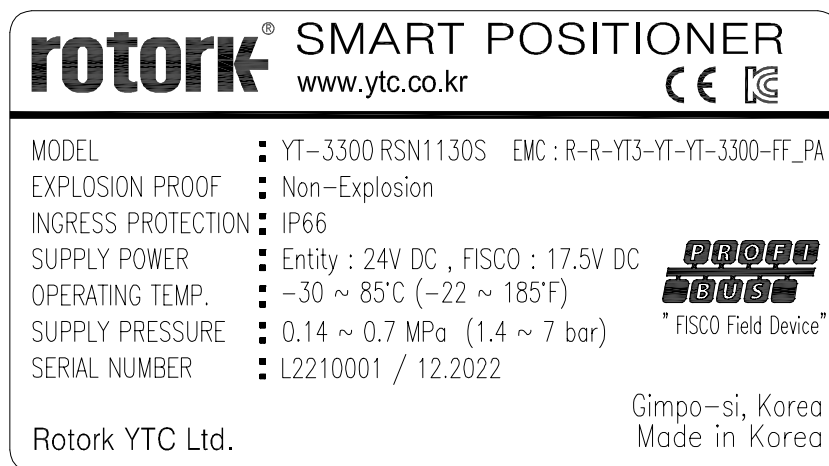


Fig. L-1: YT-3300 PA Non-explosion proof

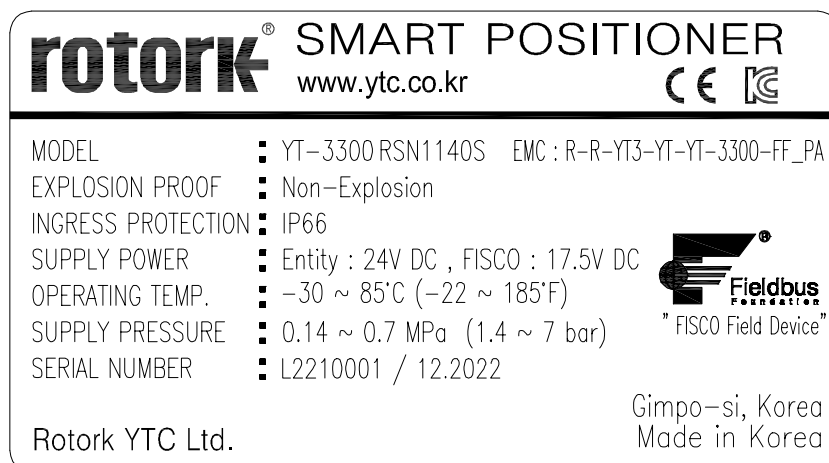


Fig. L-2: YT-3300 FF Non-explosion proof

rotork® SMART POSITIONER		www.ytc.co.kr	CE 2460 Ex II 2 GD
MODEL	: YT-3300 RS11130L	Presafe 19 ATEX 14453 X	
INTRINSIC SAFETY/	: Ex ia IIC T5/T6 Gb	IECEX PRE 19.0031X	
NONINCENDIVE	: Ex ia IIIC T100°C/T85°C Db	EMC : R-R-YT3-YT-3300-FF_PA	
INGRESS PROTECTION	: IP66		
SUPPLY POWER	: Entity : 24V DC , FISCO : 17.5V DC		
AMBIENT TEMP.	: T5 : -40 ~ 60°C(-40 ~ 140°F) T6 : -40 ~ 40°C(-40 ~ 104°F)		
SUPPLY PRESSURE	: 0.14 ~ 0.7 MPa (1.4 ~ 7 bar)		
Ui, li, Pi, Ci, Li,	: See certificate or product manual		
SERIAL NUMBER	: L2210001 / 12.2022		
Rotork YTC Ltd.		Gimpo-si, Korea Made in Korea	
		* POTENTIAL ELECTROSTATIC CHARGING HAZARD : SEE INSTRUCTIONS. WARNING * DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT.	


Fig. L-3: YT-3300 PA Intrinsic safety type (ATEX, IECEX)

rotork® SMART POSITIONER		www.ytc.co.kr	CE 2460 Ex II 2 GD
MODEL	: YT-3300 RS11140L	Presafe 19 ATEX 14453 X	
INTRINSIC SAFETY/	: Ex ia IIC T5/T6 Gb	IECEX PRE 19.0031X	
NONINCENDIVE	: Ex ia IIIC T100°C/T85°C Db	EMC : R-R-YT3-YT-3300-FF_PA	
INGRESS PROTECTION	: IP66		
SUPPLY POWER	: Entity : 24V DC , FISCO : 17.5V DC		
AMBIENT TEMP.	: T5 : -40 ~ 60°C(-40 ~ 140°F) T6 : -40 ~ 40°C(-40 ~ 104°F)		
SUPPLY PRESSURE	: 0.14 ~ 0.7 MPa (1.4 ~ 7 bar)		
Ui, li, Pi, Ci, Li,	: See certificate or product manual		
SERIAL NUMBER	: L2210001 / 12.2022		
Rotork YTC Ltd.		Gimpo-si, Korea Made in Korea	
		* POTENTIAL ELECTROSTATIC CHARGING HAZARD : SEE INSTRUCTIONS. WARNING * DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT.	

Fig. L-4: YT-3300 FF Intrinsic safety type (ATEX, IECEX)

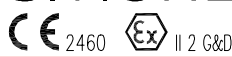
rotork® SMART POSITIONER		www.ytc.co.kr	CE 2460 Ex II 2 G&D
MODEL	: YT-3350	Presafe 19 ATEX 14453 X	
INTRINSIC SAFETY/	: Ex ia IIC T5/T6 Gb	IECEX PRE 19.0031X	
NONINCENDIVE	: Ex ia IIIC T100°C/T85°C Db		
INGRESS PROTECTION	: IP66		
SUPPLY POWER	: Entity : 24V DC , FISCO : 17.5V DC		
AMBIENT TEMP.	: T5 : -40 ~ 60°C(-40 ~ 140°F) T6 : -40 ~ 40°C(-40 ~ 104°F)		
SUPPLY PRESSURE	: 0.14 ~ 0.7 MPa (1.4 ~ 7 bar)		
Ui, li, Pi, Ci, Li,	: See certificate or product manual		
SERIAL NUMBER	:		
Rotork YTC Ltd.		Gimpo-si, Korea Made in Korea	
		* POTENTIAL ELECTROSTATIC CHARGING HAZARD : SEE INSTRUCTIONS. WARNING * DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT.	

Fig. L-5: YT-3350 PA Intrinsic safety type (ATEX, IECEX)



SMART POSITIONER

www.ytc.co.kr



MODEL : YT-3350

INTRINSIC SAFETY/ : Ex ia IIC T5/T6 Gb

NONINCENDIVE : Ex ia IIIC T100°C/T85°C Db

INGRESS PROTECTION : IP66

SUPPLY POWER : Entity : 24V DC , FISCO : 17.5V DC

AMBIENT TEMP. : T5 : -40 ~ 60°C (-40 ~ 140°F)

T6 : -40 ~ 40°C (-40 ~ 104°F)


SUPPLY PRESSURE : 0.14 ~ 0.7 MPa (1.4 ~ 7 bar)

Ui, li, Pi, Ci, Li, : See certificate or product manual

SERIAL NUMBER :

Presafe 19 ATEX 14453 X

IECEx PRE 19.0031X




Fieldbus
Foundation

" FISCO Field Device "

Gimpo-si, Korea

Made in Korea

Rotork YTC Ltd.



WARNING

* POTENTIAL ELECTROSTATIC CHARGING HAZARD : SEE INSTRUCTIONS.

* DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT.

Fig. L-6: YT-3350 FF Intrinsic safety type (ATEX, IECEx)

2.4 Product Code

YT-3300 / 3350 1 2 3 4 5 6 7 8

1 Motion Type	L : Linear (Positioner is attached the right yoke of actuator.) R : Rotary
2 Acting type	S : Single D : Double
3 Explosion Proof	N : Non-Explosion i : ATEX, IECEx : Ex ia IIC T5/T6 Gb, Ex iaD IIIC T100°C /T85°C Db, IP66
4 Lever Type	<div>Linear</div> <div>0 : 10 ~ 40 mm (Standard type) 1 : 20 ~ 100 mm (Standard type) 2 : 90 ~ 150 mm (Standard type) 3 : 16 ~ 30 mm (Adapter type) 4 : 16 ~ 60 mm (Adapter type) 5 : 16 ~ 100 mm (Adapter type) 6 : 90 ~ 150 mm (Adapter type)</div> <div>Rotary</div> <div>1 : M6 x 34L 2 : M6 x 63L 3 : M8 x 34L 4 : M8 x 63L 5 : Namur</div>
5 Conduit - Air Connection Type	1 : G 1/2 – Rc 1/4 2 : G 1/2 – 1/4 NPT (YT-3350 is available for No. 2 ONLY) 3 : G 1/2 – G 1/4 4 : M20x1.5P – 1/4 NPT 5 : 1/2 NPT – 1/4 NPT
6 Communication	3 : Profibus PA 4 : Foundation Fieldbus
7 Option	0 : None
8 Operating Temp. (Non-explosion proof) ¹⁾	S : -30 ~ 85 °C (-22 ~ 185 °F) L : -40 ~ 85 °C (-40 ~ 185 °F)

¹⁾ This option is just the normal operating temperature of the product and is not related to explosion proof temperature. See “2.6 Certificates” for explosion proof temperature.

2.5 Product Specification

Model		YT-3300		YT-3350	
Housing Material		Aluminum		Stainless Steel 316	
Motion Type		Linear	Rotary	Linear	Rotary
Acting Type		Single / Double			
Input Voltage		9 ~ 32 VDC for non-intrinsic safe applications FISCO barrier 17.5 V Entity barrier 24 V (Max Voltage: 32 VDC)			
Minimum Current		21 mA			
Supply Pressure		0.14 ~ 0.7 MPa (1.4 ~ 7 bar)			
Stroke		10 ~ 150 mm	55 ~ 110°	10 ~ 150 mm	55 ~ 110°
Air Connection		Rc 1/4 or 1/4 NPT or G 1/4		1/4 NPT	
Gauge Connection		Rc 1/8 or 1/8 NPT		1/8 NPT	
Conduit Entry		G 1/2 or 1/2 NPT or M20x1.5P		G 1/2	
Ingress Protection		IP66, Type 4X(FM)			
Explosion Proof		1. None-explosion proof 2. Intrinsic safety : ATEX, IECEx ※ See “2.6 Certificates” for details			
Operating Temperature	Standard Type	-30 ~ 85 °C (-22 ~ 185 °F)			
	Low Temp. Type	-40 ~ 85 °C (-40 ~ 185 °F)			
Ambient Temperature Of Explosion Proof	T5	-40 ~ 60 °C (-40 ~ 140 °F)			
	T6	-40 ~ 40 °C (-40 ~ 104 °F)			
Linearity		± 0.5 % F.S.			
Hysteresis		± 0.5 % F.S.			
Sensitivity		± 0.2 % F.S.			
Repeatability		± 0.3 % F.S.			
Flow Capacity		70 LPM (Sup. = 0.14 MPa)			
Air Consumption		Below 2 LPM (Sup. = 0.14 MPa @ idle)			
Output Characteristic		Linear, Quick Open, EQ%, User Set			
Vibration		No Resonance up to 100 Hz @ 6 G			
Humidity		5 ~ 95 % RH @ 40 °C			
Protocol		Profibus PA / Foundation Fieldbus			
Weight		2 kg (4.4 lb)		5.1 kg (11.2 lb)	
Painting		Polyester Powder Coating		-	



Tested under ambient temperature of 20 °C, absolute pressure of 760 mmHg, and humidity of 65 %.
Please contact Rotork YTC Limited for detailed testing specification.

2.6 Certifications

※ All certifications below are posted on Rotork YTC Limited homepage(www.ytc.co.kr).

➤ **ATEX**

Type : Intrinsic safety

Rating : II 2G Ex ia IIC T5/T6 Gb, II 2D Ex ia IIIC T100°C/T85°C Db, IP6X

Certification No. : 19 ATEX 14453 X

Ambient temperature : -40 ~ +60°C (T5), -40 ~ +40°C (T6)

➤ **IECEX**

Type : Intrinsic safety

Rating : Ex II 2G Ex ia IIC T5/T6 Gb, Ex II 2D Ex ia IIIC T100°C/T85°C Db, IP6X

Certification No. : IECEX PRE 19.0031X

Ambient temperature : -40 ~ +60°C (T5/T100°C), -40 ~ +40°C (T6/T85°C)

➤ **SIL2 (in a redundant structure up to SIL 3)**

Intended application : Safety function is defined as to move into fail-safe-position, when
signal to positioner is interrupted.

Certification No. : 968/V 1155.00/20

➤ **Electromagnetic Compatibility (EMC)**

- EMC directive 2014/30/EC from April 2016

- EC Directive for CE conformity marking

2.7 Parts and Assembly

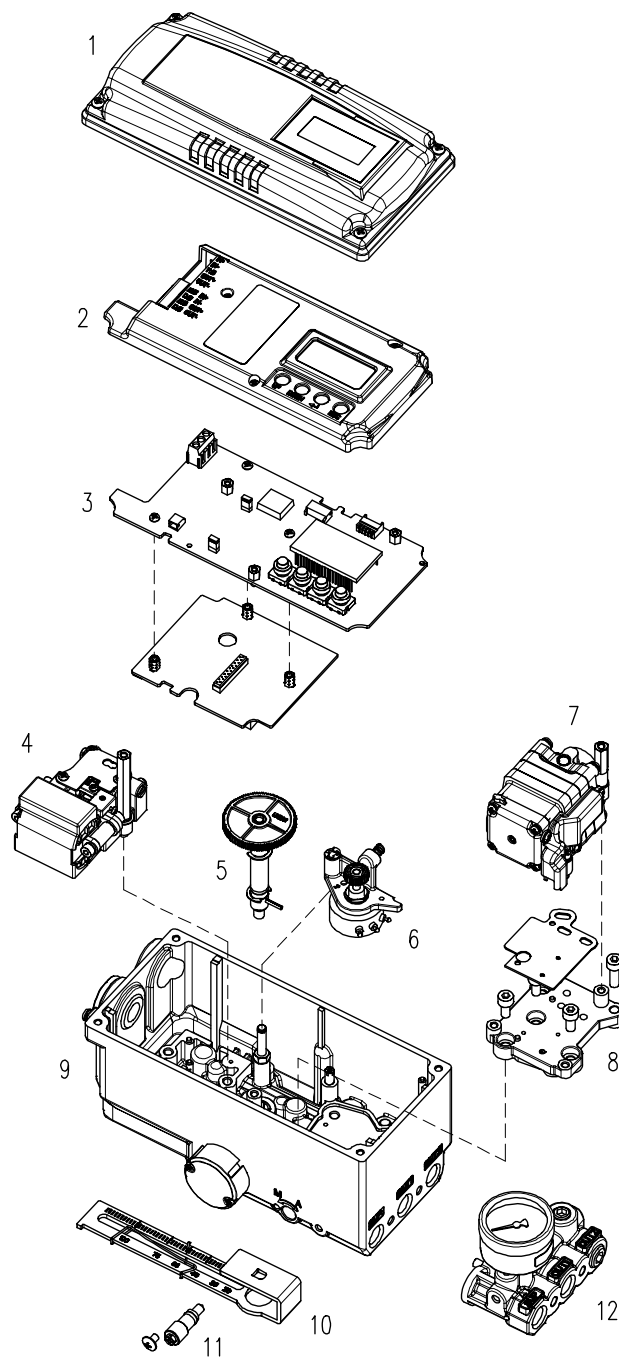


Fig. 2-1: exploded view

- | | |
|------------------|------------------------|
| 1. Base Cover | 8. Pilot Block |
| 2. PCB Cover | 9. Base body |
| 3. Main PCB | 10. Feedback Lever |
| 4. Torque Motor | 11. Auto Manual Switch |
| 5. Main Shaft | 12. Gauge Block |
| 6. Potentiometer | |
| 7. Pilot | |

2.8 Product Dimension

2.8.1 YT-3300

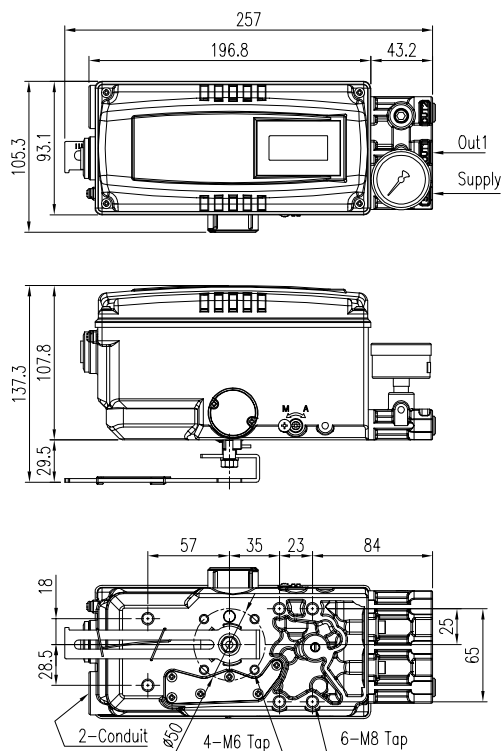


Fig. 2-2: YT-3300L (Standard Lever Type)

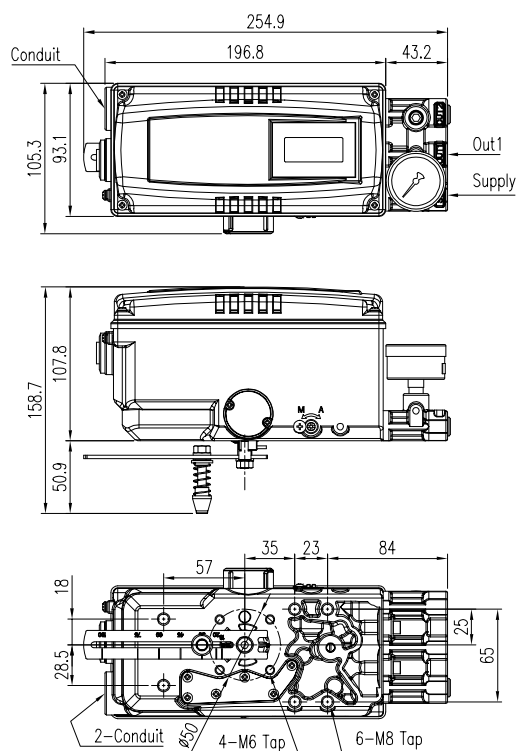


Fig. 2-3: YT-3300L (Adapter Lever Type)

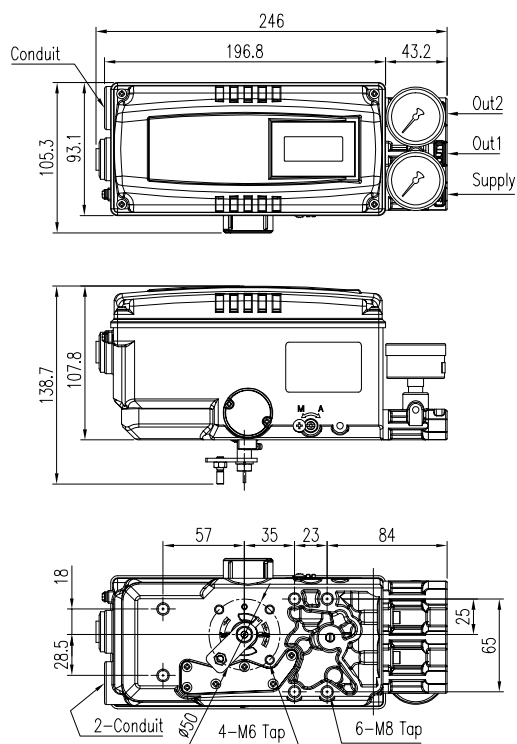


Fig. 2-4: YT-3300R (Fork lever Type)

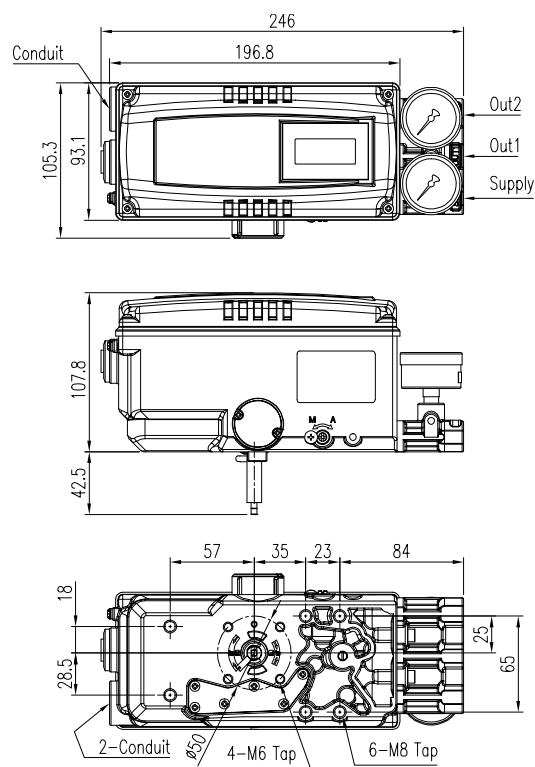


Fig. 2-5: YT-3300 (Namur Type)

