



Series 195 & 295 Smart Positioners

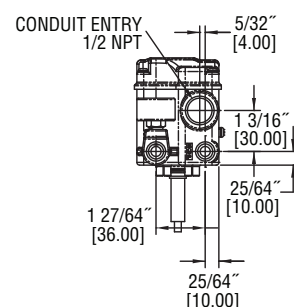
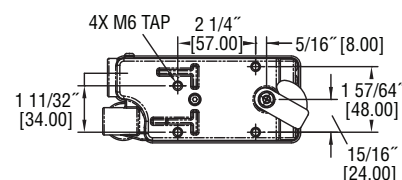
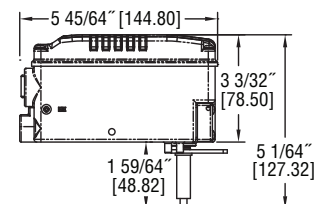
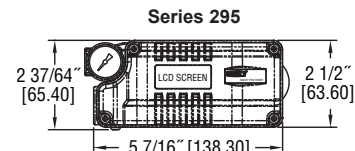
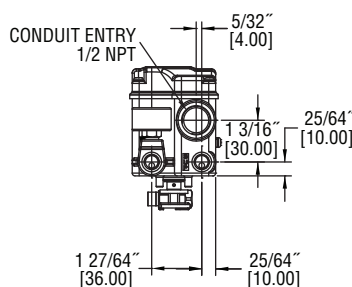
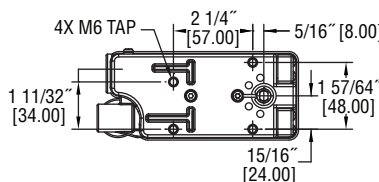
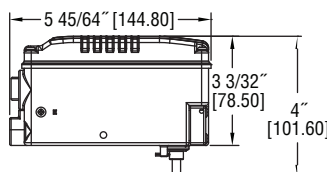
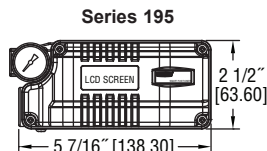
Specifications - Installation and Operating Instructions



195



295



The Series 195 and 295 Smart Positioners are a compact way to control the valve stroke accurately using an input signal of 4 to 20 mA from the controller. In addition, a highly efficient microprocessing operator built into the product. Performs various functions such as auto calibration, PID control, alarm and Hart® protocol.

Features

- LCD allows user to directly check the positioner condition in the field.
- Endures severe vibration.
- Operates normally regardless of changes in supply pressure during operation.
- Simple-to-use auto calibration.
- Low air consumption reduces operating cost.
- Compact size allows for installation on small actuators.
- Can be used in low voltage (8.5 V), leaving no limitation in controller.
- Variable orifice is applied in case of a small actuator, the hunting is controlled to the optimum condition during operation.
- HART® communication available for configuring parameters or monitoring the valve position.
- Analog feedback signal (4 to 20 mA).
- The adjustment of valve characteristics (linear, quick open, equal percentage) available.
- Specific flow control is available with setting 16 points at users' command.
- Tight shut-close and shut-open can be set in the programming menu.
- PID parameters can easily be adjusted in the field without additional communicator.
- Split ranges such as 4 to 12 mA, with 12 to 20 mA available.
- The positioner can manually actuate the valve or damper.

SPECIFICATIONS

Input Signal: 4 to 20 mA DC.

Input Impedance: 460 Ω max @ 20 mA DC.

Enclosure: Aluminum.

Air Supply: 35 to 116 psi (2.4 to 8 bar).

Air Connection: 1/4" NPT.

Gage Connection: 1/8" NPT.

Conduit Connection: 1/2" NPT.

Linearity: ±0.5% FS.

Hysteresis: ±0.5% FS.

Sensitivity: ±0.2% FS.

Repeatability: ±0.3% FS.

Air Consumption: .0004 scfm (.01 LPM) at 20 psig (1.4 bar) supply.

Flow Capacity: .32 scfm (9 LPM) at 20 psi (1.4 bar) supply.

Stroke:

195: 0.19 to 1.38" (5 to 35 mm);

295: 0 to 90°.

Enclosure Rating: NEMA 4X (IP66).

Temperature: Operating: -22 to 185°F (-30 to 85°C).

Weight: 1.8 lb (.82 kg).

Lever:

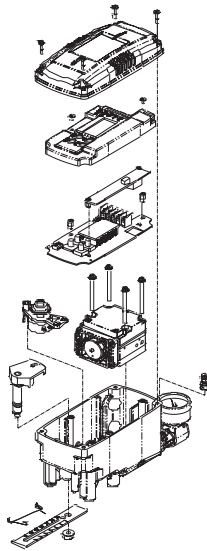
195: 39 to 1.57" (10 to 40 mm);

295: NAMUR.

HART® is a registered trademark of Hart Communication Foundation.

Structure

The structure of the 195 is shown below. The Series 295 structure is the same as the linear model without the feedback lever.



Installation

NOTICE When the positioner is replaced or installed with the actuator, make sure of the following:

- All inputs and supply pressure to the valve, actuator and other instruments must be shut down.
- The control valve must be separated from the system with a bypass valve or other equipment so that the entire system does not shut down.
- No pressure remains in the actuator.

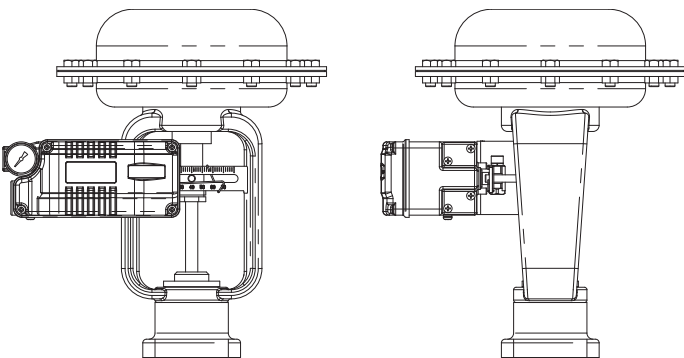
Tools For Installation

- Hexagonal wrenches
- (+) Screw driver
- (-) Screw driver
- Spanners for hexagon head bolts

Series 195 Installation

Series 195 is used for linear motion valves, such as Dwyer Instruments globe valves, using a spring return type diaphragm actuator or piston actuator. The Series 195 consists of the following components. Be sure that all the components are included.

