

Ver. PM-TS800EN-09/2023

Table of Contents

1	Intr	oduction 4						
	1.1	General information for the user 4						
	1.2	Limited warranty and disclaimer 4						
	1.3	Requirement for safety 5						
	1.4	Certificate 5						
	1.5	Basic safety instructions for use in Ex area 6						
	1.6	Conditions to maintain intrinsically safety (Ex i) 6						
	1.7	Specific Conditions of Use 6						
2	Pro	duct Description7						
	2.1	Function 7						
	2.2	Features 7						
	2.3	Options 7						
	2.4	Applications 7						
	2.5	Label 8						
	2.6	Product Code9						
	2.7	Specifications 10						
	2.8	Structure 1						
		2.8.1 External structure 1						
		2.8.2 Internal structure 12						
	2.9	System configuration 1:						
	2.10	Principle of operation 13						
	2.11	11 Product Dimension						
		2.11.1 Standard type 14						
		2.11.2 With limit switch type 14						
		2.11.3 Feedback shaft connection 14						
3	Inst	tallation1						
	3.1	Before installation 1						
	3.2	TS800L installation 1						
		3.2.1 Notes on installation 1						
		3.2.2 Effective rotation angle range of feedback lever 16						
		3.2.3 Lever type and dimension 16						
		3.2.4 Bracket Installation 1						
		3.2.5 Dimension after installation 1						
	3.3	TS800R installation 18						
		3.3.1 TS800R installation examples 18						
		3.3.2 TS800R bracket installation components 18						
		3.3.3 TS800R installation steps 19						
	3.4	TS820 Remote type installation 2						

	3.5	Option module Installation	22				
		3.5.1 Position transmitter module Installation	22				
		3.5.2 HART communication module Installation	22				
		3.5.3 Limit switch module Installation	23				
		3.5.4 How to adjust limit switch cam	24				
	3.6	How to adjust Auto/Manual switch	25				
	3.7	Orifice installation	26				
4	Pn	eumatic connection	27				
	4.1	Supply air pressure condition	27				
	4.2	Pneumatic port Description					
	4.3	Air connection	28				
		4.3.1 TS800L air connection	28				
		4.3.2 TS800R air connection	28				
5	Ele	ectrical connection	29				
	5.1	Terminal description	29				
	5.2	Wiring diagrams	30				
		5.2.1 Power and Feedback signal connection	30				
		5.2.2 Limit switch connection	30				
		5.2.3 Alarm signal connection	30				
6	Ca	libration	31				
	6.1	LCD description	31				
	6.2	Button description	32				
	6.3	How to quickly perform Auto calibration	33				
		6.3.1 Auto calibration Steps	33				
	6.4	Software map	34				
	6.5	Main menu Description	35				
	6.6	Main parameter menu Description	36				
	6.7	Submenu Description	37				
		6.7.1 TUNNING	37				
		6.7.2 PARAMETE	39				
		6.7.3 DEVICE P	41				
		6.7.4 INFOMATN	44				
		6.7.5 DIAGNOST	45				
		6.7.6 EMERGNCy	48				
7	Err	ror code and Troubleshooting	49				
	7.1	Error code during Auto calibration	49				
	7.2	Error code during operation	51				

1 Introduction

1.1 General information for the user

This instruction includes installation, operation, maintenance, and parts information for Tissin TS800 Valve Positioner. Keep these instructions in a location which is easily accessible to every user and make these instructions available to every new owner of the device.

- Installation, commissioning and maintenance of the product can only be performed by trained specialist personnel who have been authorized by the plant operator to do so.
- Before installing or commissioning, be sure to read and thoroughly understand the product manual and operate the product properly.
- Operators must strictly observe the applicable national regulations with regards to installation, function tests, repairs, and maintenance of electrical products.
- Only trained and authorized person should operate the machinery and the equipment.
- Do not use this positioner out of the range of its specifications as this can cause failure.
- Do not service or attempt to remove product and machinery/equipment until safety is confirmed.
- Never handle mechanical equipment or disassemble the device until safety is confirmed.
- Before loosening the pneumatic lines and valves, turn off the pressure and vent the pneumatic lines.
- Observe applicable accident prevention and the safety regulations for electrical equipment.

The manual can be altered or revised due to hardware of software upgrades without any prior notice. Please visit our website (www.tissin.co.kr) and check the latest documentation.

1.2 Limited warranty and disclaimer

- This product has been fully inspected and shipped through a thorough quality inspection procedure. The manufacturer warranty period of the product is 18 months after the product is shipped from Tissin in Korea.
- For any failure or damage reported within the warranty period which is clearly our responsibility, a replacement product or necessary parts will be provided. This limited warranty applies only to our product independently, and not to any other damage incurred due to the failure of the product.
- Using the device in a manner that does not fall within the scope of its intended use, disregarding this manual, using under unqualified personnel, or making unauthorized alterations releases the manufacturer from liability for any resulting damage. This renders the manufacturer's warranty null and void.

1.3 Requirement for safety

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. These safety instructions are intended to prevent hazardous situations and/or equipment damage. For the safety, it is important to follow the instructions in the manual.

Failure to observe the warning may result in serious injuries or death.

Failure to observe this warning may result in damage to the device or personal injury.

Failure to observe the warning may result in damage to the device or may degrade performance.

1.4 Certificate

This product has obtained a variety of explosion-proof certification and safety level certification. For details, please visit our website and download the corresponding explosion-proof certificate for confirmation.

Certi	fication	Certificate number	Explosion proof grade	
IECE x	IECEx	IECEx EPS 17.0088X	Ex ia IIC T5/T6 Ga Ex ia IIIC T112℃/T92℃ Da IP66	
Æx>	EPS 17 ATEX 1 174 X		II 1G Ex ia IIC T5/T6 Ga II 1D Ex ia IIIC T112℃/92℃ Da IP66	
EHE	EAC	RU C-KR.АД07.В.01840/20	1Ex ia IIC T5/T6 Ga X	
٤	Koo	20-KA2BO-0188X	Ex ia IIC T6/T5	
يو	KCS	20-KA2BO-0189X	Ex ia IIIC T85℃/100℃	
	CCC 2020322307002407		Ex ia IIC T5/T6 Gb	
Ex NEPSI	NEPSI	GYJ23.1056X	Ex ia IIIC T85°C/T100°C Db	
SIL SIL FS/71/220/19/0378 (SGS TUV SAAR)			SIL2 at HFT=0 SIL3 at HFT=1	
	CSA	80139740	CL I, DIV 2, GP ABCD; T5T6 Ex ib IIC T5T6 Gb CL I, ZN 1 AEx ib IIC T5T6 Gb CL II, DIV 2, GP EFG; T100°CT85°C; CL III Ex ib IIIC T100°CT85°C Db ZN 21 AEx ib IIIC T100°CT85°C Db	

1.5 Basic safety instructions for use in Ex area

To prevent the risk of explosion, observe not only the basic safety instructions in the respective operating instructions for operation in the Ex area, but also the following.

\Lambda WARNING

- Observe the applicable safety regulations (also national safety regulations) as well as the general rules of technology for construction and operation.
- Make sure that the device is suitable for the area of use.
- Check the positioner's certified and permitted explosion proof range.
- Close all unnecessary Cable Gland with the locking screws approved by the explosion site.

1.6 Conditions to maintain intrinsically safety (Ex i)

- Make sure to connect "Intrinsic safety" type protection device to intrinsically safe circuit only.
- Observe the specifications for the electrical data on the certificate and in technical data.
- In order to maintain intrinsically safe protection, be sure to use a barrier that meets the following specifications.

Barrier specifications	Ui	li	Pi	Ci	Li
Main power	28V	101mA	707mW	0.6nF	6uH
Position transmitter, Alarm1, Alarm2, Limit Switch (Dry contact type)	28V	101mA	707mW	0.6nF	6uH
Limit Switch (Proximity type)	16V	26mA	34mW	30nF	50uH

1.7 SPECIFIC CONDITIONS OF USE : YES as shown below :

The enclosure made of aluminum alloy is considered to present a potential risk of ignition by impact or friction. Particularly, care must be taken during installation and use to prevent impact or friction for applications that specifically require EPL Ga equipment.

\triangle	WARNING
-------------	---------

- Potential electrostatic charging hazard
 If the enclosures of the equipment incorporates the non-metallic parts which may
 generate an ignition capable level of electrostatic charge, the equipment shall be
 installed in a location where the external conditions cannot result in the build-up of
 electrostatic charge on such surfaces. For example, the equipment shall be installed in
 the location protected from direct airflow causing a charge transfer. Additionally, the
 equipment shall only be cleaned with a damp cloth and caution should be used when
 being handled.
- Do not open when an explosive atmosphere is present. The equipment shall not be opened for installation, repair or overhaul in hazardous area. The use shall consult the manufacturer if there is any problem during the usage.

2 **Product Description**

2.1 Function

Smart valve positioner TS800 series controls the valve stroke in response to an input signal of 4~20mA DC from the control panel, DCS or calibrator.

2.2 Features

- LCD and 4 button local control
- Quick and easy calibration
- PST and alarm function
- Auto/Manual switch included
- Built-in self-diagnostic function
- Modularization of the internal parts
- IP66 / NEMA4X
- Improvement of valve control speed by applying large flow pilot valve
- Strong vibration resistance and impact resistance

2.3 Options

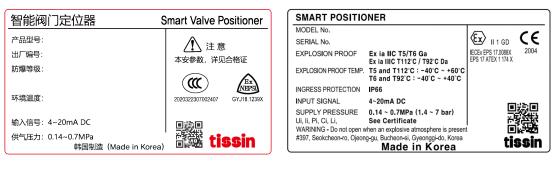
- Position transmitter (4~20mA DC Feedback signal)
- HART communication (Ver. HART 7)
- Limit switch (Mechanical or Proximity type)
- Remote control type (TS820)

2.4 Applications

The TS800 is mounted on a pneumatic control valves and is used for fluid control of industrial parts.