2.8.2 YT-3350

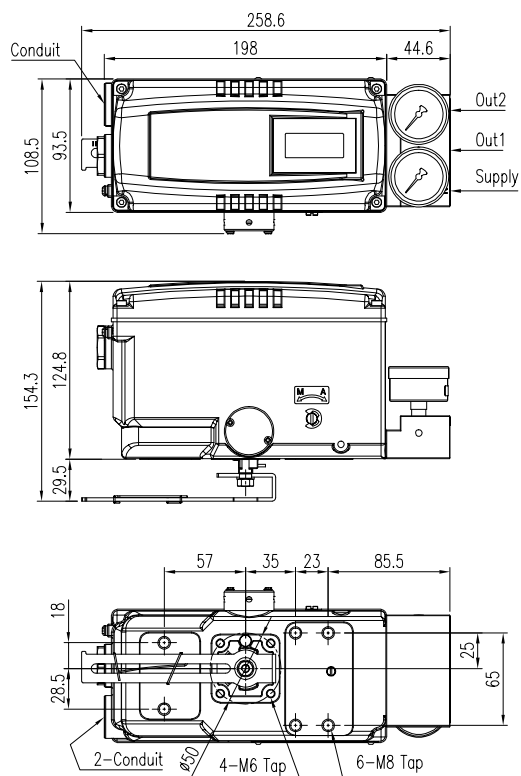


Fig. 2-6: YT-3350L (Standard Lever Type)

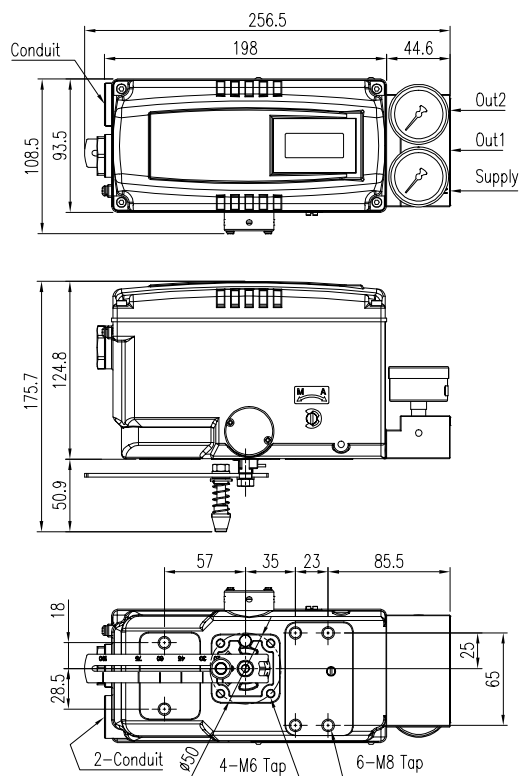


Fig. 2-7: YT-3350L (Adapter Lever Type)

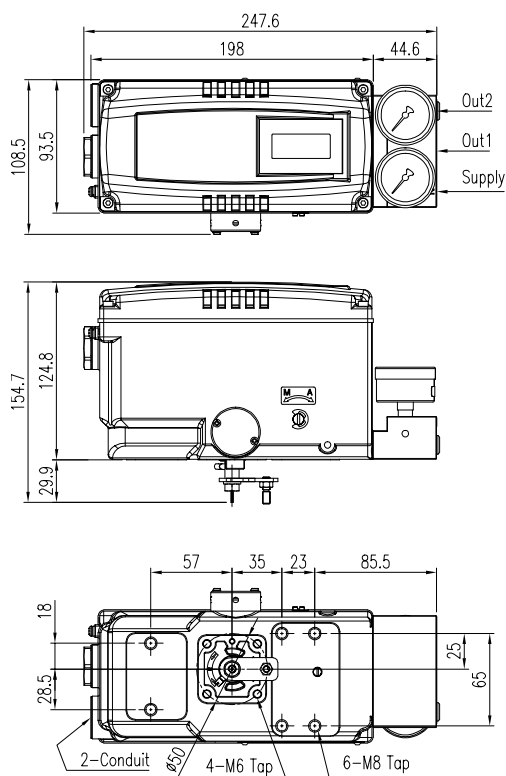


Fig. 2-8: YT-3350R (Fork lever Type)

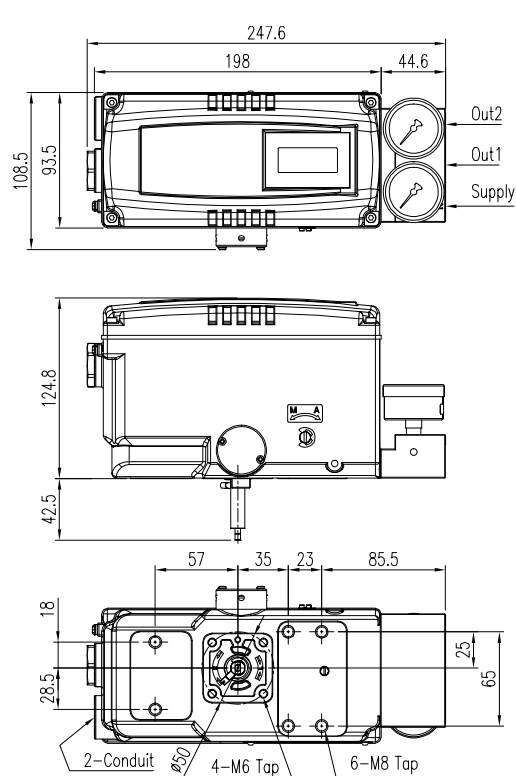


Fig. 2-9: YT-3350R (Namur Type)

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.
- The positioner has a vent cover to exhaust internal air and drain internal condensation water. When installing the positioner, make sure the vent cover must be facing downward. Otherwise, the condensation water could cause damages to PCB.

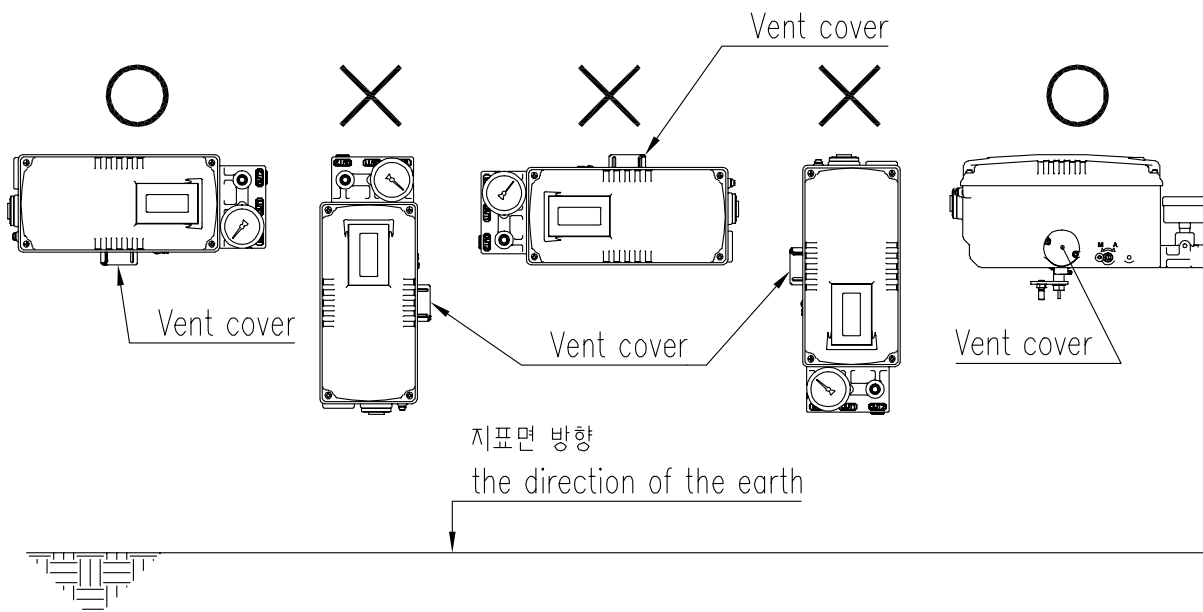


Fig. 3-1: The correct positions of a vent cover

3.2 Tools for installation

- Hex key set for hex socket cap bolts
- (+) & (-) Screw drivers
- Spanners for hexagonal-head bolts

3.3 Linear positioner Installation

Linear positioner should be installed on linear motion valves such as globe or gate type which uses spring return type diaphragm or piston actuators.

3.3.1 Linear positioner Installation of Standard lever type

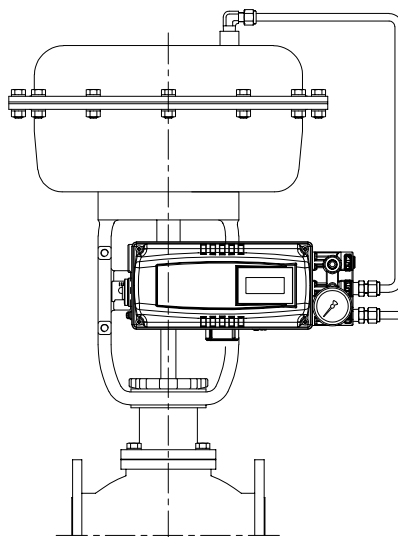


Fig. 3-2: Installation of standard lever type example

Before proceeding with the installation, ensure following components are available.

- Positioner
- Feedback lever and lever spring
- M6 nut and spring washer (fastening feedback lever to a main shaft)
- Bracket, bolts and washers for positioner or sensor – not supplied with the positioner
- Connection bar – not supplied with the positioner

3.3.1.1 Safety

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 vertical to the valve stem at 50 % of the valve stroke.
- The connection bar of the actuator clamp for the feedback lever 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



- 5) Insert the connection bar between the feedback lever and lever spring. The connection bar must be located upward from the lever spring as shown below left figure. If it is located downward from the lever spring as shown below right figure, the connection bar or the lever spring will be worn out quickly because of excessive strong tension.

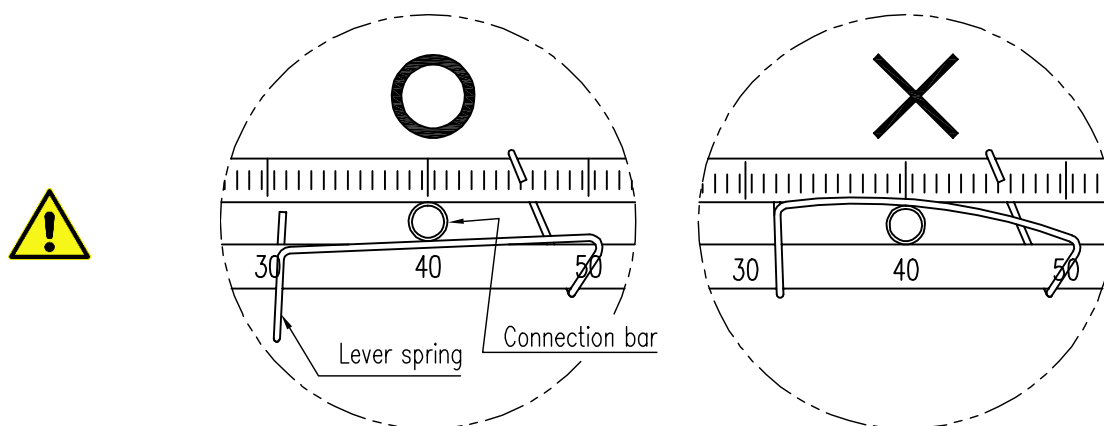


Fig. 3-5: Proper way to insert connection bar between feedback lever and lever spring

- 6) Check if feedback lever is vertical to the valve stem at 50 % of the valve stroke. If it is not vertical, adjust the bracket or the connection bar to make vertical. Improper installation may cause poor linearity.

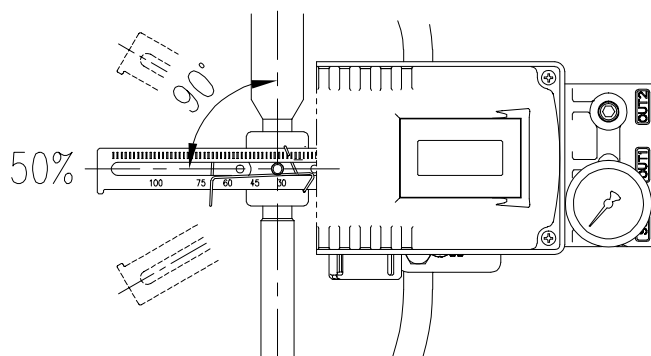


Fig. 3-6: Feedback lever and valve stem

- 7) Check the valve stroke. The stroke numbers are engraved on the feedback lever of the positioner. Position the connection bar at the number on the feedback lever which corresponds with the desired valve stroke. To adjust, move the bracket, the connection bar or both.

※ The effective linear lever angle of positioner is 60 degree

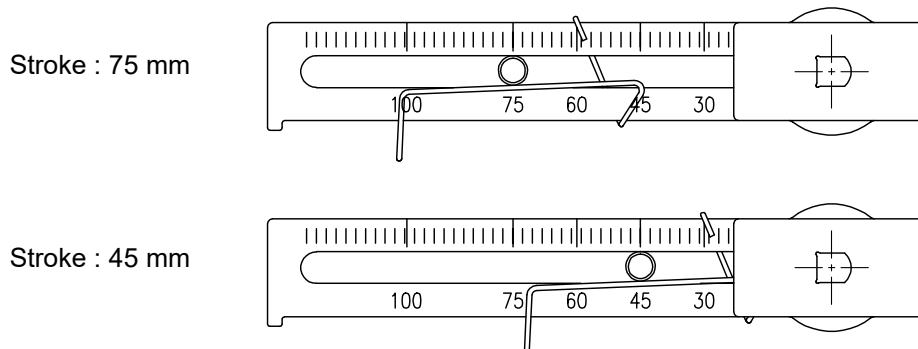


Fig. 3-7: Feedback lever and location of the connection bar



- 8) After installing the positioner, operate the valve from 0 % to 100 % stroke by using direct air to the actuator. 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 center of the actuator.

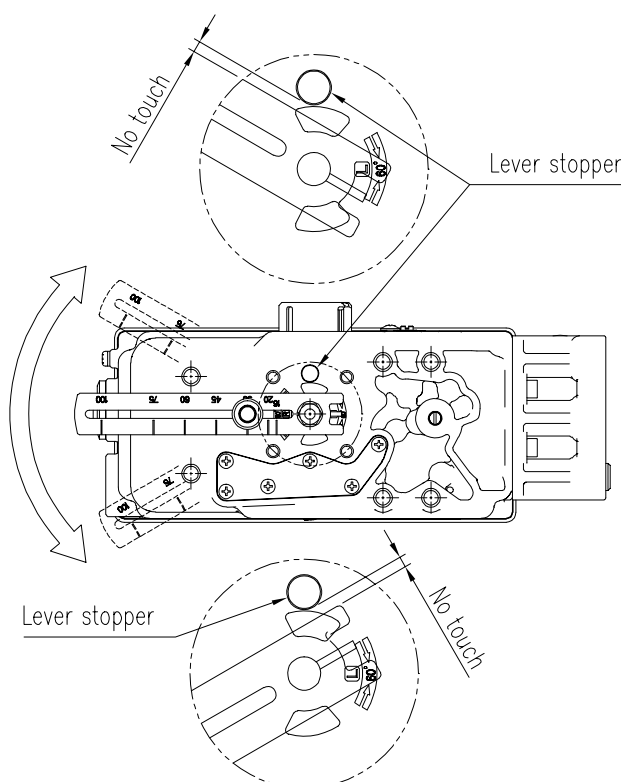


Fig. 3-8: Feedback lever should not touch lever stopper on 0 % ~ 100 % valve stroke.

- 9) After the installation, tighten all of the bolts on the bracket and the connection bar.

3.3.2 Installation of Adapter lever type (on tubeless actuator)

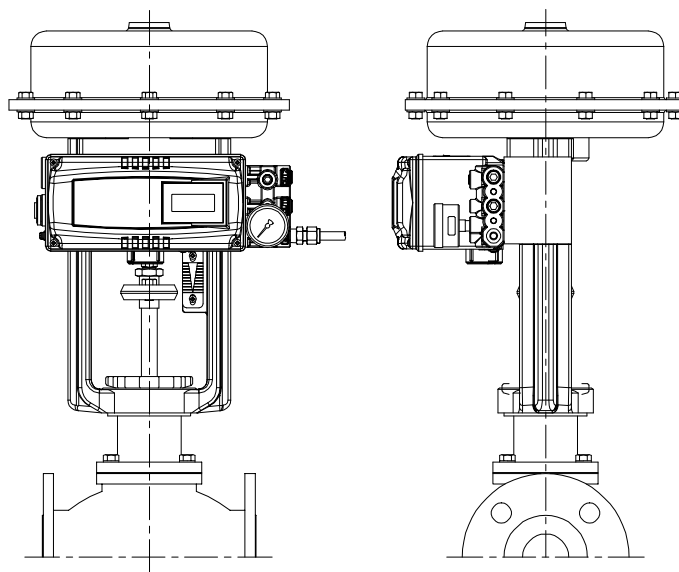


Fig. 3-9: Installation of adapter lever type example

Before proceeding with the installation, ensure following components are available.

- Positioner
 - Feedback lever
 - M6 nut and spring washer (fastening feedback lever to a main shaft of positioner)
 - O-ring(Connect out1 port of positioner and actuator) – not supplied with the unit
 - 1/4 plug – not supplied with the unit
 - Adapter holder – not supplied with the unit
 - 2 pcs x bolts (M8 x 1.25P) – not supplied with the unit
- ✕ When using adapter lever, generally tubeless actuator which doesn't requires pipe between actuator and positioner is used. Therefore, in this section, installation method of tubeless actuator and positioner will be introduced like below.

3.3.2.1 Safety

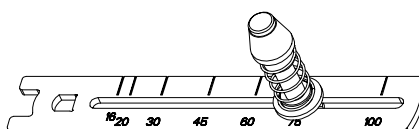


- Positioner's feedback lever must be vertical to the valve stem at 50 % of the valve stroke.
- Adapter of feedback lever should be installed in such a way that the valve stroke length coincides with the corresponding figure in "mm" marked on the feedback lever.

3.3.2.2 Adapter lever type positioner Installation Steps

- 1) Remove Out1 Plug(Fig. 3-11) on the bottom of the positioner. Plug up out1 port of gauge block with 1/4 plug using sealant.
- 2) Check the valve stroke. The stroke numbers are engraved on the feedback lever of the positioner. Position the adapter at the number on the feedback lever which corresponds with the desired valve stroke. To adjust, loosen M6 nut behind the adapter, move the adapter to correct position, and then tighten the M6 nut.

Stroke : 75 mm



Stroke : 30 mm

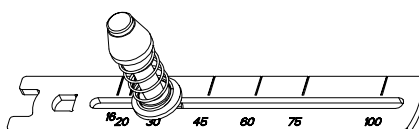


Fig. 3-10: Feedback lever and location of the connection bar

- 3) **Loosen Adapter holder on actuator's stem.**
- 4) Add O-ring between the positioner and actuator and attach the positioner to the actuator yoke tightly by fastening the bolts (M8 x 1.25P, 2 pieces).

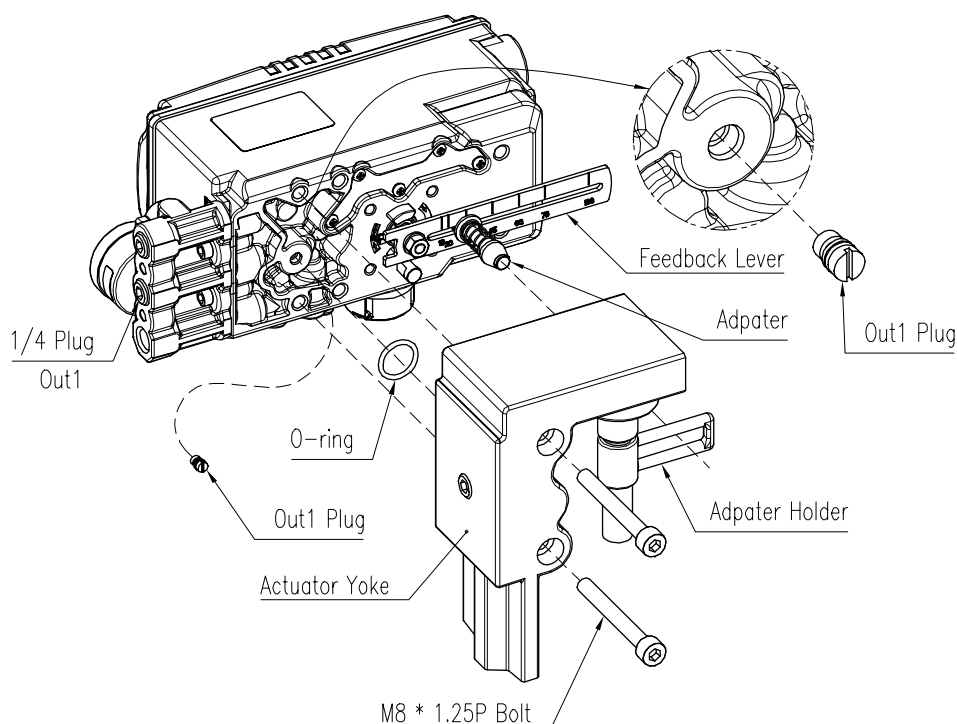


Fig. 3-11: Installing the positioner on the actuator

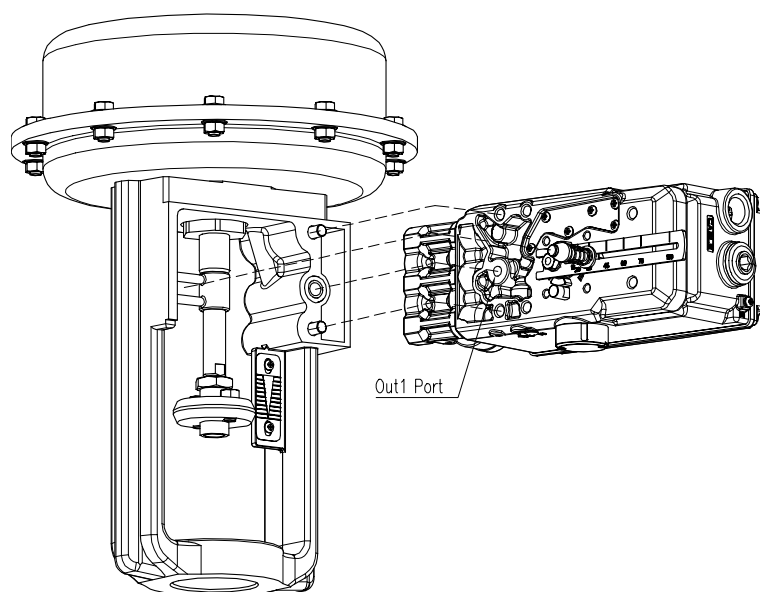


Fig. 3-12: Adapter Lever Type

- 5) Connect Air-filter regulator to Supply port of the positioner.
- 6) Turn the Auto/Manual switch counterclockwise (toward "M"). Refer to 6.1 for more detail. Supply enough air pressure to the actuator in order to position the valve stroke at 50 % of the total stroke.
- 7) Check if feedback lever is vertical to the valve stem at 50 % of the valve stroke. If it is not vertical, adjust the adapter holder on the actuator's stem to make vertical – **DO NOT TIGHTEN THE ADAPTER HOLDER COMPLETELY**. Improper installation may cause poor linearity. Refer to Fig 3-11.
- 8) After installing the positioner, operate the valve from 0 % to 100 % stroke by using direct air to the actuator. 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 adapter holder should be moved or the adapter of feedback lever should be moved further away from the main shaft of the positioner. Refer to Fig 3-8.
- 9) After the installation, tighten the adapter holder. And Turn the Auto/Manual switch clockwise (toward "A") tightly. Refer to 6.1 for more detail.