- Series 195 main body
- Feedback lever and lever spring
- Flange nut (attached on the bottom of main shaft of Series 195 body)
- Four hexagon head bolts M8x1.25P



Series 195 Installation Example

- Four M8 plate washers

Installing Series 195 with Bracket

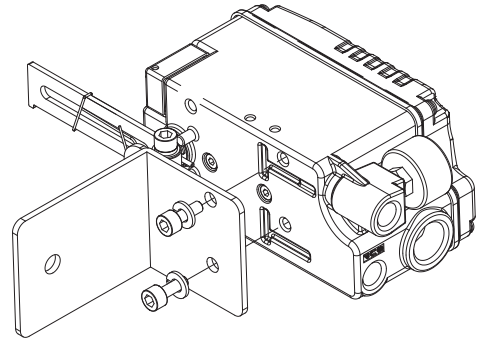
It is necessary to make a proper bracket to attach on the actuator yoke.

The most important considerations in the design of the bracket are as follows:

- Series 195 feedback lever should be at 50% of valve stroke.
- Feedback level connection bar of actuator clamp should be connected in the position so that the valve stroke and the numbers carved on feedback lever are fitted.

If the bracket meets the above conditions, Series 195 can be installed very easily.

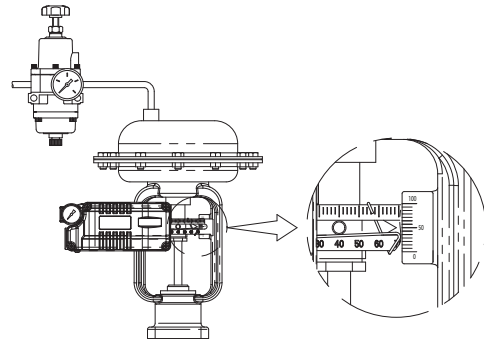
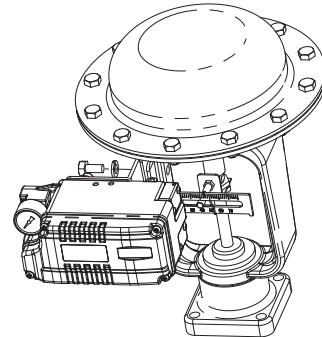
2. Assemble Series 195 and bracket with bolts. Use standard bolts in bolt holes on the backside of the unit.



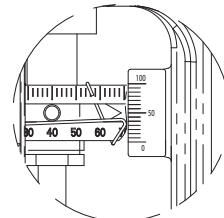
3. After assembling Series 195 and bracket with bolts, attach it using the bolt holes of the actuator yoke. Do not tighten completely. There must be some space.

4. Install the bar connected with Series 195's feedback lever on the actuator clamp. The slot length between Series 195's feedback lever is .26" (6.5mm), so the diameter of the connection bar should be less than .25" (6.3 mm).

5. Connect the air filter regulator with the actuator temporarily. Set supply pressure of air filter so that the actuator clamp is positioned at 50% of valve stroke.

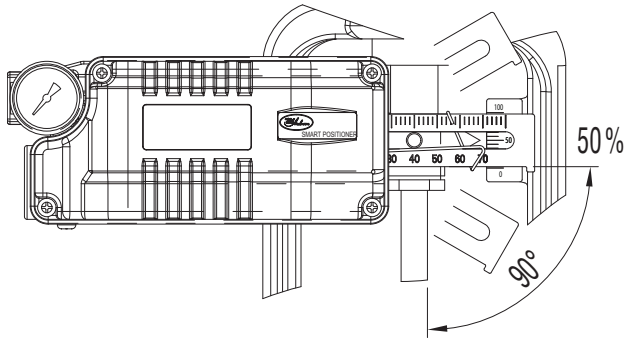


6. Insert the connection bar attached on the actuator clamp into the slot of Series 195's feedback lever. In order to reduce hysteresis, it should appear as shown:

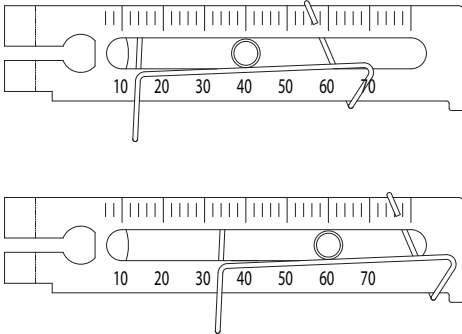


The connection bar inserted correctly between feedback lever and lever spring

7. Check that the Series 195's feedback lever is level at 50% of valve stroke. If not, move the bracket or feedback link until it is level. Product linearity becomes work if Series 195 is installed without being level at 50% of valve stroke.

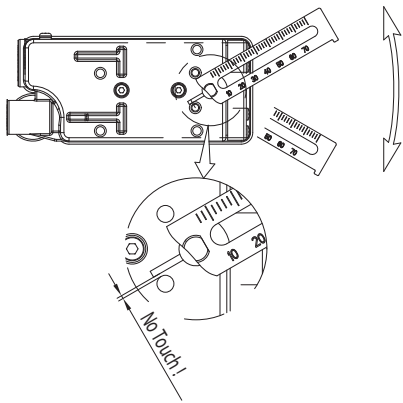


8. Check the valve stroke. The numbers indicating the stroke are carved in the Series 195's feedback lever. Set the connection bar attached on the actuator clamp to the number on the feedback lever applicable to the valve stroke, as shown in the following picture. To set the connection bar and the number, move the bracket attached on Series 195 or connection bar from side to side.



Installation Position of Connection Bar for Valve Stroke

NOTICE After installation, operate the valve from 0 to 100% stroke using an air filter regulator on the actuator. When the stroke is both 0 and 100%, the feedback lever should not reach to the lever stopper on the backside of the Series 195 unit. If the feedback lever reaches the lever stopper, move attachment of Series 195 away from the yoke center.

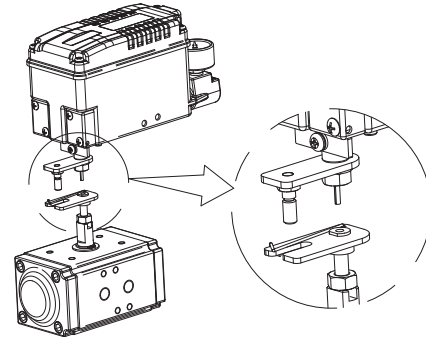


9. Once the Series 195 is installed according to the above procedures, tighten the bolts and nuts of the bracket and feedback lever connection bar completely.