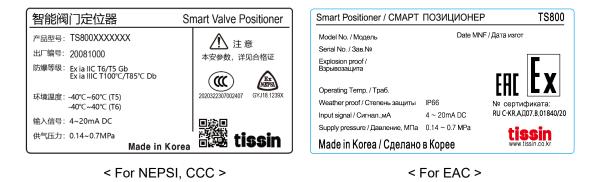
- Oil and gas
- Chemicals
- Power plant
- Paper
- Water treatment
- Pharmaceutical
- Printing and dyeing processing
- Food and beverage
- Etc.

2.5 Label



< For Non-explosion proof >

< For ATEX >



Smart Positioner MODEL No.		(SA)
SERIAL No. EXPLOSION PROOF	CL I, DIV 2, GP ABCD; T5T6 Ex Ib IC T5T6 Gb CS CL I, ZN 1 AEx Ib IIC T5T6 Gb CL II, DIV 2, GP EFG; T100°CT85°C; CL Ex Ib IIIC T100°CT85°C Db ZN 21 AEx Ib IIIC T100°CT85°C Db	CUS 6A 21CA80139740X III
ENCLOSURE RATINGS AMBIENT TEMP.		
INPUT SIGNAL	4 ~ 20mA DC	o se con
SUPPLY PRESSURE Intrinsically safe when wired	0.14 ~ 0.7 MPa (1.4 ~ 7 bar) per drawing TS800 WD 01 A1, TS800 WD 01 A2	認識
Bucheon-si, Korea		0.45
Tissin Co., Ltd	Mada in Karaa	tieein



< TS800/TS820 for CSA >

Made in Korea

< TS805 for CSA >

2.6 Product Code

		TS800							
Model	Standard type	TS800							
	Remote type	TS820							
	Stainless steel	TS805							
	316 type								
Acting type	Linear type		L						
	Rotary type		R						
Explosion proof	Non-explosion p	oof		Ν					
type	KCs, ATEX, CC	C, EAC		А					
	CSA			S					
Connection type	Conduit entry	<u>Air e</u>	conne	<u>ction</u>					
	G(PF)1/2	PT1	/4		1				
	G(PF)1/2	NP	Г1/4		2				
	NPT1/2	NP	Г1/4		3				
	M20	NP	Г1/4		4				
	M20	G1/	4		5				
Lever type	10~80mm					1			
(Linear)	70~150mm					2			
	For tubeless act	uator (70n	nm)			3			
Lever type	M6 x 39L (Fork lever type) 1								
(Rotary)	NAMUR					5			
Ambient Temp.	-30°C∼ +85°C (S	tandard ty	pe)				S		
(Non-explosion proof)	-40°C∼ +85°C L								
	-60°C~ +85°C (for EAC) U								
Communication	None							0	
	Position transmit	tter (4~20ı	mA D(C feed	back)			1	
	HART communio	cation						2	
	HART and Posit	ion transm	nitter (4~20n	nA DC	feed	back)	3	
Limit switch	None				0				
(For TS800/TS805)	Mechanical type (Dry contact NO, NC, COM)				М				
	Proximity type (F	P+F NJ1,5	-F-N)						Ρ
	With Dome cove	er (Without	Limit	switch	ר)				D
Cable length	5m								1
(For TS820)	10m								2
	User define (Les	s than 20	meter	s)					Х

2.7 Specification

Model		TS800	TS805		
Input sign	al	4~20mA DC			
Impedanc	ce	500Ω (20mA DC)			
Supply pr	essure	0.14~0).7MPa		
Stroke		10~150mm(Linear typ	e), 0~90º(Rotary type)		
Air conne	ction	PT1/4, NPT1/4, G1/4	NPT1/4		
Gauge co	onnection	PT1/8, NPT1/8	NPT1/8		
Conduit		G(PF)1/2, NPT1/2, M20	G1/2		
Explosion	proof type		IC T5/T6 Ga 2℃/T92℃ Da IP66		
Enclosure	9	IP66 (EI	N60529)		
	Acting Temp.	-30℃~+85℃(Standard type),			
Ambient		-40°C~+85°C(Low temp type)			
Temp.	Explosion proof	-40°C∼ +60°C (T5 and T112°C)			
	Temp.	-40°C∼ +40°C (T6 and T92°C)			
Linearity		±0.5% F.S.			
Sensitivity	ý	±0.2% F.S			
Hysteresi	s	±0.5% F.S			
Repeatab	oility	±0.3% F.S			
Air consu	mption	Below 2.3LPM (Sup.=0.14MPa)			
Required	air quality	Class 3 (ISO8573-1)			
Flow capa	acity	Over 100LPM (Sup.=0.14MPa)			
Material		Aluminum die cast	Stainless steel 316		
Weight		2.2kg	4.2kg		

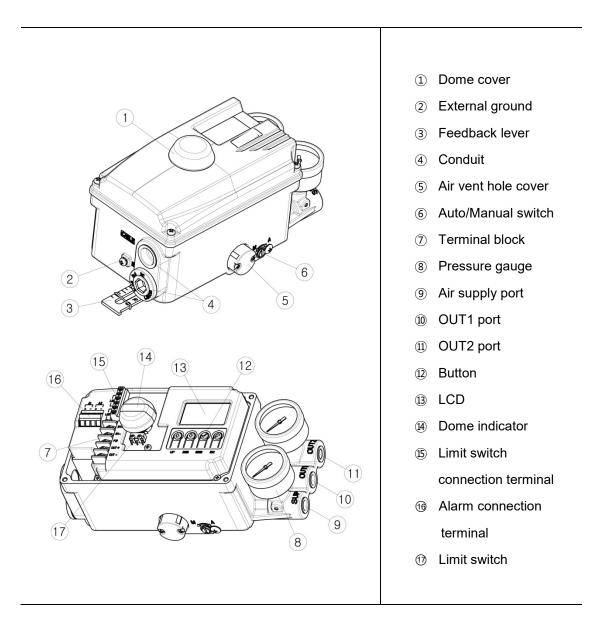
Option specification

Option	ltem	Specification		
HART	HART version	HART 7		
Desition transmitter	Wire connection type	2 Wires		
Position transmitter	Supply voltage	10~30V DC		
Limit switch	Mechanical type	AC125V, 3A, DC30V, 2A		
	Proximity type	DC8.2V 8.2A		

Note: Please contact our sales department for other specifications.

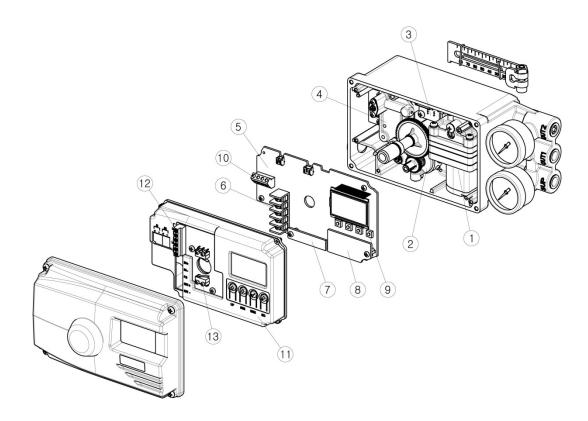
2.8 Structure

2.8.1 External structure



Note: Only Limit switch type product is equipped with Dome indicator.

2.8.2 Internal structure

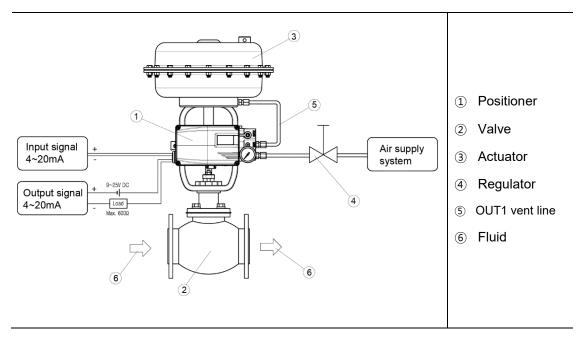


- ① Pilot valve
- 2 Potentiometer
- ③ Pressure sensor (Option)
- ④ Torque motor
- 5 Main PCB
- 6 Terminal block
- ⑦ HART communication module (Option)

- (8) Position transmitter module(Option)
- 9 Buttons
- 10 Alarm signal connection terminal
- ① PCB cover
- 2 Limit switch connection terminal
- Limit switch (Option)

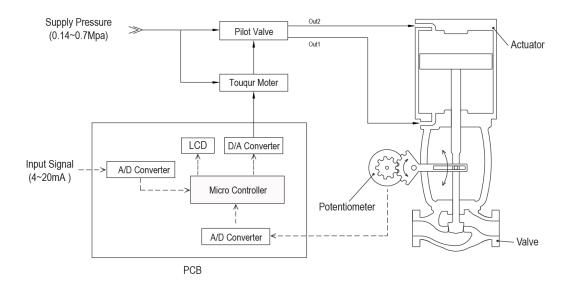
2.9 System configuration

Basically, the control valve system consists of a positioner for controlling the pneumatic pressure of the actuator, an actuator for controlling the opening of the valve, and a valve for controlling the flow of the fluid.