3.4 Rotary positioner Installation

Rotary positioner 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 its stem rotates 90 degrees. Before proceeding with the installation, ensure following components are available.

3.4.1 Components

- Positioner
- Fork lever (Only Fork lever type)
- Rotary bracket set (2 pieces) → The upper brackets of fork lever type and Namur type are different.
- 4 pcs x hexagonal headed bolts (M8 x 1.25P) → Fork lever type
- 4 pcs x M8 plate washers → Fork lever type
- 4 pcs x wrench headed bolts (M6 x 1P x 10L) → Namur type, For the positioner and the upper bracket
- 4 pcs x wrench headed bolts (M6 x 1P x 15L) : For the bracket set
- 4 pcs x M6 nuts : For the bracket set
- 4 pcs x M6 spring washers : For the bracket set
- Bolts and washers to attach bracket to actuator – not supplied with the positioner

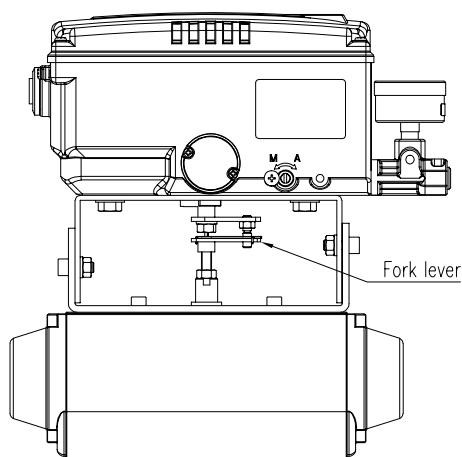


Fig. 3-13: Fork lever type

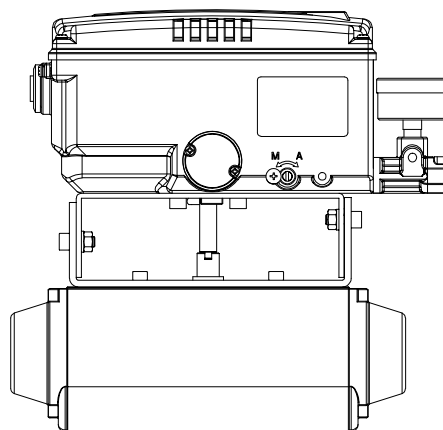


Fig. 3-14: Namur type

3.4.2 Rotary Bracket Information



The rotary bracket set (included with the positioner) contains two components. (but the upper brackets of Fork lever type and Namur type are different.) The bracket is designed to fit onto the actuator with 20 mm, 30 mm and 50 mm stem height (H) according to VDI/VDE 3845 standard. Please refer to below table how to adjust the height of the bracket.

Actuator stem height (H)	Markings of bolt holes			
	A-L	B-L	A-R	B-R
20 mm	H : 20	H : 20, 30	H : 20	H : 20, 30
30 mm	H : 30	H : 20, 30	H : 30	H : 20, 30
50 mm	H : 50	H : 50	H : 50	H : 50

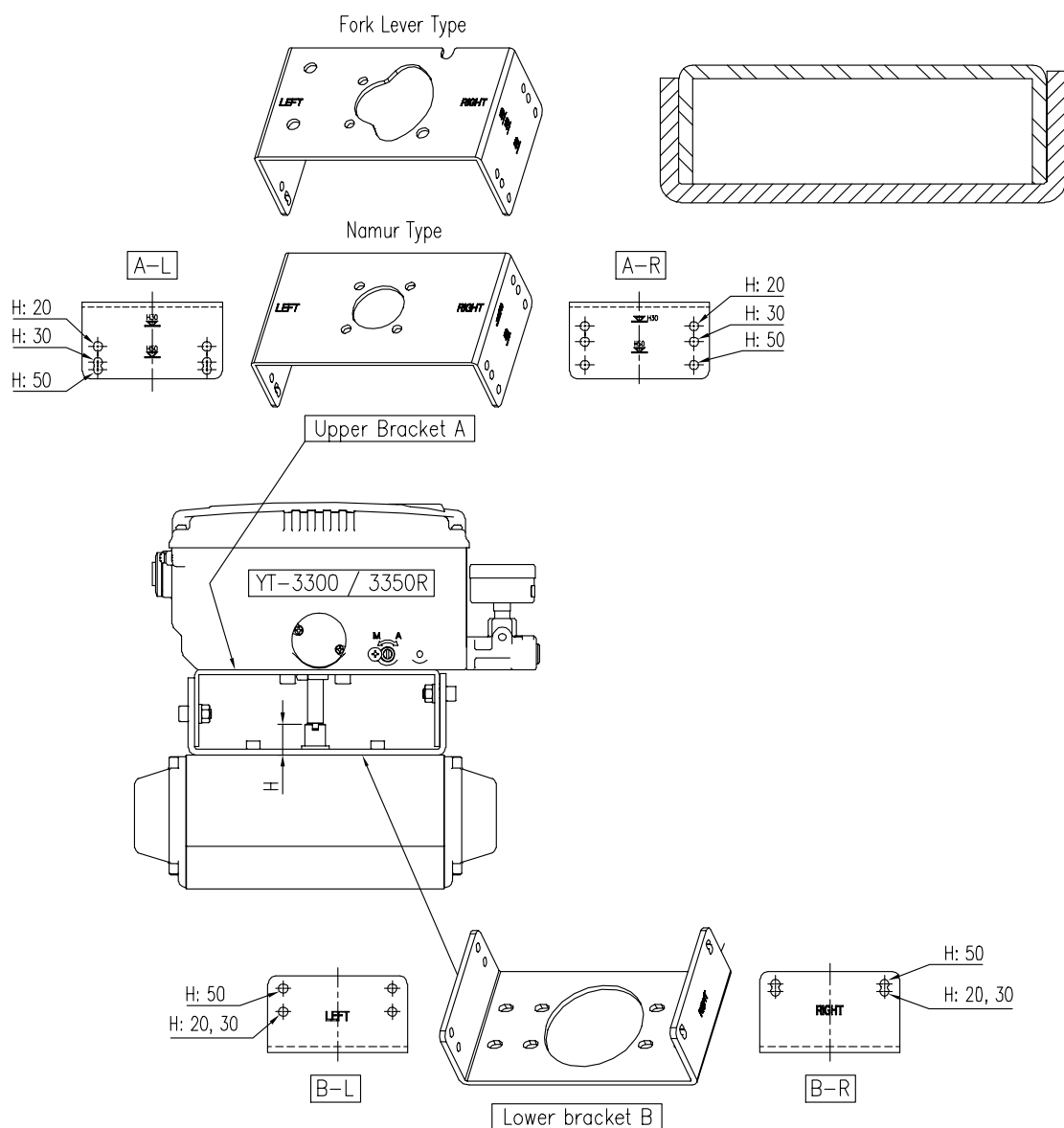


Fig. 3-15: YT-3300R / 3350R / 3303R Brackets and positioner

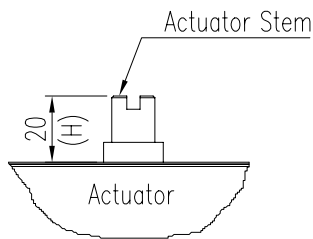


Fig. 3-16: Actuator stem Height

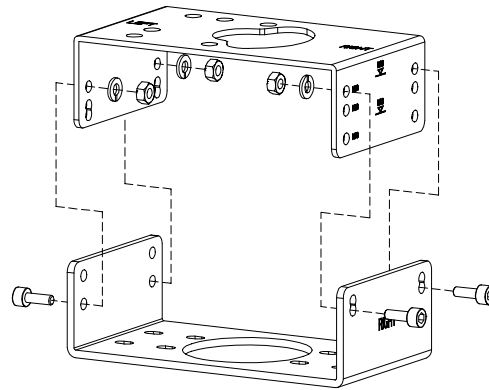


Fig. 3-17: Exploded Brackets

3.4.3 Rotary positioner Installation Steps

- 1) Please check the actuator's stem height and adjust the brackets by referring to the above bracket table.
- 2) Attached the brackets onto the actuator. It is recommended to use spring washer so the bolts will not be loosen from vibration.
- 3) Set rotation position of the actuator stem at 0 %. For single acting actuator, it is easy to check 0 % point by supplying no pressure to the actuator. For double acting actuator, check actuator stem's rotation direction – clockwise or counter-clockwise - by supplying pressure to the actuator.
- 4) (Only Fork lever type) Install the fork lever after setting actuator's stem at 0 %. Check the actuator stem's rotation direction – clockwise or counter-clockwise.
Installation angle of the fork lever should be 45° to the longitudinal direction of the actuator.

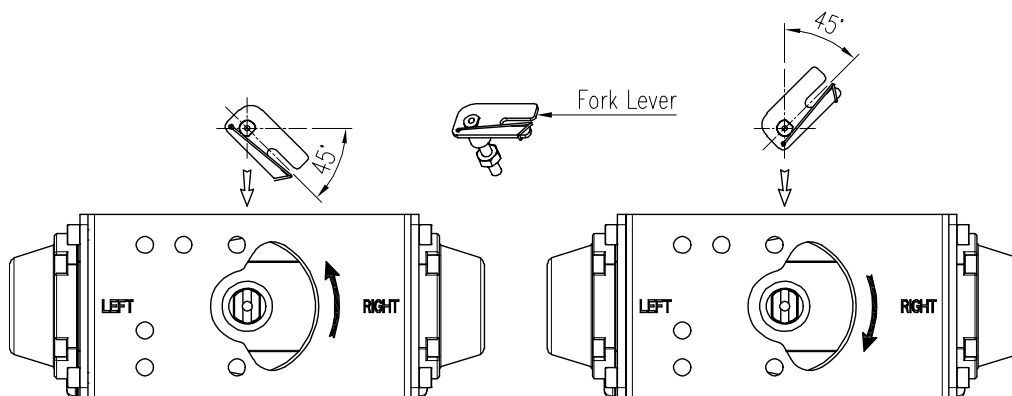


Fig. 3-18: Counter-clockwise and clockwise rotation.



- 5) (Only Fork lever type) After setting fork lever position, fasten lock nuts which are located on the bottom of the fork lever. Ensure to set the gap between the top of upper bracket and the top of the fork lever within **23 ~ 28 mm**.

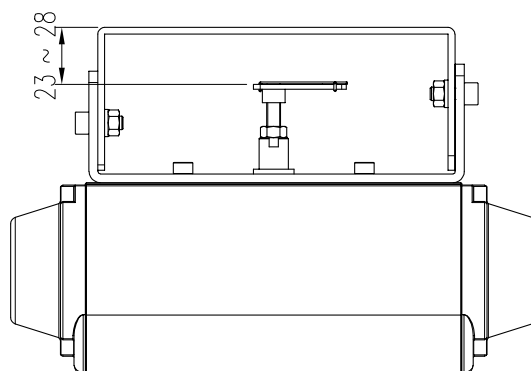


Fig. 3-19: Height to the bracket (fork lever type of YT-3300R / 3350R)



- 6) Attach the positioner to the bracket. *<Only fork lever type : Fix the clamping pin (5 mm Dia.) into the fork lever slot and insert center pin (2 mm Dia.) of the main shaft of the positioner into the hole of center of the fork lever. The clamping pin will be locked to the fork lever spring.>* Setting alignment of center of main shaft of the positioner and center of the actuator's stem is very important. Poor alignment of the main shaft and the actuator's stem decreases the positioner's durability due to unnecessary forces on the main shaft.

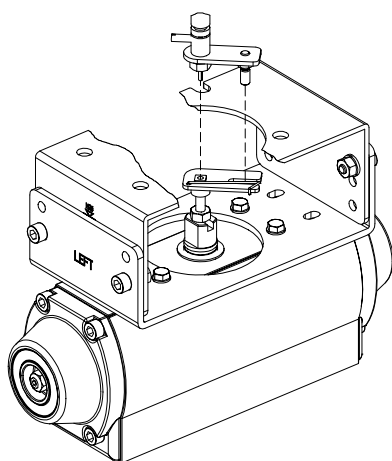


Fig. 3-20: Main shaft center alignment (Fork lever)

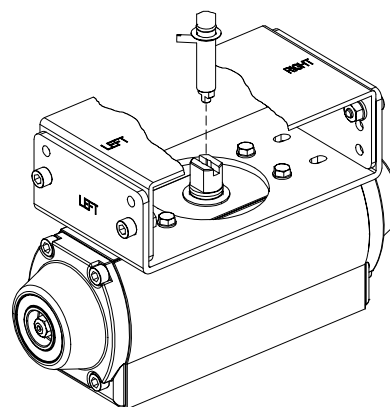


Fig. 3-21: Main shaft center alignment (Namur)

- 7) Tighten the positioner and the bracket with bolts **after checking the positioner's position**.

4 Connection - Air

4.1 Safety

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

4.2 Supply Pressure Condition



- Dry air with dew point of at least 10 °C lower than ambient temperature.
- Avoid from dusty air. Use 5 micron or smaller filter.
- Avoid oil.
- Comply with ISO 8573-1 or ISA 7.0.01.
- Supply pressure range is 0.14 ~ 0.7 MPa (1.4 ~ 7 bar)
- 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 damages.
- Pipeline should have more than 6mm of inner diameter (10 mm 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 – Piping with actuator

4.4.1 Single acting actuator

Single acting type positioner is set to use only OUT1 port. OUT1 port of positioner should be connected with supply port of actuator when using spring return actuator of single acting type.

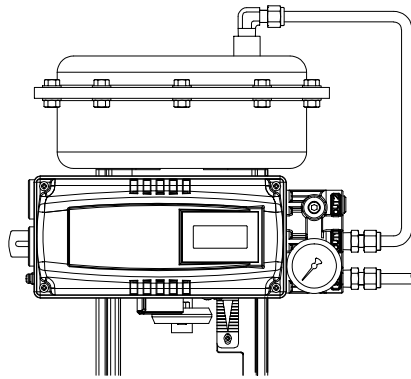


Fig. 4-1: Single acting linear actuator

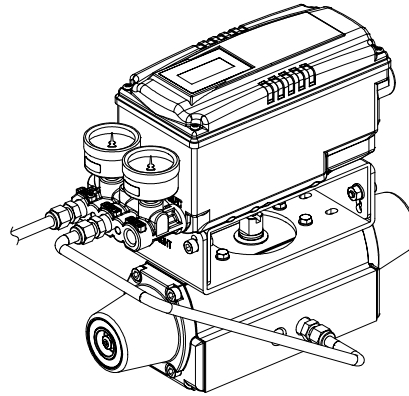


Fig. 4-2: Single acting rotary actuator

4.4.2 Double acting actuator

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.

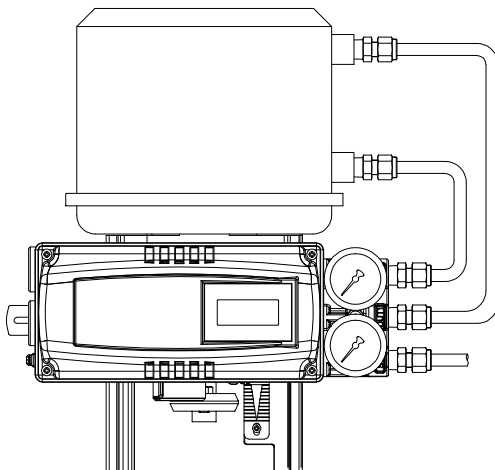


Fig. 4-3: Double acting linear actuator

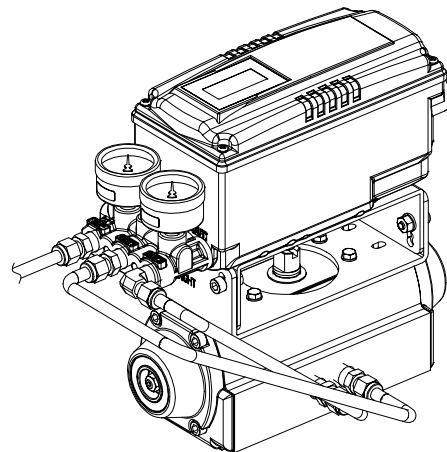


Fig. 4-4: Double acting rotary actuator

5 Connection – Power

5.1 Safety

- There are two conduit entries on the product. See “2.4 Product Code” for conduit entry threads.
- Before connecting terminal, ensure that the power is off completely.
- It uses DC 9 to 24 V(20 ± 0.5 mA) power.
 - Intrinsic safety barrier specification for FISCO power supply :
Ui: 17.5 V, Ii: 380 mA, Pi: 5.32 W, Ci: 2.2 nF, Li: 3.3 uH
 - Intrinsic safety barrier specification for Entity power supply :
Ui: 24 V, Ii: 380 mA, Pi: 1.4 W, Ci: 2.2 nF, Li: 3 uH
- Positioner should be grounded.
- Please use twisted cable with conductor section are 1.25 mm² and that is suitable for 600 V (complying with the conductor table of NEC Article 310). The outer diameter of the cable should be between 6.35 ~ 10 mm. Use shield wire to protect against electro-magnetic field and noise.
- Please do not install the cable near high noise equipment, such as high-capacity transformer or motor.



5.2 Connection

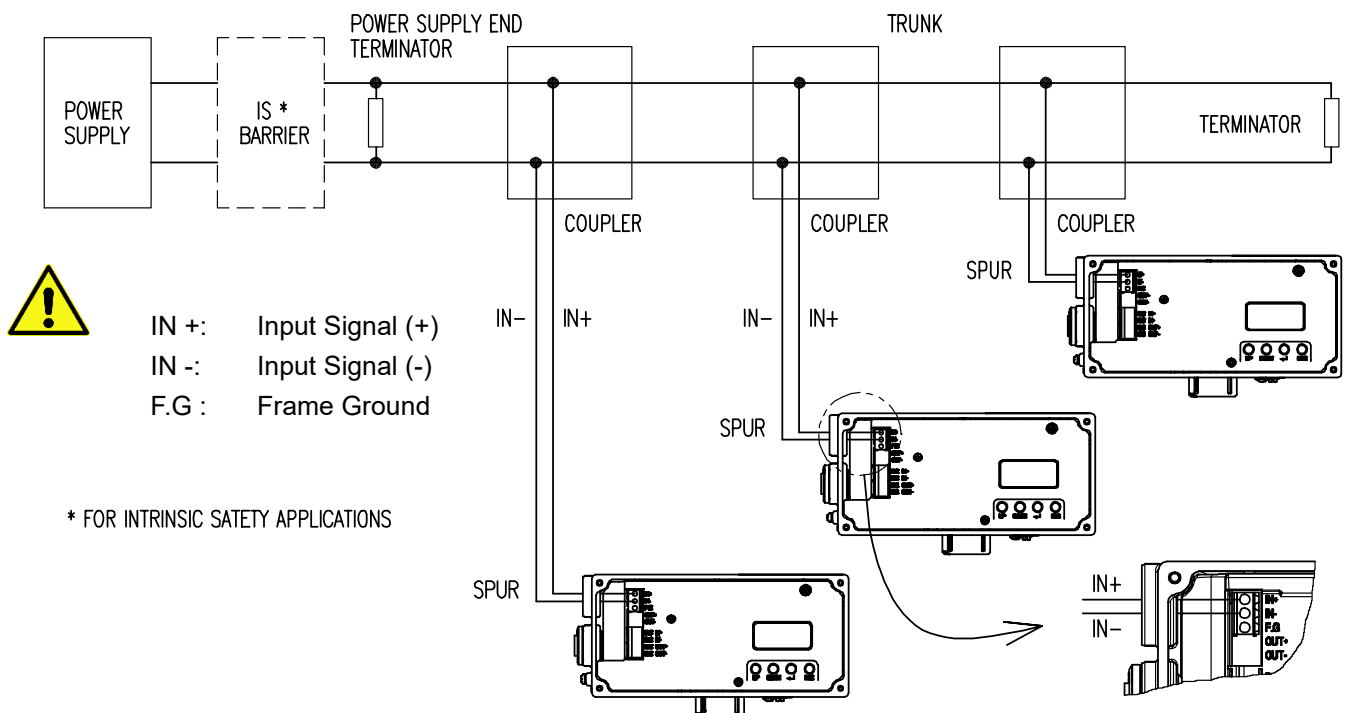


Fig. 5-1: Terminal Overview

5.3 Ground

- 1) Ground must be done before operating the positioner.
- 2) Open base cover and there is an internal ground "F.G" on the left hand.