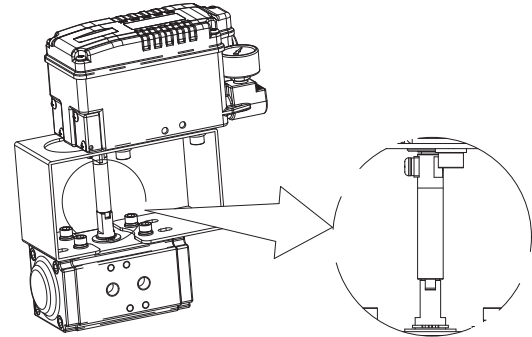
Series 295 Installation

Series 295 is designed for rotary motion valves, such as Dwyer Instruments ball and butterfly valves, using rack and pinion, scotch yoke or complex type actuators whose stem is rotated 90°. Series 295 positioners consist of the following components:

- Series 295 main body
- Fork lever and lever spring to attach on actuator
- 1 bracket
- Four hex bolts M8x1.25P
- Four M8 plate washers



Series 295 Installation Example of Fork Lever



Series 295 Installation Example of Namur Shaft

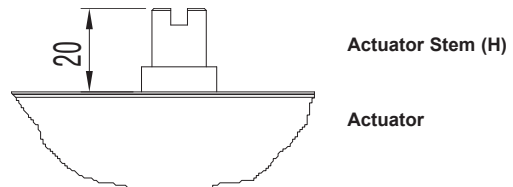
Installing Series 295 with Bracket

Series 295 is supplied with a standard bracket. The bracket consists of two parts and is used with a NAMUR shaft. The bracket is assembled in the factory based on .79" (20 mm) of actuator stem height. If the actuator stem height is higher, such as 1.18" (30 mm) or 1.97", use the table below to check hole positions.

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

Ex) If H is 30 mm, A-L should be locked in H:30 hole, B-L in H:20, 30, A-R in H:30, and H:20, 30 with bolts.

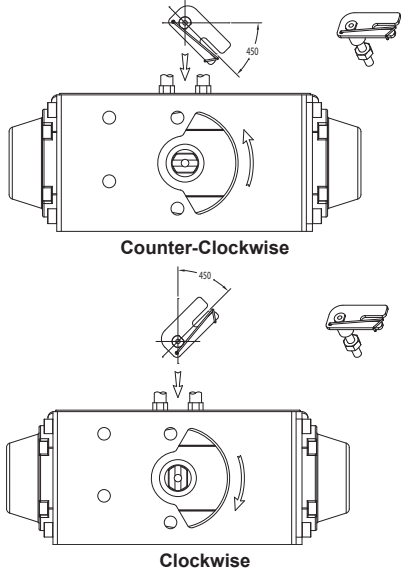
1. Typically actuator stem heights (H) are .79, 1.18, and 1.97 inches (20, 30, and 50 mm). After checking H, assemble brackets following previous guidelines. The bracket is set at .79" (20 mm) in the factory.



2. Attach the bracket to the actuator using hex bolts. The diameter of the bracket bolt holes is .24" (6 mm). Using spring washers or thread lock compound so the bolts will not be loosened by vibration or impact. The direction of the bracket varies by operating conditions, but normal direction is depicted in the following picture. That is, when the piping of actuator and Series 295 is as shown in direction A, the bracket hole and indicator attached on the bottom of the Series 295 main shaft should be mounted in the same direction.

3. Set the rotation position of the actuator stem as the initial zero point, which is 0% stroke. For a spring return type actuator, the actuator stem is always rotated to the zero point without supply pressure, making it easy to check the zero point. If the actuator is double-acting, check whether the rotation direction of the actuator is clockwise or counter-clockwise, or the rotation direction of the actuator using supply pressure.

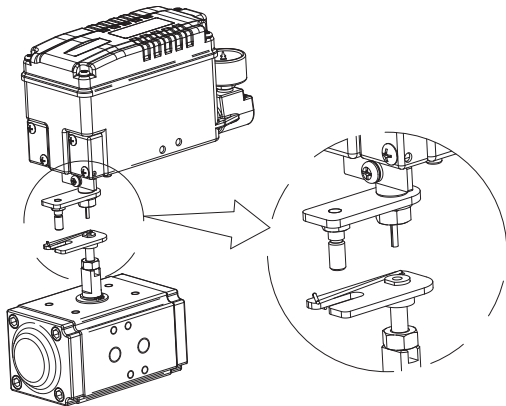
4. Set the actuator stem as the initial zero point and install a fork lever as showing in the following picture. Confirm the position of initial zero point when the actuator stem is turned clockwise and counter-clockwise. Installation angle of the fork lever should be about 45 degrees based on the linear shaft. But the angle is not related to the NAMUR shaft.



Installation Position of Fork Lever

5. Once the fork lever position is set, lock the check nuts on the bottom of the fork lever by turning clockwise. Set the upper height of the fork lever to .24 to .43" (6 to 11 mm) lower than the upper height of the bracket.

6. Attach the Series 295 unit to the bracket. Fix the clamping pin on the main shaft center of the Series 295 into the hole of the fork lever. Insert the connection bar attached on the main shaft lever into the fork lever slot to be locked by the fork lever spring. This is to fit the main shaft of the Series 295 to the center of the actuator stem. If they are not fitted correctly, too much force on the main shaft will greatly reduce product durability.



7. Attach the Series 295 base and the bracket with hex bolts and plate washers. It is best to lock the bracket and Series 295 together by inserting four bolts after checking the position.

PIPING CONNECTION

- NOTICE**
1. To prevent ingress of moisture, oil and dust, give careful consideration to the choice of supply pressure compressor and piping.
 2. It is recommended to attach a filter or air filter regulator in front of the supply port of the Series 295 unit.

Conditions of Supply Pressure

1. Dry air with a dew point that is at least 50°F (10°C) lower than that of the ambient temperature.

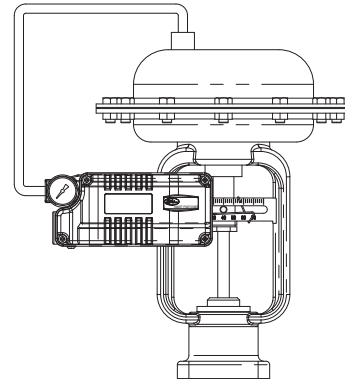
2. Free from solid particles. Result of being passed through 5 micron or finer filter.
3. Does not contain oil or lubricating oil.
4. Comply with ANSI/ISA-57.3 1975(R1982) or ISA S7.3-1975(R1981).
5. Not used beyond the range of 20 to 100 psi (140 to 700 kPa).
6. Set supply pressure of air filter regulator to 10% higher than operating pressure of actuator.

Conditions of Pipe

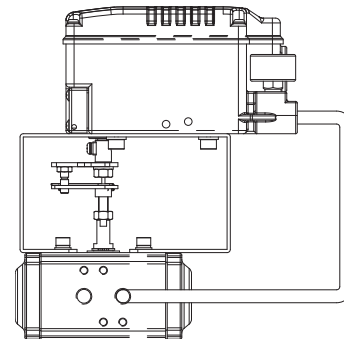
1. Remove foreign objects from inside of pipe.
2. Do not use squeezed or broken pipe.
3. To maintain flow rate of Series 295, use a pipe with inner diameter of greater than .24" (6 mm) (outer diameter .39" (10 mm)).