2.10 Principle of operation

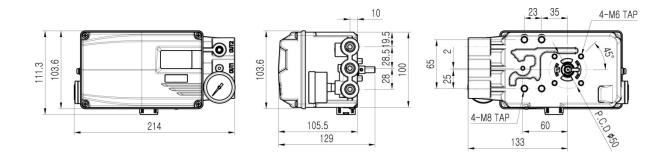
TS800 receives 4-20mA input signal of the control room, micro-processor (CPU) compares input signal with position feedback through potentiometer and sends control signal to I/P conversion module torque motor, torque motor converts it to a pneumatic signal to controls pilot valve to controls the opening of the control valve by converting output pressure of OUT1 and OUT2.



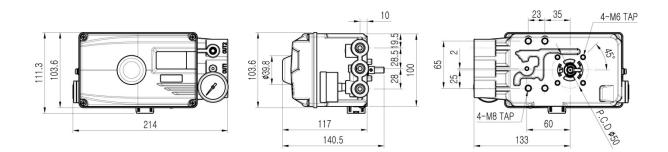
tissin

2.11 Product Dimension

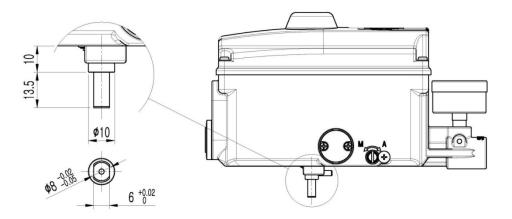
2.11.1 Standard type



2.11.2 With limit switch type



2.11.3 Feedback shaft connection



3 Installation

3.1 Before installation

MARING

- Make sure if TS800 is appropriate to the valve and actuator installation conditions and the site requirements specifications before installation.
- If the installation state is not correct, TS800 control characteristics may be degraded.

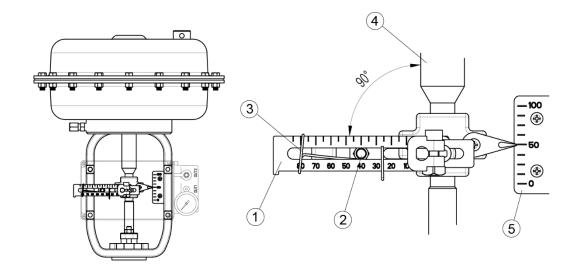
3.2 Linear type installation

3.2.1 Notes on installation

When make the mounting bracket and connecting the lever to the stem connection pin, be sure to observe the following two points.

If failure to observe the followings, it will affect the product performance such as linearity.

- ① When the valve stroke is 50%, the feedback lever should be horizontal.
- ② When the valve stroke is 50%, the stem connection pin must be located at the numeric position marked on the feedback lever that is corresponding to the valve stroke.



- ① Feedback lever
- \bigcirc Stem connection pin
- ③ Pin fixing spring

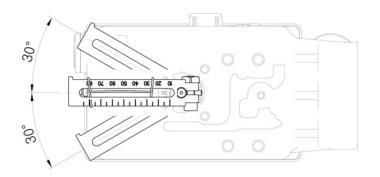
- ④ Actuator stem
- 5 Valve opening indicator

3.2.2 Effective rotation angle range of feedback lever

The effective rotation angle of TS800L lever is respectively 30° upward and downward that is based on horizon.

Follow 3.2.1 notes, effective rotation angle can be maintained to achieve the best performance.

- If the rotation angle range is too small during operation, the performance of products such as linearity may be degradation.
- If the rotation angle range is too big during operation, may damage the product or cause malfunctions.



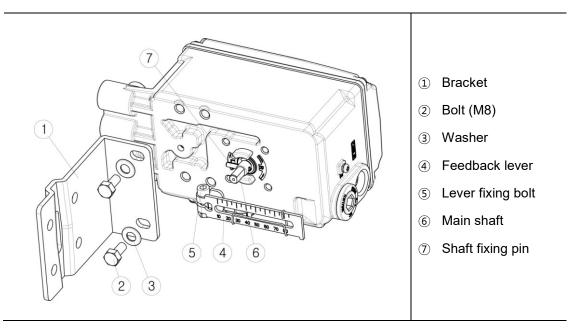
3.2.3 Lever type and dimension

The numeric positions marked on the feedback lever correspond to the valve stroke, and the stem connection pin must be connected to the corresponding marked location.

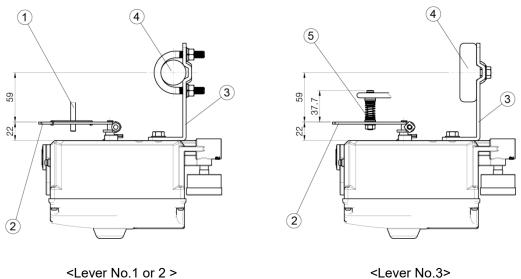
Lever No.	Valve stroke	Dimensions
No.1	10~80mm	
No.2	70~150mm	
No.3	10~70mm For the tube less type actuator	

3.2.4 **Bracket Installation**

Refer to the TS800L drawing (refer to 2.11.1) and actuator drawing, please make appropriate bracket and install the positioner on the actuator.



3.2.5 **Dimension after installation**



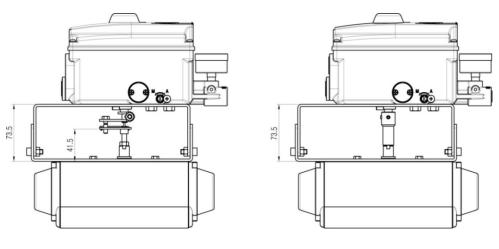
<Lever No.3>

- ① Stem connection pin
- Feedback lever (2)
- ③ Bracket

- ④ Actuator york
- (5) Lever adapter

3.3 **Rotary type installation**

3.3.1 Rotary type installation examples

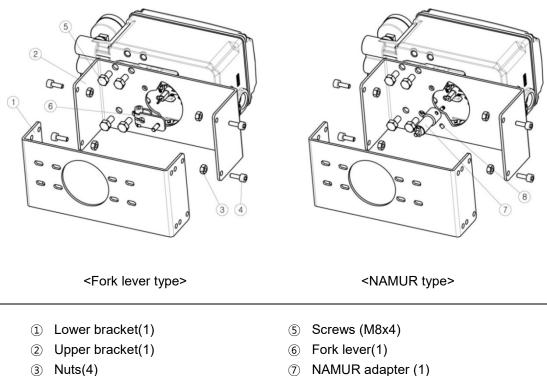


<Fork lever type>

<NAMUR type>

3.3.2 Rotary type bracket installation components

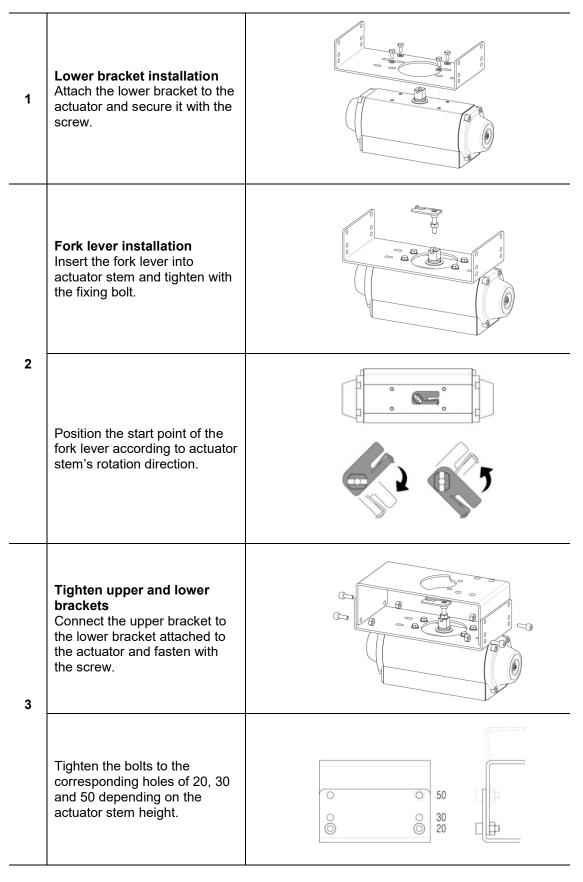
When shipped from the factory, components No.1~8 are provided as standard. The brackets support the NAMUR mounting standard (VDI/VDE3835, IEC60534-6-2).