An external ground bolt is located next to the conduit entry. Please make sure that the resistance is less than 100 ohm.

6 Adjustments

6.1 A/M switch adjustment

- 1) On the right hand bottom of positioner, there is A/M switch (Auto/Manual). A/M Switch allows the positioner to be functioned as by-pass. If the switch is turned clockwise (toward “A”) and it is fastened tightly, then the supply pressure will be transferred to actuator through output by positioner control. On the other hand, if the switch is turned counter-clockwise (toward “M”), it is loosened, then the supply pressure will be directly supplied to the actuator regardless of positioner control. It is extremely important to check the allowed pressure level of the actuator when the switch is loosened.
- 2) Check whether the supply pressure is too high.
- 3) After using “Manual” function, A/M switch should be returned to “Auto”.

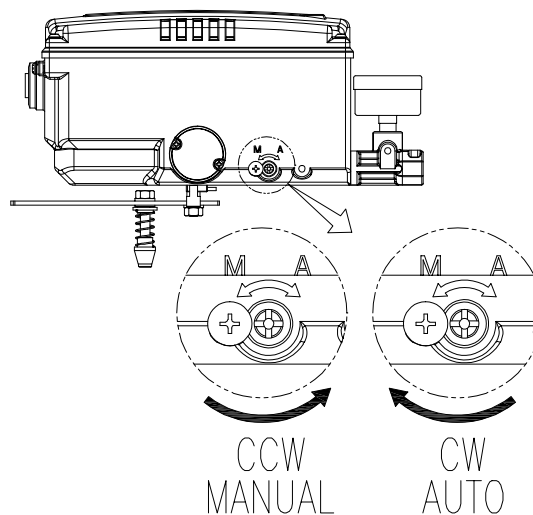


Fig. 6-1: A/M switch adjustment

6.2 Orifice Installment

Hunting can be occurred when the actuator's volume is too small. In the event of hunting, hunting can be prevented by installing an orifice to reduce the flow rate of OUT1 and OUT2 air entering the actuator. The diameter of orifice hole is 1 mm.

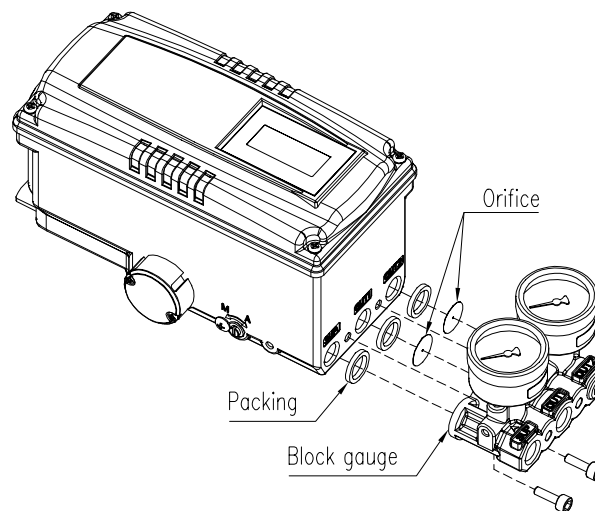


Fig. 6-2: Plate type Orifice installment

7 Maintenance

7.1 Supply air

If Supply air pressure is not stable or Supply air is not clean, the positioner may not function properly. Air quality and pressure should be checked regularly to see if the air is clean and pressure set is normal.

7.2 Seals

Once a year, it is recommended to check if there are any damaged parts of the positioner. If there are damaged rubber parts such as diaphragms, o-rings and packings, replace with new ones.

8 Typical connection of YT-3300 with Profibus PA and Foundation Fieldbus

8.1 Profibus PA

The diagram below shows how to connect YT-3300 PA using EDD for Siemens SIMATIC PDM. Commands from the host PC are transmitted to the DP/PA coupler through the Profibus DP interface module, and then converted into low-speed signals and transmitted to the positioner. The response to the command is sent to the host PC through the reverse process.

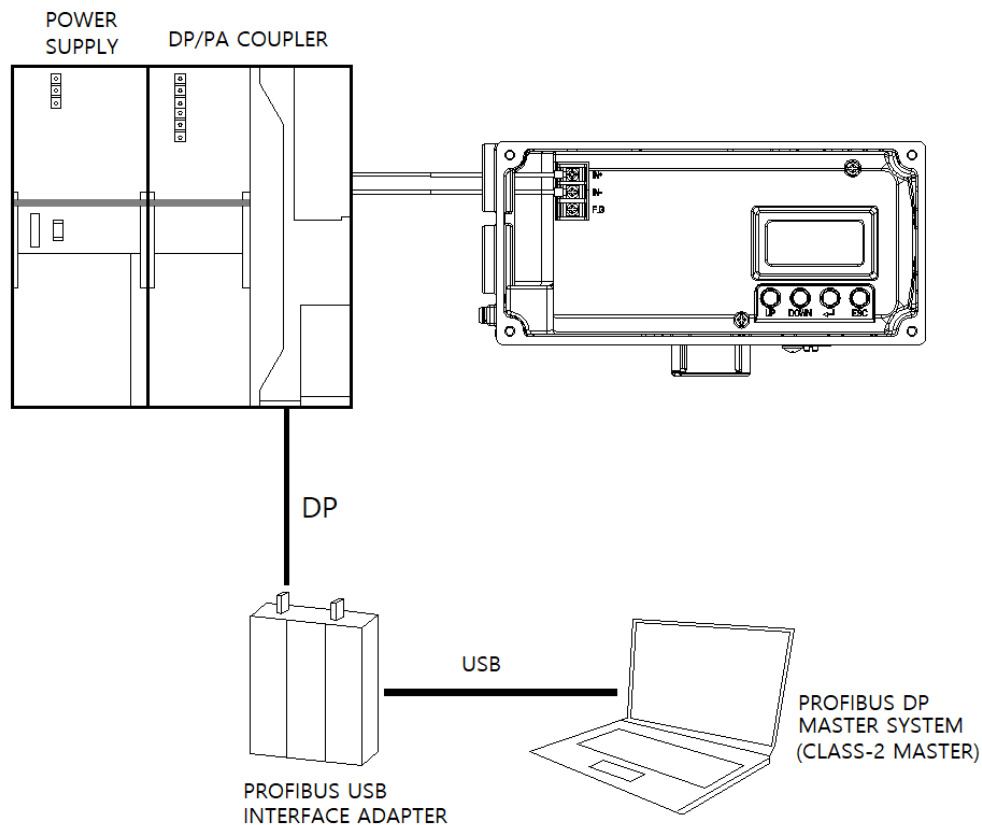


Fig. 8-1: Connecting YT-3300 using EDD for Siemens SIMATIC PDM

8.2 Configurations for high speed solution & low speed solution

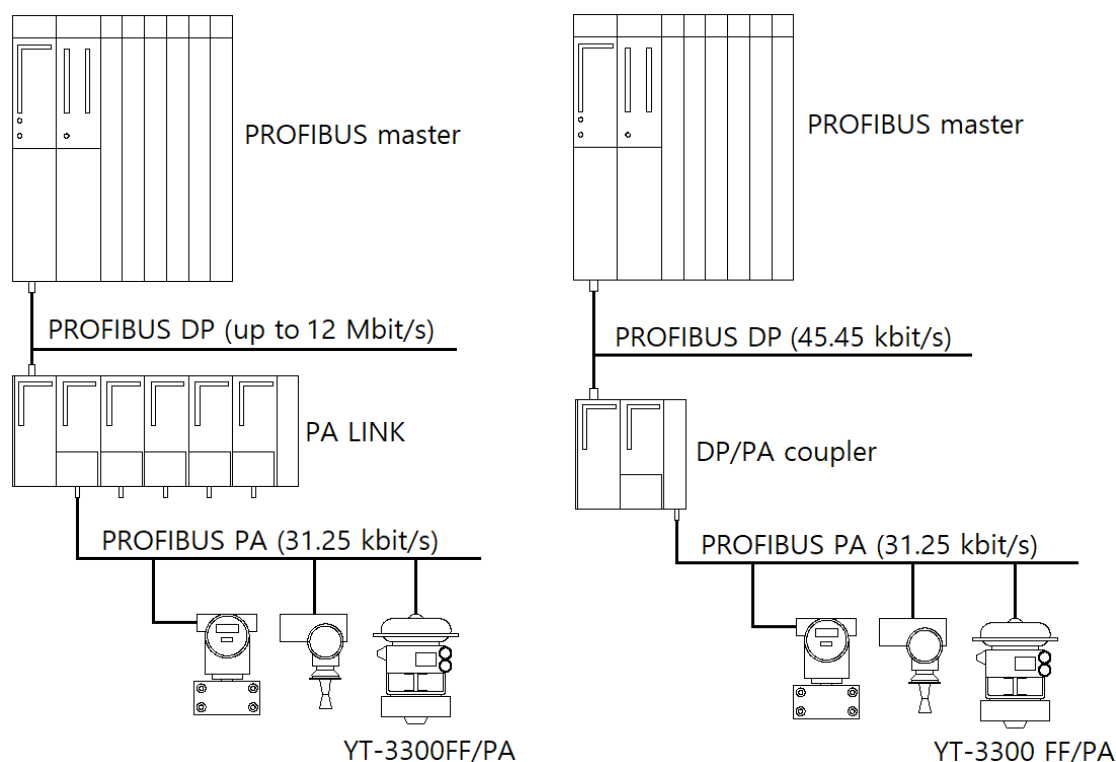


Fig. 8-2: High Speed solution with Profibus PA Link & Low speed solution with DP/PA coupler

8.3 Foundation Fieldbus

YT-3300 is connected to junction box of Foundation Fieldbus HI bus system (31.25 kbps) and its signals are transmitted to HSE (High Speed Ethernet) through Fieldbus controller (or linking device).

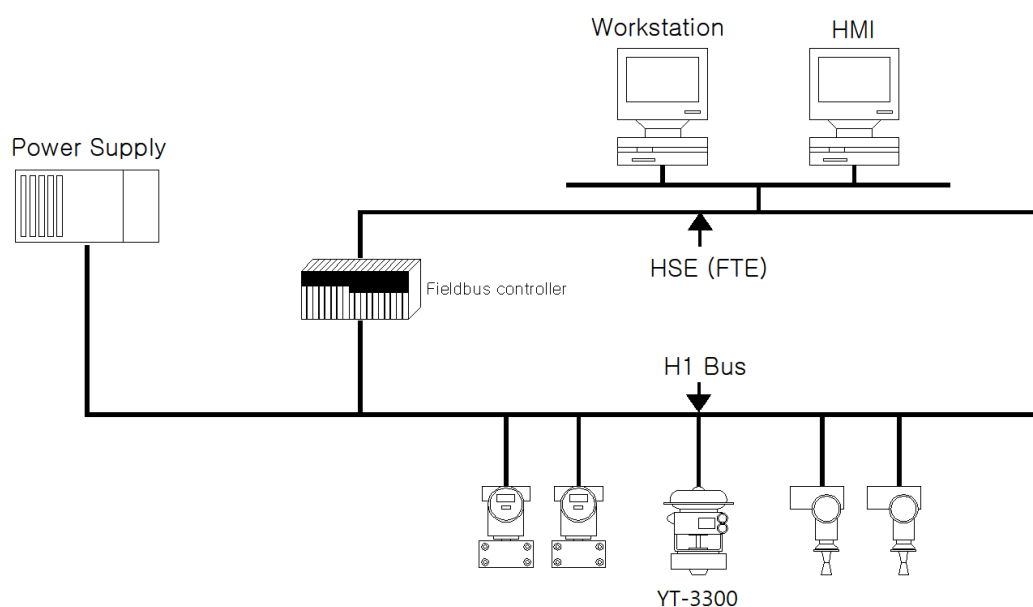


Fig. 8-3: Typical connection of Foundation Fieldbus

9 Auto Calibration and PCB Operation

9.1 Warning



Following process will operate valve and actuator. Before proceeding with any Auto Calibration, please separate valve from the entire system by using bypass valve, so Auto Calibration will not affect entire valve process.

9.2 Button Description

Positioner has 4 buttons, and they enable to perform various functions.

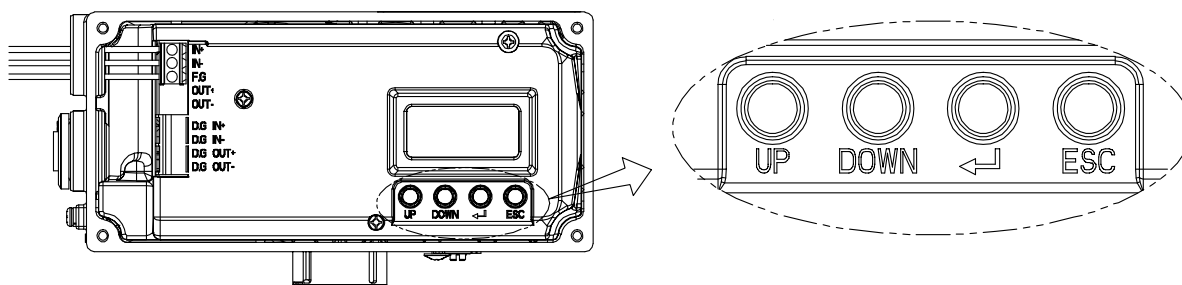


Fig. 9-1: <UP> & <DOWN>: Move to next menu, and adjust.
< ← , ENTER>: Enter to main and sub menus, and save
<ESC>: Return to previous menu

9.3 Run Mode (RUN)

After power connection to the positioner, Run Mode will be appeared on positioner's LCD screen in about 0.5 seconds. "RUN" indicates that the positioner adjusts the valve stroke according to the receiving signal. There are five 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 MV: Manipulate Value – Motor Manipulate Value (Digit)
- 4) Run VEL: Velocity – Current valve stem's velocity (Digit)
- 5) Run ERR (%): Error – Difference between SV and PV

To change the RUN PV to another RUN mode, hold <ESC> button and press the <UP> or <DOWN> button. The above 5 modes are sequentially displayed each time it is pressed.

By pressing <ESC>, the display will return to "RUN PV" mode.

※ Please note that the screen will return to "RUN PV" mode if 100 seconds elapse from the last button pressed.

- ※ By pressing <ESC> button several times from any MODES, it will return to “RUN PV” mode.
Therefore, if the users have entered the wrong mode by mistake or do not wish to proceed with their current work, they could return to “RUN PV” mode.

9.4 Auto Calibration mode (AUTO CAL)

Auto Calibration mode (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 4 types of AUTO CAL.

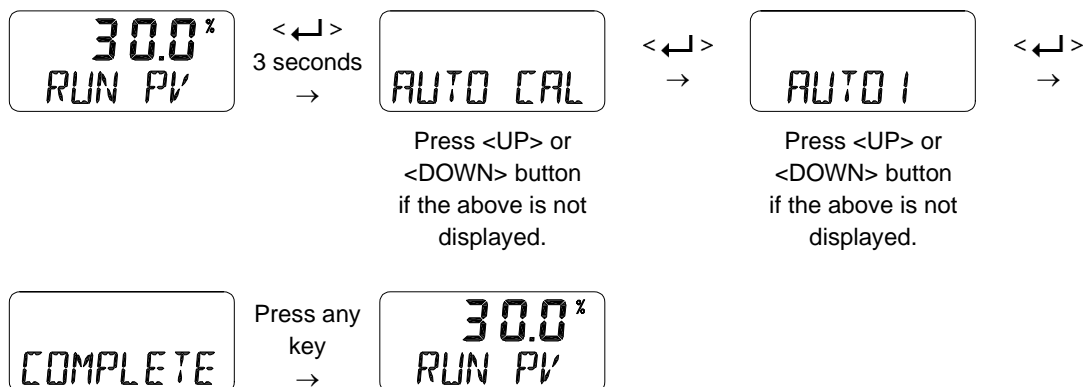
	Zero Point	End Point	P, I, D	RA / DA	BIAS	KF
AUTO 1	O	O	X	X	X	X
AUTO 2	O	O	O	O	O	X
AUTO 3	O	O	O	O	O	O
AUTO HF	O	O	O	O	O	X



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

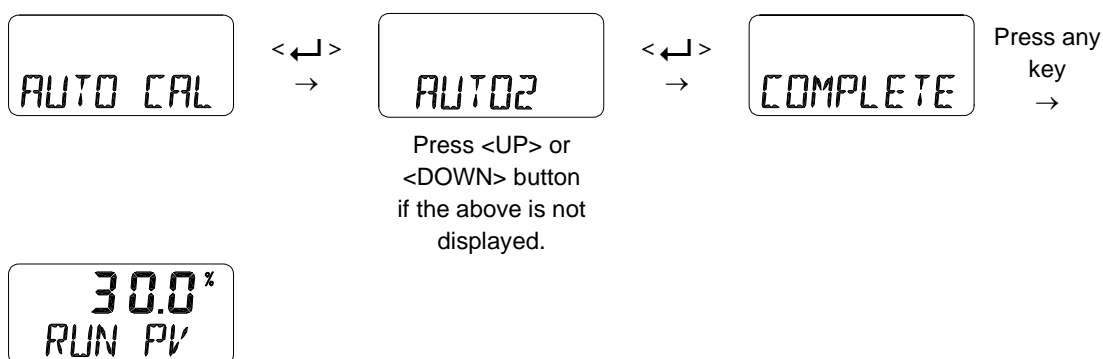
9.4.1 AUTO1 Calibration (AUTO1)

AUTO1 changes only zero and end points; however other parameters (P, I, D etc.) 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.



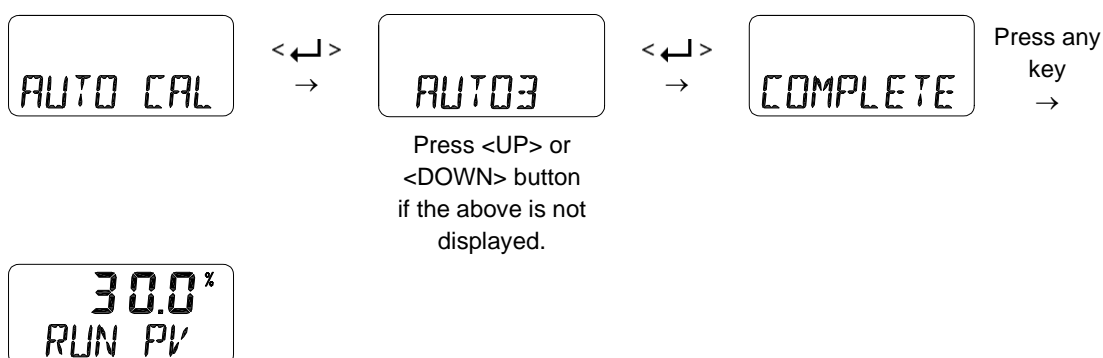
9.4.2 AUTO2 Calibration (AUTO2)

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 or the positioner has been reinstalled after disassemble from an actuator.



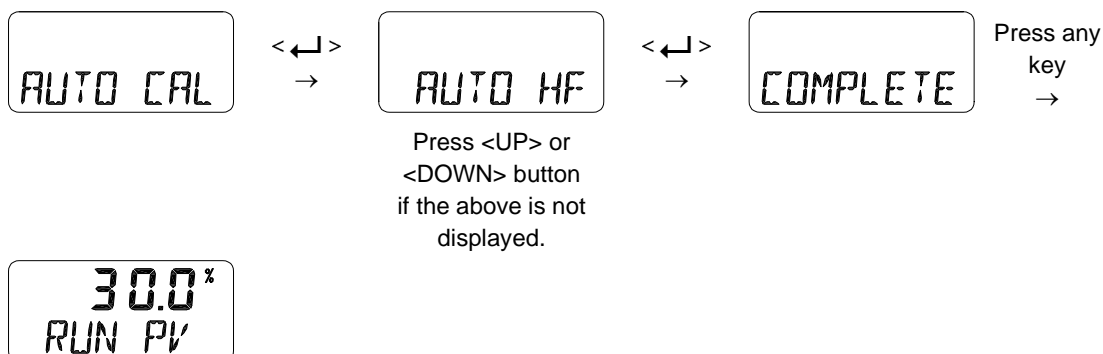
9.4.3 AUTO 3 Calibration (AUTO 3)

This calibration is with KF function added to AUTO2. Use when the valve has long dead time.