Piping Connection With Actuator

Series 195 and Series 295 can operate either single or double acting actuators.



Piping Connection Example of Series 195 with Single Acting Actuator



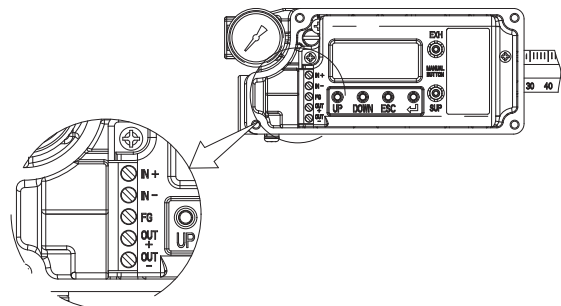
Piping Connection Example of Series 295 with Single Acting Actuator

Single Acting Actuator

To operate a single acting actuator, connect OUT1 port to actuator supply pressure port. Close off the OUT2 port with the supplied 1/4" NPT plug.

Power Connection

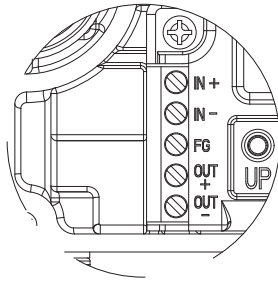
- CAUTION**
1. Before connecting terminal, power must be shut off.
 2. Use ring type terminal against oscillation, impact, etc.
 3. Series 195 and 295 positioners use 4 to 20 mA DC for power. Minimum supply current is 3.2 mA (standard type) and 3.8 mA (HART® type). Maximum supply current must not exceed 24 mA. In order to protect the Smart Positioner, the ground terminals should be grounded.
 4. Use twisted cable with conductor sectional area at least 0.0019 in² (1.25 mm²), and suitable for 600V as on conductor table of NEC Article 310. Outer diameter of cable should be .25 to .39" (6.35 to 10 mm). Use shielded wire against electromagnetic waves and noise.
 5. Do not install the cable near equipment such as a high-capacity transformer or motor.



Terminal Plate of Series 195 & 295

Terminal Connection of Feedback Signal

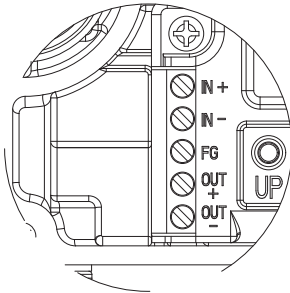
1. Open cover by loosening the four M4 bolts on the positioner cover.



2. Loosen locking bolts of terminal plate.
3. Insert a cable through the cable connector in the positioner.
4. Use a ring type cable terminal so that it does not come out.
5. Insert terminal bolts in terminal holes of cable and lock them with (+) terminal and (-) terminals on the terminal plate. Tighten terminal bolts with 1.1 lbs-ft (15 kfgcm) of torque.
6. Be sure not to change the polarity of the terminals.

Inner Terminal Connection to Ground

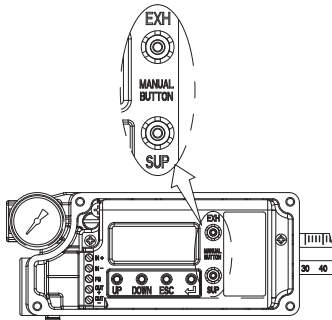
1. The ground is necessary for the safety of the positioner and system.
2. The ground terminals are inside the terminal in the center of the terminal plate, and outside terminal beside outer cable entry. Use any ground terminal that is available. Resistance must be less than 100 Ω.



3. For use with inside ground, open cover by loosening the four screws of positioner cover.
4. In order to maintain the ground connection, use a ring type ground cable terminal to prevent it from coming out.

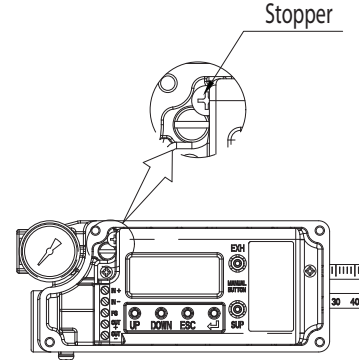
S/E Button (SUP/EXT Buttons)

There are "SUP" and "EXT" buttons next to the LCD display of the Series 195 and 295 positioners. If the "SUP" button is pressed, air pressure will be supplied to the actuator. If the "EXT" button is pressed, the air pressure will be exhausted from the actuator. This function is used when diagnosing actuator operation.



Variable Orifice

Hunting can occur if the actuator volume is too small. In this case, adjust the variable orifice using a (-) flathead screwdriver. Hunting is prevented by reducing the flow rate of supply pressure transmitted to the actuator.



Auto Calibration and Basic Operations

CAUTION Since this makes the valve or actuator move, before auto calibration, the valve must be separated from the entire system.

Buttons Operations

Series 195 and 295 positioners perform various functions using four buttons. The position of the buttons is shown below:
 <Enter> : is used to go to the main menu, save adjusted parameter values, or choose sub menus.
 <Esc> : is used to return to previous menu.
 <UP> : is used to move to another menu or change parameter values.
 <DOWN> : is used to move to another menu or change parameter values.

RUN mode

After connecting the power to the positioner, the following is displayed on the LDC in 6 seconds.



RUN on the bottom line means that the Smart Positioner adjusts valve stroke based on an outside signal (4 to 20 mA), and PV refers to the number on the LCD. In RUN mode, valve stroke is changed according to input signal.

1	Run PV	Process Value	Valve Stroke (%)
2	Run SV %	Set Value	Input Signal (0 to 100%)
3	Run SV mA	Set Value	Input Signal (4 to 20 mA)
4	Run MV	Manipulate Value	Motor/Piezo Valve Manipulate Value (Digit)
5	Run Vel	Velocity	Current Value Stem's Velocity (Digit)
6	Run Err	Error	Difference Between SV and PV (%)

There are six options in RUN mode. In order to change display, push <ESC> and <UP> at the same time. When the buttons are pushed, display order is changed. If the <ESC> and <DOWN> buttons are pushed simultaneously, the order is opposite and if <ESC> is pushed only, display returns to RUN mode.

First Auto Calibration

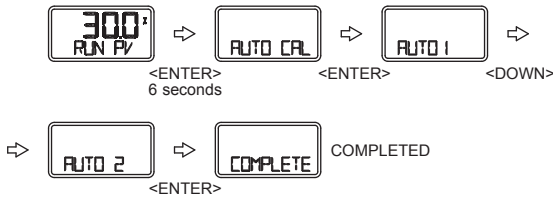
First auto calibration is usually used when the positioner has not been set, such as the initial setting with valve at the valve company, or replacement with other product in the field. In this case, all parameters are set by using the AUTO2 calibration.