④ Screws (M6x4)

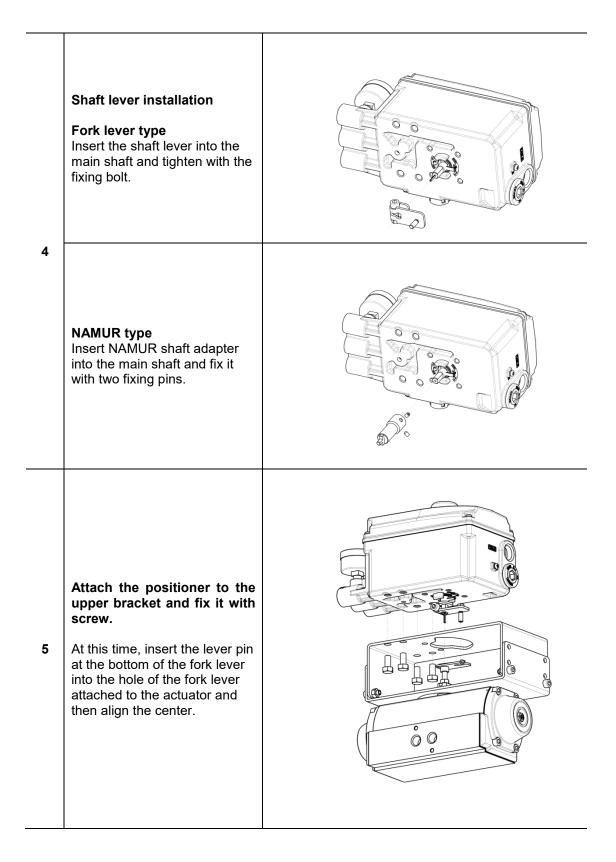
- ⑦ NAMUR adapter (1)
- ⑧ Adapter fixing pin(2)

3.3.3 Rotary type installation steps



Smart valve positioner TS800/TS805 Series

tissin



3.4 TS820 Remote type installation

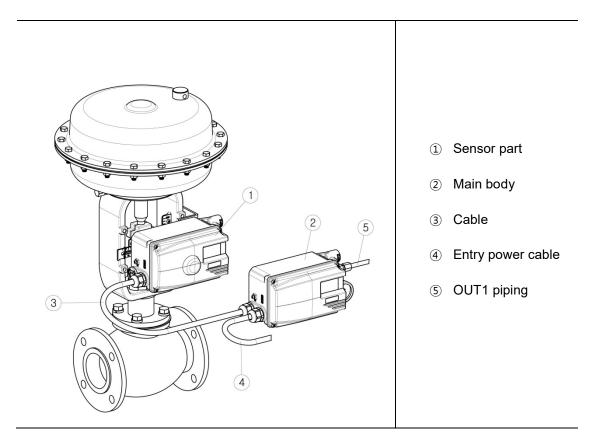
The TS820 is designed cable to the sensor part and the main body, it is designed to transmit the change of the stem position of the valve to the body through the potentiometer built in the sensor.

Application site

- Where the valve is located at a high or inaccessible location.
- High temperature environment. (over than 85° degrees) (Non-explosion proof model only)
- Large vibrating lines.

Installation

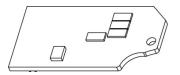
- ① Install the sensor part on the valve, and install Main body on the accessible places.
- ② Please follow the installation instructions of TS800L or TS800R for the sensor part's installation.
- ③ The sensor part and Main body are connected via cable, the length of cable must not over 20M.
- ④ Pneumatic piping should connect the OUT port of Main body to the actuator.



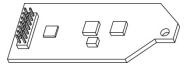
3.5 Option module Installation

According to the site requirements, the following modules can be purchased separately and installed. The corresponding function can be realized by installing modules, and the modules do not affect each other.

X Please cut off the input power and install the modules.



<Position transmitter module>

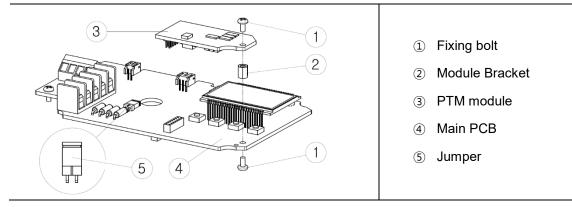


<HART communication module>

3.5.1 Position transmitter module Installation

Open the body cover and PCB cover, and install the position transmitter module to the main PCB as figure below.

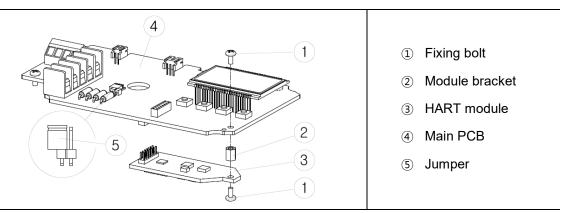
- Be sure to set feedback zero point setting and end point setting once after installed the feedback module. Please refer to page 38 OUT ZERO and OUT END setting method.
- Please connect ⑤ Jumper when you install PTM module.



3.5.2 HART communication module Installation

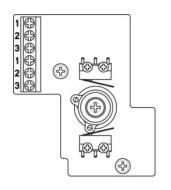
Open the body cover and PCB cover, and install the HART communication module to the main PCB as figure below.

※ Please disconnect ⑤ Jumper when you install HART module or install HART and PTM both.

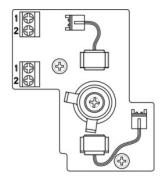


3.5.3 Limit switch module Installation

There are two types of limit switch, mechanical and proximity type.



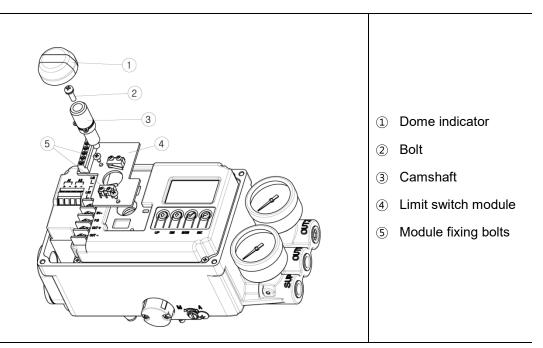
<Mechanical type module>



<Proximity type module>

Installation steps

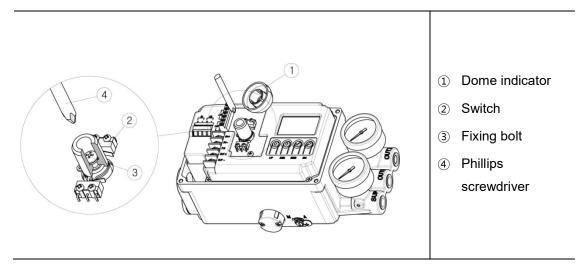
- ① Open the cover.
- 2 Mount the limit switch module in PCB protective cover groove and fix with fixing bolts.
- ③ Turn the camshaft and mount it to the main shaft.
- ④ Fix the camshaft with fixing bolts.
- (5) Mount the dome indicator to the camshaft.



Note

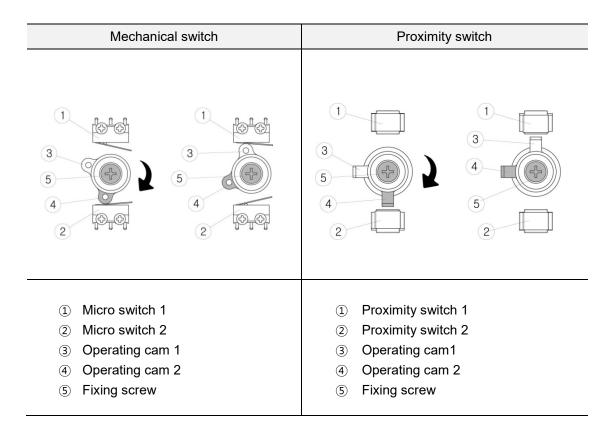
Standard product does not have a dome indicator sight window. The cover for limit switch product must also be replaced.

3.5.4 How to adjust limit switch cam



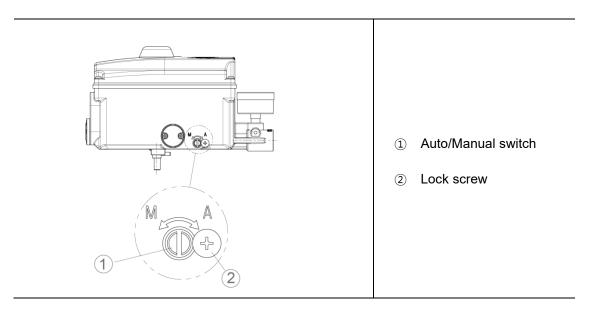
The cam position is set at the factory. If you want to change the cam position, please follow the steps below.

- ① Open the cover and separate the dome indicator by referring to the above figure.
- 2 Loosen the fixing bolt slightly with a Phillips screwdriver, but do not separate it.
- ③ Adjust cam 3 and 4 by referring to the following figure below, and adjust the angle so that the switch operates at the position you want.
- ④ After adjusting the angle, fasten the fixing bolt tightly.



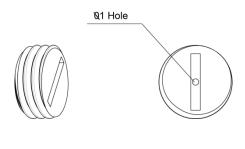
3.6 How to adjust Auto/Manual switch

- Please be careful as the valve moves when you operate Auto/Manual switch.
- The input air pressure is directly transmitted to the actuator when you switch to manual mode, so do not exceed permissible air pressure range.



Description	 Auto/Manual switch acts as a bypass valve. If set to Auto, the positioner controls the valve opening. If set to Manual, regardless of signal from the positioner, the supply pressure input from the regulator is transmitted directly to the actuator.
Purpose	 When Control valve fails, set to Manual mode and adjust the output pressure of the regulator, if the valve moves with the pressure change, there is a high possibility that the positioner has a problem. But if the valve does not move, there is a high probability that the valve has failed. You can adjust the valve opening with the regulator by switching to Manual mode in case of product installation or field emergency. (It works only in single acting type product)
Adjustment method	 If turns Auto/Manual switch fully clockwise with a slotted screwdriver, it sets to Auto mode, i.e. the positioner controls the valve. If turns Auto/Manual switch counterclockwise a few times with a slotted screwdriver, it sets to the Manual mode, i.e. the regulator's air pressure is transmitted directly to the actuator.
Notes	The product is set to Auto mode at the factory.