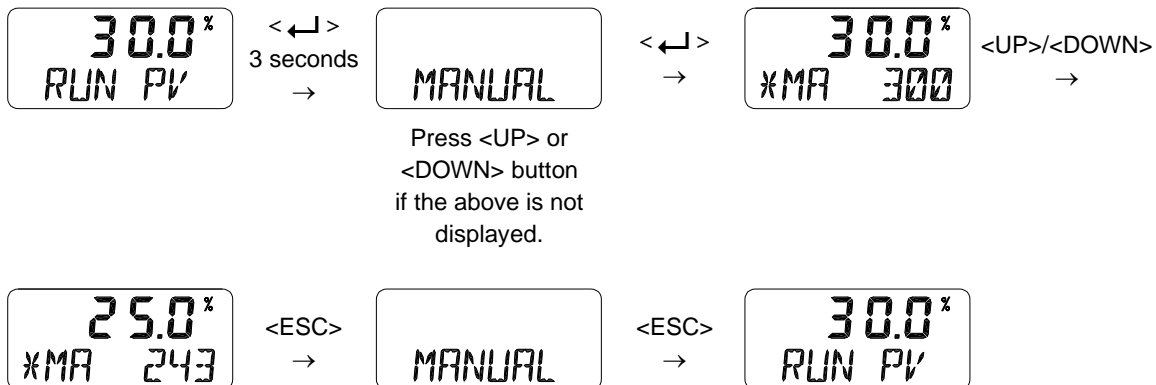
9.4.4 AUTO HF Calibration (AUTO HF)

AUTO HF calibration is almost same calibration process as to AUTO2, but AUTO HF is used when the valve has high friction level. The responsiveness is somewhat slower.



9.5 Manual Mode (MANUAL)

Manual mode is used to manually raise or lower the valve stem. In the manual mode, the positioner does not control the valve according to the electric signal inputted from the outside but the stroke of the valve can be adjusted only by the operation of <UP> or <DOWN> button of the positioner. Move the stem up and down to make it visible. If you press <ESC> button twice to return to RUN mode, the positioner is controlled by the input electric signal again.



9.6 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.



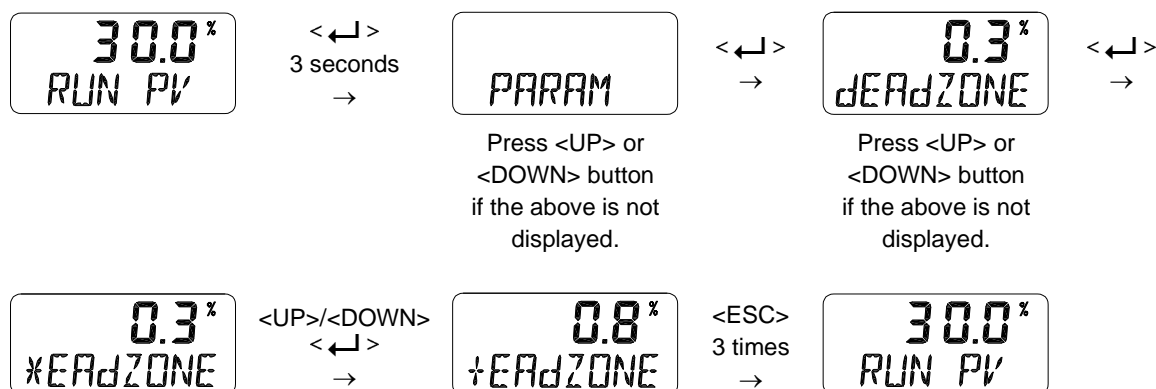
If you change the parameter values with <UP> <DOWN> buttons, the changed value is immediately applied to the positioner control. When the desired control status is reached, you must press <UP> button to save the values.

Below is the list of features which could be set from Parameter mode.

- 1) Dead-Zone (dEAdZONE)
- 2) P value (KP)
- 3) I value (KI)
- 4) D value (Kd)
- 5) P_, I_, D_ value (KP_, KI_, Kd_)
- 6) KF Up value (KFUP)
- 7) KF Down value (KFdN)
- 8) Control mode (CTRL)

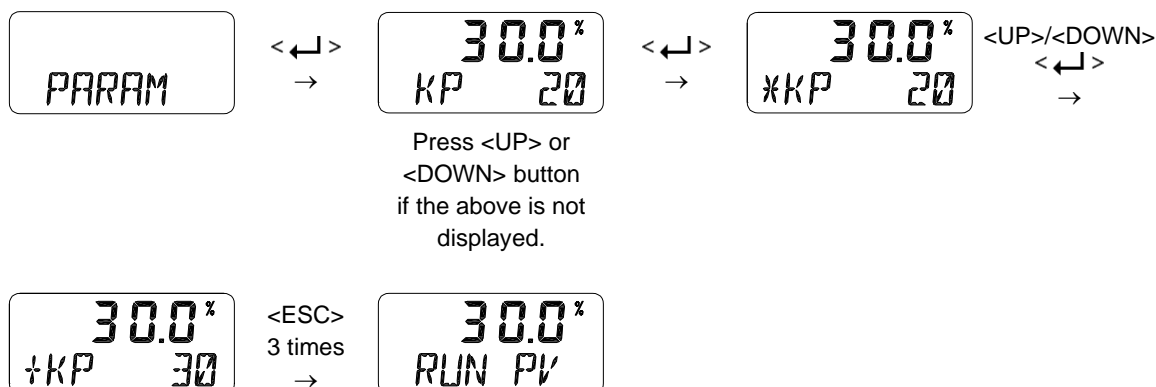
9.6.1 Dead-Zone (dEAdZONE, %)

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



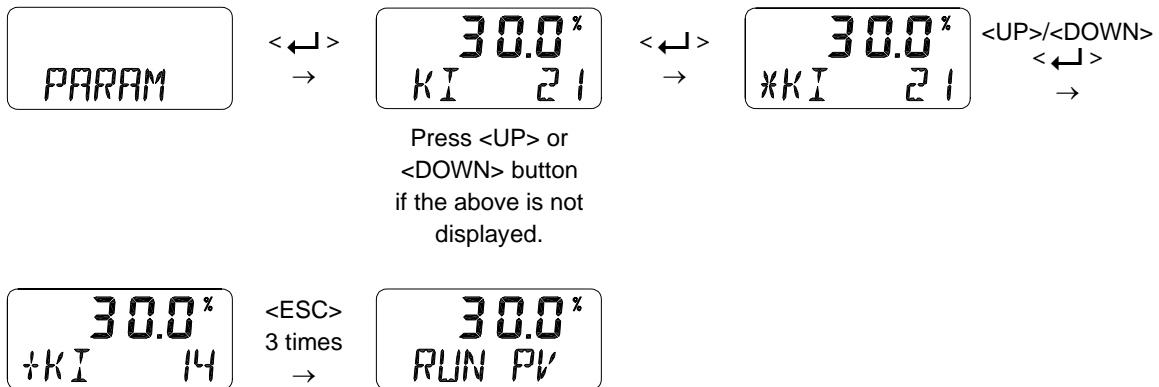
9.6.2 P Value (KP)

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 point quickly, but it is more likely to have hunting. As the value decrease, the stability of the positioner is higher, but it finds the target point slowly.



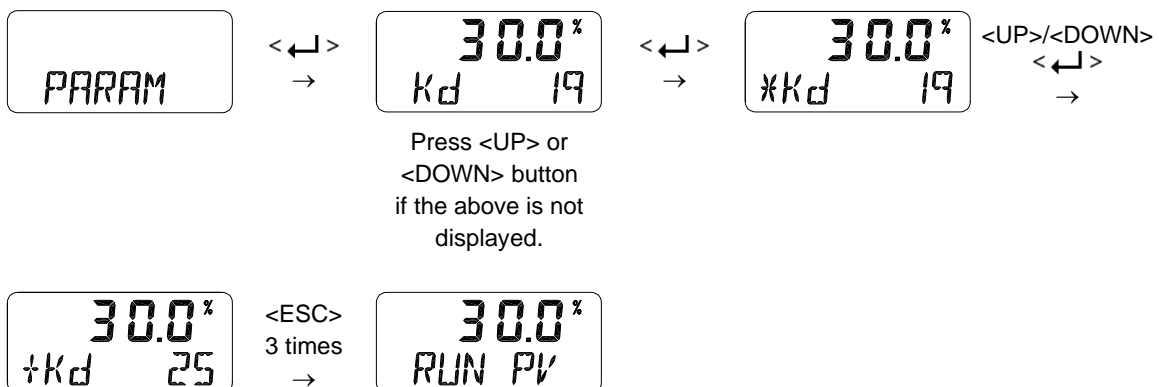
9.6.3 I Value (KI)

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.



9.6.4 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 or dynamic characteristic.

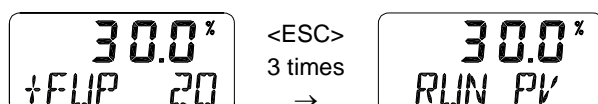
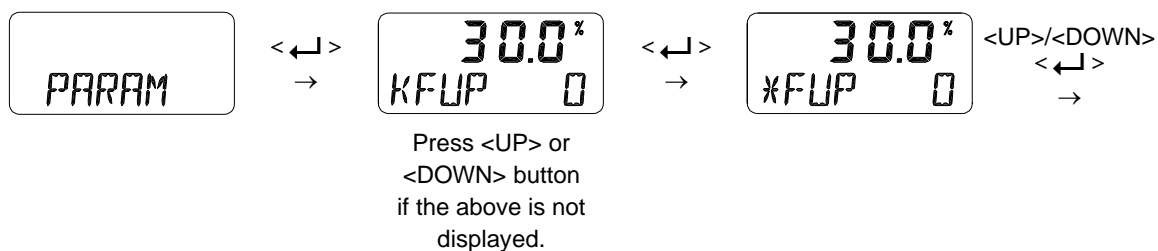


9.6.5 P_ (KP_), I_ (KI_), D_ (Kd_) Values

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

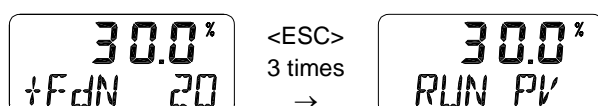
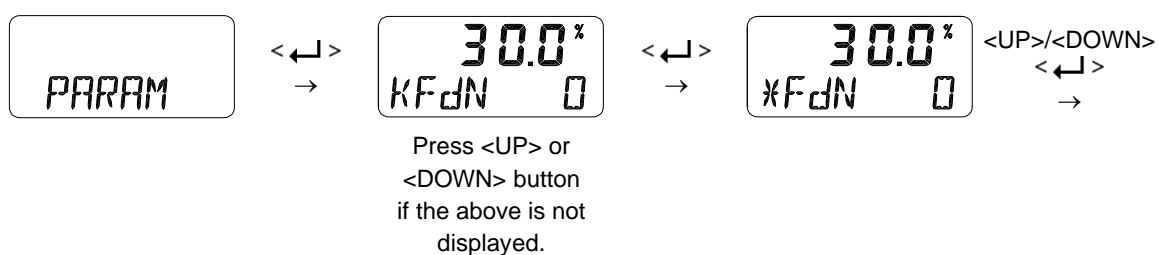
9.6.6 KF Up Value (KFUP)

KF Up control value corrects valve friction when moving from 0 % to 100 %, reducing the dead time.



9.6.7 KF Down Value (KFdN)

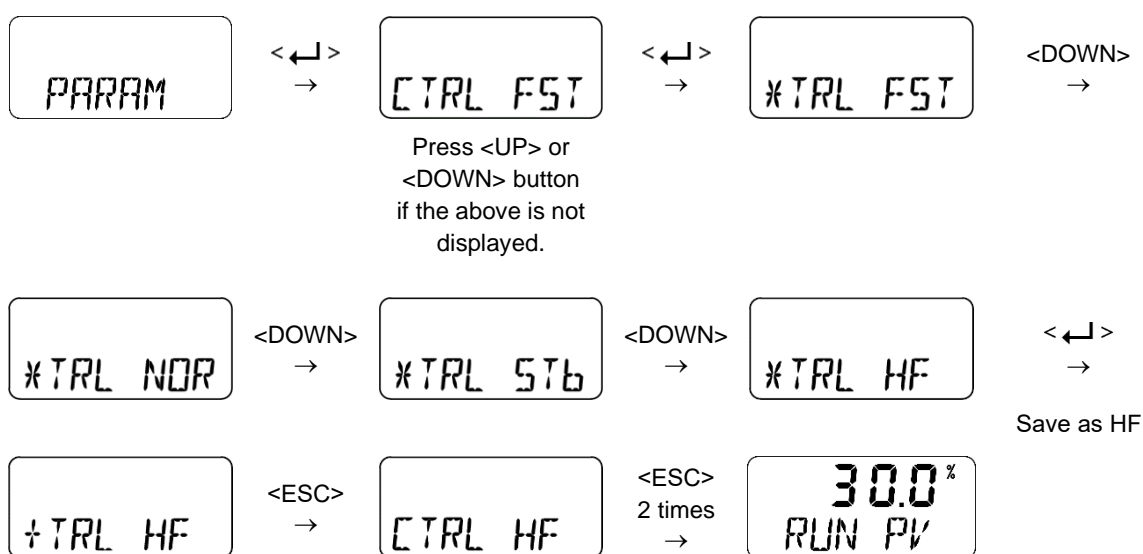
KF Down control value is used to reduce the dead time when the valve friction is high when moving from 100 % to 0 %.



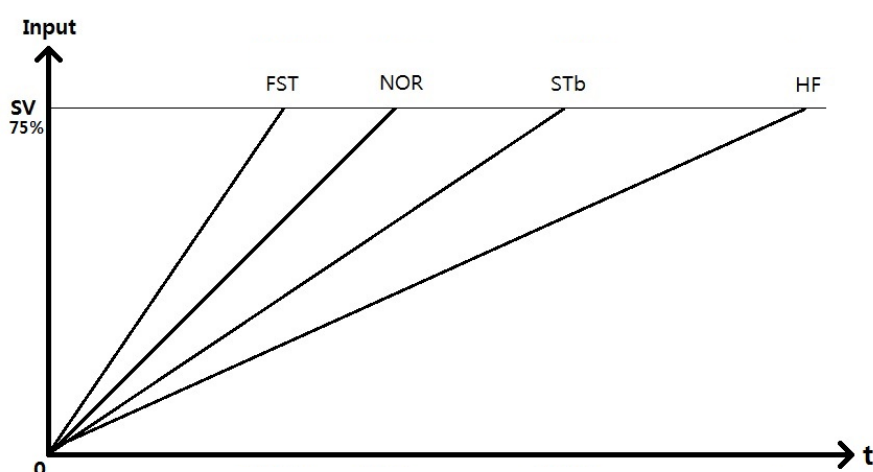
9.6.8 Control mode (CTRL)

This function is used to select the PID tuning set that already stored corresponding to the stability or responsiveness, not in the way the user changes the KP, KI, or KD manually.

- FAST (FST): This parameter is optimized for fast response characteristics. (Default)
- NORMAL (NOR): This is an optimized parameter when general response characteristics are required.
- STABLE (STb): This parameter is slower than NORMAL but optimized for relatively stable response characteristics.
- HIGH FRICTION (HF): Optimized for high friction valves.



※ An example of target position response time according to control mode selection (It may vary depending on the valve).

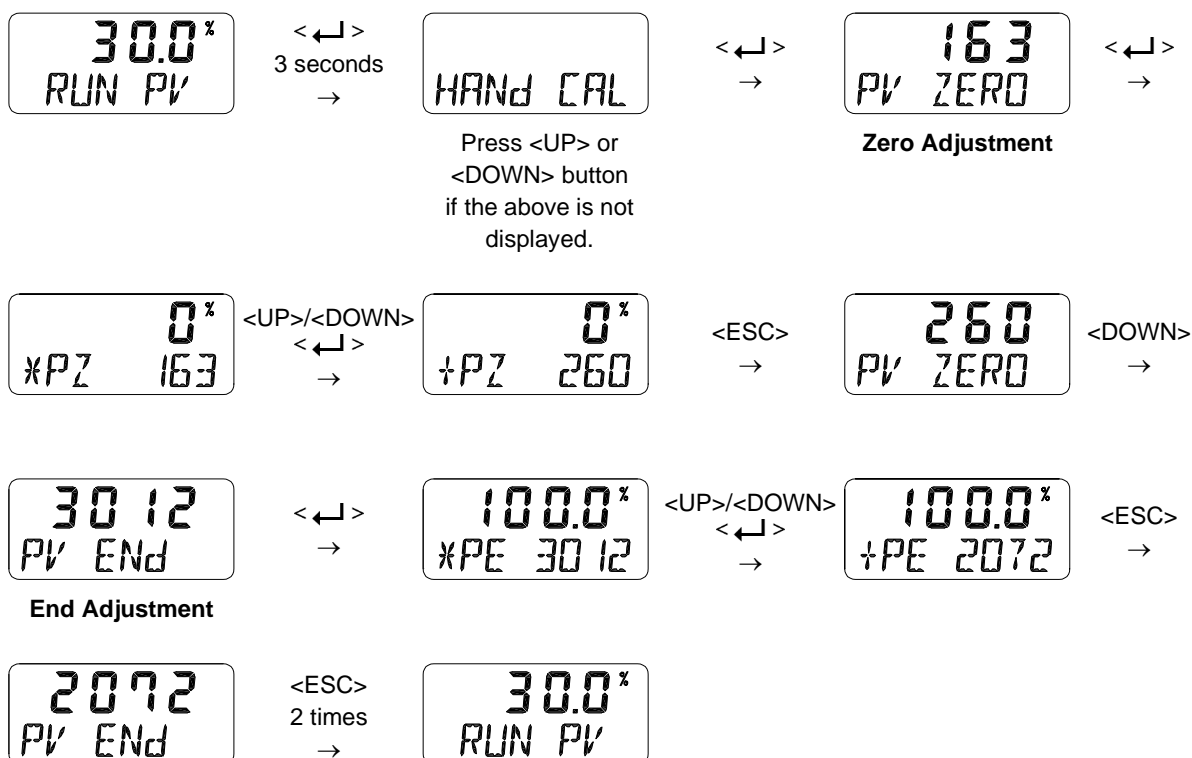


9.7 Hand Calibration Mode (HAND CAL)

Hand Calibration mode is used when the zero-point or end point of the valve is required to be readjusted after Auto Calibration has been performed.

9.7.1 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.



9.8 Valve Mode (VALVE)

Valve mode offers useful and various function settings for operating the control valve.

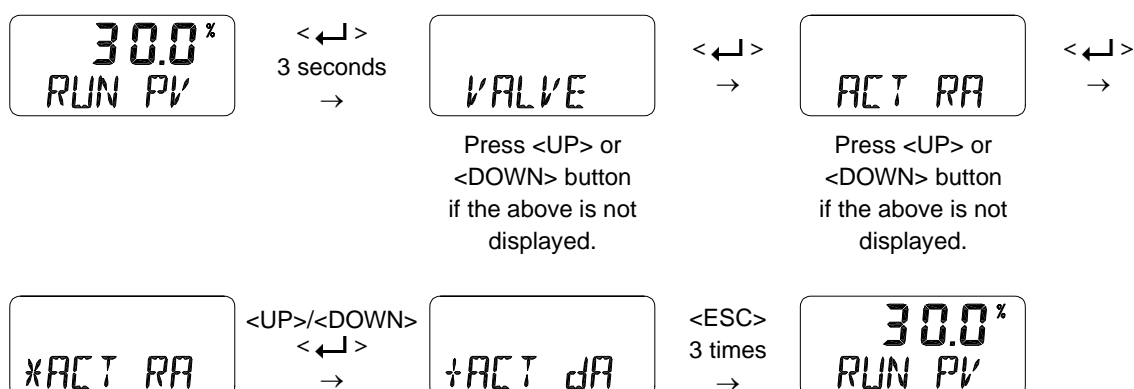
Below is the list of functions which could be set from Valve mode.

- 1) Acting Adjustment (ACT RA / dA)
- 2) Characteristic Adjustment (CHAR)
- 3) User Characteristics (USER SET)
- 4) Tight Shut Open (TSHUT OP)
- 5) Tight Shut Close (TSHUT CL)
- 6) Interpolation Mode (ITP ON / OFF)
- 7) Acting Type (SINGLE / dDOUBLE)
- 8) Lever Type (STd / AdT)

9.8.1 Acting Adjustment (ACT RA / dA)

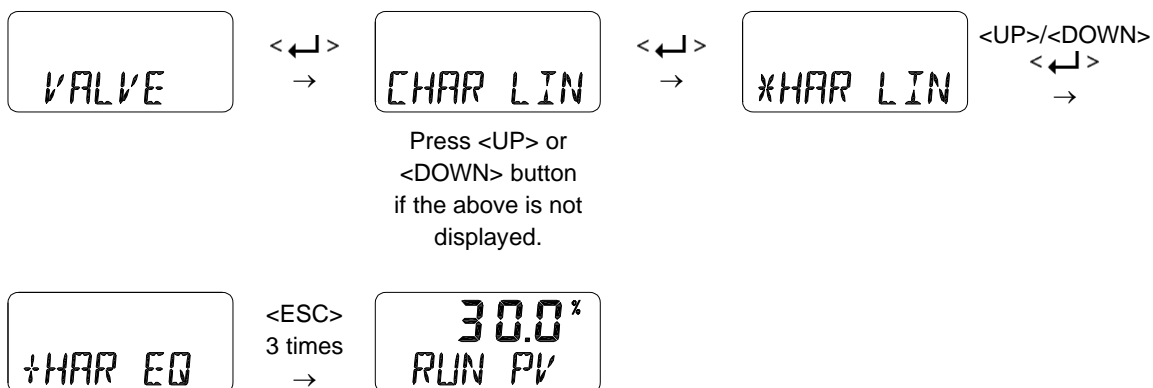
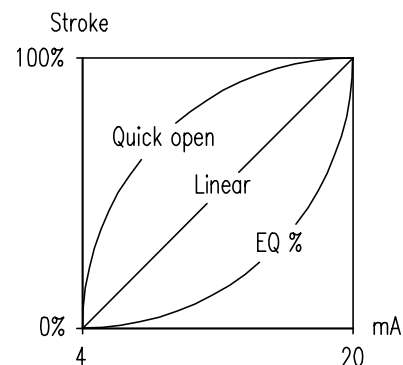
RA & DA are automatically set by performing "AUTO 2" from Auto Calibration. However, this function is used when the user wants to change RA & DA.