CAUTION When the positioner is installed on the valve in the field after setting, we recommend using AUTO2 calibration rather than AUTO1 calibration. This is because the valve company sets optimum parameters, so it is better that those registered parameters are not changed by AUTO1 calibration.

1. Connect power. Any values between 4 to 20 mA (DC) can be used for power. After connecting power, 'READY 3, 2, 1' message appears on the LDC, which means preparing to operate PCB circuit and parts. The following message is displayed in 6 seconds. Push <ENTER> for 6 seconds at RUN mode and AUTO CAL message should appear.
2. Push <ENTER> and then AUTO1 mode is started.
3. Push <DOWN> and AUTO2 mode is displayed.
4. Push <ENTER> at AUTO2 mode. Auto 2 calibration is started and the next modes are displayed in order on the LCD. Normally it will take 3 to 5 minutes for auto calibration in AUTO2 mode, but it can be different based on actuator's volume.

- When Auto calibration is done, 'COMPLETE' message appears on the LCD. After 4 seconds the procedure is returned to RUN mode and valve stroke controlled by the input signal will be displayed as a percentage.
- Zero, Span, PID parameters and RA/DA are automatically set when Auto 2 calibration is completed.

Entire Modes and Functions



Auto Calibration (AUTO CAL)

The calibration of the Positioner is simply performed by Auto calibration. There are 3 types of Auto calibration: AUTO1, AUTO2 and AUTO3.

AUTO1 calibration is useful for users in the field. AUTO2 calibration is for valve companies or the initial parameter setting for the positioner.

It takes about 2-3 minutes for Auto calibration and it can be different based on the actuator's volume. AUTO2 and AUTO3 calibration set the RA/DA automatically.

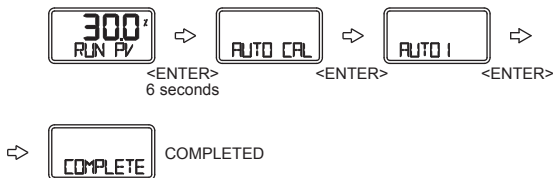
	Zero Point	End Point	KP, KI, KD	RA/DA
AUTO1	o	o	x	x
AUTO2	o	o	o	o
AUTO3	x	x	o	o

Auto Calibration Types

Auto 1 Calibration (AUTO1)

In this mode, all parameters necessary for valve operation are set except KP, KI, KD and RA/DA. AUTO1 is used to re-execute calibration in the field after being installed.

- Push <ENTER> for 6 seconds in RUN mode and AUTO CAL message should appear.
- Push <ENTER> and then AUTO1 mode is displayed.
- Push <ENTER> again at AUTO1 mode and Auto 1 calibration is started.
- When Auto 1 calibration is done, 'COMPLETE' message appears on the LCD. After 4 seconds the procedure returns to RUN mode and the valve stroke by current input signal is displayed as a percentage.



Auto 2 Calibration (AUTO2)

All parameters necessary to operate the valve are set. This calibration is used when the positioner is first installed with valve. Refer back to First Auto Calibration.

Auto 3 Calibration (AUTO3)

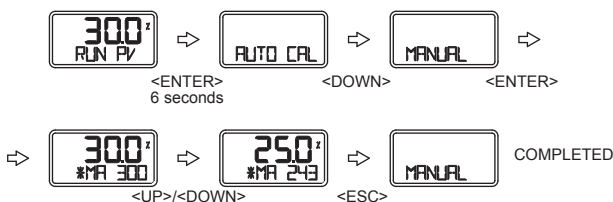
All parameters necessary to operate the valve are set except zero and end point. This function is used to re-execute auto calibration without changing the zero and end point after adjusting them manually.

- Push <DOWN> at AUTO2 and AUTO3 is displayed.
- Push <ENTER> and AUTO3 calibration is started. The remaining procedures of this calibration are the same as other calibrations.

Manual Mode

Manual mode is used to raise or lower the valve stem manually. In this mode, valve stroke is adjusted only by operating buttons, not by the current input signal. This mode does not affect controlling data registered in the positioner. It only is used to move the valve stem up and down.

- Push <ENTER> at RUN mode until AUTO CAL message is displayed.
- Push <DOWN> and MANUAL mode is displayed.
- Push <ENTER> again. Two lines appear on the LCD. The upper line indicates valve stroke by percentage and the lower line indicates absolute value of inner resistance of the positioner. "MA" means that Manual mode is in operation.



- Push <UP> or <DOWN> and valve stem moves up or down. Regardless of RA/DA, if <UP> is pushed, valve stem moves up (in case of linear valve). If <DOWN> is pushed, valve stem moves down. In order to make the valve stem move fast, push <ENTER> with <UP>, or <DOWN>. Push <ESC> and MANUAL mode is displayed.

<UP> only	Increase stem value slowly
<UP>+<ENTER>	Increase stem value quickly
<DOWN> only	Decrease stem value slowly
<DOWN>+<ENTER>	Decrease stem value quickly

Parameter Mode (PARAM)

Parameter Types

There are four types in Parameter mode: Dead Zone, KP, KI, and KD. These values are reflected as soon as they are changed, therefore the appropriate values are found by checking the valve's motion in real time.

Dead Zone (dEAdZONE)

This is the range of error % that the positioner is not adjusted. Hunting or oscillation due to friction between the stem and packing is prevented by this parameter.

KP

This is a proportion constant value that is correction by error %. If this value is too big, there can be hunting, even though it finds position by the input signal. If the value is too small, accuracy gets worse.

KI

This is an integral constant value adding or subtracting the correction that is corrected error % on the previous correction signal. If this value is too big, there can be oscillation. If it is too small, the time to find the exact position increases.

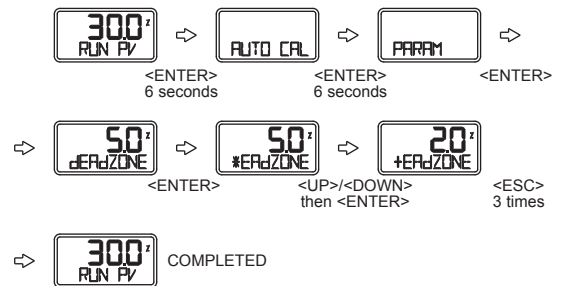
KD

This is a differential constant value adding the previous correction signal with the changing correction signal by the error % change rate.