3.7 Orifice installation



<Orifice>

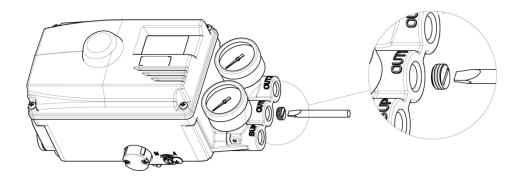
Purpose

A normal action product does not need to install the orifice, but if the hunting phenomenon occurs after installation on a small actuator, it can be solved by installing an orifice to reduce the output flow of air pressure transmitted to the actuator from the positioner. The hole size of the orifice is 1mm.

How to install

As figure below, Insert the orifice into OUT1 port, and fix it by turning it all the way with a slotted screwdriver

- When using for single type actuator, please install orifice to OUT1 port only.
- When using for double type actuator, please install orifice to both OUT1 and OUT2 ports.



Note

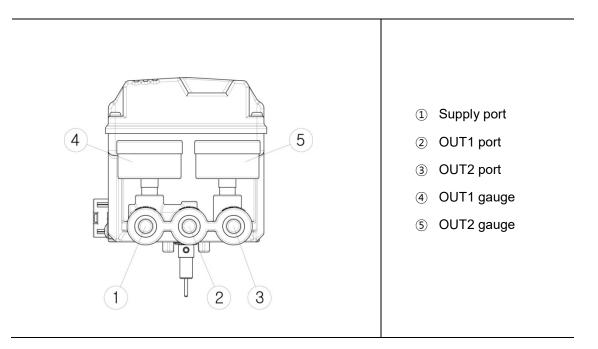
Please contact us, if you need any of the above parts.

4 **Pneumatic connection**

4.1 Supply air pressure condition

- Use only dehumidified and dust-extracted compressed clean air.
- The air pressure input must be equipped with a regulator to supply constant air pressure.

4.2 Pneumatic port Description



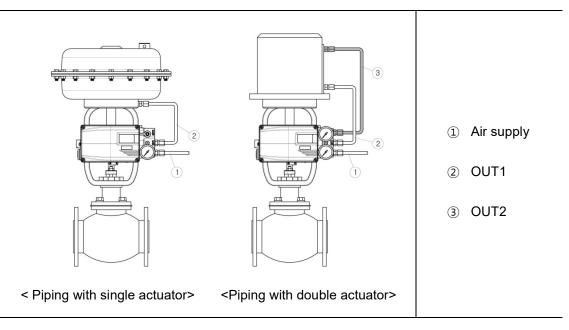
4.3 Air connection

 This product is designed to increase the air pressure of OUT1 as 4 ~ 20mA current input signal increases.

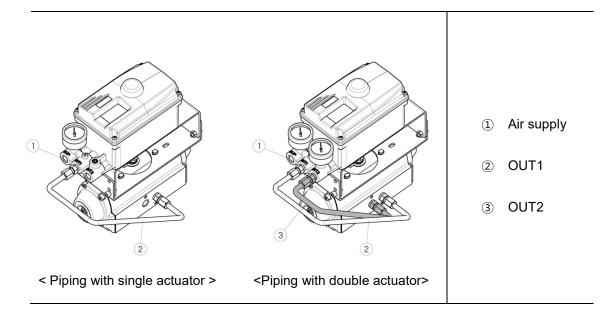
NOTICE

∕∖

4.3.1 TS800L air connection



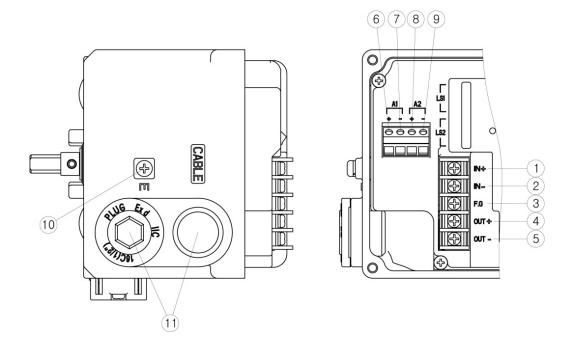
4.3.2 TS800R air connection



5 Electrical connection

- Be sure to always check that the electrical load is within the stated range on the label. Exceeding the rating might cause a malfunction to circuit boards or burn out electrical components.
- Check polarity of + and exactly and connect wires.

5.1 Terminal description

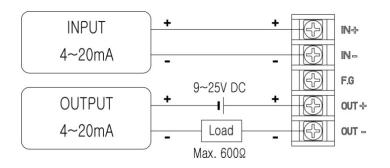


- ① Input signal (+)
- ② Input signal (-)
- ③ Internal ground
- ④ Feedback signal (+)
- (5) Feedback signal (-)

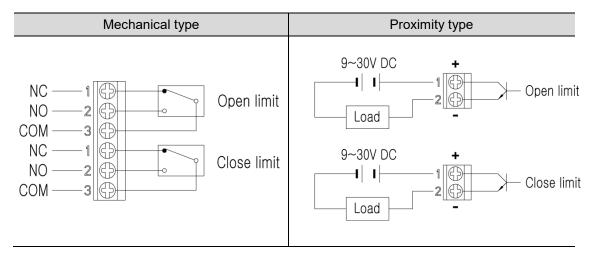
- 6 Alarm1 signal (+)
- ⑦ Alarm1 signal (-)
- (8) Alarm2 signal (+)
- (9) Alarm2 signal (-)
- 10 External ground bolt
- (1) Conduit

5.2 Wiring diagram

5.2.1 Power and feedback signal connection

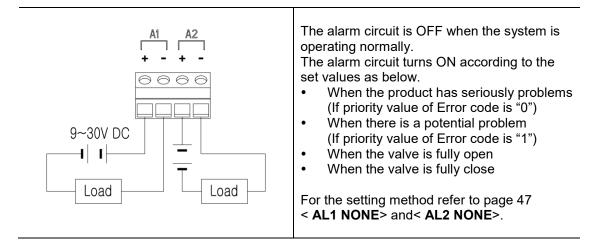


5.2.2 Limit switch connection



5.2.3 Alarm signal connection

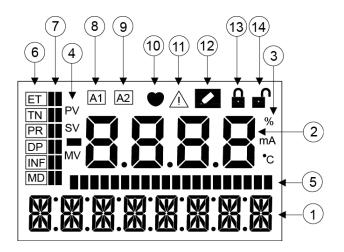
The alarm module is built in to all products. According to the requirements of the site, you can get the feedback from the emergency alarm signal by wiring as follow.



tissin

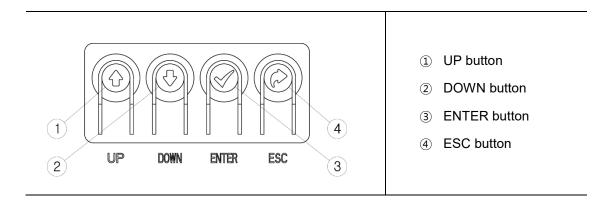
6 Calibration

6.1 LCD description



No.	Displayed contents	Description			
1	Menu information	Displays the running menu. (Main menu, Main parameter, Sub parameter)			
2	Menu's value	Displays t	he present parameter value of the menu.		
3	Menu's value unit	Displays t	he present menu's value unit.		
		PV	Progress value		
4	Menu's value separator	SV	Signal value		
	Sopulation	MV	Motor control value		
5	Progress bar	Displays t	he progress of the processor in bar form.		
6	Main parameter	Displays the currently selected main parameter.			
$\overline{\mathcal{O}}$	Parameter bar	Displays the position of the selected main parameter.			
8	Alarm 1	The icon is displayed, when the set value of alarm 1 is satisfied.			
9	Alarm 2	The icon is displayed, when the set value of alarm 2 is satisfied.			
10	HART communication	The icon is displayed, when HART communication is in progress.			
(11)	Error code	The icon is displayed If there is an error during calibration or operation.			
12	Modifying	The icon is displayed when changing the internal setting values such as parameter modification.			
13	LOCK	The icon is displayed when the program is locked.			
(14)	UNLOCK	The icon i	s displayed when the program is unlocked.		

6.2 Button description



Button	Description
ENTER	Execute the functions of the selected menu.Saving the modified parameter values.
ESC	 Moving from the current menu go back to the upper level menu. Cancel current command.
UP	 Moving between menus of the same level such as main menu, main parameter, sub parameter. Change to the larger value of the set value of the selected parameter.
DOWN	 Moving between menus of the same level such as main menu, main parameter, sub parameter. Change to the smaller value of the set value of the selected parameter.

6.3 How to quickly perform Auto calibration

Open the cover of the product and follow below steps to perform Auto calibration.

- ① Please input current signal **18mA**, then press **<UP>** button for 3 seconds.
- 2 The positioner automatically performs Auto calibration.
- ③ Auto Calibration is performed sequentially from STEP 1 to 7 on LCD, and may take 2-5 minutes depending on the valve size.

Ŵ	NO	ΓΙϹΕ
---	----	------

• If an error occurs during Auto calibration, please refer to Error codes on page 49 to 50.

6.3.1 Auto calibration Steps

When you progress auto calibration, it automatically proceed in the following steps below.

Steps	Description
STEP0	Check ZERO point of the valve speed. Checked at the reference point of valve stops.
STEP1	Find ZERO point of the valve stroke.
STEP2	Find END point of the valve stroke.
STEP3	Measure the valve fully close time. Measure the time of the valve takes from full open to full close.
STEP4	Measure the valve fully open time. Measure the time of the valve takes from full close to full open.
STEP5	Measure Low BIAS Measure the motor signal reference value, when the position of valve at 25%.
STEP6	Measure High BIAS Measure the motor signal reference value, when the position of valve at 75%.
STEP7	Measure maximum error value.