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



9.8.2 Valve flow Characteristic Adjustment (CHAR)

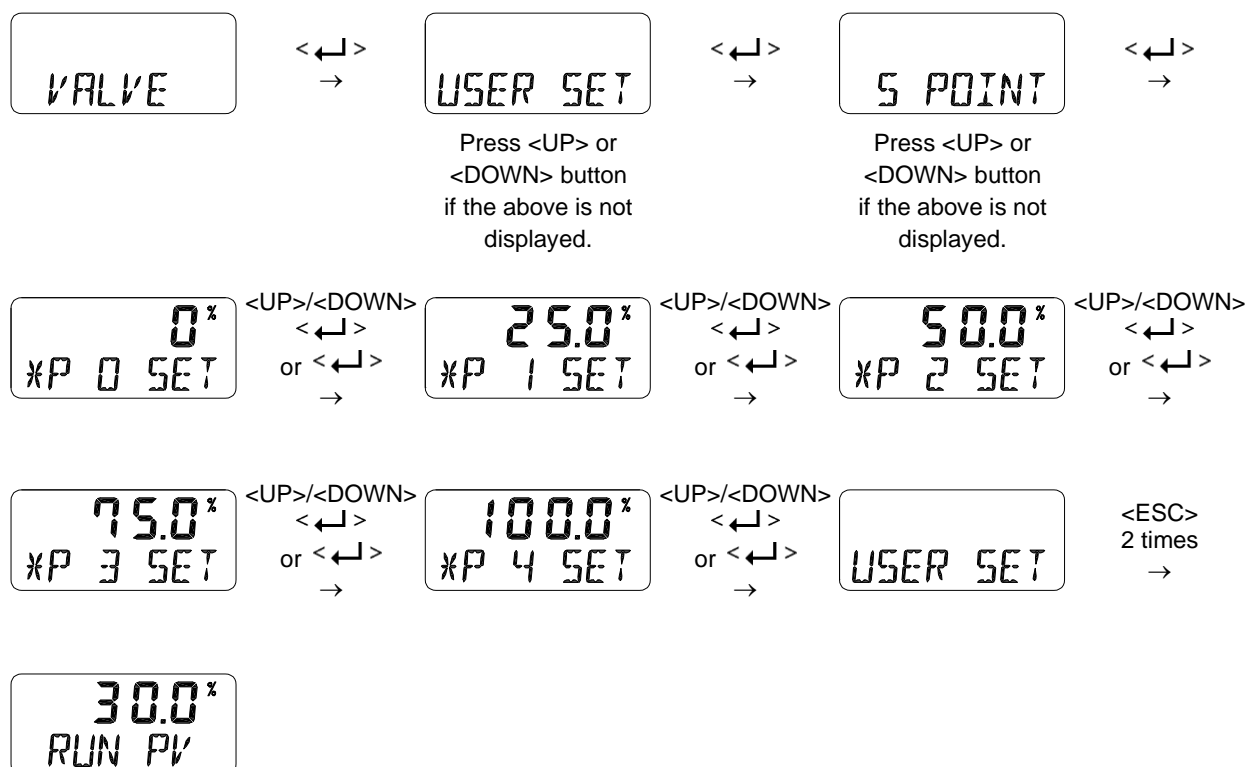
The valve flow characteristic can be set on the field's requirement. There are 4 types of characteristics – linear (LIN), user setting (USR), quick open (QO), and equal percentage (EQ).



9.8.3 User defining flow Characteristics (USER SET)

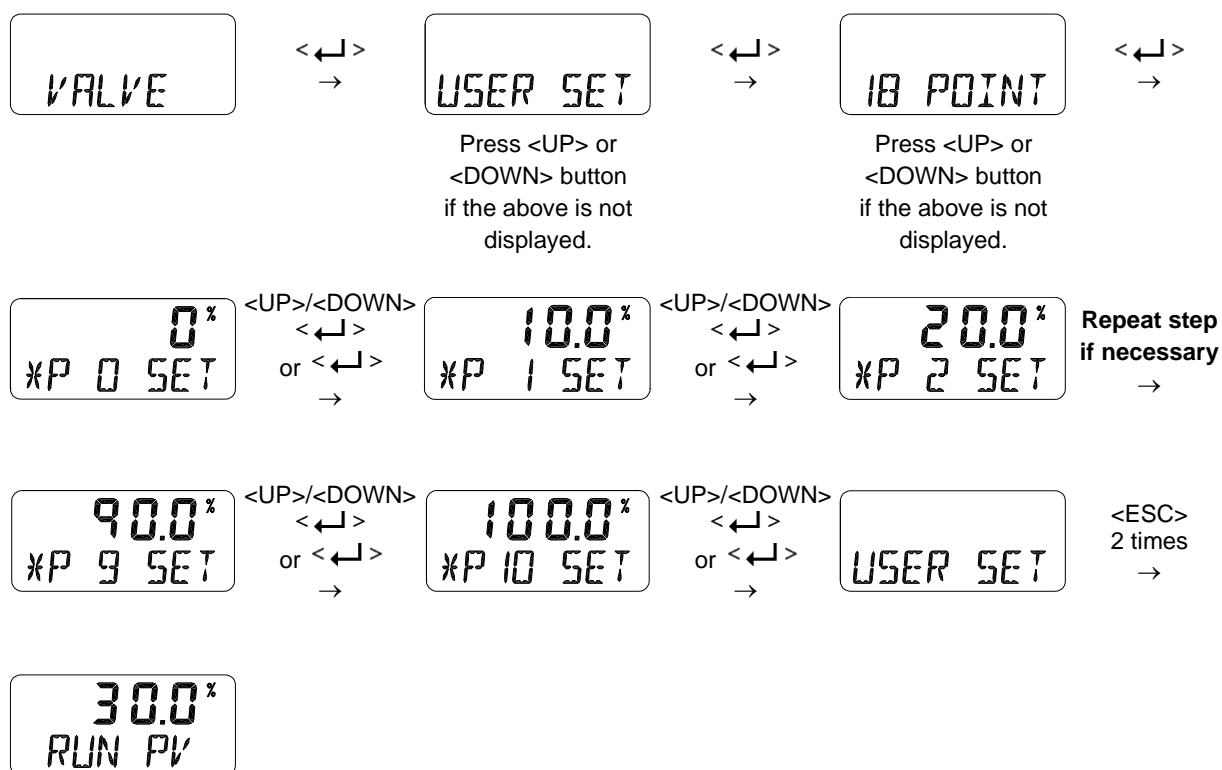
User can make its own flow characteristic curve with this mode. USER SET can be set in two ways, 5 points and 11 points. User can choose whichever is more suitable for their application.

- 1) 5 points setting can be set with 4mA intervals. The initial positions are P0(4 mA = 0 %), P1(8 mA = 25 %), P2(12 mA = 50 %), P3(16 mA = 75 %) and P4(20 mA = 100 %) but user can change the % values to different values. User can change all 5 points or only change partially and exit the menu by pressing <ESC> button.



This function can be activated by selecting "CHAR USR" mode of above 9.8.2 Valve flow Characteristic Adjustment (CHAR).

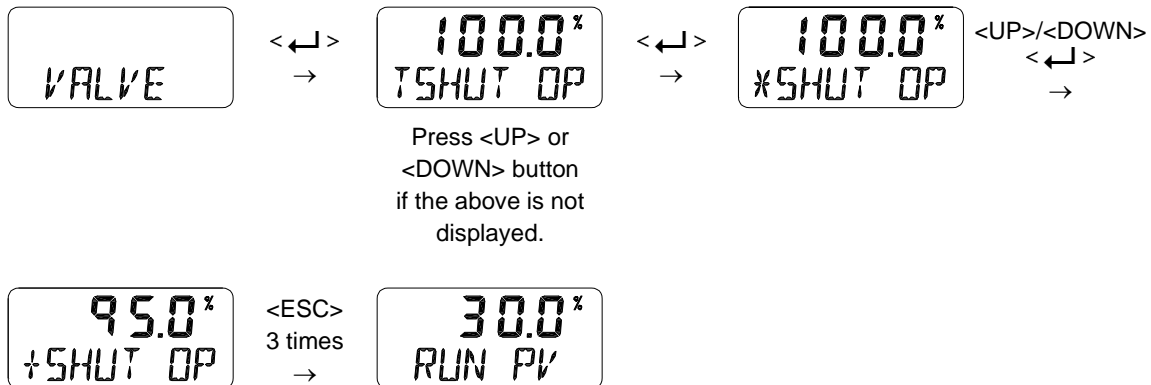
- 2) 11 points setting can be set with 1mA intervals. The initial positions are P0(0 %), P1(10 %), P2(20 %), ... P9(90 %) and P10(100 %) but user can change the % values to different values. User can change all 11 points or only change partially and exit the menu by pressing <ESC> button.



This function can be activated by selecting “CHAR USR” mode of above 9.8.2 Valve flow Characteristic Adjustment (CHAR).

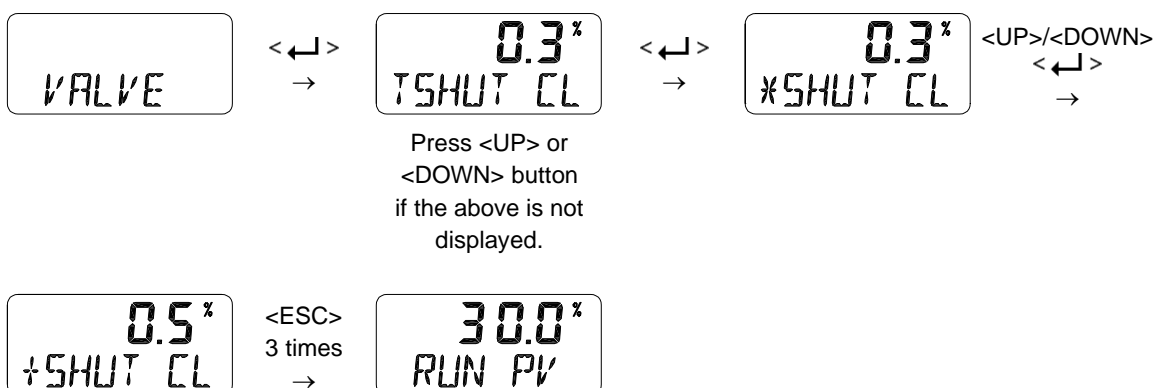
9.8.4 Tight Shut Open (TSHUT OP)

Tight shut open shows the current value in percentage (%). Input current of 4 mA is 0 %, 20 mA is 100 %. If temporary Tight shut open value (≤ 100 %) is set and input current value is above the set % value, the valve's position is immediately moved to 100 %. For example, if linear actuator is used and the valve's closing direction is 100 % and input value of the current is above Tight shut open set value, the set pressure from the regulator will be transferred to the actuator which will enhance the power to close the valve and keep it from any leakage.



9.8.5 Tight Shut Close (TSHUT CL)

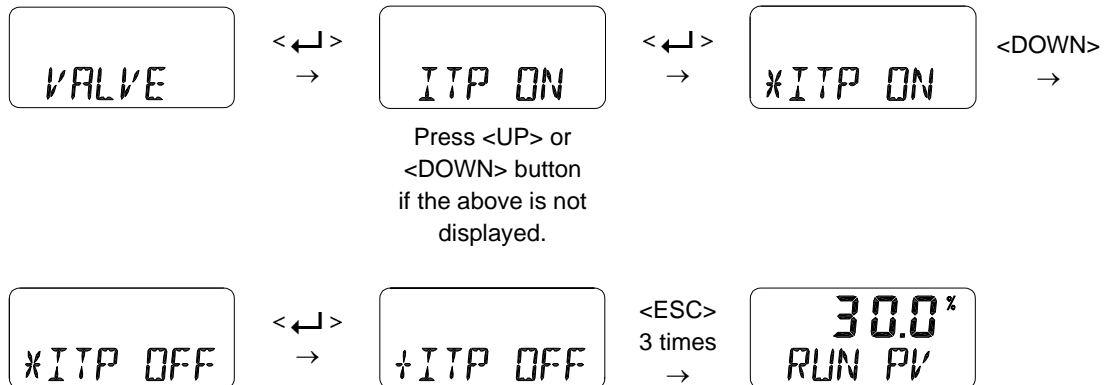
Tight shut close shows the current value in percentage (%). Input current of 4 mA is 0 %, 20 mA is 100 %. If temporary Tight shut close value (≤ 100 %) is set and input current value is below the set % value, the valve's position is immediately moved to 0%. For example, if rotary actuator is used and the valve's closing direction is 0% and input value of the current is above Tight shut open set value, it will release all the remaining pressure from Out1 of the actuator which will have the return spring power of the actuator or Out2 pressure to close the valve and keep it from any leakage.



9.8.6 Interpolation Mode (ITP ON/OFF, ITP USER SET)

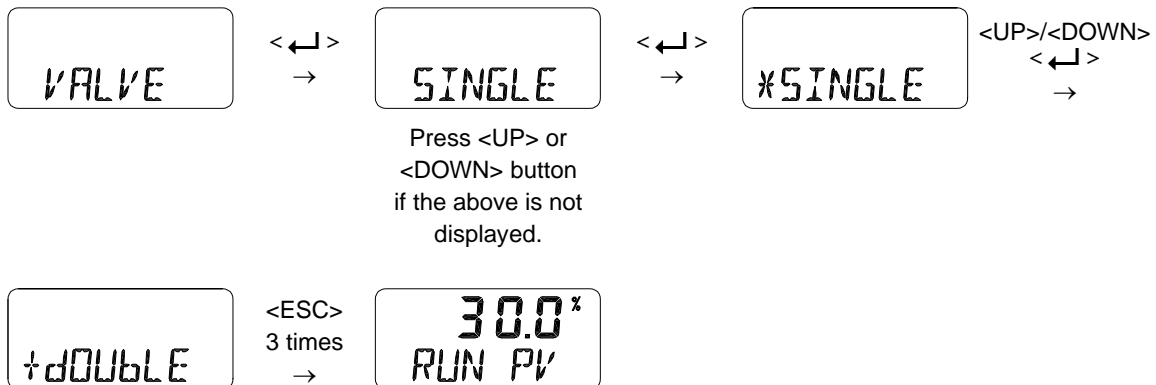
In case of linear positioner, the error of accuracy occurs when the linear motion of actuator changes into the rotary motion of feedback lever. After the auto calibration, the positioner turns on ITP function with an appropriate value of interpolation automatically. The user can manually turn on or off the ITP function, also can set any value of the interpolation. (in ITP USER mode)

※ The below shows that the user manually change ITP ON into OFF.



9.8.7 Acting Type (SINGLE / dOUBLE)

Displays or changes actuator's current acting type.



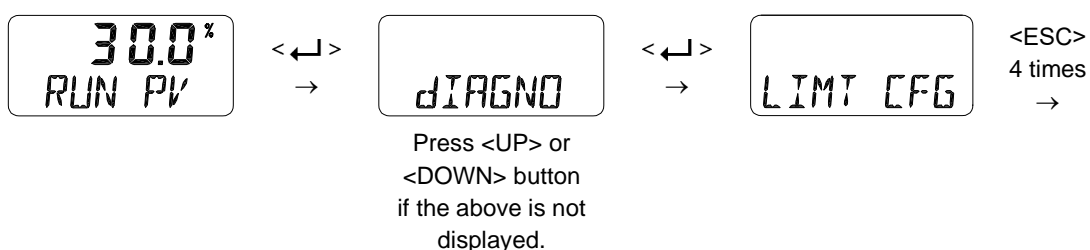
9.9 Diagnostic (dIAGNO)

Below is the list of functions which could be set from Diagnostic mode and PST mode.

- 1) Diagnosis Limit Configuration (LIMT CFG)
 - A. Deviation (dEV)
 - B. Deviation Time (dEV TIME)
 - C. Travel Accumulation Limit (TVLA LMT)
 - D. Low Alarm (LO ALRM) and High Alarm (HI ALRM)
 - E. Low Low Alarm (LL ALRM) and High High Alarm (HH ALRM)
- 2) PST Introduction
- 3) PST Mode (PST)
- 4) PST Configuration (PST CFG)
 - A. Start Position (START PO)
 - B. Target 1 (TARGET 1)
 - C. Target 2 (TARGET 2)
 - D. Interval (INTERVAL)
 - E. Tolerance (TOL)
 - F. Limit Time (LIMIT TM)
 - G. Latency (LATENCY)
- 5) PST Result (PST RSLT)

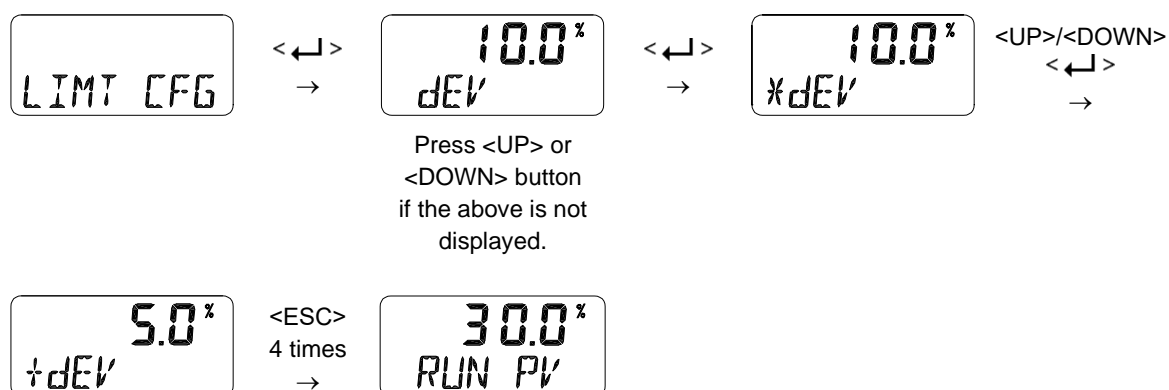
9.9.1 Diagnosis Limit Configuration (LIMT CFG)

This configuration is used to set the upper or lower limit that is generated by the Deviation Timeout Alarm, Travel Accumulation Limit Alarm, Travel High Limit Alarm, Travel Low Limit Alarm, Travel High High Limit Alarm, Travel Low Low Limit Alarm.



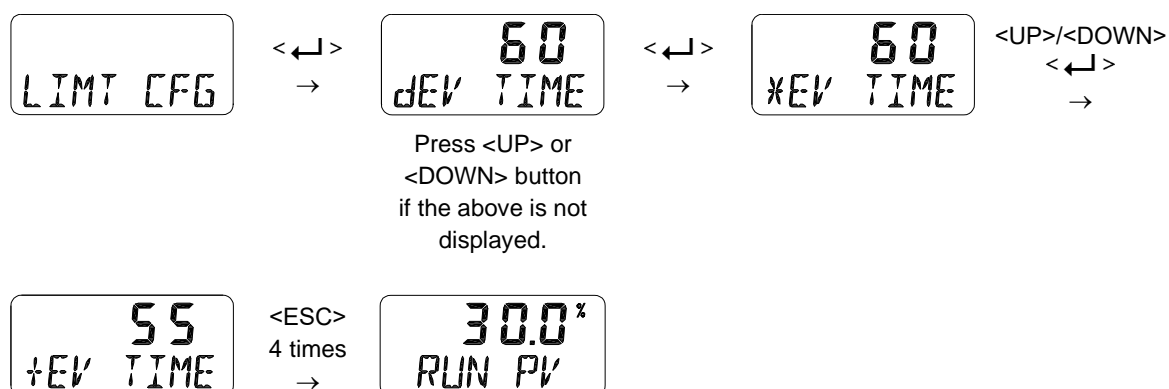
9.9.1.1 Deviation (dEV)

This is used to set the deviation in % between the target position and actual position. Default is 10 %. Alarm is triggered if actual deviation greater than the preset deviation “dEV” persists longer than the preset Deviation Time “dEV TIME”.