Adjustment of Parameter

Dead Zone (dEAdZONE)

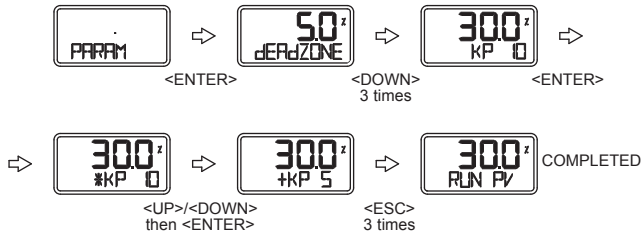
- Push <ENTER> at RUN mode for 6 seconds and AUTO CAL message appears.
- Push <DOWN> twice and PARAM mode is displayed.
- Push <ENTER> and dEAdZONE mode is displayed.
- Push <ENTER> again and *EAdZONE message appears.
- Adjust dEAdZONE value by pushing <UP> or <DOWN>. Adjusted value is applied immediately without additional operation. Users can easily check its adjustment by changing the current input signal to the positioner. Optimum control value is found by adjusting values during valve operation.
- Push <ENTER> to save the value. +EAdZONE message appears on LCD.



- Push <ESC> three times to return to RUN mode.

KP

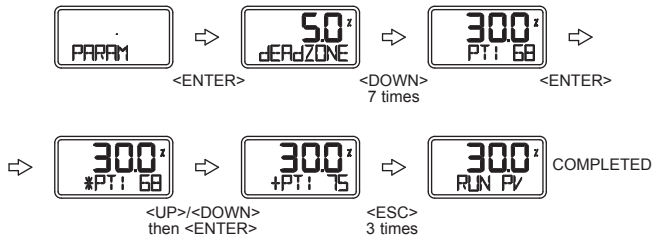
- 1-3. Adjustment method and procedure same as dEAdzone.
4. Push <DOWN> at dEAdZONE mode and KP mode is displayed.
5. Push <ENTER> and *KP message appears on LCD.
6. Adjust KP values with <UP> or <DOWN>. Adjusted value is applied immediately without additional operation. Users can easily check its adjustment by changing the current input signal to the positioner. Optimum control value is found by adjusting values during valve operation.
7. Push <ENTER> to save the value. +KP message appears on LCD.
8. Push <ESC>.



9. Push <ESC> twice to return to RUN mode.

PT

- 1-3. Adjustment method and procedure same as dEAdZONE.
4. Push <DOWN> 7 times at dEAdZONE mode and PT mode is displayed.
5. Push <ENTER> at PT mode and *PT message appears on LCD.
6. Adjust PT value with <UP> or <DOWN>. Adjusted value is applied immediately without additional operation. Users can easily check its adjustment by changing the current input signal to the positioner. Optimum control value is found by adjusting the values during valve operation. Push <ENTER> to save the value and +PT message appears on LCD.



7. Push <ESC>.
8. Push <ESC> twice to return to RUN mode.

HAND CAL

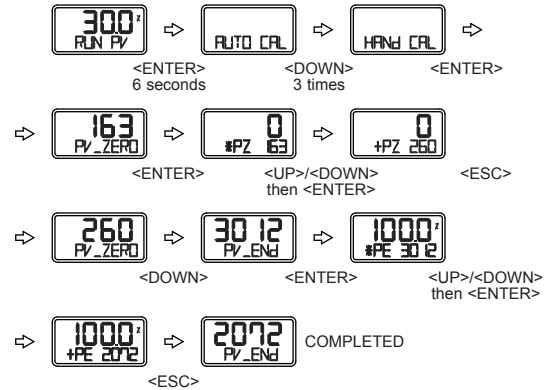
When auto calibration is started, Series 195 and 295 positioners set zero points and end points based on full stroke.

Hand Calibration Types

- PV_ZERO: Edit mode to change the zero point of valve.
- PV_END: Edit mode to change the end point of a valve.
- TR_ZERO: Edit mode to change the zero point of transmitter.
- TR_END: Edit mode to change the end point of transmitter.

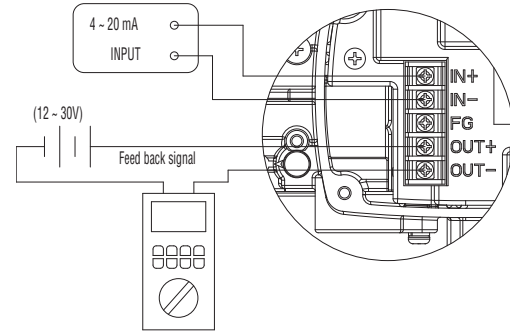
Adjustment of valve zero point (1 to 5) and end point (6 to 10).

1. Push <ENTER> at RUN mode for 6 seconds and the AUTO CAL mode is displayed. Push <DOWN> three times, and the HAND CAL mode is displayed.
2. Push <ENTER> at HAND CAL mode and PV_ZERO mode is started.
3. Push <ENTER> at PV_ZERO mode and *PZ mode is started. At this mode it is available to change valve zero point, and the valve stem moves automatically to the current zero point. On LCD, the valve stroke is displayed as 0%. +PZ message that indicates edit mode of zero point and inner value showing current zero point position is also displayed.
4. Adjust valve stem by pushing <UP> or <DOWN>. When valve stem has arrived at the desirable zero point, save it with <ENTER>. +PZ message appears on LCD.
5. Push <ESC> to return to PV-ZERO mode. (Push <ESC> twice to return to RUN mode.)
6. In order to change valve end point, push <DOWN> at PV_ZERO mode and PV_END mode begins.
7. Push <ENTER> at PV_END mode and *PE mode is displayed. At this mode it is available to change valve end point, and the valve stem moves automatically to current end point. On LCD, the valve stroke is displayed 100%. *PE message indicating edit mode of end point and inner value of end point is also displayed.
8. Adjust valve stem with using <UP> or <DOWN>. When valve stem arrives at desirable end point, save it with <ENTER>. +PE message appears on LCD.
9. Push <ESC> to return to PV-END mode.
10. Push <ESC> twice and RUN mode is displayed.

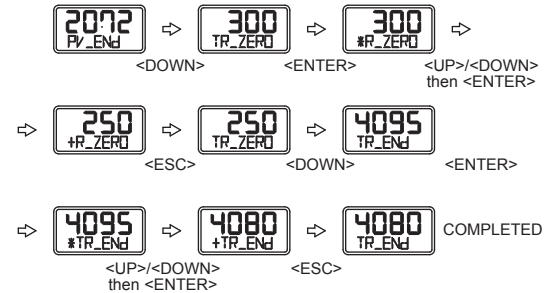


Adjustment of zero point (1 to 4) and end point (5 to 9) of transmitter.

If valve zero point and end point are changed, transmitter is also changed automatically. Usually there is no need for the transmitter zero point and end point to be adjusted by users, but if transmitter output signal is unstable, transmitter zero point and end point should be adjusted. The ammeter showing feedback signal is necessary and the connection should be down as shown.