6.4 Software map

- To enter Main Parameter menu: Please input 4-20mA current signal and press **<ENTER>** button for 3 seconds after booting up.
- To enter Submenu : Press <UP> or <DOWN> button to select Main Parameter menu and press <ENTER> button.
- To select Submenu : Press <UP> or <DOWN> button.

Main parameter menu	TUNNING	PARAMETR	DEVICE P	INFOMATN	DIAGNOST	EMERGNCy
	AUTO RN1	DEAD bND	ACTU SNG	FIRM VER	ERR CODE	PASSWORD
	AUTO RN2	KP	ACTU LIN	DEVI REV	AUTO CHK	EMGY NON
	AM FULL	KI	FORCE OP	HART VER	PST RUN	FULL OP
	TbL	KD	FORCE CL	dEid	PST CFG	FULL CL
	VAL OPCL	GKP	DAMP	POLL ADD	PST REDy	STOP
Cubmanu	VAL ZERO	GKI	SPLT ZER	TRAVEL K	AL1 NONE	UNLOCK
Submenu	VAL END	GKD	SPLT END	OP TIME	AL2 NONE	
	OUT ZERO	KF	COMPENSA	CL TIME		-
	OUT END	KL	ACT NORM	TEMPERAT		
	IN ZERO	RANGE I	OUT NORM	TEMP MAX		
	IN END	CHAR LIN	HT NORMR	TEMP MIN		
		USER DEF	DSP NORM			

6.5 Main menu description

After the product is booted, **<MAIN LIN>** is displayed, which shows the current opening of the valve. Press **<UP>** or **<DOWN>** button to move to the following menu and check the corresponding information.

In Main menu, information such as the valve opening and the magnitude of the input current signal can be checked and the execution of the command or the modification of the parameter value cannot be performed.

Main menu	Description		
	Displayed the percentage of current valve opening value. Depending on the set value of the flow characteristics, one of the following values is displayed.		
	LCD display value	Flow characteristics	
MAIN LIN	MAIN LIN	Linear	
	MAIN EQ1	EQ1 (1/25)	
	MAIN EQ2	EQ2 (1/50)	
	MAIN QO	Quick Open	
	MAIN USR	User defined 17 points	
MAIN IN %	 Displayed the magnitude of input signal that the positioner recognizes as percentage. If the size of the input signal recognized by the positioner differs from output signal of the DCS or calibrator, check the voltage of the power supply. If the supply current is normal, please reset <in zero=""> and <in end=""> values in <tuning> of main parameter.</tuning></in></in> 		
MAIN IN mA	 Displayed the magnitude of input signal that the positioner recognizes as mA. If the size of the input signal recognized by the positioner differs from output signal of the DCS or calibrator, check the voltage of the power supply. If the supply current is normal, please reset <in zero=""> and <in end=""> values in <tunning> of main parameter.</tunning></in></in> 		
MAIN VEL	 Displayed currently operating speed of the valve as numbers. As the value, between -2047 to +2048, negative numbers indicate speed at close, and positive numbers indicate speed at open. 0 means stop and the larger the absolute value, the faster the speed. 		
MAIN DEV %	Displayed the percentage of error between the current input signal and valve opening value.The larger the error, the lower the control characteristic.		
ABSP DIG	ABS Potentiometer Digit value Value converted to digital value by reading Potentiometer resistance value (range: 0 ~ 4095)		
ABSP PER	ABS Potentiometer value in percentage Value in percentage converted to digital value by reading Potentiometer resistance value (range: 0% ~ 100%)		

6.6 Main parameter menu Description

Main parameter menu corresponds to main menu in which various parameters are classified by function.

- After the product is booted, press **<ENTER>** button for 3 seconds to enter Main Parameter menu.
- Main parameter menu is classified as below and can be moved by pressing <UP> or <DOWN> button.
- Press **<ENTER>** button in the corresponding menu to enter Submenu.

Main parameter menu	Main function		
TUNNING	 Run Auto calibration. Change Zero and Span of the valve manually. Change Zero and Span of feedback signal manually. 		
PARAMETR	 Set Dead band. Change PID values. Change flow characteristics. 		
DEVICE P	 Set Single/Double according to actuator type. Set Linear/Rotary according to actuator type. Set signal point of Force Open/Close. Set acting type. (Direct Action / Reverse Action) Set the valve acting speed. (DAMP) 		
INFOMATN	 Display the product model. Display the device and HART version. Display Full Open/Close time. Display the current ambient temperature, the recorded maximum ambient temperature, and the recorded minimum ambient temperature. 		
DIAGNOST	 Display the error code. Set PST function. Set Alarm function. 		
EMERGNCy	 Set Password. In case of emergency, set to forcibly open the valve, or close valve, or maintain current position of the function. Set Lock and Unlock function. 		

6.7 **Submenu Description**

The following is a detailed description of Main parameter menu's Submenu.

- Press **<ENTER>** button in Main parameter menu to enter Submenu. Use **<UP>** and **<DOWN>** button to move between Submenu. •
- •

6.7.1 TUNNING

Submenu		Description		
AUTO RN1	 Run Auto calibration. Executable from any input signal between 4 and 20 mA. It takes 1~3 minutes, depending on the valve size. Same PID values are applied when the valve is open/close. 			
	The running tin	n. m any input signal between 4 and 20 mA. ne of AUTO RN2 is 2~3 times than AUTO RN1. alues are applied when the valve is open/close.		
AUTO RN2				
	 Please use this mode when the control characteristics(ex. friction) are different when the valve is open/close. Please do NOT use this mode when the product includes HART option. 			
	Select Auto calibrat	ion mode.		
	Mode	Description		
	AM FULL	Set all parameter values again.		
AM	AM BIAS	Only reset the motor reference value, but the other parameter values are not modified.		
	AM PIDb	Only reset PID value, but the other parameter values are not modified.		
	AM ZEb R	Only reset End point and Zero point of the valve, but the other parameter values are not modified.		
	Factory setting	AM FULL		
	Set the sensitivity of product. The setting value can be changed when hunting occurs due to a large friction of the valve stem or a small actuator size.			
	TbL 1 HS	When hunting occurs due to the actuator size is very small.		
TbL	TbL 2 NS	Normal mode.		
	TbL 3 LS	When you want to lower the sensitivity. For example, when hunting occurs due to the high friction of the valve stem.		
	TbL 4 LLS	When the actuator size is very large.		
	TbL 2 NS			

VAL OPCL	Regardless of the current signal, it performs the function of opening and closing the valve with <up></up> or <down></down> button manually.		
VAL ZERO	Reset ZERO point of the valve manually. Input 4mA current, press <up></up> and <down></down> button to change the valve position, and press <enter></enter> button to save the current valve position, then the positioner recognizes the current position as valve ZERO point.		
VAL END	Reset END point of the valve manually. Input 20mA current, press <up></up> and <down></down> button to change the valve position, and press <enter></enter> button to save the current valve position, then the positioner recognizes the current position as valve END point.		
OUT ZERO	Reset ZERO point of the feedback signal manually. Input 4mA current signal, valve reaches Zero position, after press < UP > or < DOWN > button to adjust the value, until the 4mA feedback signal is output, and then press < ENTER >button to save.		
	Please reset OUT ZERO setting after installing feedback module.		
OUT END	Reset END point of the feedback signal manually. Input 20mA current signal, valve reaches end position, after press < UP > or < DOWN > button to adjust the value, until the 20mA feedback signal is output, and then press < ENTER > button to save.		
	Please reset OUT END setting after installing feedback module.		
IN ZERO	Reset ZERO value of input signal manually. If < MAIN IN% > and < MAIN mA > displayed at Main menu differ from the actual input signal, conduct the commands of this menu. Input 4mA current at this menu and press < ENTER > button twice to save.		
	After replacing the main board or conduct program initialization, please reset IN ZERO setting.		
IN END	Reset END value of input signal manually. If <main in%=""></main> and <main ma=""></main> displayed in Main menu differ from the actual input signal, conduct the commands of this menu. Input 20mA current at this menu and press <enter></enter> button twice to save. NOTICE		
	After replacing the main board or conduct program initialization,		

6.7.2 PARAMETR

Submenu Description					
the problem can be solved by increasing the value wit allowed by the field.	 If hunting or oscillation occurs due to high packing friction of the valve, the problem can be solved by increasing the value within the range allowed by the field. If the value is set too high, the accuracy may be reduced. 				
Factory setting 0.3%					
 P control value, the proportionality constant value of the coprocess of reaching the target point If the setting value increase, the positioner finds the tarbut it is more likely to have hunting. If the setting value decrease, the stability of the positioner finds the target point slowly. 	 P control value, the proportionality constant value of the control signal in the process of reaching the target point If the setting value increase, the positioner finds the target point quickly but it is more likely to have hunting. If the setting value decrease, the stability of the positioner is higher, but 				
	innel e condina 4.				
 I control value, the integral value that adds the correction s the error percentage to the existing correction signal. If the setting value is too high, the time to reach the tal accelerated, but the oscillation phenomenon is easy to If the setting value is too low, it will slow down the sea point. 	rget point is o occur.				
Range 0~500					
kDbased on the percentage of error allowance.If the setting value is too high, it will slow down the sea point.	• If the setting value is too high, it will slow down the search for the target point.				
Range 0~500					
 GKP P control value, the proportionality constant value of the coprocess of reaching the target point The function is the same as KP control value but falls error range of the target value, GKP value is applied in 	within the ± 1%				
Range 0~5.0					
 GKI I control value, the integral value that adds the correction s the error percentage to the existing correction signal. The function is the same as KI control value but falls w error range of the target value, GKI value is applied in the second se	vithin the ± 1%				
Range 0~5.0					
D control value, indicates the derivative value of the competition based on the percentage of error allowance.	ensation signal				
• The function is the same as KD control value but falls error range of the target value, GKD value is applied in	within the ± 1%				
	within the ± 1%				
error range of the target value, GKD value is applied in Range 0~5.0 Control value to overcome valve friction. Increasing KF value can improve hunting caused by value	within the ± 1% nstead of KD value.				
error range of the target value, GKD value is applied in Range 0~5.0 Control value to overcome valve friction.	within the ± 1% nstead of KD value.				