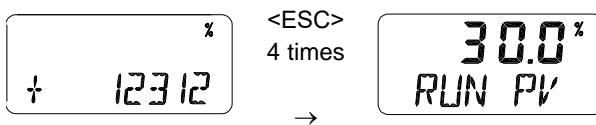
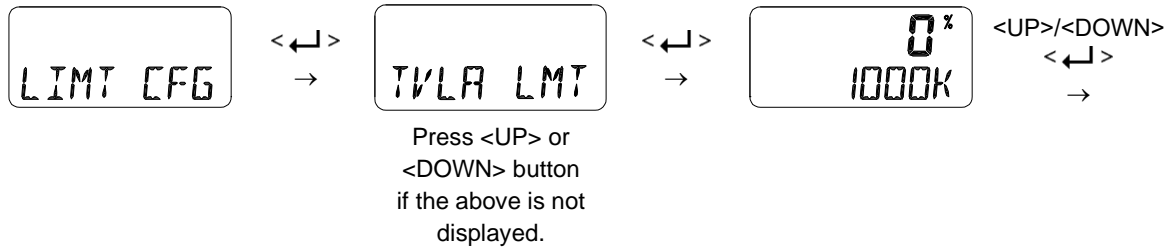
9.9.1.2 Deviation Time (dEV TIME)

This is used to set the deviation time in seconds to trigger an alarm when actual deviation greater than the preset Deviation “dEV” persists longer than this Deviation Time. Default is 60 seconds.



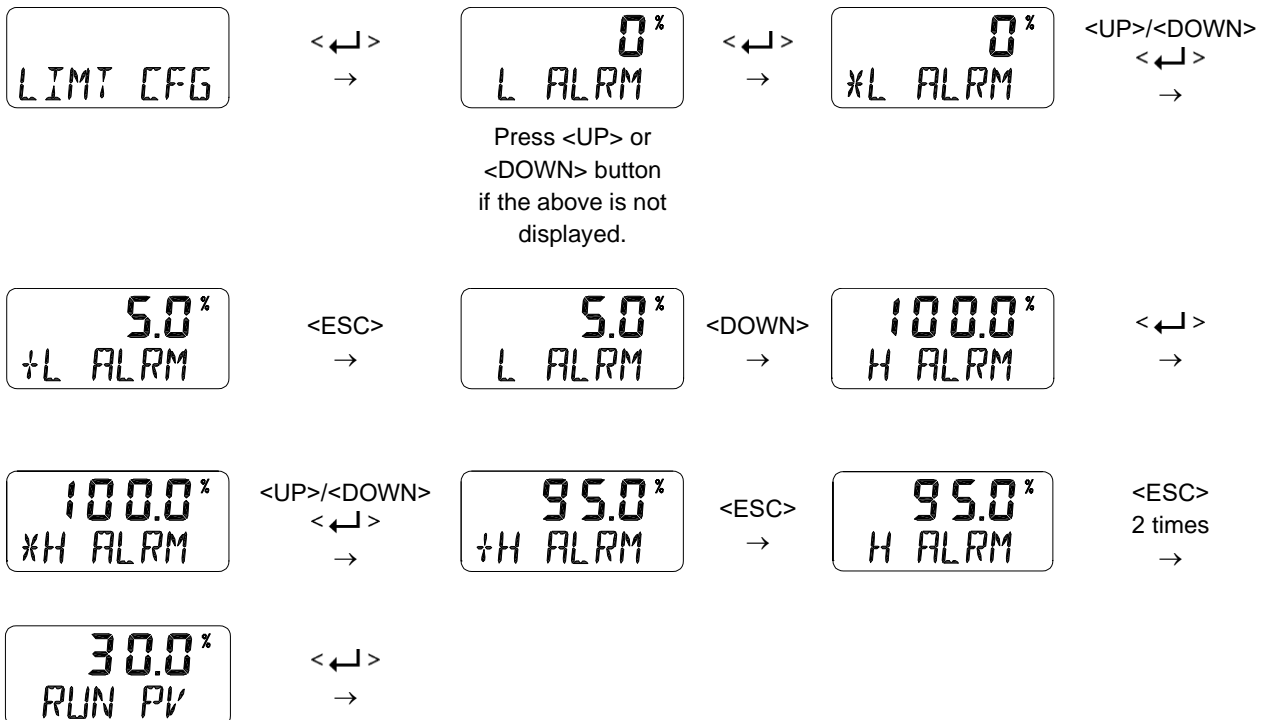
9.9.1.3 Travel Accumulator Limit (TVLA LMT)

Travel Accumulator Alarm is triggered when total valve travel accumulated exceeds this Travel Accumulator Limit “TVLA LMT”.



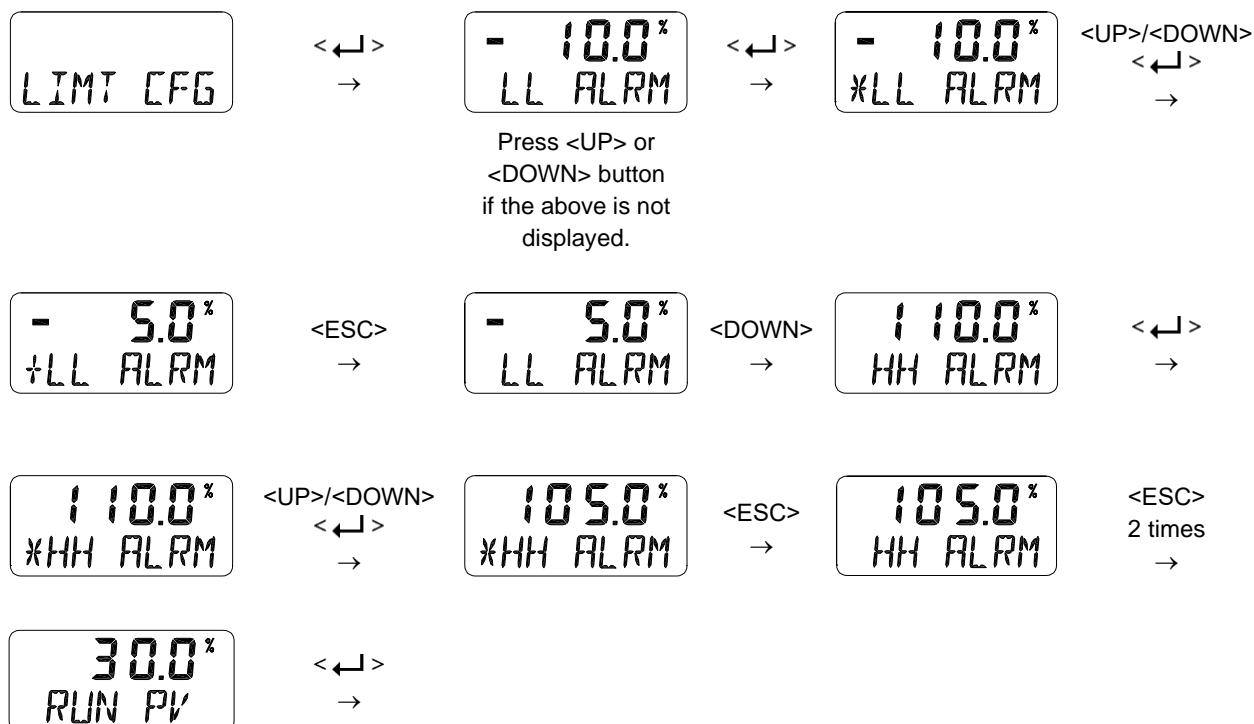
9.9.1.4 Low Limit Alarm (LO ALRM) and High Limit Alarm (HI ALRM)

This is used to set a position to trigger Low Limit Alarm or High Limit Alarm when the valve moves to the position lower than LO ALRM or higher than HI ALRM. The initial factory setting is 0 % and 100 %, respectively.



9.9.1.5 Low Low Limit Alarm (LL ALRM) and High High Limit Alarm (HH ALRM)

This is used to set a position to trigger Low Low Limit Alarm or High High Limit Alarm when the valve moves to the position lower than LL ALRM or higher than HH ALRM. The initial factory setting is -10 % and +110 %, respectively.

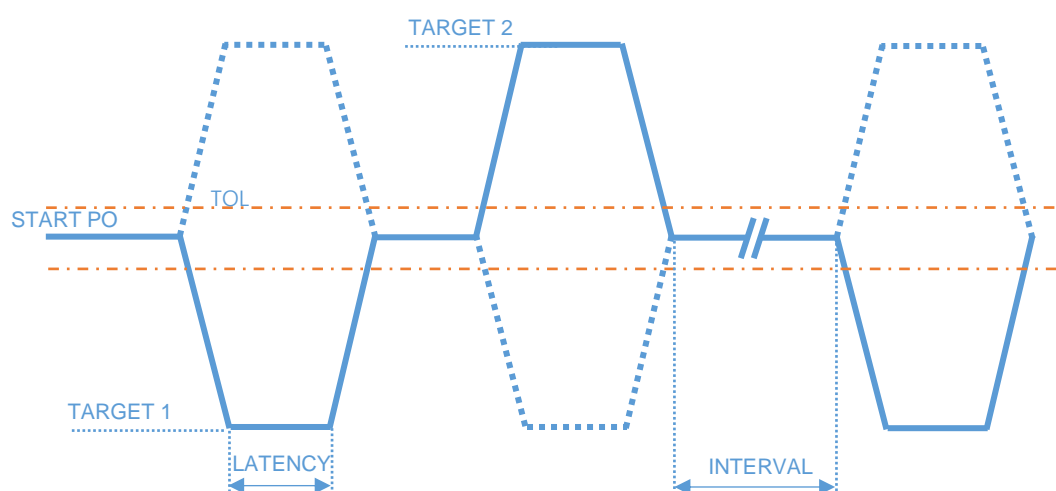


< The positions for Low Low Alarm, Low Alarm, High Alarm and High High Alarm >

9.9.2 PST Introduction

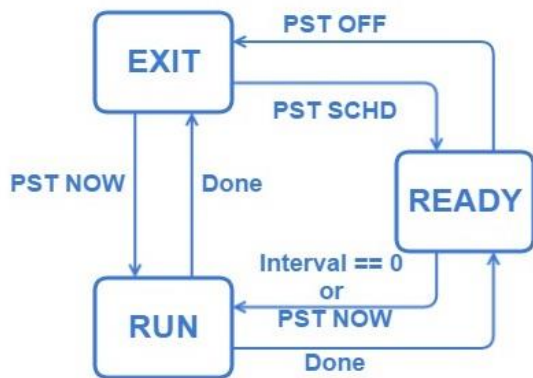
Unlike FST (Full Stroke Test) where a valve is fully closed and opened, PST (Partial Stroke Test) is a method used to test a percentage of the possible failure of the valve by slightly closing and opening the valve.

PST can be applied in parallel with FST and can reduce costs and risks compared to running FST on a regular basis. The YT 3300 has its own PST function within the positioner to run the PST offline without any other software. Also, PST configuration or result can be set or checked through HART communication.



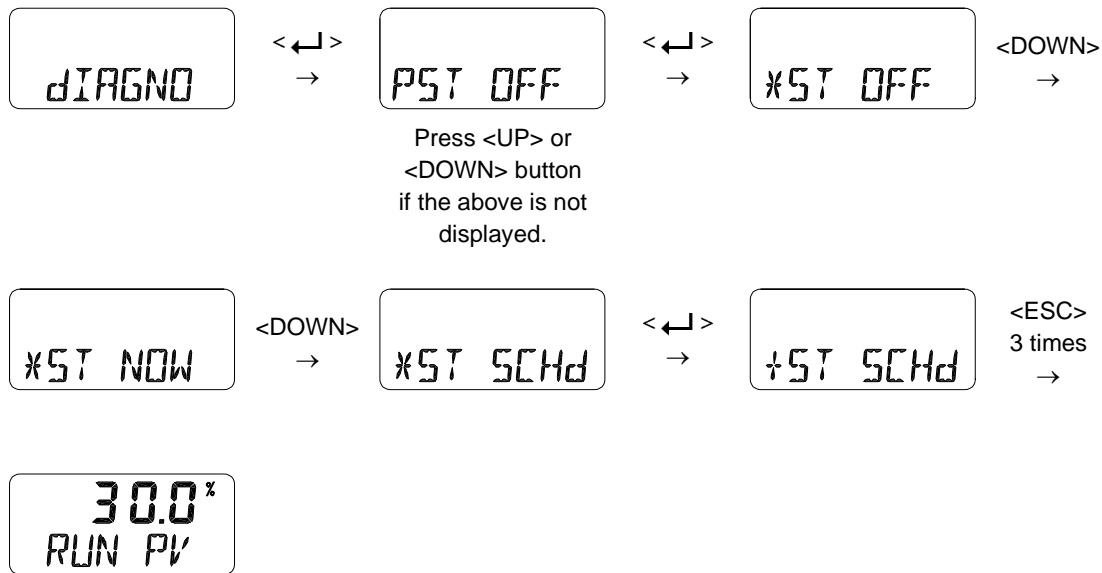
When the **PST** is run by **PST NOW** or **SCHD**, if valve position is within the range of **TOL** at the position of **START PO**, Positioner supply or vent the pneumatic air until the valve reaches the **TARGET 1** or **2**. But the **PST** will stop if valve position is out of the **TOL** or doesn't reach **TARGET1** or **2** within the **LIMIT TM**. After the valve position reaches the **TARGET 1** or **2**, the valve will pause at that position during the **LATENCY** time and then move back to the **START PO** position. For **SCHD** mode, where the PST has just been completed, the valve waits for the **INTERVAL** time and then runs the PST again.

9.9.3 PST Mode (PST)



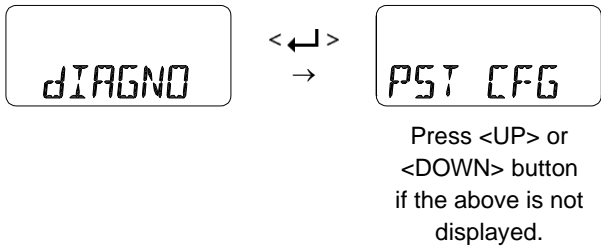
To run **PST**, select a **PST** mode. There are 3 mode for running PST.

Mode	Description
PST OFF	Turn off PST. It's a default mode
PST NOW	Run PST once immediately. After PST is completed, it turns back to the previous mode.
PST SCHED	PST runs periodically every the preset INTERVAL time.



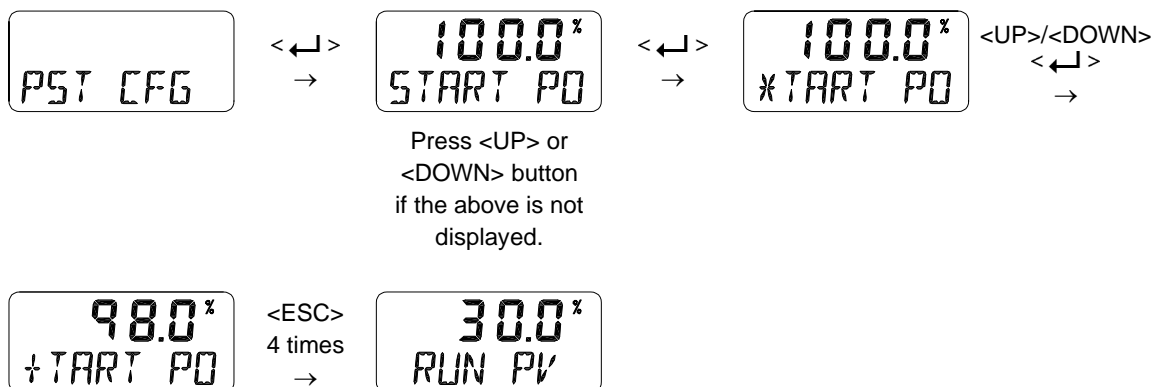
9.9.4 PST Configuration (PST CFG)

Check PST parameter values and configuration



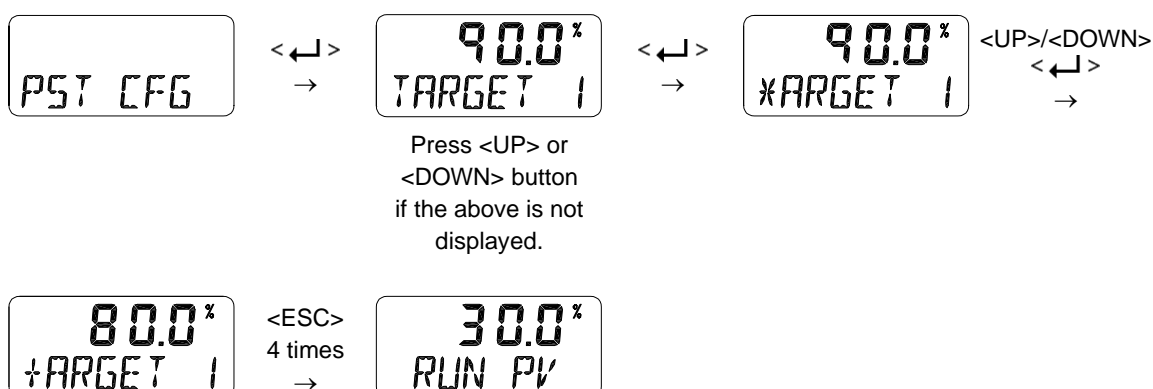
9.9.4.1 Start Position (START PO)

It is used to set a start position when PST initiates. The position must be in between 0 and 100 %, and default value is 100 %.



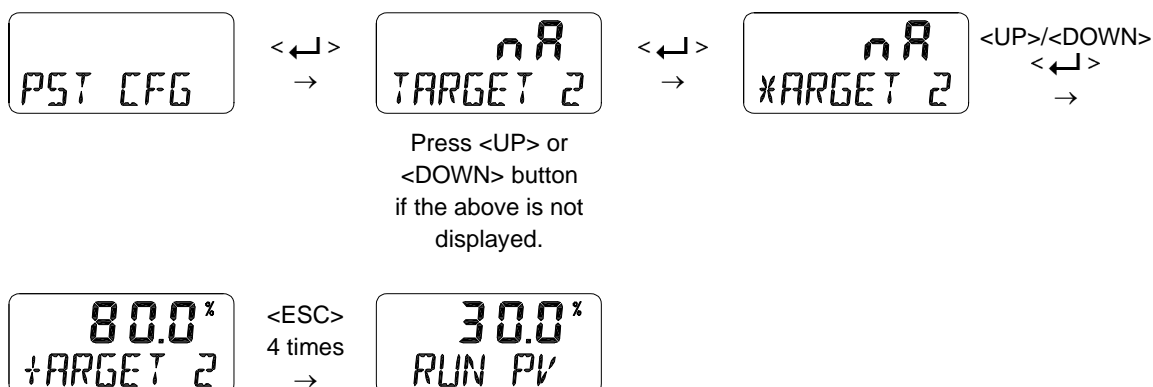
9.9.4.2 Target 1 (TARGET 1)

Target 1 is used to set 1st target position of PST. The position must be in between 0 and 100 %, and default value is 90 %.



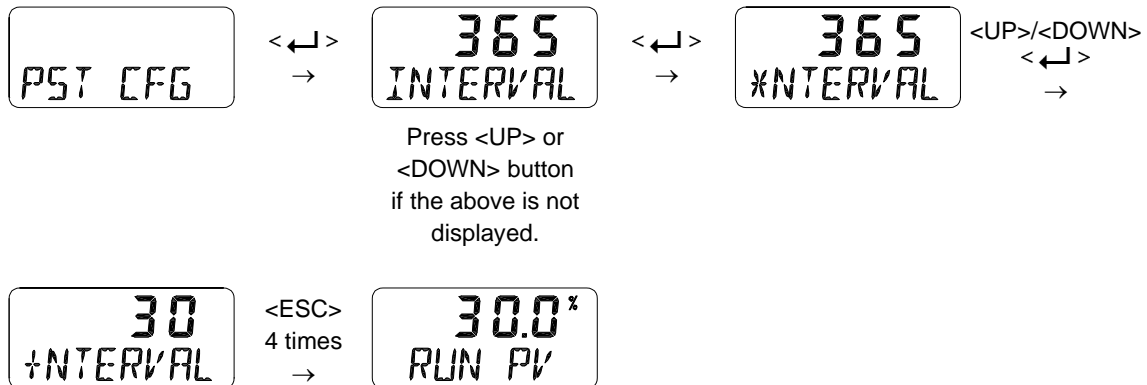
9.9.4.3 Target 2 (TARGET 2)

Target 2 is used to set 2nd target position of PST if necessary. The position must be in between 0 and 100 %, and default value is N/A (Not Applicable).



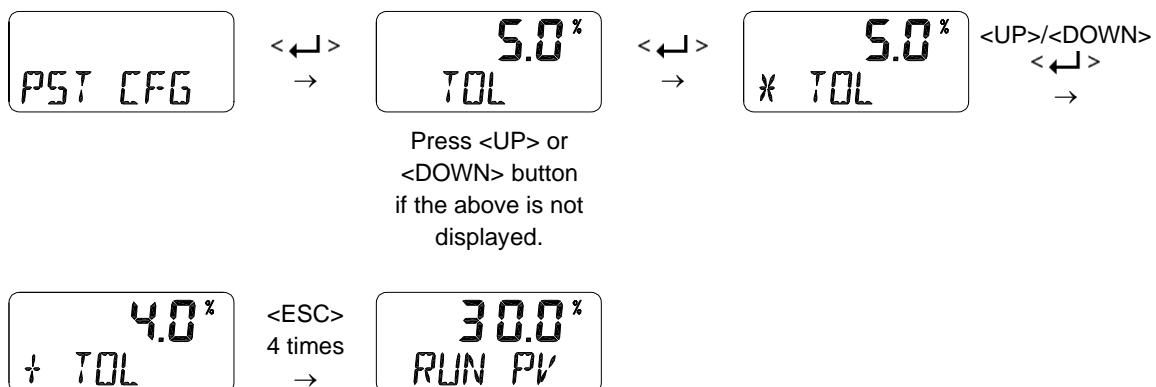
9.9.4.4 Interval (INTERVAL)

Interval time (days) between 1st PST and the next PST. The value must be between 1 ~ 365, and default value is 365 (days).