1. Push <DOWN> at PV-END mode and then TR_ZERO mode is displayed.
2. Push <ENTER>. *R_ZERO mode is started and at this mode users can adjust the zero point of the transmitter. Valve stem is moved to zero point automatically.
3. Push <UP> or <DOWN>. The number on the LCD is changed and the measured current value is changed accordingly on an ammeter equipped outside. Adjust it to be 4 mA and push <ENTER> to save it. +R_ZERO message is displayed.
4. Push <ESC>. TR_ZERO mode is displayed.
5. Push <DOWN> at TR_ZERO mode. Then TR_END mode is displayed. (Push <ESC> twice to return to RUN mode.)
6. Push <ENTER>. *TR_END mode is started and at this mode users can adjust the end point of the transmitter. The valve stem is moved to the end point automatically.
7. Adjust measured current value to be 20 mA on ammeter with <UP> or <DOWN> buttons. Push <ENTER> to save it. +R_END message appears.



8. Push <ESC>. TR-END mode is displayed.

Valve Mode

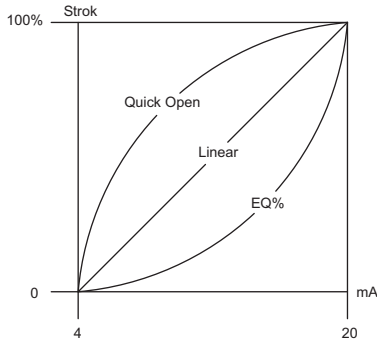
This mode adjusts the various characteristics.

Action Type (ACT)

It can be set to Direct Action (DA) or Reverse Action (RA).

Characteristics (CHAR)

Set Characteristics. There are three types of valve characteristics: Linear (LIN), EQ% (EQ), and Quick Open (QO). The following is the example of the three characteristic curves.



User Characteristics (USER SET)

When a specific characteristic is needed but not included in the above characteristics, the user can make a specific characteristic curve by choosing 16 points voluntarily according to the field conditions the user's need.

Tight Shut Open (TSHUT OP)

This allows the user to fully open valve at any value around the 20 mA current input signal.

Tight Shut Close (TSHUT CL)

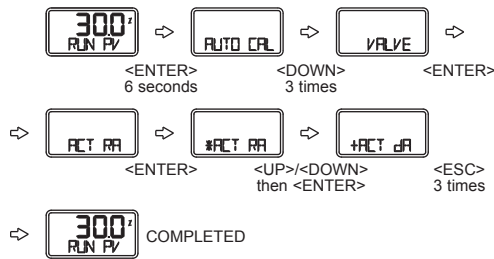
This allows the user to completely close valve at value around 4 mA input signal from outside.

Split Range Control (SPLIT)

This allows the user to control entire stroke with input signals of 4 to 20 mA, 4 to 12 mA or 12 to 20 mA.

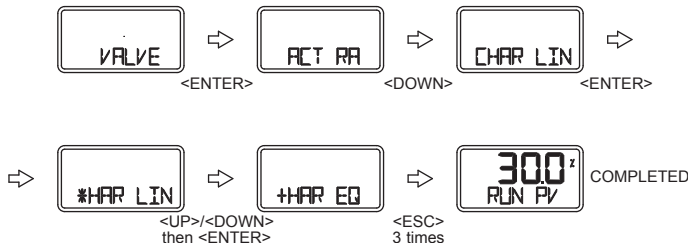
Adjustment of Acting Type (ACT)

1. Push <ENTER> at RUN mode for six seconds and then AUTO CAL mode is displayed. Push <DOWN> four times to go into VALVE mode.
2. Push <ENTER> and ACT RA (in case of RA) is displayed.
3. Push <ENTER> again, then *ACT RA is displayed.
4. Adjust to *ACT DA by pushing <UP> or <DOWN> and save it with <ENTER>. +ACT DA message appears.
5. Push <ESC> three times to return to RUN mode.



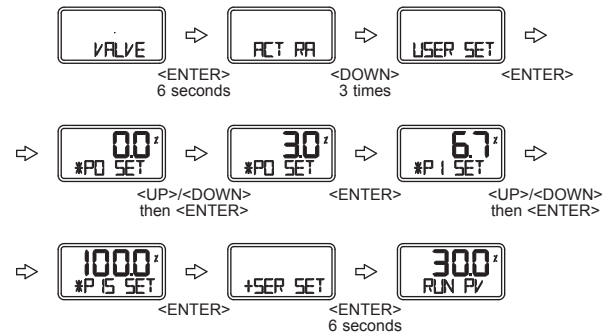
Adjustment of Characteristics (CHAR)

1. Push <ENTER> at VALVE mode and then push <DOWN>. CHAR LIN (in case of linear characteristics) mode is displayed.
2. Push <ENTER>. *HAR LIN mode is displayed and characteristics can be adjusted at the mode.
3. Adjust Characteristics (ex: EQ) by pushing <UP> or <DOWN> and save it with <ENTER>. + HAR EQ is displayed.
4. Push <ESC> three times to return to RUN mode.



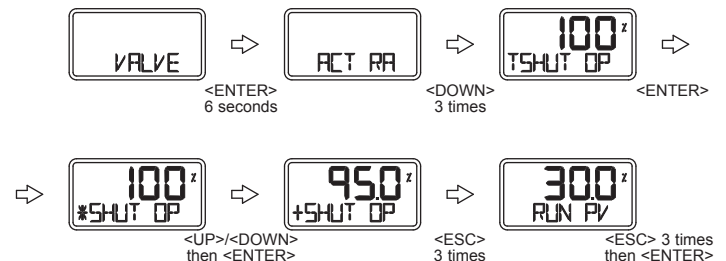
Adjustment of User Characteristics (USER SET)

1. Push <ENTER> at VALVE mode and ACT RA or ACT DA is displayed.
2. Push <DOWN> twice, then USER SET mode is started.
3. Push <ENTER>. *PO SET mode is displayed. In this mode, users can adjust the first point of characteristic in 16 points. The number on the LCD is the valve stroke percentage set to P0.
4. Adjust the valve stroke percentage using <UP> or <DOWN>.
5. Save it with <ENTER>. While P0 value is being saved, *P1 SET mode is displayed.
6. *P1 SET mode is used to adjust the second point characteristic in 16 points. Adjustment method is the same as P0* SET mode.
7. Save the valve stroke percentage from P2 to P15 SET mode, save it with <ENTER>.
8. After adjustment of valve stroke percentage at *P15 SET mode, save it with <ENTER>.
9. +SER SET is displayed. Sixteen points of valve stroke percentage are all set. Push <ESC> three times to return to RUN mode.