	Control value to overcome over • Increasing KL value can im			shooting. prove overshooting problem.					
KL	Range		0	~50					
	Factory setting		0						
RANGE I	um control ra too high, the lue is used, too low, the 's control ran position sen	e time whic time nge s sitive	e of Au h is like of Auto maller ly.	to calib ely to ca o calibr	ration i ause ov ation is	s incre /ershoo shorte	oting. en. But	it	
	Range			~40					
	Factory setting		5						
	Set the characteris	stics of the v	alve	control					
	100		1	Input (mA)	Linear (%)	EQ1 (%)	EQ2 (%)	QO (%)	USER (%)
	-0		1	4	0	0	0	0	0
	80 ³⁶ ³⁶ ⁵		/	5	6.25	2.55	1.31	29.13	4
	Se wick Ope	58		6	12.5	3.26	2.81	46.84	8
	8 60 Quick Use	Lineot		7	18.75	4.16	4.54	57.21	12
		line		8	25	5.32	6.55	64.56	18
	40	EQ2 PED PED		9	31.25	6.79	8.92	70.27	30
	20	EQT LOT		10 11	37.5 43.75	8.67 11.07	11.73 14.76	74.93 78.87	40 50
	20	/		12	43.75	14.14	18.26	82.28	59
	0			13	56.25	18.06	22.58	85.29	65
	4 8 1: Inp	2 16 ut (mA)	20	14	62.5	23.06	27.93	87.99	70
				15	68.75	29.45	34.55	90.42	75
CHAR				16	75	37.61	42.73	92.65	80
				17	81.25	48.02	52.85	94.69	85
				18	87.5	61.32	65.37	96.59	90
				19	93.75	78.31	80.85	98.35	95
				20	100	100	100	100	100
	CHAR LIN		Linear						
		CHAR EQ	1	Equa	Equal percentage (1/25)				
	Mode CHAR EQ2 CHAR QUI CHAR USE								
			AR QUI Quick Open						
			२	User defined 17 points					
	Factory setting CHAR LIN								
	 Run the special flow curve by u In addition to the above Lin typical flow characteristics valve stroke position to acl 			Equal user ca specia	percen an set t al flow o	itage, 0 he 4~2 curve c	0mA control.	orrespo	onding
	I o run this fur Steps				Descri			- ment	л.
USER DEF	*USR P0	Set the val	ve po	osition		•	t signal	l is 4 m	A.
	*USE P1	Set the val					-		
	*USR P2	Set the val							
	*USR P3~16	Follow abo input signa	ve st	eps for	setting		-		
	*USR P17	Set the val				ne inpu	t signal	l is 20 r	nA.
		I	•				5		

6.7.3 DEVICE P

Submenu		Descript	tion		
	Depending on the actuator type, it must be set to Single or Double manually.				
			E		
ACTU SNG	If the setting difference be degraded.	s from the actuator typ	e, the control characteristic may		
	Mode	ACTU SNG ACTU DbL	Single type Double type		
	Factory setting	TS900L TS900R	ACTU SNG ACTU DbL		
	Depending on the manually.		be set to Linear or Rotary		
			CE		
ACTU LIN	If the setting different be degraded.	s from the actuator typ	e, the control characteristic may		
	Mode	ACTU LIN	Linear type		
	Mode	ACTU ROT	Rotary type		
	Factory setting	TS900L TS900R	ACTU LIN ACTU ROT		
FORCE OP	higher than the se the valve is forced This parameter is move the valve int seat with the maxi force of the actuat	to open. used to o its mum	Force open set point % Force close set point % 100		
	Range	0~100%			
	Factory setting	TS900L TS900R	100% 99.7%		
	Note	When the value set to 100%, this function is no applied.			
	forced to close.When the value	-	an the set value, the valve is pressure in the actuator chamber		
	can be compl	ciery released.			
FORCE CL	Range	0~100%			
FORCE CL	· · · ·	-			

_

 This function controls the operating speed of the valve. The higher the set value, the slower the operating speed of the valve. With this function, hunting problem in small actuator can be solved. 					
Range	0~5	500			
Factory setting	0				
Note	Wh	en the val	ue set to 0, this	function is not applied.	
value during the spl For example, if the s 50%, 12mA corresp	it rang set val	e control. ue is o 0%	100 (%)		
			0 12mA	20mA Input Signal (mA)	
Range	0~1	100.0%			
Factory setting	0.0	%			
value during the spl For example, if the s 50%, 12mA corresp	it rang set val onds t	e control. ue is o 100%	001 (%) Aalve Stroke (%) Oalve AmA	12mA Input Signal (mA)	
Range	0~1	100.0%			
Factory setting	100	0.0%			
This parameter corrects the error between LCD value and actual valve opening.					
			TICE		
			th Linear type p	oducts and Rotary	
Range		-50.0~	50.0%		
_		TS900	L(Linear type)	3.0%	
Factory setting		TS900	R(Rotary type)	0.0%	
	 The higher the With this function Range Factory setting Note Set Zero point of the value during the splet of the value during the splet of the value opening on the right figure of the value opening. Range Factory setting Set End point of the value during the splet of the value during the splet of the value during the splet of the value opening. Range For example, if the splet of the value opening. Range Factory setting Set End point of the value during the splet of the value opening on the right figure opening. Range Factory setting This parameter corresplet of the value opening. This function should products must be set 	 The higher the set val With this function, hur Range O~5 Factory setting O Note Wh Set Zero point of the signal value during the split range For example, if the set vale 50%, 12mA corresponds t of the valve opening as shon the right figure . Range O~7 Factory setting O.0 Set End point of the signal value during the split range For example, if the set vale 50%, 12mA corresponds t of the valve opening as shon the right figure . For example, if the set vale 50%, 12mA corresponds t of the valve opening as shon the right figure . For example, if the set vale 50%, 12mA corresponds t of the valve opening as shon the right figure . For example, if the set vale 50%, 12mA corresponds t of the valve opening as shon the right figure . For example, if the set vale 50%, 12mA corresponds t of the valve opening as shon the right figure . For example, if the set vale 50%, 12mA corresponds t of the valve opening as shon the right figure . This parameter corrects the opening. This function should only the products must be set to 09 Range 	 The higher the set value, the slope with this function, hunting problemation in the set with this function, hunting problemation in the set with the	 The higher the set value, the slower the operatin With this function, hunting problem in small acture Range 0~500 Factory setting Note When the value set to 0, this function of the signal value during the split range control. For example, if the set value is 50%, 12mA corresponds to 0% of the valve opening as shown on the right figure . Range 0~100.0% Factory setting 0.0% Set End point of the signal value during the split range control. For example, if the set value is 50%, 12mA corresponds to 100% of the valve opening as shown on the right figure . For example, if the set value is 50%, 12mA corresponds to 100% of the valve opening as shown on the right figure . For example, if the set value is 50%, 12mA corresponds to 100% of the valve opening as shown on the right figure . For example, if the set value is 50%, 12mA corresponds to 100% of the valve opening as shown on the right figure . Range 0~100.0% Factory setting 100.0% Factory setting 100.0% This parameter corrects the error between LCD valuopening. It is function should only be used with Linear type products must be set to 0%. Range -50.0~50.0% TS900L(Linear type) 	

	Change the action type of the valve.				
	Reverse A	ction	Direct Action		
	Valve Stroke%		Valve Stroke%		
ACT NORM	100 0 4mA	Input Signal mA 20mA	100 0 20mA 4mA Input Signal mA		
		ACT NOR	M Reverse Action		
	Mode	ACT REVE	Direct Action		
	Factory setting	ACT NOR	М		
			ioner can be output at the same opposite percentage.		
	Norma	al	Reverse		
OUT NORM	001 (%) Aalve Stroke (%)		100 (%) Valve Stroke (%)		
	0 4mA Output Signa	20mA Il (mA)	0 20mA 4mA Output Signal (mA)		
			M Normal action		
	Mode	OUT REVE			
	Factory setting	OUT NORI			
			rd reverse or direction of HART		
HT NORMR	Mada	HT NORM	R Direct action		
-	Mode	HT REVER	R Reverse action		
	Factory setting	HT NORM	R		
	Display the valve ope	ning value on LC	D in direct/reverse direction.		
	Mode		Description		
DSP NORM			LCD when the valve is 0%, and on LCD when the valve is 100%.		
			on LCD when the valve is 0%, and LCD when the valve is 100%.		
	Factory setting	OSP NORM			

6.7.4 INFOMATN

You can find the following information through Submenu.

Submenu	Description				
FIRM VER	Display firmware version of the product.				
DEVI REV	Display the version of device.				
HART VER	Display the version of HART communication.				
dEid	Display ID number of device.				
POLL ADD	Display Polling address of the device in HART communication.				
TRAVEL K	Display the accumulated total travel distance of the valve after the positioner has been used. (Unit: K%) One full travel distance from full close to full open means 100% = 0.001K% For example, if the travel value is 1K%, this means that the valve has moved 1000 stroke percentages.				
OP TIME	Display the time that takes from the valve fully close to fully open during Auto calibration. Unit : Second				
CL TIME	Display the time that takes from the valve fully open to fully close during Auto calibration. Unit : Second				
TEMPERAT	Display the current ambient temperature (°C).				
TEMP MAX	Display the recorded highest ambient temperature value after using the product.				
TEMP MIN	Display the recorded lowest ambient temperature value after using the product.				