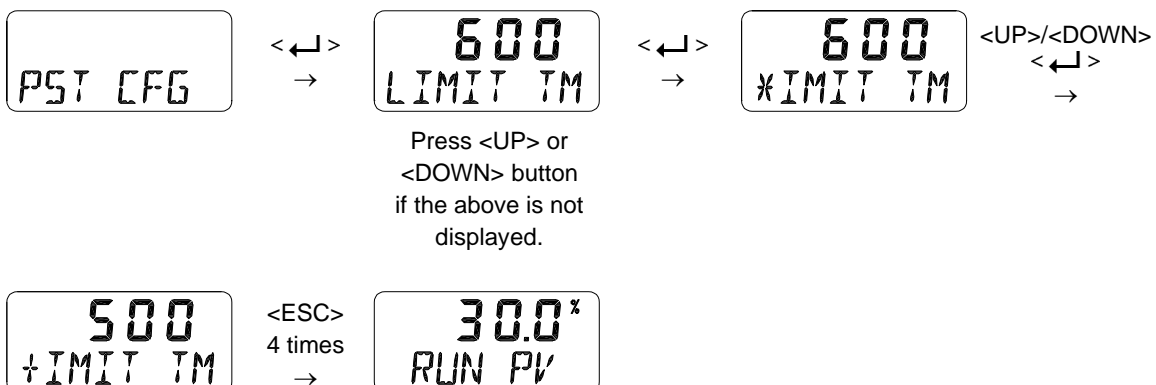
9.9.4.5 Tolerance (TOL)

Tolerance level of the start position when PST runs. The value must be between 0.1 ~ 10 %, and default value is 5 %.



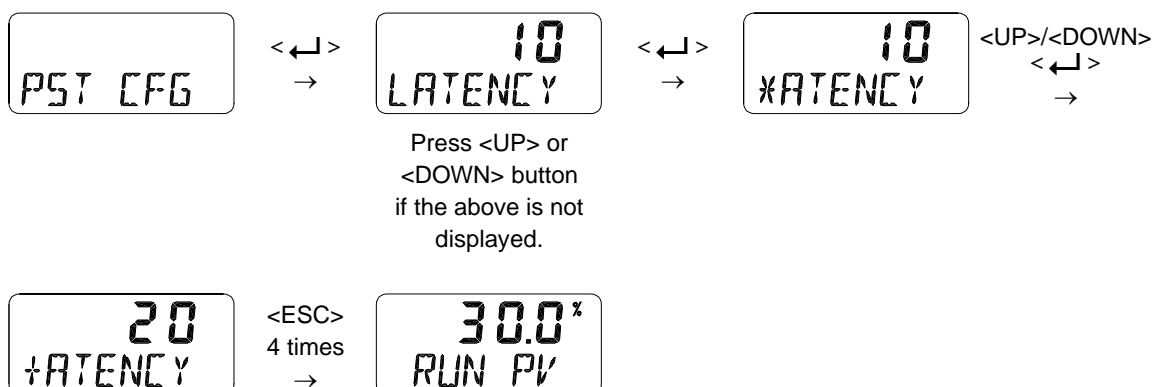
9.9.4.6 Limit Time (LIMIT TM)

Limit the stroke time between start position and Target 1 and 2. The value must be between 0 ~ 600 sec, and default value is 600 (sec).



9.9.4.7 Latency (LATENCY)

Latency for next movement after valve move. The value must be between 1 ~ 60 sec, and default value is 10 (sec).

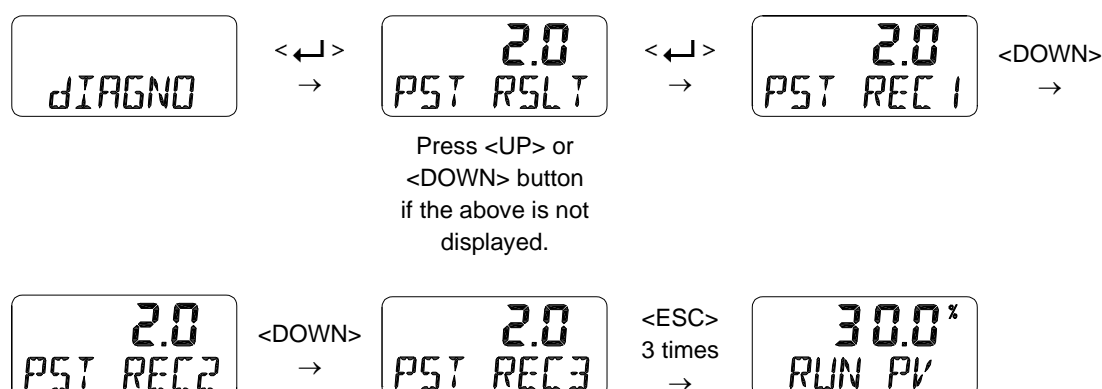


9.9.5 PST Result (PST RSLT)

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

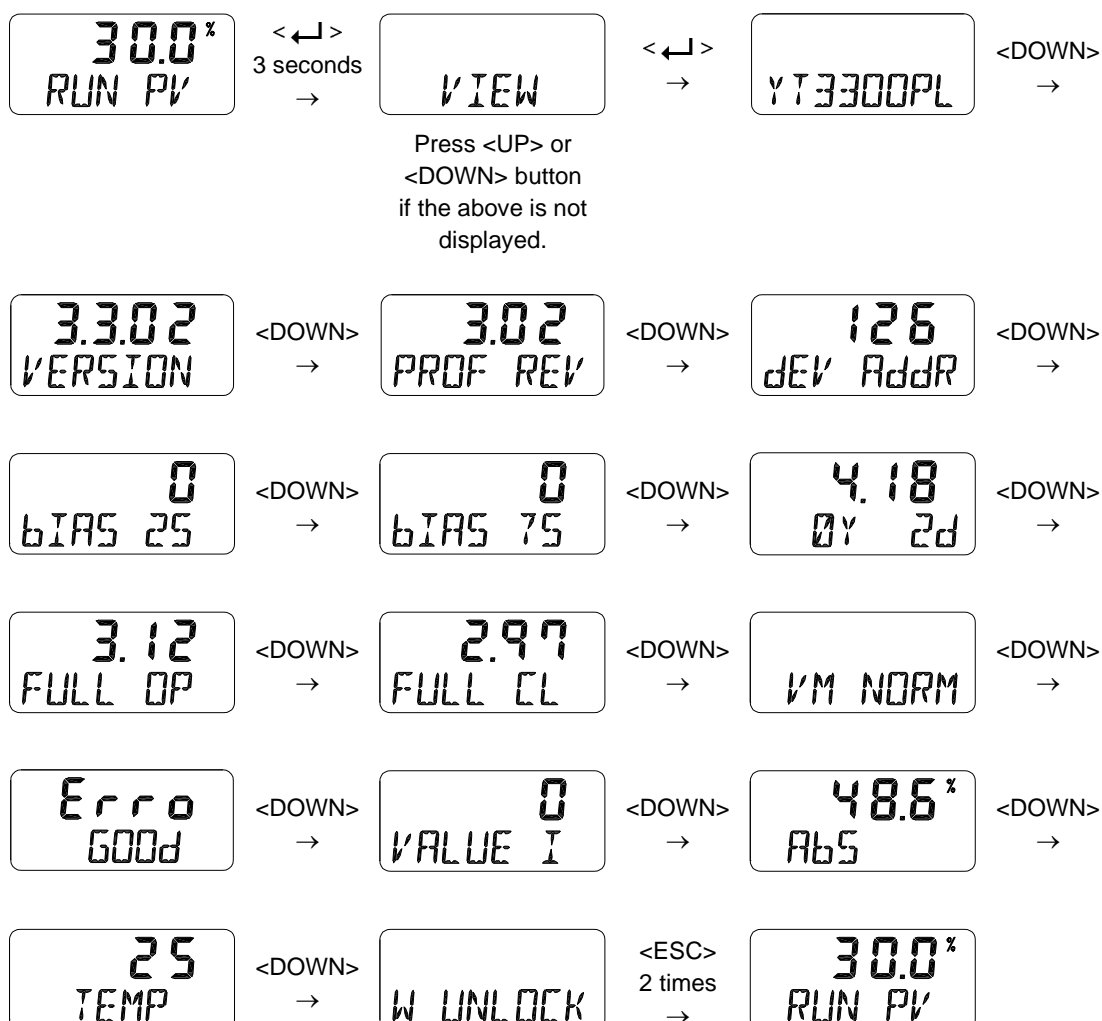
NAME	VALUE	DEFAULT
PST REC1	OOT,LTO,NR, 0 ~ 600(sec)	0
PST REC2	OOT,LTO,NR, 0 ~ 600(sec)	0
PST REC3	OOT,LTO,NR, 0 ~ 600(sec)	0

Error	Message
OOT	When the valve position is out of tolerance (TOL) at 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



9.10 View Mode (VIEW)

Displays various information of the positioner.



ITEM	Description
YT-3300PL	Positioner model.
3.3.02 VERSION / 2022DC31	1'st row indicates version number of firmware. 2'nd row is just VERSION / 2022-12(DC)-31: loading date of software. (January JA, February FB, March MR, April AR, May MY, June JN, July JL, August AG, September SP, October OT, November NV, December DC) ※ You can toggle them, pushing <↵>.
ITK REV 6.0 / PROFI REV 3.02	ITK REV 6.0 is Revision of Foundation Fieldbus. PROFI REV 3.02 is Revision of Profibus PA
POL Addr	Device address of Profibus PA. ※ You can change it, pushing <↵>.


bIAS 25	BIAS value when valve position is at 25 %
bIAS 75	BIAS value when valve position is at 75 %
4.18 0Y 0d	Total operation time. If the device is used for less than 1 hour, the time does not accumulate. 1'st row→"4.18" means 4hours and 18minutes. 2'nd row→0Y: years, 0d: days
3.12 FULL OP	Time required (seconds) to fully open the current valve from the closed state. Saved after AUTO 2 / AUTO 3 / AUTO HF Calibration.
2.97 FULL CL	Time required (seconds) to fully close the current valve from the opened state. Saved after AUTO 2 / AUTO 3 / AUTO HF Calibration.
VM NORM / VM REVS/ VM dIZ	Display types of valve stroke on LCD. VM NORM: View Mode Normal.. VM REVS: View Mode Reverse. Display actual position in reversal. i.e. Display position = 100 % - actual position. VM dIZ: Raw data in valve position. ※ You can change it, pushing <↵>.
Erro	Error code (C, D) or warning code (B, F, G, H). Refer to 10 sections
VALUE I	Current accumulated value of I
AbS	Absolute resistance value.
SERVICE	Check the valve usage and overcurrent count value. TVL ACUM: Displays the position value moved to the present in Percent (%). FULL OP: This is the value that counts the Full Open (100 %) operation to date. FULL CL: It is the value that counts the operation of Full Close (0 %) up to now. CYC CNT: This is a count that counts when the valve's trajectory has changed. OVCR CNT: This is the value counted when overcurrent is input.
Temp	Current Temperature. (°C)
W LOCK / W UNLOCK	When W UNLOCK, you can change all parameters including auto calibration function. When W LOCK, cannot. You can change it, pushing <↵>.

10 Warning / Alarm Code

This is the status and alarm code displayed on the LCD screen when a change in the state of the product and process occurs while using the product. Please refer to the table below to check the code for the status and alarm and take the appropriate action.

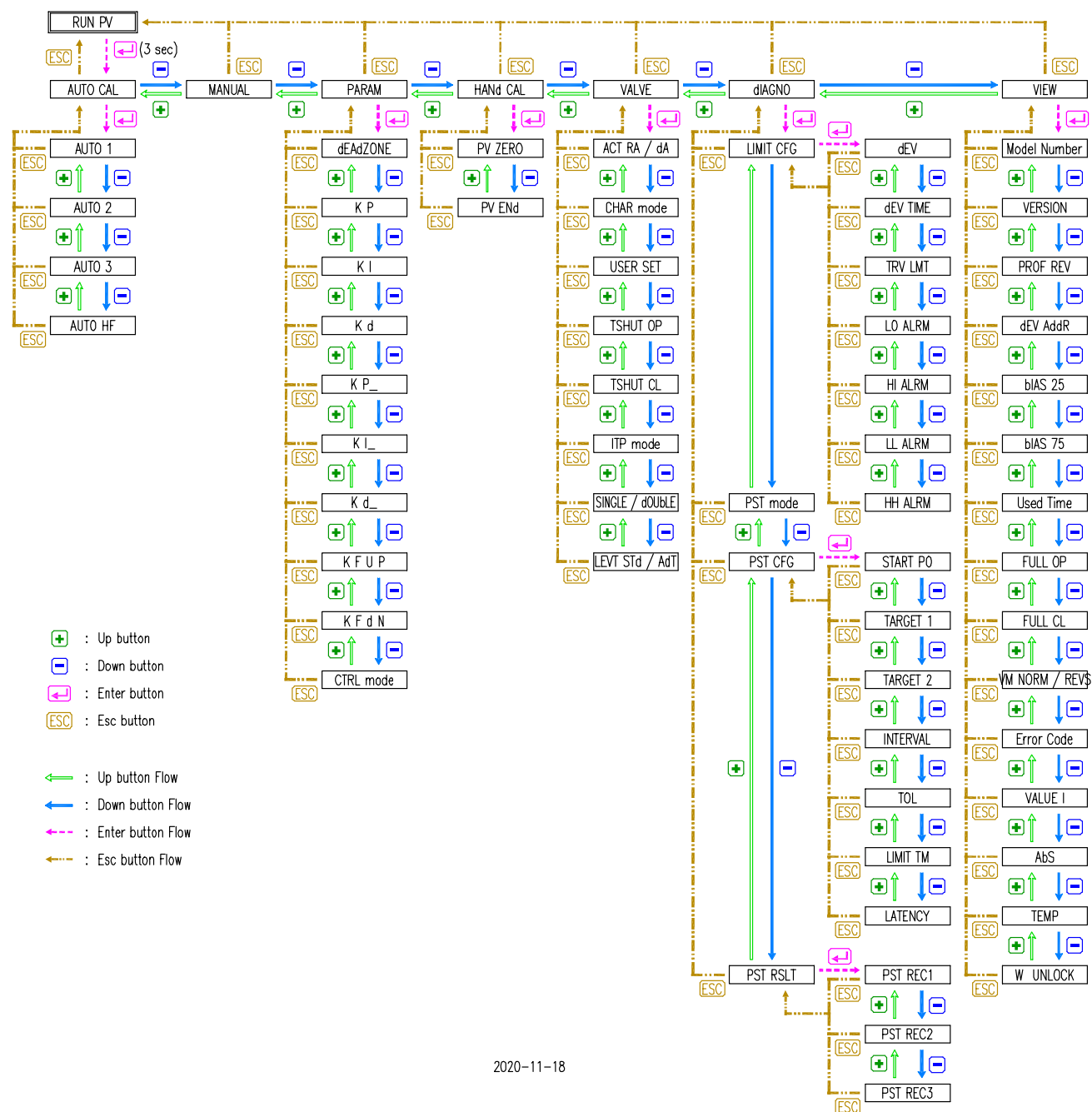
- Auto Calibration: Status and alarm code occurring during Auto Calibration.
Normally: Status and alarm code that may occur normally.
- The status and alarm code can be found in the Error item in View Mode. Refer to section 9.10.

Category	Alarm Code	Code Description and Cause	Action
Auto Calibration	MT ERR L	<ul style="list-style-type: none"> ➤ Displayed during Auto Calibration when the positioner is not well aligned mechanically. ➤ When there is a possibility that the feedback lever at 0 % position collides with the positioner's stopper. ➤ When this alarm is detected, Auto Calibration is aborted and this alarm code is displayed immediately on the LCD display. 	<ul style="list-style-type: none"> ➤ Install the positioner so that the feedback lever is horizontal at the 50 % position. ➤ Adjust the positioner so that the feedback lever's angle is to be as follows. Linear: 60 degree Rotary: 90 degree
	MT ERR H	<ul style="list-style-type: none"> ➤ Displayed during Auto Calibration when the positioner is not well aligned mechanically. ➤ When there is a possibility that the feedback lever at 100 % position collides with the positioner's stopper. ➤ When this alarm is detected, Auto Calibration is aborted and this alarm code is displayed immediately on the LCD display. 	
	RNG ERR	<ul style="list-style-type: none"> ➤ Displayed when the feedback lever's angle to be used is excessively small during Auto Calibration. ➤ When this alarm is detected, Auto Calibration is aborted and this alarm code is displayed immediately on the LCD display. 	<ul style="list-style-type: none"> ➤ Move the position of the positioner so that the angle of use of the feedback lever is greater than the current level and perform AUTO1 calibration.

Category	Alarm Code	Code Description and Cause	Action
Auto Calibration	CHK AIR	<ul style="list-style-type: none"> ➤ Displayed when the valve does not move even though the positioner sends "Full Open" signal during Auto Calibration. ➤ When this alarm is detected, Auto Calibration is aborted and this alarm code is displayed immediately on the LCD display. 	<ul style="list-style-type: none"> ➤ Check if air pressure is being supplied normally to the positioner.
	FOFC ERR	<ul style="list-style-type: none"> ➤ Displayed when Full open & Full close time is less than 1 second. ➤ Size of the actuator is too small. ➤ When this alarm is detected, Auto Calibration is aborted and this alarm code is displayed immediately on the LCD display. 	<ul style="list-style-type: none"> ➤ Use orifice to lower the flow rate. ➤ Alternatively, replace the actuator with a large size.
Normal Operation	GOOD	<ul style="list-style-type: none"> ➤ Working normally 	
	ROM ERR	<ul style="list-style-type: none"> ➤ When the parameters stored in the memory is out of range, this alarm code is displayed immediately on the LCD. 	<ul style="list-style-type: none"> ➤ Press any key to automatically solve the ROM ERR and then return to "RUN PV" mode.
	 POS ERR	<ul style="list-style-type: none"> ➤ It is displayed in front of RUN PV when PV is out of range. 	<ul style="list-style-type: none"> ➤ Ensure that the feedback lever does not touch the positioner stopper when installing the product.
	DEV ERR	<ul style="list-style-type: none"> ➤ It is displayed if the deviation between the target position SV and the actual position PV of the valve continues longer than the set deviation (default: 10%) and the set deviation time (default: 1 minute). ➤ It is displayed when the valve is not operated, the friction force of the valve is too large, or the set pressure of the pneumatic regulator is too low. 	<ul style="list-style-type: none"> ➤ Perform auto-calibration again. ➤ Check air supply pressure.
	I ERR	<ul style="list-style-type: none"> ➤ Displayed when Accumulated I value reached I max. limit or I min. limit. ➤ Displayed when valve's friction is extremely high or supply pressure during operation has changed to lower than rated supply pressure. 	<ul style="list-style-type: none"> ➤ Re-perform auto-calibration ➤ Check supply pressure and adjust it if necessary.

Category	Warning Code	Code Description and Cause	Action
Normal Operation	LO ALRM	<ul style="list-style-type: none"> ➤ Warning is triggered when the actual position (PV) is lower than setting in "LO ALARM". ➤ Menu hierarchy to set LO ALRM (dIAGNO / LIMIT CFG / LO ALRM) 	<ul style="list-style-type: none"> ➤ Reset the LO ALRM value to an appropriate value.
	HI ALRM	<ul style="list-style-type: none"> ➤ Warning is triggered when the actual position (PV) is higher than setting in "HI ALARM". ➤ Menu hierarchy to set HI ALRM (dIAGNO / LIMIT CFG / HI ALRM) 	<ul style="list-style-type: none"> ➤ Reset the HI ALRM value to an appropriate value.
	LL ALRM	<ul style="list-style-type: none"> ➤ Warning is triggered when the actual position (PV) is lower than setting in "LL ALARM". ➤ Menu hierarchy to set LL ALRM (dIAGNO / LIMIT CFG / LL ALRM) 	<ul style="list-style-type: none"> ➤ Reset the LL ALRM value to an appropriate value.
	HH ALRM	<ul style="list-style-type: none"> ➤ Warning is triggered when the actual position (PV) is higher than setting in "HH ALARM". ➤ Menu hierarchy to set HH ALRM (dIAGNO / LIMIT CFG / HH ALRM) 	<ul style="list-style-type: none"> ➤ Reset the HH ALRM value to an appropriate value.
	TVLA OVR	<ul style="list-style-type: none"> ➤ Warning is triggered when the Travel Accumulator Count value (TVL ACUM) is higher than the Travel Accumulator Limit (TVLA LMT). ➤ Menu hierarchy to view TVL ACUM (VIEW / SERVICE / TVL ACUM) ➤ Menu hierarchy to set TVLA LMT (dIAGNO / LIMIT CFG / TVLA LMT) 	<ul style="list-style-type: none"> ➤ Reset the TVLA LMT value to an appropriate value.

11 Main Software Map



2020-11-18

Manufacturer: Rotork YTC Limited

Address: 81, Hwanggeum-ro, 89 Beon-gil, Yangchon-eup, Gimpo-si, Gyeonggi-do, South Korea

Postal code: 10048

Tel: +82-31-986-8545

Fax: +82-70-4170-4927

Email: ytic.sales@rotork.com

Homepage : <http://www.ytc.co.kr>

Issued : 2023-07-11

Copyright © **Rotork YTC Limited**. All Rights Reserved.