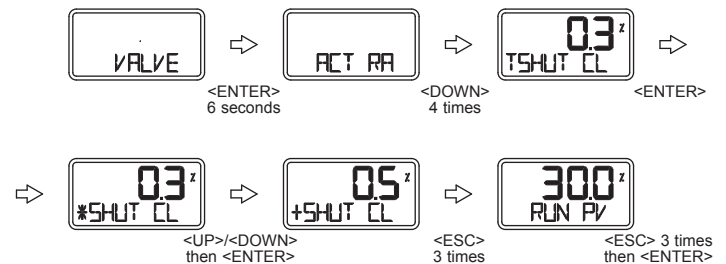
Adjustment of Tight Shut Open (t SHUT OP)

1. Push <Enter > at VALVE mode and ACT RA or ACT DA is displayed. Push <DOWN> three times at this mode. t SHUT OP is displayed.
2. Push <ENTER>. *SHUT OP mode is displayed, and in this mode users can set stroke at the time of Tight Open. Initial setting is done at 100%, which means cancellation of this function. Adjust the value (ex: 95.0%) by pushing <UP> or <DOWN> and save it with <ENTER>. +SHUT OP is displayed.
3. Push <ESC> three times to return to RUN mode.



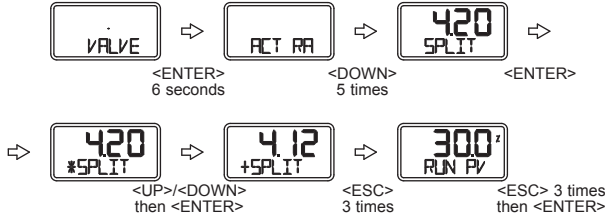
Adjustment of Tight Shut Close (T SHUT CL)

1. Push <ENTER> at VALVE mode and ACT RA or ACT DA is displayed. Push <DOWN> four times at this mode. TSHUT CL is displayed.
2. Push <ENTER>. *SHUT CL mode is displayed and in this mode users can set stroke at the time of Tight Close. Initial setting is done as 0.3%. 0% means cancellation of this function. Adjust the value (ex: .5%) by pushing <UP> or <DOWN> and save it by pushing <ENTER>. +SHUT CL is displayed.
3. Push <ESC> three times to return to RUN mode.



Adjustment of Split Range (SPLIT)

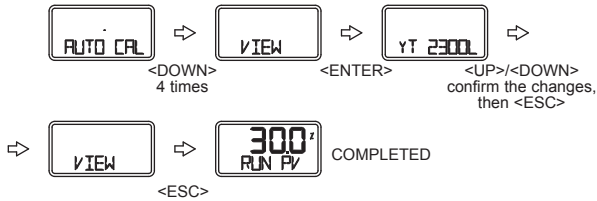
1. Push <ENTER> at VALVE mode and ACT RA or ACT DA is displayed.
2. Push <DOWN> five times and SPLIT mode is displayed. The numbers on the LCD are the range of current signal input to the positioner. 4 to 20 mA current signal is set as the standard.
3. Push <ENTER>. *SPLIT mode is displayed and input signal range can be adjusted. Adjust input signal range with <UP> or <DOWN> and save it with <ENTER>.
4. +SPLIT mode is displayed while saving adjusted range. Push <ESC> three times to return to RUN mode.



VIEW Mode

This mode provides users with various information about the Series 195 and 295 positioners. In this mode, users can change the valve stroke types displayed on the LCD to % or numbers. Refer to the next table for information and description displayed on VIEW mode.

1. Push <DOWN> at AUTO CAL mode and VIEW mode is displayed.
2. Push <ENTER> at VIEW mode, then information mode is started.
3. Check information by using <UP> or <DOWN> and push <ESC>.
4. Push <ESC> again to return to RUN mode.



	Description
YT-2500L	Positioner model
VERSION	Main software version
HART V	HART Protocol version
POL Addr	Channel address that is used in HART Protocol
BIAS VI	BIAS value for motor/piezo valve control. Can be adjusted only by manufacturer.
0Y 0d	Total used time duration. If a unit was used less than 1 minute, the time does not accumulate.
FULL_OP	Time elapsed for valve to fully open.
FULL_CL	Time elapsed for valve to fully close.
VM NOR	Display type of valve stroke on LCD (either in percentage or value).
Erro	Display error code or warning message <Figure XX>.
VALUE I	Current I-Value. Can be adjusted only by manufacturer.
ABS	Display absolute resistance value.

Information Checked on VIEW Mode

Error and Warning Code

If there are any problems during Series 195 and 295 positioner operation, you can check the error and warning code at VIEW mode as follows:

Error Code

This code is displayed when the Series 195 and 295 positioner control becomes impossible. Code C, D applies.

Error Code	Code Description and Cause	Action
MT ERR L	Positioner is improperly installed. Positioner lever is not parallel to the ground at 50% point. Lever is at lower position than actual 50% point.	Re-install/mount the positioner. Make sure the feedback lever does not touch the stopper at both 0 and 100%.
MT ERR H	Positioner is improperly installed. Positioner lever is not parallel to the ground at 50% point. Lever is at lower position than actual 50% point.	Re-install/mount the positioner. Make sure the feedback lever does not touch the stopper at both 0 and 100%.
CHK AIR	Valve does not operate when positioner receives "Full Open" signal during auto calibration.	Check if supply pressure is stable and appropriate.
RNG ERR	Operating angle is too small due to improper mounting of positioner.	Adjust bracket so the positioner can be mounted closer to actuator.
C	Error 10% or above persists more than 1 minute. No valve movement. Friction of valve is too large. Setting pressure of actuator changes.	Perform BAS calibration. Check setting pressure of actuator and set the pressure as recommended.
D	I-Value reaches at maximum or minimum limit point. Friction of valve changes. Setting pressure of actuator changes.	Perform AUTO calibration. Check setting pressure of actuator and set the pressure as recommended.

Warning Code

This code is displayed when the positioner control is available but there is a possibility of malfunction or low accuracy. Code B, F, G, H applies.

Warning Code	Code Description and Cause	Action
B	PV end-PV zero range is below 500. The angle of feedback lever is too small.	Re-install/mount the positioner. Make sure the feedback lever does not touch the stopper at both 0 and 100%. After re-installation, perform AUTO1 calibration.
F	Time elapsed for either full-open or full-close is less than 1 second. The size of the actuator is too small.	Use variable orifice. Replace actuator with larger capacity.
G	Pv zero is below 100. The angle of feedback lever is too large.	Re-install/mount the positioner. After re-installation, perform AUTO1 calibration.
H	Pv end is over 4000. The angle of feedback lever is too large.	Re-install/mount the positioner. After re-installation, perform AUTO1 calibration.

MAINTENANCE/REPAIR

Upon final installation of the Series V-195/295, no routine maintenance is required. The Series V-195/295 is not field serviceable and should be returned if repair is needed. Field repair should not be attempted and may void warranty.

WARRANTY/RETURN

Refer to "Terms and Conditions of Sales" in our catalog and on our website. Contact customer service to receive a Return Goods Authorization number before shipping the product back for repair. Be sure to include a brief description of the problem plus any additional application notes.