6.7.5 DIAGNOST

Submenu		Description		
ERR CODE	Display error code of the product. You can check the error code to resolve the problem. For details, please refer to Page 51.			
		ction checks the installation status of the product, internal ube connection, etc.		
	Error code	Description		
	PNEUMATIC	No pneumatic output to OUT port.		
	POTENMTR	Main shaft gear and Potentiometer gear are dislocated due to external shocks, etc.		
АИТО СНК	SIZE ANGLE	Display rotation angle of the lever of the product. Installation problems do not occur frequently for Rotary product. However, for linear product, the angle of the product may be bigger or less than the effective angle(60°) depending on bracket and the position of lever connection. If displayed number is less than 40°, please refer to page 15-17 to correctly install the product again.		
	COMPENSATE	Display the optimal compensation value based on the current rotation angle.		
	Run PST function	Run PST function according to the following PST CFG configuration.		
PST RUN	What is PST?	Partial stroke testing (or PST), within the range of no affecting to the flow process, PST prevents the valve stem from sticking by moving the valve finely according to the set value and the period. In case of emergency, it can make the valve operate normally.		
PST CFG	Set necessary iter Submenu of PST			

_

	0.1		Description			
	Submenu		Description			
	0P POINT	Valve initial posi	Set the initial valve position for PST to start. Valve initial position must be within ±1% from "0S POINT ". If not, wait until this condition is satisfied.			
		Default value	100%			
		Range	0~100%			
		Set 1st target position of PST.				
	1S POINT	Default value	90%			
		Range	0~100%			
		Set 2nd target p	osition of PST.			
	2N POINT	Default value	80%			
		Range	0~100%			
		Set the waiting t before the secor	ime after the first PST is end and nd PST start.			
	INTERVAL	Default value	20 (Seconds)			
		Range	1~100 (Seconds)			
	LATENCY	Set the waiting time from " 1S POINT " to " 2N start. After reaching the first target point " 1S POIN " to the initial position, wait for " LATENCY " tim specified by the user, and then move to the s " 2S POINT " target point again.				
		Default value	10 (Seconds)			
		Range	1~100 (Seconds)			
	LMT TIME	If the time to rea execution excee	wed to reach the target point. the target value during the PST eds " LMT TIME " time or there is no is considered to have failed and PST nterrupted.			
		Default value	50 (Seconds)			
		Range	1~100 (Seconds)			
		In PST process, if the valve position exceeds " EMERGNCY " set value, PST function is stopped.				
	EMERGNCY	Default value	15%			
		Range	0~100%			
PST REDy		mation is displaye	It value. ed on LCD based on the set values able below to confirm PST execution			
		PST REDy	Ready to run PST.			
	Result Value		PST success.			

		PST TOUT	"LMT TIME" failed to reach the target	
			value within the set time value range.	
		PST FIXD	Valve has no action.	
		PST DOUT	Exceed the target value more than 1%.	
			When allowable range of valve movement, i.e. "EMERGENCY" value is exceeded.	
	Set Alarm 1 According to the set value, If the following conditions are satisfied, the alarm circuit is turned "ON", and LCD displayed A1 symbol. It remains "OFF" during normal operation.			
AL1 NONE		9~30V DC		
		AL1 URGT	When the product has a serious problem (If priority value of error code is "0") (Refer to page 51)	
	Mode	AL1 PRI 1	When there is a potential problem. (If priority value of error code is "1") (Refer to page 51)	
		AL1 F_CL	When the valve is fully closed.	
		AL1 F_OP	When the valve is fully opened.	
		AL1 NONE	Disable this alarm function	
	Factory setting	AL1 NONE		
AL2 NONE		ned "ON", and l	following conditions are satisfied, the _CD displayed A2 symbol. peration.	
		Same as "AL1 NONE" above		
	Mode	Same as "AL	1 NONE" above	

6.7.6 EMERGNCy

Submenu	Description					
	Must put a password to enter this menu. The password is set at the factory and cannot be changed by the user.					
PASSWORD	Factory setting	Press UP > ENTER > DOWN > UP button sequentially. (1321 on LCD)				
		ne valve to be moved v ed. (If priority value of e	vhen an abnormality of the rror code is "0")			
		EMGy NON	Do not take any action.			
EMGY NON	Mode	EMGy OP	Open the valve fully.			
	Mode	EMGy CL	Close the valve fully.			
		EMGy STP	Stop the valve operation.			
	Factory setting	EMGy NON				
FULL OP	Open the valve fully by manual regardless of the input signal.					
FULL CL	Close the valve fully by manual regardless of the input signal.					
STOP	Maintain the present valve position regardless of the input signal.					
UNLOCK	It locks to prevent changing all parameter values. When set to " LOCK ", all commands such as Auto calibration, PID changes, and parameter values settings cannot be changed.					
UNLOOK	Mode	LOCK	Lock the program			
	WOUE	UNLOCK	Unlock the program			
	Factory setting	UNLOCK				

7 Error code and Troubleshooting

7.1 Error code during Auto calibration

- Error code as below is displayed on LCD if an error occurs during Auto calibration.
- Check the error code and refer to the table below to solve the problem.

No	Error Code	Cause	Cause Solution	
1	STEP0 V0	Displayed when the valve does not stop after a long period of time when the data is measured to detect the first stop of the valve during auto calibration. And it is mainly caused by damage to Main board.	Replace Main PCB.	
2	STEP1 PZ	Displayed when Zero point is lower than allowable range.	 Check the status of the positioner installation or reinstall the positioner. Set initial angle (Zero point) of the lever higher than the current status. 	
3	STEP2 PE	Displayed when End point is higher than allowable range.	 Check the installation status of the positioner or reinstall the positioner. Set final angle (End point) of the lever lower than the current status. 	
4	ACT TYPE	Displayed when Zero point and End point of the lever are too close or equal.	 Check the status of supply air. Unplug the potentiometer cable in the positioner and reconnect it to Main board. Check the status of feedback lever installation. And set the operation angle that between initial angle(Zero point) and final angle(End point) over 40 degree. Replace Main PCB. 	
5	STEP3 CT	Displayed when Close time is too long during auto calibration.	 Check the status of feedback lever installation. If Zero point of the valve changes, please conduct auto calibration 2~3 times. If the actuator size is too big, please set TbL value as TbL 4 LLS and conduct auto calibration again. (Refer to page 37) 	

Smart valve positioner TS800/TS805 Series

6	STEP4 OT	Displayed when Open time is too long during auto calibration.	 Check the status of feedback lever installation. If the actuator size is too big, please set TbL value as TbL 4 LLS and conduct auto calibration again. (Refer to page 37)
7	STEP5 BL	Displayed when LOW BIAS value is not found within the allowed time.	 Check the status of supply air. If Torque motor of the positioner is damaged, please replace Torque motor. Check the status of feedback lever installation.
8	STEP6 BH	Displayed when HIGH BIAS value is not found within the allowed time.	 Check the status of supply air. If Torque motor of the positioner is damaged, please replace Torque motor. Check the status of feedback lever installation.
9	PID TBLE	Displayed when PID Table memory of Main PCB is damaged.	Replace Main PCB.
10	STEP7 MX	Displayed when the positioner can't find the accurate position due to friction of the actuator is too big.	• Change TbL value as TbL 3 LS to minimize the friction of the valve stem and conduct auto calibration again. (Refer to page 37)
11	ERR	Displayed when auto calibration failed due to other unknown reasons.	Replace the positioner.

7.2 Error code during operation

- If there is a problem during the operation, please enter "**ERR CODE**" which is Submenu of "**DIAGNOST**" to check the error code.
- Check the error code and refer to the table below to solve the problem.

No	Code	priority	Cause	Solution
1	L	1	Valve End point is set too high	 Check whether the positioner is installed too high or low. Check whether the positioner is installed too far from the actuator. (Check the angle of use) Check the potentiometer gear and main gear are out of position. (The cause of the problem is strong vibration or external shock).
2	к	1	Valve Zero point is set too low	 Check whether the positioner is installed too high or low. Check whether the positioner is installed too far from the actuator. (Check the angle of use) Check the potentiometer gear and main gear are out of position. (The cause of the problem is strong vibration or external shock).
3	J	1	Valve End and Zero points are set too close. (Use angle is too small)	Increase the angle of use by repositioning the positioner closer to the actuator.
4	I	1	Input current is below 3.8mA	Check input current signal
5	Н	1	Input current is over 22mA	Check input current signal
6	G	1	BIAS value exceeds limit	 Run Auto-Calibration again (Accuracy is significantly reduced when used without auto-calibration)
7	F	1	Ambient temperature is too high	Check ambient temperature
8	Е	1	Ambient temperature is too low	Check ambient temperature
9	D	1	Used over 100,000 cycles	Check positioner regularly
10	с	0	Used over 500,000 cycles	Check positioner regularly
11	В	0	Used over 1million cycles	Replace positioner
12	Α	0	EEPROM damaged	Replace main PCB



Tissin Co.,Ltd.

201-1105, No 397, Seokcheon-ro, Bucheon-si, Gyeonggi-do, Korea 14449 Tel : +82-32-624-4573, Fax : +82-32-624-4574 www.tissin.co.kr

